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University of Washington



For Additional Information

Campus Guide to Student Services

Published annually in early June. Includes basic information about all services provided by the Student Affairs Office as well as services offered by other offices on campus.

University of Washington; Office of Student Affairs; 476 Schmitz, PB-10; Seattle, Washington 98195

Evening Classes

Annual publication, available each June, listing courses and degree programs available at the University of Washington in late afternoon and evening.

University of Washington; Division of Academic and Professional Programs; 222 Lewis, DW-30; Seattle, Washington 98195

Financial Aid Information

Available in December for the next academic year, this bulletin includes information about eligibility, programs at the University of Washington, other sources of information, and the application forms.

University of Washington; Financial Aid Office; 105 Schmitz, PE-20; Seattle, Washington 98195

Graduate Study and Research

Detailed information on admission, degree requirements, programs, research and scholarship, and financial aid, as well as helpful information about University services.

University of Washington; Graduate Admissions; 98 Administration, AD-10; Seattle, Washington 98195

Independent Study

Descriptions of all courses offered by correspondence at the University of Washington as well as rules and regulations pertaining to credit by correspondence.

University of Washington; Division of Academic and Professional Programs; 222 Lewis, DW-30; Seattle, Washington 98195

Information for Prospective Foreign Students

Leaflet for undergraduate foreign students containing detailed information on admission, testing, financial requirements, immigration requirements, housing, and other details of interest to prospective applicants from abroad.

University of Washington; Office of Admissions; 320 Schmitz, PC-30; Seattle, Washington 98195

Information for Prospective Graduate Students

Leaflet for persons considering a postbaccalaureate education at the University of Washington. Lists graduate degree programs, requirements for graduate admission, application closing dates, and additional sources of information.

University of Washington; Graduate Admissions; 98 Administration, AD-10; Seattle, Washington 98195

Summer Quarter

Published annually in mid-March. Provides information on admission, registration, and fees, and lists all undergraduate and graduate courses offered for academic credit during day and evening. University of Washington; Summer Quarter Office; 103 Lewis, DW-40; Seattle, Washington 98195

Time Schedule

Quarterly listing of time and place of meeting for specific classes, names of instructors, and number of credits awarded. Has registration instructions, academic calendar, examination schedule, and new course information.

Not distributed outside the campus.

Undergraduate Study at the University of Washington

A brochure for those interested in enrollment at the University of Washington. Gives information on admission, application dates, and University facilities and services.

University of Washington; Office of Admissions; 320 Schmitz, PC-30; Seattle, Washington 98195

Most University departments have descriptive material on individual programs for distribution to prospective students. Write to the academic departments directly for specific information on programs and courses.

Directory of Offices

Admissions (Graduate): Graduate Admissions Office 98 Administration, AD-10

Admissions (Undergraduate): Office of Admissions 320 Schmitz, PC-30

Residence Classification Office 320 Schmitz, PC-30

Associated Students of the University of Washington 204L Student Union, FK-10

Division of Academic and Professional Programs (Evening Classes) 222 Lewis, DW-30

Housing and Food Services Office 301 Schmitz, PC-50

Office of Student Financial Aid 105 Schmitz, PE-20

Summer Quarter Office 103 Lewis, DW-40

Address correspondence to:

University of Washington (Name of office and location—see above) Seattle, Washington 98195

College or School, Office of the Dean (See Programs of Study section beginning on page 73)

International Services Office 461 Schmitz, PB-10

Office of Student Affairs 459 Schmitz, PB-10

Placement Center 301 Loew, FH-30

Graduation Office 207 Schmitz, PD-10

Grade Information Office 248 Schmitz, PD-10

Registration Office 225 Schmitz, PD-10

Transcripts Office 260 Schmitz, PD-10



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Using This Catalog

The material in this book has been compiled and organized to provide the reader with a comprehensive overall view of the University's programs and courses. It includes academic requirements and procedures necessary for admission and graduation. Information is usually arranged in alphabetical order, but the descriptions of programs and courses follow departmental structure within each school or college.

Although much of what readers need to know may be found by reviewing the Contents page or turning to a particular section, departmental name changes and the interdisciplinary nature of many University programs make it almost impossible to use this catalog efficiently without consulting the Index. As much as possible, cross references also have been added within the text.

Any student seriously considering enrollment at the University of Washington not only should examine specific areas of interest but also should read carefully the sections on admission and rules and procedures. It is also important to remember that, like all general catalogs, this bulletin presents information in a general way. It cannot cover every aspect of a program or interpret every rule and procedure. A student should assume the responsibility of checking other sources of University information and turning to an academic adviser when questions arise.

All announcements in the *General Catalog* are subject to change without notice and do not constitute an agreement between the University of Washington and the student.

Curriculum revisions and program changes usually occur during the two-year period this catalog is in circulation. For a book like this to be useful, it should be treated primarily as a reference document. It should be consulted as needed and used in conjunction with the *Time Schedule*, which gives more recent information on calendar dates, courses newly added to the curriculum, registration, class hours, and classroom locations. A list of other University publications and offices serving prospective and entering students appears on page 2 in this catalog.



Academic Calendar

1980-81

Summer Quarter 1980

Application closing date for all new and former students May 15
Preregistration for all students registered Spring Quarter 1980
In-Person Registration for new and former students June 12, 13, 16, 17
School of Law classes begin June 16
Regular quarter and Term a classes begin June 23
School of Dentistry classes begin June 23
Independence Day holiday July 4
Term a classes end July 23
Term b classes begin July 24
School of Dentistry classes end August 22
Regular quarter and Term b classes end August 22
School of Law classes and August 20

Autumn Quarter 1980

Application closing date for all new students entering from high school
Application closing date for all other new and former students July 1*
Preregistration for matriculated students registered Spring Quarter 1980 May 20-23, 27-30
In-Person Registration for new and former matriculated students June 23-August 22 and September 18, 19, 22, 23
In-Person Registration for all nonmatriculated students
School of Law begins (first-year students) September 26
All other classes begin
Veterans Day holiday November 11
Thanksgiving recess November 27, 28
Last day of instruction December 10
Final examinations December 11-18

Winter Quarter 1981

Application closing date for all new and former

students	November 1*
Classes begin	. January 5
Washington's Birthday holiday	February 16
Last day of instruction	. March 13
Final examinations	March 16-20

Spring Quarter 1981

Application closing date for all new and former	
students	February 1*
Classes begin	. March 30
Memorial Day holiday	May 25
Last day of instruction	June 5
Final examinations	. June 8-12
Commencement	June 13

1981-82

Summer Quarter 1981

Application closing date for all new and former students	May 15
School of Law classes begin	June 15
Regular quarter and Term a classes begin	June 22
School of Dentistry classes begin	June 22
Independence Day holiday	July 3
Term a classes end	July 22
Term b classes begin	July 23
School of Dentistry classes end	ugust 21
Regular quarter and Term b classes end A	ugust 21
School of Law classes end	ugust 28

Autumn Quarter 1981

Application closing date for all new students entering from high school
Application closing date for all other new and former students
School of Law begins (first-year students) September 25
All other classes begin
Veterans Day holiday November 11
Thanksgiving recess November 26, 27
Last day of instruction
Final examinations December 10-17

Winter Quarter 1982

Application closing date for all new and former	•
students	November 1*
Classes begin	January 4
Washington's Birthday holiday	February 15
Last day of instruction	. March 12
Final examinations	March 15-19

Spring Quarter 1982

Application closing date for all new and former

students	• • • • • • •	• • • • • •	. February 1*
Classes begin			March 29
Memorial Day holiday			May 31
Last day of instruction .			June 4
Final examinations			June 7-11
Commencement			June 12

Dates in this calendar are subject to change without notice; those appearing in admission and registration instructions printed in *Time Schedule* and posted throughout the campus take precedence over those in this catalog.

* If University undergraduate enrollment quotas are filled before the application closing date, it may not be possible to offer enrollment even though an applicant may be scholastically eligible for admission.

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A university is a community of scholars, a place where faculty and students pursue truth and enrich human understanding. Universities have been regarded as essential attributes of civilized societies for hundreds of years, providing training for the professions and more general educational opportunities in scientific and humanistic studies. The University of Washington has become one of the finest universities in the country, richly combining its research, instructional, and public service missions. It is an exciting place to be, and its contributions to the state and the nation will continue to grow as we all face the formidable challenges of the late twentieth century.

N. Gerberden

William P. Gerberding President





THE UNIVERSITY

Founded in 1861, the University of Washington is the oldest state-assisted institution of higher education on the Pacific Coast. Its original site was on a ten-acre tract of wooded wilderness that is now downtown Seattle. The present campus—680 acres of trees, landscape, and buildings, located between the shores of Lake Washington and Lake Union—is in a residential section of the city that has long been considered one of the most attractive in the nation.

The University's enrollment was 37,547 in Autumn Quarter 1979. Of the total, 28,187 were undergraduates and the remainder were in professional and graduate programs. More than three-fourths 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 majority of students who enter the University as freshmen are from the top one-third to onefifth of their high school graduating class. The grade-point average for the regularly admitted freshman class entering in Autumn Quarter 1979 was 3.40. In 1979-80 the full-time teaching faculty of the University numbered 2,588.

The University recognizes as one of its highest educational priorities the need to increase the number of qualified minorities and women in certain of the academic fields and professions in which they have been historically denied access or traditionally underrepresented in higher education. Through its admission policies, the University attempts to bring in more minorities and women at all levels of its educational programs. In addition, special educational support services are provided through the Office of Minority Affairs and the Graduate School's Minority Education Division to facilitate the entry of persons from underrepresented minorities and to enhance their likelihood of success while attending the University.

Accreditation

The University 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 associations in their respective fields.

Academic Sessions

University instruction is offered during three quarters of approximately eleven weeks each during Autumn, Winter, and Spring quarters, and for nine weeks during Summer Quarter. Day and evening credit classes are integrated so that the students may attend the University either during the day or at night or in a combination of the two.

Autumn Quarter begins in September and ends before the Christmas holidays; Winter Quarter continues from early January until the third week in March, and Spring Quarter extends from late March until the middle of June. Summer Quarter, which starts in mid-June and ends in mid-August, includes two 4½-week terms. Although most courses are offered for the full quarter, some are scheduled on a one-termonly basis to increase student options and opportunities.

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Summer Quarter

The opportunities for study during Summer Quarter are comparable to those of the regular school year, except that the number of courses offered is not as large. A wide selection of courses in most major fields is available to graduate and undergraduate students pursuing degree programs on a year-around basis, as well as to teachers and other summeronly students seeking to broaden, intensify, or refresh their subject matter competence. Freshman students entering from high school are encouraged to begin their college work in the summer. Through the Office of Admissions, enrollment in summer courses may be arranged under certain circumstances for specially qualified students who have not yet completed high school.

Admission requirements for Summer Quarter are the same as for any other quarter; credits earned are evaluated as residence credits; and—with the exception of separate fee schedules for medical and dental students—Summer Quarter fees closely parallel those of a regular quarter. Nonresidents pay the same fees as residents during the summer.

Students may register for either day or evening credit courses, or for a combination of day and evening credit courses, on the basis of a single fee schedule. Fees for parttime study are charged in accordance with the number of credits for which the student is registered. A complete listing of undergraduate and graduate courses offered during Summer Quarter is published in the Summer Quarter bulletin available, on request, from the University of Washington; Office of Summer Quarter, DW-40; Seattle, Washington, 98195 telephone (206) 543-2320.

Academic Divisions

The University is made up of six colleges, each of which offers a curriculum (i.e., sequence of courses) leading to the Bachelor of Arts or Bachelor of Science degree. A college may include schools, departments, divisions, and institutes. Within the University are two types of schools: independent units (e.g., Business Administration, Dentistry, Law, Medicine, Nursing, Pharmacy, Public Health and Community Medicine, and Social Work), which offer professional training to students who may be required to complete a period of preprofessional study, and units within colleges (e.g., Art, Communications, Drama, Music, and Nutritional Sciences and Textiles), most of which offer semiprofessional training in single fields of study. The unit of instructional organization in a particular science or art is called a department (e.g., History). The department differs from the semiprofessional school in its tendency to place less emphasis on the application of subject matter. The Graduate School coordinates the work of students who already have obtained a baccalaureate degree and have been admitted to the school for advanced work toward the master's or doctoral degree.

PROGRAMS OF STUDY

At the undergraduate level, the freshman or transfer student generally enrolls in the college that offers his or her chosen major. If admission to the selected major is restricted, or if the student has not yet selected a major, the student enters the College of Arts and Sciences as a premajor. The premajor category is also provided in certain other colleges for those students who have not made a definite choice of major in the college. Undergraduates preparing for professional study in such fields as architecture, business administration, dental hygiene, dentistry, education, engineering, medical technology, medicine, occupational therapy, pharmacy, physical therapy, prosthetics and orthotics, social welfare, and urban planning complete preliminary work in the preprofessional programs offered within the College of Arts and Sciences.

The programs of study in a variety of fields not only train students for the professions and occupations but also prepare them to contribute to the culture and progress of society. The colleges and schools and the principal fields of study at the University are listed here. Most colleges, schools, and departments offer both graduate and undergraduate courses.

College of Architecture and Urban Planning

Architecture Building Construction Landscape Architecture Urban Planning

College of Arts and Sciences

African Studies* American Indian Studies* Anthropology Art Art History **Asian American Studies*** Asian Languages and Literature Astronomy **Atmospheric Sciences** Biology **Black Studies** Botany Chemistry Chicano Studies* **China Regional Studies** Cinema Studies* Classics (Latin, Greek, Classical Studies) Communications (advertising, editorial journalism, broadcast journalism, radio-TV, communication theory)

* Program that may be taken for a degree under General Studies.

THE UNIVERSITY



Comparative Arts* Comparative History of Ideas* **Comparative Literature** Comparative Religion **Computer Science** Dance Drama (general drama program, professional actor training program) Economics English **Environmental Studies*** Ethnicity and Nationality* Ethnomusicology* French Language and Area Study* **General Studies** Genetics[†] Geography **Geological Sciences** Geophysics[†] Germanics **Health Education** History International Studies (coordinates instructional and research programs on East and South Asia, Russia and Eastern Europe, Africa, Latin America, and Near East; sponsors programs in comparative religion and ethnicity and nationality; see individual listings) Japan and Korea Regional Studies Jewish Studies* Kinesiology **Korea Regional Studies** Latin American Studies Linguistics **Mathematics** Medieval and Renaissance Studies* Microbiology and Immunology Music Near Eastern Languages and Literature **Near Eastern Studies** Nutritional Sciences and Textiles (clinical dietetics, costume studies, nutritional science and foods, textile science) Oceanography Philosophy **Physics Political Science** Psychology **Romance Languages and Literature Russian and East European Regional Studies** Scandinavian Languages and Literature Scientific and Technical Communication* Slavic Languages and Literature Social Theory and Ideology* Society and Justice Sociology South Asia Studies **Speech and Hearing Sciences** Speech Communication Statistics

Women Studies*

Zoology

School and Graduate School of Business Administration

Accounting Business, Government, and Society Finance, Management, and Organization Marketing

School of Dentistry

Community Dentistry Continuing Dental Education Dental Hygiene Dentistry Endodontics Graduate Dental Education Oral Biology Oral Diagnosis and Treatment Planning Oral Surgery Orthodontics Pedodontics Periodontics Prosthodontics Restorative Dentistry

College of Education

Educational Administration Educational Curriculum and Instruction Educational Policy Studies Educational Psychology Higher Education Independent Study, Research, and Field Experiences Special Education

College of Engineering

Aeronautics and Astronautics Bioengineering Chemical Engineering Civil Engineering Computer Science Electrical Engineering Humanistic-Social Studies Industrial Engineering Mechanical Engineering Mining, Metallurgical, and Ceramic Engineering Nuclear Engineering[†] Ocean Engineering

College of Fisheries

Fisheries Science Food Science Quantitative Science Wildlife Science

* Program that may be taken for a degree under General Studies.

† Graduate program. Certain courses open to undergraduates.

College of Forest Resources

Fórest Engineering Forest Resources Management Forest Science Outdoor Recreation Pulp and Paper Technology Quantitative Science Wildlife Science Wood and Fiber

Interschool or Intercollege Programs

Bioengineering Computer Science Marine Studies Quaternary Studies[†] Quantitative Science Social Management of Technology University Conjoint Courses Wildlife Science

School of Law

School of Librarianship[†]

School of Medicine

Anesthesiology Biochemistry Bioengineering **Biological Structure Biomedical History Family Medicine** Human Biology Laboratory Medicine **Medical Practice** Medical Technology Medicine Microbiology and Immunology Neurological Surgery **Obstetrics and Gynecology Occupational Therapy** Ophthalmology Orthopaedics Otolaryngology Pathology **Pediatrics** Pharmacology Physical Therapy Physiology and Biophysics **Prosthetics and Orthotics Psychiatry and Behavioral Sciences Radiation Oncology** Radiology Surgery Urology

School of Nursing

Community Health Care Systems Maternal and Child Nursing Physiological Nursing Psychosocial Nursing

School of Pharmacy

Pharmaceutical Sciences Pharmacy Practice

Graduate School of Public Affairs†

Public Administration Public Policy

School of Public Health and Community Medicine

Biostatistics Environmental Health Epidemiology Health Services Pathobiology

Reserve Officer Training Programs

Aerospace Studies Military Science Naval Science

School of Social Work

Other Programs

A description of other study programs offered by the University, including evening and extension credit programs, independent study through correspondence, noncredit studies, short courses and conferences, and telecourses, appears in the Continuing Education section of this catalog.

DEGREES

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

Undergraduate Degrees

Bachelor	of Arts		•	•	•		••	•	•	•	• .	•	•	•	•	•	•	•	B	A.
Bachelor	of Arts	in	B	usi	ne	SS	A	dn	nir	is	tra	iti	on				B.	A	.B.	Α.

† Graduate program. Certain courses open to undergraduates.

THE UNIVERSITY



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 Aeronautics	
and Astronautics	B.S.A.&A.
Bachelor of Science in Building Construction .	. B.S.B.C.
Bachelor of Science in Ceramic Engineering .	B.S.Cer.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 Electrical Engineering.	. B.S.E.E.
Bachelor of Science in Engineering	B.S.E.
Bachelor of Science in Fisheries	. B.S.Fish.
Bachelor of Science in Forest Resources	B.S.F.
Bachelor of Science in Industrial Engineering .	. B.S.I.E.
Bachelor of Science in Mechanical	•
Engineering	. B.S.M.E.
Bachelor of Science in Medical	
Technology	.Med.Tech.
Bachelor of Science in Metallurgical	· · ·
Engineering	B.S.Met.E.
Bachelor of Science in Nursing	. B.S.Nurs.
Bachelor of Science in Occupational	
Therapy	Occ. Therapy
Bachelor of Science in Pharmacy	B.S.Pharm.
Bachelor of Science in Physical	
Therapy	hys.Therapy

Dental, Law, and Medical Degrees

Doctor of Dental Surgery.	D.D.S.
Juris Doctor	J.D.
Doctor of Medicine	M.D.

Graduate degrees are listed in the Graduate School section of this catalog. For detailed information about the programs of study and requirements in the colleges, schools, and departments, see the sections describing each.

FINANCIAL AID AND 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 optional fees, such as insurance coverage, and possible additional expenses for books and laboratory supplies. Personal expenses (clothing, laundry, recreation, and transportation), which vary with each individual, should not be overlooked.

The following figures should be used only as a guide in estimating a University student's expenses for an academic year. All fees are payable in U.S. dollars. *Tuition and fees are subject to change without notice*.

Estimated Expenses for the Academic Year

	Under-	Grad-
Washington Residents	graduate ¹	uate ²
Tuition and fees ³	. \$ 687	\$ 771
Insurance	. 125	125
Room and board (average)	. 2,000	2,000
Books, materials, and supplies	. 300	300
Personal expenses (average) .	. 1,500	1,500
Nonresidents ⁴		
All above estimates apply		
except for: Tuition and fees	. 2,394	2,736

1. Includes postbaccalaureate (fifth-year) and nonmatriculated students.

2. Includes law school. Tuition and fees for medical and dental students are higher (see Rules, Requirements, and Procedures section of this catalog).

3. For a detailed explanation of tuition and fees and special charges, consult the Rules, Requirements, and Procedures section of this catalog.

4. Applicants from abroad should plan for additional expenses, such as health insurance, which is required of nonimmigrant international students. Student health insurance is available to students and may be purchased at the time of registration. A foreign student with proof of current health insurance coverage may obtain a waiver card from the International Services Office. Between-quarter expenses also need additional consideration.

Financial Aid

Students who need financial assistance should inquire about loans and scholarships at the Office of Student Financial Aid, 105 Schmitz. The primary purpose of the financial aid program is to assist students who otherwise would find it impossible or difficult to enter or remain at the University. Another important purpose is to provide financial assistance to students experiencing acute, temporary financial emergencies. To be eligible for financial aid a student must be a citizen or a permanent resident of the United States.

Students should apply at the Office of Student Financial Aid for Basic Educational Opportunity Grants, undergraduate scholarships, federal and University long-term low-interest loans, University short-term emergency loans, and employment under the College Work-Study Program.

Graduate students may obtain loan and employment information through the Office of Student Financial Aid. Information on graduate fellowships, scholarships, and teaching and research assistantships may be obtained from the graduate program adviser in the academic unit and the Graduate School section of this catalog.

Many forms of financial aid require students to submit applications by deadlines as early as February 1 in order to be considered for the following academic year. Students must observe these deadlines if they wish to make sure their applications will be considered. Applications for financial aid must be submitted for the year the aid is needed.

The Office of Student Financial Aid provides information concerning private scholarships offered through that office and also through various academic departments on campus. The Office of Student Employment, 105 Schmitz, lists many part-time, temporary, and summer jobs available both on and off campus to University students and their spouses. On-campus employment is limited by University regulations to no more than 19½ hours per week. A student may make application for employment *in person* after he or she is enrolled, or is in the process of enrolling, with matriculated standing at the University.

A student need not apply for financial aid to use the services of the Student Employment Office.

FACILITIES AND SERVICES

Student Housing

Students are free to make their own housing arrangements, and they are urged to select the types that best serve their academic and personal needs. The demand for housing, particularly in the campus residence halls, is much greater than the number of units available. Early contact with the Housing Assignment Office is important.

Residence Halls

Residence hall accommodations for men and women at the University are available in a variety of types, in seven different buildings. All are located within walking distance of campus classrooms and laboratory buildings. Some of the halls operate with active student government organizations in "houses" of from fifty to one hundred twenty students each. Preference in assignment to Mercer Hall is given to graduate students.

For information about special 'language programs conducted in the residence halls, see Special Living Groups.

For reservations or additional information, write to: University of Washington; Housing and Food Services Office; 301 Schmitz, PC-50; 1400 Northeast Campus Parkway; Seattle, Washington 98195.

University Housing for Married Students

The University operates a variety of housing accommodations, though limited in number, for married students with or without children. Students with limited financial resources have initial priority in assignment to vacancies as they occur. The following schedule of assignment priorities, from the highest to the lowest, has been adopted for students who meet the basic financial eligibility criteria:

1. Students who have special housing problems, such as the physically handicapped, those in the University's Educational Opportunity Program, and others with extreme financial or personal hardship.

2. Students who are single parents and have dependent children.

3. Other students who meet the established financial eligibility criteria.

4. All other students who exceed financial eligibility.

For additional information about housing facilities, income schedule, and application procedure, write to: University of Washington; Housing and Food Services Office; 301 Schmitz, PC-50; 1400 Northeast Campus Parkway; Seattle, Washington 98195.

Privately Operated Accommodations

Listings of off-campus rental properties, such as rooming and boarding houses, housekeeping rooms, apartments, and houses, are maintained in the Housing and Food Services Office, 301 Schmitz, for the convenience of single and married students. The University does not inspect these accommodations, and, therefore, students and parents must accept full responsibility for making a selection. Because these listings change frequently, they cannot be mailed out and must be consulted in person.

Fraternities and Sororities

Twenty-eight fraternities and twenty sororities own and operate complete living facilities near the University campus. Members either live in the chapter houses or, as commuters living at home, have use of the facilities. These living groups conduct educational, social, recreational, and cultural activities, placing particular emphasis on study programs for new students.

Fraternities and sororities are self-governing student organizations. Through the Office of Student Affairs, however, the University makes available staff members to advise house leaders on all phases of chapter life and operation. Activities of the fraternities and sororities are coordinated and governed by the student Interfraternity Council and Panhellenic Association, respectively. These organizations also coordinate and supervise the membership recruitment programs for the fraternities and sororities.

For additional information write to: University of Washington; Panhellenic Association (or Interfraternity Council); Student Union Building, FK-10; Seattle, Washington 98195.

Religious Living Groups

Faith and Life Community (Interfaith), University Christian Union Women's House and University Christian Union Men's House (Protestant), and Baptist Student Center provide housing for students at the University. Their primary purposes are to offer an environment consistent with religious ideals and to encourage maximum scholastic achievement.



Special Living Groups

Russian House is a living group for both men and women interested in learning the Russian language. Because Russian is spoken at all times among residents, the student should have some familiarity with the language before applying for admission to the house program. For additional information write to: University of Washington; Russian House Faculty Adviser; Department of Slavic Languages and Literature, DR-30; Seattle, Washington 98195.

In cooperation with language departments, living-language programs in French, German, and Spanish are conducted in coeducational residence halls by students. Members are grouped according to language interests and eat meals together. Additional information may be obtained from the departments concerned.

Student Union Building and South Campus Center

The Student Union Building, commonly known as the HUB, is a social, cultural, recreational, and service center for students and the University community. HUB activities are planned and coordinated by student committees assisted by trained advisers. In addition to dining facilities, the HUB has a ticket office, an auditorium, a bookstore branch, Peoples Bank branch, hair cutting and styling services, meeting rooms, lounges, a ballroom, and several game rooms.

The South Campus Center is located on Portage Bay between the health sciences complex and the Showboat Theatre. It provides services and activities similar to those in the HUB for students and the University community.

Student Health Insurance

Medical-surgical-hospital insurance is available to regularly enrolled University students and their dependents on a voluntary basis. A student may enroll in the plan at the time of registration each quarter by completing the insurance section on the registration form. The plan provides coverage for accidents and for illnesses that require treatment or hospitalization. Brochures describing this insurance coverage and costs are available at the Office of Student Affairs, 459 Schmitz, and at Hall Health Center.

The University also sponsors a field-trip sickness and accident insurance plan. Applications may be requested from the Risk Management Office, 4725 Thirtieth Avenue Northeast, telephone (206) 543-0183.

Insurance for Foreign Students

The University requires that all international students have a health-and-accident insurance policy in force while registered at the University. This may be achieved by purchasing the Student Health and Accident Insurance offered through the Unversity, or by taking proof of other coverage

to the International Services Office and obtaining an insurance waiver. The Cashier's Office must have full payment of tuition/fees and an insurance waiver on file, or full payment of tuition/fees and insurance, by the tuition due date to avoid registration cancellation.

Hall Health Center

The University operates Hall Health Center as a medicalcare facility for students, but not for their dependents.

Clinics, open from 8:00 a.m. to 5:00 p.m. Monday through Friday throughout the calendar year, offer general medical care and specialist consultation of several types.

Evening, Saturday, Sunday, and holiday emergency service is also available during the regular school year. No charge is made for professional services obtained through the Student Health Service; however, students must pay for outpatient prescriptions. Major surgery and the occasional illness of exceptional severity require treatment elsewhere, and the student should protect himself or herself against the expenses of these by supplementary medical insurance. A low-cost group medical-surgical-hospital policy designed to meet these specific needs may be purchased at time of registration.

University Libraries

The University Libraries system, with more than three and one-half million volumes, consists of the Suzzallo Library, the Odegaard Undergraduate Library, the Health Sciences Library, and eighteen branch libraries. The libraries' holdings include archival materials and manuscripts, maps, newspapers, microforms, research reports, media materials, and government publications. Services offered by the library system include photocopying facilities; the Central Serials Record of all cataloged serials in the library system; and Computer-Based Reference Services with access to more than a hundred data bases in business, in the sciences, and in the humanities and social sciences. Most special facilities and equipment for persons who are disabled are provided in the Suzzallo and Odegaard Undergraduate libraries.

The Suzzallo (main) Library is the central acquisitions, administrative, and book-processing unit for the library system and houses the system's major humanities and social sciences collections. It contains many specialized collection areas, such as Government Publications, University Archives and Manuscripts, the Newspaper-Microform Section, and the Northwest Collection. The Natural Sciences Library, also located in Suzzallo Library, maintains the library system's general sciences and history-of-science collections in addition to materials on atmospheric sciences; geology and geophysics; biology, botany, and zoology; agriculture; nutrition; physical health and education; and textile sciences. The Odegaard Undergraduate Library (OUGL) collection supports the undergraduate curriculum and is interdisciplinary, with the emphasis on undergraduate materials in the social sciences and humanities. OUGL Reserve is the primary reserve unit in the library system for non-health sciences subjects. The OUGL Media Center provides media services and materials for the library system with both course-related and recreational programs. Almost all study materials needed by undergraduates may be found in this library.

The Health Sciences Library collection includes materials on medicine, dentistry, nursing, pharmacy, public health, and related biological, quantitative, and behavioral sciences. The Health Sciences Library is a Medline Center, serves as the collection and operations base for the Pacific Northwest Regional Health Sciences Library, and houses the King County Medical Society Library Services and the Drug Information Services.

The University of Washington Libraries system participates in many regional and national bibliographic enterprises. The Pacific Northwest Bibliographic Center, a library corporation, maintains in the Suzzallo Library a union card catalog of more than four and one-half million author entries from forty-eight libraries in the Pacific Northwest. This catalog is an aid to locating, in other library collections, needed materials not found in the University libraries.

Henry Gallery

The Henry Art Gallery, the art museum of the University, brings to the campus and the community exhibitions of contemporary and historical work in all media. The offerings include lectures, demonstrations, symposia, and an active publishing program. The small, but distinguished, collection includes European and American paintings and prints, and contemporary American and Japanese ceramics. The Henry Gallery Association offers membership to students, faculty, and the community for the purpose of supporting this multifaceted program. With the exception of occasional special exhibitions, admission is free. Open six days a week, the gallery is closed Mondays and University holidays.

Museum

The Thomas Burke Memorial Washington State Museum is an educational and cultural center whose function is to collect, preserve, research, exhibit, and interpret the natural and cultural objects of the human environment, particularly the Pacific Ocean, its islands, and mainland shores. Museum divisions are anthropology, education, exhibition, geology, and zoology.

Graduate training in the museum includes a program that leads to a Master of Arts degree in anthropology with a specialization in museology. The museum is accredited by the American Association of Museums.

University Theatres

The School of Drama operates three theatres: the Glenn Hughes Playhouse, with a thrust stage; the Penthouse Theatre, the first theatre-in-the-round built in America; and the Showboat Theatre, fashioned after a turn-of-the-century floating showboat with a proscenium stage. Faculty- and student-directed plays drawn from the full range of world dramatic literature are presented throughout the year.

The school also mounts annual productions in the two theatres of Meany Hall, and it gives technical and design support to opera and dance productions of the School of Music.

Ethnic Cultural Center

The Ethnic Cultural Center, 3931 Brooklyn Avenue Northeast, was established to increase minority group students' awareness of their own heritages and to develop among all students an understanding and appreciation of those heritages. Facilities include multipurpose rooms, study rooms, office space, a library, and kitchen facilities. Other facilities are a two-hundred-seat theatre and a closed-circuit television system. Many of the student activities of the Asian Student Coalition, Black Student Union, MECHA, and the American Indian Student Association take place at the cultural center. Activities include meetings, speakers, films, drama productions, and various cultural programs.

University Research Facilities

In addition to the campus facilities described above, the University has numerous educational and cultural resource centers. Academic or research activities and facilities that are of general significance in all or many fields of knowledge throughout the University are listed in the Graduate School section of this catalog; others are described in the appropriate school or college section.

STUDENT SERVICES OFFICES

Office of Student Affairs

The Office of Student Affairs is concerned with the general welfare of University students in their campus extracurricular life and activities. The Vice President for Student Affairs is responsible for providing assistance to students with personal, social, and other scholastic adjustments problems, as well as to advocate to the President and other University administrators issues and concerns of general student interest. Services operated by the Office of Student Affairs to assist students include the Counseling Center, Placement Center, Student Activities Office, South Campus Center, Husky Union Building, Office of Student Publications, Financial Aid Office, Recreational Sports Programs, and the Department of Intercollegiate Athletics.



Students are encouraged to contact the vice president's office, or members of the student affairs staff, telephone 543-4972, if they need any information concerning their out-of-classroom life at the University.

The Office of Student Affairs also provides special services through the following offices:

International Services Office

The International Services Office provides assistance to international students, including such matters as general orientation of new students to the campus and community; advice and counsel for educational, financial, and personal problems; dissemination of important information through newsletters; and assistance in meeting United States Immigration and Naturalization Service regulations on matters such as extensions of stay, change of status, transfer of schools, and work permits. The office is located in 461 Schmitz, telephone 543-0840.

English as a Second Language (ESL) Center

The ESL center welcomes all nonnative speakers of English affiliated with the University (students, faculty, staff) who are interested in improving their English. The center, 108 Denny, provides the following services and resources:

1. Academic courses in English as a second language academic year and summer. During the *academic year* (Autumn, Winter, and Spring quarters), courses designed for foreign students who are officially enrolled in a degreeseeking program at the University as either undergraduate or graduate students are offered. Students take ESL courses along with their regular programs of study. For *Summer Quarter* (June-August), an intensive program is offered at intermediate, high intermediate, and advanced levels. Although the instruction is intended primarily for new and continuing University students, other qualified applicants may be accepted into the program with permission of the ESL Center on a space-available basis.

2. Placement testing for certifying skill levels required for certain courses and for identifying areas needing additional work in the tutorial program.

3. Tapes and books on grammar, pronunciation, idioms, vocabulary, listening comprehension, and English for special purposes, such as business English and English for engineers.

4. Individual tutoring, free of charge.

5. Study rooms for individual or small-group study.

Language Learning Center

The Language Learning Center is a pooled resource within the College of Arts and Sciences that provides support in areas related to the teaching and learning of languages. Services directly available to students include listening facilities, individual recording and replay, a reference service for exercise materials, provision of cassette copies of laboratory exercises with short-term loan of cassette players, and a tutoring service for occasional use in study of the major foreign languages taught on campus. For both faculty and students, conversation with native speakers may be arranged with no fee to participants.

Office of Minority Affairs

The Educational Opportunity Program (EOP), administered by the Office of Minority Affairs, provides a variety of services to students from minority and economically disadvantaged backgrounds. Among these services are recruitment, admissions, academic advising, tutoring, counseling, and financial aid.

The program operates the instructional center, which provides assistance in reading, composition, mathematics, sciences, and basic study skills as well as individual and small-group tutorial support for courses offered at the University. These programs are open to nonminority students and those outside the EOP program on a space-available basis.

The Ethnic Cultural Center and Theatre offer a variety of educational cultural and performing arts programs that allow for student and community participation.

The Resident Release Project is an innovative program in community-based correction that offers access to higher education to a selected group of study-release participants.

The Office of Minority Affairs is located on the third floor of Schmitz Hall.

Disabled Student Services

The University provides program access to students with disabilities through a variety of services and equipment. To the maximum extent possible, disabled students are integrated into the general student population and any problems are resolved through the usual channels.

In those instances that a person requires a special accommodation as a result of a disability, Disabled Student Services, 468 Schmitz, 543-8924 (voice or TTY), works with individuals to define and coordinate specific adaptations. Available services include counseling and referrals, priority registration, classroom relocation, interpreter services, tape recording of textbooks, and reader referrals. Other individualized services are assessed and arranged as needed. Students may use braillers, Visual Tek, Phonic Ear, teletype communication devices, enlarger copier, and blind reader rooms by arrangement. The Access: University of Washington guidebook and accompanying map show accessibility information about classroom buildings, including entrances, restrooms, curb cuts, and wheelchair routes across campus. A braille map and tape-recorded tour of campus also are available.

Various departments offer additional services: Transportation Department coordinates parking for disabled people (545-1543), free on-campus transportation (545-1511, Dial-a-Ride), and a battery recharge facility for power wheelchair users (545-1555). For additional information from Recreational Sports Programs (543-7082), Housing (543-6222), Placement (543-0535), Financial Aid (543-6101), or Hall Health Center (545-1011), departments may be contacted.

The Associated Students, University of Washington, sponsors the Disabled Students Commission to encourage interaction and participation with disabled students. The allstudent organization offers peer counseling, advocacy referrals, and special projects (543-7503 voice, 543-8725 TTY) from its office, 302a HUB.

Additional information about disabled student services may be obtained by telephoning 543-8924 or writing Disabled Students Commission; 1400 Northeast Campus Parkway, PB-10; Seattle, Washington 98195.

Educational Assessment Center

Testing and educational evaluative services for University departments and individual students are available at the Educational Assessment Center. Of particular interest to prospective and entering students are the center's programs for admissions testing, including the Washington Pre-College Testing Program, and for placement testing in foreign languages, mathematics, and chemistry. For the University student approaching graduation, the center administers tests required for admission to graduate, law, medical, or other professional schools, as well as those tests often requested by prospective governmental or private employers. The center has its offices on the fourth floor of Schmitz Hall.

Counseling Center

All full-time students at the University may make use of the services of the Counseling Center and its staff of psychologists and vocational counselors to discuss educational progress, personal adjustment, or career goals. Psychological tests, when necessary, are provided as part of the center's counseling service. A library of reference materials on occupations and career opportunities is available for student use.

Other services of the center include the provision of various group programs directed toward concerns and skills of interest to students in their efforts to adapt to the University.

Students are not charged for the first appointment, which is to determine if the Counseling Center's services are needed. Individual appointments after the first visit cost \$4 each. A \$10 fee is charged for entrance to any of the group programs. For students financially unable to pay the fee, efforts are made to find other alternatives. The center is located on the fourth floor of Schmitz Hall.

Placement Center

The University's Placement Center, which includes a Minority Placement Program, offers career information and assists undergraduates, graduate students, and degree- or certificate-holding 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 campaigns, and (3) to find suitable employment upon leaving the University or to change employment thereafter.

Office of Veterans Affairs

The Office of Veterans Affairs, 180 Schmitz, assists veterans, their dependents, and service personnel in obtaining educational benefits from the Veterans Administration.

In addition to the regular monthly benefits, the office provides information concerning VA educational loans, tutorial assistance, work-study positions, and state tuition and fee exemptions and reductions.

CAMPUS ACTIVITIES

Associated Students, University of Washington

The Associated Students, 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. In order to vote in ASUW elections or to hold ASUW office, a student must be a member of the ASUW by indicating an affirmative answer on the University registration form each quarter.

The ASUW has an annual budget of approximately \$350,-000, allocated from the services and activities fee paid as part of tuition. The government of the ASUW is headed by a president, three other officers, and a seven-member board of control, all elected by the student body each year. The ASUW maintains agencies, commissions, and service groups to provide students with a varied program of activities during the school year. Other ASUW services include lecture notes, poster printing service, the Experimental College, and a bicycle repair shop. Questions regarding the ASUW and its services should be directed to either the Student Activities Office, 207 HUB, 543-2380, or the ASUW

Graduate and Professional Student Senate

The Graduate and Professional Student Senate (GPSS) is composed of representatives elected from each graduate and professional degree-granting academic unit. The senate elects three officers and works through standing committees and issue-oriented subgroups, in which any graduate or professional student may participate. GPSS is funded from



student activities fees and allots a portion of its budget each year to direct allocations to departmental student groups and for special programs benefiting students from many departments. GPSS seeks to improve the quality of graduate life, having as its first concern the academic welfare of students, and becomes involved in issues advocacy as it affects that concern. GPSS recommends student representatives to a spectrum of University committees and councils, publishes newsletters and *The Guide to Graduate Life*, and sponsors an information fair for all graduate and professional students and an orientation workshop for teaching and research assistants. All graduate and professional students are welcome to participate in GPSS. Its offices are located in the Student Union Building.

Student Organizations

Students at the University are encouraged to become active in at least one of the campus's approximately three hundred fifty voluntary student organizations, which include honorary, professional, and social organizations; service and coordinating clubs; activity groups; and church 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, telephone 543-2380.

Student Publications

Student publications at the University include the *Daily* and the *Student Directory*. The *Daily* is published Tuesday through Friday mornings throughout the academic year and is distributed 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.

Intercollegiate Athletics

The Department of Intercollegiate Athletics operates an integrated program for men and women. Intercollegiate competition is limited to full-time students.

There are nine women's teams: cross-country, volleyball, gymnastics, basketball, swimming, track and field, tennis, golf, and crew. Women's competition is in Division 1 of the Northwest College Women's Sports Association. National championships are in Division 1 of the Association for Intercollegiate Athletics for Women. Additional competition is scheduled throughout the West Coast. Twelve sports are offered for men's competition: baseball, basketball, crew, cross-country, football, golf, gymnastics, soccer, swimming, tennis, track and field, and wrestling. Men's teams compete on a full Pacific 10 Conference schedule, as well as with other institutions locally, regionally, and some nationally. The University is a member of the National Collegiate Athletic Association.

Facilities available to intercollegiate athletic teams are Hec Edmundson Pavilion, Husky Stadium, Graves Baseball Field, Chavelle Track and Field Complex, Conibear Shellhouse and other crew facilities on Lake Washington at the eastern boundary of the campus, the Quilliam Memorial Tennis Courts, and a variety of golf courses throughout the greater Seattle area

Recreational Sports

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The Department of Recreational Sports Programs provides a comprehensive program of sports activities designed to meet the diverse needs and interests of students. To provide this service, the department manages recreation facilities, including the Intramural Activities Building, Golf Driving Range, Waterfront Activities Center, and Practice Climbing Rock. A varied program of intramural sports, corecreational activities, sports skill classes, sports clubs, special events, and general recreation is open to every student (with modifications available for disabled participants as needed) with a valid student identification card.

Instruction is offered in archery, badminton, basketball, canoeing, conditioning, fencing, golf, gymnastics, handball, mountaineering, racquetball, roller skating, ski conditioning, skin and SCUBA diving, soccer, softball, springboard diving, squash, swimming, tae kwon do, tennis, volleyball, and weight training.

Sports clubs exist for aikido, archery, badminton, bicycling, boxing, canoeing, climbing, equestrian, fencing, handball, ice hockey, judo, karate, kendo, kung fu, lacrosse, racquetball, rifle and pistol, rugby, sailing, silverfish, skiing, skin and SCUBA diving, skydiving, soaring, soccer for men and women, squash, tae kwon do, volleyball, water polo, and weight lifting.

Intramural sports for men, women, and corecreational activities are offered in bowling, flag football, foos ball, handball/racquetball, innertube basketball, skiing, soccer, softball, squash, swimming, track and field, volleyball, and wrestling, in addition to a variety of special events. More information regarding these programs may be obtained from the IMA Building, 543-4590, Waterfront Activities Center, 543-2217 or the Golf Range, 543-8759.



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UNDERGRADUATE ADMISSION AND ENROLLMENT

The University of Washington welcomes inquiries regarding its many undergraduate programs and invites prospective students to visit the campus. Tours are conducted every weekday at 2:00 p.m. Interested individuals should write or telephone the Office of Admissions for reservations. The tours last about 1½ hours.

General Admission Policy

Eligibility for admission is determined through criteria established by the University faculty. In general, admission is based on the applicant's scholastic standing, admission test scores, and adequacy of preparation for University study while in high school or another collegiate institution, with preference given, as necessary, to those with the greater probability of success in completing a degree program. In the event that there are more qualified applicants than can be accommodated, priority is given to those students offering the highest admission qualifications. Special consideration is given to the applicant's choice of curriculum and the availability of space at the proposed level of entrance.

Admission of Nonresident Students

Because the University is a state institution, its primary obligation is toward the education of residents of the state. Students who are nonresidents are expected to present academic credentials higher than those required by Washington residents. Nonresident students also pay higher tuition and fees than residents.

Nonresident sons and daughters of University alumni are considered for admission according to resident admission requirements, but are required to pay the nonresident tuition and fees.

Admission Procedures and Closing Dates

To be ensured consideration, applications must be received by the following closing dates:

Autumn Quarter

Freshman (from high school), May 1 Transfer, postbaccalaureate, and nonmatriculated, July 1 Winter Quarter, November 1 Spring Quarter, February 1 Summer Quarter, May 15

Application forms, obtained from the Office of Admissions, should be returned as soon as possible, together with the necessary test scores and transcripts, because quarterly quotas may be filled prior to closing dates.

High school applicants normally apply in December-January of their senior year; students transferring from another

school or college apply at the beginning of their final term. Applications and credentials should be sent to the University of Washington; Office of Admissions; 320 Schmitz, PC-30; 1400 Northeast Campus Parkway; Seattle, Washington 98195.

Some departments have application deadlines earlier than the University closing dates specified above. Refer to the appropriate departmental section of this catalog for detailed information.

Notification of Admission

Applications are reviewed soon after they are received, and applicants are notified of their admission status as soon as possible. Eligible applicants receive an offer of admission and a leaflet informing them of required procedures for enrollment. Admission is not confirmed until these procedures are completed.

The offer of admission is valid only for the quarter indicated. Applicants who wish to be considered for a subsequent quarter must file a new application with the Office of Admissions.

Appeal of Admission Decisions

An applicant who is dissatisfied with the original admission decision may appeal to the Committee on Academic Standards, Admission and Graduation, with the assurance that any additional evidence in support of the application will be carefully reviewed. Students accepted by the committee are expected to comply with requirements outlined by the committee at the time of admission.

Retention of Admission Credentials

The credentials of an applicant who does not register for the quarter to which he or she has been admitted are retained for a twelve-month period unless the applicant has notified the Office of Admissions of a continued interest in attending the University or of enrollment in independent study programs.

Credentials submitted to the Office of Admissions become the property of the University and may not be returned to the student or duplicated for another school.

Reservations for University Housing

Admission to the University does not automatically entitle a student to residence hall space. Because housing arrangements must be made separately, students do not need to wait until they are admitted to the University before applying for a room in the residence halls. Demand for housing has been significantly greater than space availability, so it is recommended that application be made as early as possible. Additional information on student housing appears in The University section of this catalog.

Application for Financial Aid

Application for financial aid is a process entirely separate from application for admission. Interested students should contact the University's Office of Financial Aid or the counselors at their own school for information about financial aid availability and procedures. Details appear under Financial Aid and Expenses in this catalog.

Admission Requirements for Undergraduates

To be considered for admission as a freshman or transfer student, an applicant must submit the following:

1. A completed application by the required closing date.

2. Transcripts showing completion of the equivalent of an acceptable college preparatory program and records of all college study. Prior studies must include thirteen specified high school course units (or college equivalents) as follows:

• three years of English

• two years of one foreign language

• two years of college preparatory mathematics (algebra and geometry/trigonometry)

• two years of social sciences

• one year of a laboratory science (preferably biology, chemistry, or physics)

• three years of electives chosen from the above areas.

In equivalent college courses, 5 quarter credits are treated as equal to one high school unit (one year, or two semesters, of study).

3. Verbal and quantitative composite scores from the Washington Pre-College Test, the Scholastic Aptitude Test, or the American College Test, *unless* the student:

(a) has earned at least 75 quarter credits of transferable college-level work, and either

(b) qualified under the Direct Transfer Agreement now in force with the Washington community colleges (see below), or

(c) has a scholastic record yielding a prediction that his or her upper-division grade-point average at the University will be equal to, or higher than, the median upper-division grade-point average of the University's junior-senior classes.

Qualified applicants are ranked by means of formulas combining their previous grade-point averages with their test scores. Since the University often has many more applicants than it has space to accommodate, it cannot guarantee admission to all qualified students. Each quarter, in accordance with the number of spaces available in the student body, all applicants above a certain ranking are offered admission, but those below the ranking must be denied admission. It is impossible to state absolute or fixed minimums



for admission, but in recent years residents of the state of Washington entering from high school with a cumulative grade average of B or slightly below, combined with a total of about 100 on the Washington Pre-College Test for the verbal and quantitative composite scores (or about 900 total for the SAT verbal and mathematics scores) have usually been admissible. Nonresidents are expected to present much higher grades and scores. The high school gradepoint average for freshmen entering from high school in Autumn Quarter 1979 was 3.40; the average college gradepoint average for transfer students was 3.13. Of the 3,447 freshmen who entered Autumn Quarter 1979 from the state of Washington, 87 percent were enrolled in Spring Quarter of 1980.

Direct Transfer Agreement

The University of Washington has a direct transfer agreement with each of the twenty-seven community colleges in the state of Washington. The provisions of this agreement are as follows:

1. Admission: A student will be guaranteed admission (provided space is available) without submitting test scores, only if the student (a) is a Washington resident; (b) has satisfied all the University core-subject admission requirements, including foreign language; (c) was in attendance at a Washington community college the last term prior to entering the University of Washington; (d) has completed 75 or more transferable credits; and (e) has attained a gradepoint average in transferable courses of at least 2.75 (lower in some quarters). This agreement provides for admission only to the College of Arts and Sciences, not to any other college or school, nor to any particular department.

2. *Transfer of Credits:* Students admitted under the transfer agreement will be granted transfer credit in exactly the same way as all other transfer students.

3. A.A. Degrees: Attainment of an associate degree has no bearing on admission to the University, but a student with an associate degree will be a junior at the University if the student's official record includes 90 transferable credits. Such students will not have satisfied distribution requirements of the College of Arts and Sciences unless their record includes 20 credits from Arts and Sciences-approved courses in the area of humanities, social sciences, and natural sciences, or from equivalent community college courses.

4. Graduation: Students admitted under the transfer agreement, like other students, must satisfy all the requirements of the academic major, the college, and the University in order to graduate, except that the proficiency requirement of the College of Arts and Sciences may be considered to have been satisfied if a student enters with 85 or more transferable credits.

Admission of Students With Immigrant or Refugee Status From Non-English-Speaking Countries

Immigrant, refugee, or foreign students from non-Englishspeaking countries who have been attending high school in the United States before applying for admission to the University must satisfy the same admission requirements as other applicants. In certain cases, however, a native language other than English can be used to satisfy the foreignlanguage requirement, and some evidence of proficiency in English may be required. Students in these categories should consult the Office of Admissions for specific information.

Admission of Postbaccalaureate Students

Students holding baccalaureate degrees from colleges and universities that are fully accredited by their regional accrediting associations may pursue additional undergraduate study leading to a second baccalaureate degree or a teaching certificate by applying for admission to the University for postbaccalaureate (formerly fifth-year) status. Postbaccalaureate status also may be used by students who need to satisfy prerequisites for admission to a particular graduate or professional degree program.

An applicant's scholastic record is the primary criterion for admission. Approval of the department concerned and, ordinarily, a grade-point average of at least 2.50 in the junior and senior years of the undergraduate program are required for admission.

Because postbaccalaureate students are not graduate students, they are not permitted to register for courses numbered 500 or above without special permission. Courses completed while in this status may not ordinarily be applied later to an advanced degree in the Graduate School.

Admission of Nonmatriculated Students and Auditors

The nonmatriculated status is a special classification for students who do not wish to pursue a program leading toward a degree or teaching credential at the University. Among those who enter the University under this category are (1) students who enroll in courses for the purpose of earning credits toward a degree program at another college or university, (2) teachers and school administrators who take special-interest courses to earn additional University credits, (3) postbaccalaureate students who do not desire formal admission to a graduate or second undergraduate program, (4) others interested in specific course work.

Nonmatriculated students enroll for courses on a spaceavailable basis after all matriculated (regularly enrolled) students have had an opportunity to register. Admission as a nonmatriculated undergraduate does not guarantee subsequent acceptance as a matriculated student in a specific degree program. If a nonmatriculated student is later admitted as a matriculated undergraduate, the scholastic standing achieved and appropriate credits earned in the nonmatriculated status will apply toward the requirements for the baccalaureate degree. However, the student must subsequently complete at least 45 credits in matriculated status to qualify for a degree. Credits earned by a nonmatriculated student may not apply to a graduate degree. Nonmatriculated admission is frequently closed due to full enrollment.

Individuals who wish to audit University courses should apply for admission with nonmatriculated standing. Attendance in courses as an auditor is by consent of the instructor involved and is conditioned by the extent to which space is available. Permission to audit is ordinarily granted for lecture classes only. An auditor may not participate in class discussion or laboratory work, and his or her registration may be canceled at the discretion of the instructor. No record of audited courses is kept. Regular tuition and fees are charged. To receive credit for an audited course, the student must register for the class for credit in a subsequent quarter.

Admission of Returning Former Students

A returning former student who has been away for one quarter or more or a graduate student returning from official leave status is required to complete and file a Former Student Enrollment Application by the closing date. Returning former students who have been away from the University less than one year will have the highest priority for readmission. A student previously enrolled in an academic program with restricted enrollment and/or special admission requirements should consult his or her adviser about procedures for readmission. Returning nonmatriculated students are enrolled as space permits.

A returning student must pay a nonrefundable enrollment service fee by the date indicated in the offer of readmission.

The Rules, Requirements, and Procedures section of this catalog contains additional information on registration and tuition and fees.

Admission to Educational Opportunity Program

The University seeks to enroll minority students and others who have not received the usual educational advantages.

American Indian, Black, Asian American, Chicano, and White students from disadvantaged backgrounds are urged, regardless of their previous academic records, to apply for admission to the University through its Educational Opportunity Program (EOP), which is administered by the Office of Minority Affairs.

Students who believe they are qualified to participate in this program should contact the EOP admission office. Students in the Educational Opportunity Program are given special assistance so that they may achieve their potential at the University.

Admission of Undergraduate Students From Abroad

The University believes its greatest contribution to international education can be made in the area of graduate study.

Because of limited University facilities and departmental restrictions, very few foreign undergraduate applicants are accepted directly from abroad. Most foreign applicants must have completed at least one year of university study before they will be considered for admission. Such students also must present evidence of English language proficiency, usually by providing scores from the Test of English as a Foreign Language.

Specific information on admission of foreign undergraduates is available in the booklet *Information for Prospective Foreign Students* published by the Office of Admissions.

Academic Programs With Special Admission Requirements

Fulfilling the University's minimum requirements for admission does not guarantee acceptance into a specific department or program. Some academic programs have earlier application dates than, and admission requirements in addition to, those required for entrance to the University. Information on admission to programs with special requirements appears in departmental sections of this catalog.

The following academic units currently have special admission requirements: Anthropology, Architecture, Art, Building Construction, Business Administration, Clinical Dietetics, Communications, Computer Science, Dance, Dental Hygiene, Drama (B.F.A. degree), Education, Engineering, Environmental Health, Fisheries, Forest Resources, Geological Sciences, Health Education, Kinesiology, Landscape Architecture, Medical Technology, Microbiology, Music, Nursing, Nutritional Science and Foods, Occupational Therapy, Pharmacy, Physical Therapy, Prosthetics and Orthotics, Social Welfare, Society and Justice, Speech and Hearing Sciences, Speech Communication, Textile Science and Costume Studies, and Urban Planning.

Transfer Credits

The University reserves the right to accept or reject credits earned at other collegiate institutions. In general, it is the University's policy to accept credits earned at institutions fully accredited by their respective regional accrediting associations.

Students entering from two-year community colleges may apply a maximum of 90 transferable credits toward a baccalaureate degree. The final 45 credits of a University of Washington degree program, however, must be earned at the University.

UNDERGRADUATE ADMISSION AND ENROLLMENT

Transfer courses equivalent to University courses apply toward the baccalaureate degree exactly as do their counterparts taken at the University. Other transfer courses that are not exact equivalents, but which cover areas of instruction offered by the University, are also accepted. Such courses are identified on the student's record, not by University number but simply by department, followed by the designation "X." "X" credits may satisfy department or college requirements or count as electives to the extent the degree program permits.

Up to 15 credits for occupational-vocational programs may be given at the point of admission, depending on the quality of the program and its relevance to the proposed University program. The application of such credits toward the degree, however, requires the approval of the college or school concerned.

The University reserves the right to accept or reject credits earned in educational programs sponsored by the armed forces. In general, consideration is given to work completed according to recommendations made by the American Council of Education. If a student repeats a course taken previously through the armed forces and accepted for credit, the University credit is honored and the other credit canceled. The maximum number of credits obtainable through completion of such programs is 30.

Course work completed in unaccredited institutions may be validated or certified through examinations described under Earning Credit by Special Examination in the Rules, Requirements, and Procedures section of this catalog.

The University does not accept or award credits for the College Level Examination Program (CLEP) general examinations. Any such credits earned at other institutions or through independent testing may not be transferred to the University. Acceptance of CLEP subject examinations is at the discretion of the department whose subject matter is covered in the examination, but credit granted for such examinations by other colleges may be accepted when a student transfers to the University.

Advanced Placement

Students who do college-level work in high school can receive appropriate credit or placement, or both, at the University on the basis of performance in the Advanced Placement Program (AP) of the College Board.

Listed below are departmental policies on granting placement or credit for AP examinations: Grades range from a high of 5 to a low of 1; in most departments, credit and/or placement is awarded for grades of 3 or higher. In some cases, the student must consult the appropriate departmental adviser after arriving at the University.

Art History	AP-5	ART H 201, 202, 203 (9 credits)
	AP-4	Exempt from ART H 201, 202, 203; no credit
Studio Art	AP-3	No credit; see departmental adviser for place- ment
Biology	AP-5 AP-4	See departmental adviser; 5 credits will be granted, plus 5 more if student completes recom- mended class with grade of 2.5 or above
•	AP-3	See departmental adviser; placement in BIOL 101-102 may be available
Chemistry		See departmental adviser for possible placement and credit
Classics Latin Lyric	AP-5 AP-4	LAT 305, 306 (6 credits)
Vergil	AP-5 AP-4	LAT 305, 307 (6 credits)
Latin Lyric and Vergil	AP-5 AP-4	LAT 305, 306, 307 (9 credits)
English	AP-5	ENGL 111, 181 (10 credits)
	AP-4	ENGL 111, 171 (8 credits)
	AP-3	ENGL 171 (3 credits)
German	AP-5 AP-4 AP-3	15 credits See departmental adviser 10 credits for placement 5 credits
History		
American	AP-5 AP-4	HSTAA X (5 credits) if essay is of sufficient quality
European	AP-5	HST 113 (5 credits)
	AP-4	HST 113 (5 credits) if essay is of sufficient qual- ity
Mathematics		•
AB Examination	AP-5	Placement into MATH 126; credit for MATH 124 and 125 (5 credits each) is awarded when the student successfully completes MATH 126
•	AP-4 AP-3	Advanced placement into MATH 125; credit for MATH 124 (5 credits) is awarded when the stu- dent successfully completes MATH 125
BC	AP-5	As AP-5 for AB Examination
Examination	AF-4 AP-3	As AP_4 and AP_3 for AR Examination

Although the University encourages students to complete the advanced placement mathematics course in high school, it is not necessary for these students to take the advanced placement examination. Students may instead take the free University mathematics placement test when they first come to campus to register.

Music Appreciation	•	•	See departmental adviser for placement and pos- sible credit
Theory		•	No credit; see departmental adviser for place- ment
Physics	•	AP-5 AP-4	No credit; exemption from PHYS 121, 122 for Physics C Examination, or from PHYS 114, 115, 116 for Physics B Examination
Domanas			Sae departmental advicer

University Placement Tests

Languages

Information concerning mathematics, chemistry, or foreign-language placement tests is included in the leaflet on registration instructions, which is mailed to applicants upon receipt of their enrollment confirmation. Additional information on recommended tests may be obtained from the appropriate college or departmental advising office. Testing information is also available at the Educational Assessment Center in Schmitz Hall.





RULES, REQUIREMENTS, AND PROCEDURES

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. Changes go into force whenever the proper authorities so determine and may apply not only to prospective students but also to those who at that time are matriculated in the University. The University also reserves the right to withdraw courses at any time.

It is the University's expectation that a student follow University rules and procedures as they are stated in the *General Catalog*. In instances in which no appeal procedure is outlined and the student is persuaded that a special set of circumstances makes appeal reasonable, he or she may appeal the application of specific rules or regulations to the Office of the Dean of the school or college in which he or she is enrolled in the case of an academic matter or to the Office of Student Affairs in the case of a nonacademic matter. These offices will render a decision on the appeal, arrange for a hearing if appropriate, or refer the student to the proper office for a decision.

REGISTRATION AND WITHDRAWAL

Preregistration

Preregistration is designed to accommodate currently registered matriculated students. Preregistration occurs on specified days during the latter half of the quarter preceding that for which the student is registering, except that currently enrolled students registering for Autumn Quarter preregister in Spring Quarter. To preregister, a student turns in a mark-sense registration form listing the classes he or she wishes to take during the coming quarter. A quarterly *Time Schedule* listing the courses offered and the time and location of class meetings is published prior to preregistration. The *Time Schedule* outlines preregistration procedures.

In-person Registration

In-person registration occurs just prior to the beginning of the quarter and is intended primarily to accommodate new and returning students, as well as continuing students who fail to turn in programs during preregistration. Students are provided appointment dates to register.

Faculty-Staff Tuition Exemption

Eligible faculty and staff may enroll for up to 6 credits each quarter under the tuition exemption program. Such students are registered on a space-available basis and must register after other students. The quarterly *Time Schedule* lists registration dates and hours during which the faculty and staff may register. Eligibility information may be obtained from either the Staff Personnel Office or the Registration Appointment Office.

Change of Program to Drop or Add Classes

1. Preregistered students may add and drop classes during an early change period before the quarter begins. Appointments are necessary. Information on dates and procedures appears on posters placed throughout the campus and in the quarterly *Time Schedule*.

2. All students may add and drop courses during the first week of school by following instructions in the quarterly *Time Schedule*.

Late Registration

Students may register late, but are charged a \$15 fee after the official registration period.

Change of Address

The student is held responsible for keeping his or her address up-to-date in the Registrar's Office by filling out a change of address form at the Registration Office. The mailing of notices to the last address on record constitutes official notification.

Withdrawal From the University

Once an eligible student turns in a registration form, he or she is considered to be registered and must officially withdraw if he or she later chooses not to attend. 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).

1. To be official, a withdrawal from the University must be turned in at the Withdrawal Office, 264 Schmitz. Withdrawal forms are available at advising offices or, in some cases, at the Dean's office. An official withdrawal is effective the day it is received in the Withdrawal Office.

2. Submission of a graduate on-leave application does not constitute official withdrawal from the University.

3. Refer to Grading System, Grading Options, and Scholarship for information on grades and withdrawal.

4. A recipient of veterans' benefits should immediately' notify the Office of Veterans Affairs of withdrawal.

5. A student with a scholarship or loan awarded through the University should notify the Scholarship and Loan Fiscal Office of withdrawal.

Detailed instructions on official withdrawal from the University are outlined in the quarterly *Time Schedule*.

Restrictions on Attending Classes

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 Registrar's Office.

Student Identification

Each student is issued a quarterly identification card at the time of registration at the University. This card is the student's means of establishing entitlement to the rights and privileges that normally accrue to students.

The student identification card may be required by any University agency offering services, activities, or facilities wherein a student priority is to be maintained.

Students whose identification cards are either lost or destroyed can have them replaced by paying a nonrefundable fee at the University Cashier's Office. Replacement of cards made invalid by changes in students' names or of cards rendered unusable by normal wear and tear is done without charge upon return of the original card to the Registrar's Office.

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

GRADING SYSTEM, GRADING OPTIONS, AND SCHOLARSHIP

Grading System

The following grading system is used at the University, subject to certain exceptions in the Graduate School and in the schools of Dentistry, Law, and Medicine:

Grades are entered as numbers, the possible values being $4.0, 3.9, \ldots$ and decreasing by 1/10 until 0.7 is reached. The number 0.0 is assigned as a failing grade. No grades are assigned between .7 and 0.0 for undergraduates. No grades are assigned between 1.7 and 0.0 for graduate students. Correspondence between numerical grades and letter grades is as follows:

Letter Grade	Numeric Grade-Point Fauivalent	Fralanation
A	Lyuivaichi	Explanation
A	4.0	Highest grade.
B	· 3.0	•
°C	2.0	•
	1.7	Lowest passing grade for graduate students.
D	1.0	_
,	0.7	Lowest passing grade for undergraduates.
E	0.0	Failure or unofficial withdrawal. No credit



The following letter grades also may be used:

- N No grade. Used only for hyphenated courses and courses numbered 600, 700, and 800.
- ŀ Incomplete. An Incomplete is given only in case 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. 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. An Incomplete grade not made up by the end of the next quarter will be converted to the grade of 0.0 by 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. The Incomplete conversion grade is posted under the quarter in which it is converted.

An instructor may approve an extension of the Incomplete removal deadline. Such an extension must be received, in writing, at the Grade Recording 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 before the Incomplete has been converted into a failing grade.

A graduate student must convert an Incomplete into a passing grade by the last day of the next quarter *in residence*. This rule may be waived by the Dean of the college in which the course was offered only if the nature of the uncompleted work is such as to make the fulfillment of this requirement impossible. In no case can an Incomplete be converted to a passing grade after a lapse of two years or more. An Incomplete received by a graduate student does not automatically convert to a 0.0 but remains an Incomplete.

- S Satisfactory grade for courses taken on a satisfactory/not satisfactory basis. An S grade is automatically converted from a numerical grade of 1.7^* or above for undergraduates and a numerical grade of 2.7 for graduates. The grade S may not be assigned directly by the instructor, but is a grade conversion by the Registrar's Office.
- NS Not-satisfactory grade for courses taken on a satisfactory/not satisfactory basis. A grade less than 1.7* for undergraduates, or less than 2.7 for graduates, will be converted to NS. NS is not included in the gradepoint-average calculation. 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. The grade is awarded directly by the instructor.
- NC Credit not awarded in a course offered on a credit/no credit basis only. The grade is awarded directly by the instructor and is not included in a grade-point-average calculation.
- W Official withdrawal or drop during the third and fourth weeks of the quarter for undergraduates and through the seventh week for graduates.
- W Grade assigned when an undergraduate uses his or her uncontested drop privilege to withdraw from a course after the fourth week of the quarter. No course drops are allowed during or after final examination week.
- HW Grade assigned when an undergraduate is allowed a hardship withdrawal from a course after the fourth week of the quarter (seventh week for graduate students).

Dropping a Course

Undergraduates dropping a course during the first two weeks of a quarter shall have no entry on their permanent academic record. During the third and fourth weeks, an official withdrawal is recorded as W. Withdrawals require that a student process a Change of Program card through the Registrar's Office, but do not require an instructor's signature. During Summer Quarter, an undergraduate student may not withdraw from a course (a term, b term, or full term), or from the University, on the last five days of instruction.

Undergraduates cannot drop courses starting the fifth week of the quarter through the last day of instruction, with the following exceptions:

(a) A student may drop all courses by withdrawing from the University through the last day of instruction.

(b) An undergraduate student is allowed a limited number of uncontested course drops in accordance with the following schedule:

No. of Credits Earned at UW at	No. of Uncontested Course Drops		
Time of Course Drop	Permitted		
0-44	.3		
45-89	1		
90-134	• i •		
135-179	1		
180-224	Ī		
eto			

An entry of *W will be made for each uncontested drop.

* A change in this figure is being considered as this catalog goes to press.

The three uncontested course drops that are allowed to students who have earned 0-44 University of Washington credits may not be accumulated for use after 44 credits are earned. Subsequent uncontested course drop privileges, however, may be so accumulated and used as the student sees fit.

(c) A student may petition the Registrar in writing to drop a course. Such a petition will be granted if, in the Registrar's judgment, (1) the student is unable to complete the course in question due to a severe mental or physical disability, or (2) unusual and extenuating circumstances beyond the student's control prevented him or her from dropping the course by the end of the fourth week, if an undergraduate, or by the end of the seventh week, if a graduate student. A petition must be filed immediately after the student discovers it necessary to drop the course.

The Registrar shall enter the grade of HW (Hardship Withdrawal) for all courses approved for drop by petition.

The instructor's signature is not required if a student drops a class during the quarter.

No drops or withdrawals may be made after the last day of instruction (i.e., no drops are permitted during or after the final examination period).

The drop limitations listed above apply to all quarters of the regular academic year and the Summer Quarter with the following exceptions: During the Summer Quarter, no entry will be made on the student's record for drops made during the first week of an a term course, or the first week of a b term course. During the second week of either term, the grade W will be recorded.

Graduate students withdrawing officially from a course during the first two weeks of a quarter shall have no entry on their permanent academic record. The grade W shall be recorded by the Registrar's Office after the first two weeks of a quarter. No drops are permitted after the seventh week of the quarter except through petition to the Registrar in accordance with criteria noted in paragraph c, 1 and 2 above.

A student who drops a class unofficially (i.e., without the proper approvals and without processing an add/drop card through Sections) will be given a grade of 0.0.

The grade W, *W, or HW shall count neither as completed credits nor in the computation of grade-point averages.

Auditors: No entry is made on the permanent record for courses audited.

Repeating a Course

ALL SCHOOLS AND COLLEGES, EXCEPT DENTISTRY, LAW, AND MEDICINE

When a student notifies the Registrar in writing that he or she has repeated a course at the University of Washington, only the grade earned the last time the repeated course was taken is included in the cumulative grade-point average, as long as the last grade is not a W, I, NS, NC, X, or N. To notify the Registrar, the student may either mark the appropriate circle on the registration form or fill out a Repeated Course Notice at the Grade Recording Office after the quarter ends. The cumulative grade-point average is adjusted during the fourth week of the following quarter. Any grade not included in the grade-point average is identified by a diagonal line through the grade. Once a student has received a degree, the grades earned prior to the degree may not be changed. A course repeated through extension or at another institution will not change the student's grade-point average.

SCHOOL OF DENTISTRY

A student in the School of Dentistry who receives the grade of E in a course may, with the permission of the Dean, the instructor of the course, and the Student Progress Committee, be permitted to perform additional work and to take such exercises and examinations, including a final examination, as the department may prescribe. If the student completes such exercises and examinations successfully and satisfies the department and the Student Progress Committee that he or she has a reasonable knowledge of the subject in question, the grade earned by the repetition may be awarded. The original grade of E will remain on the student's official transcript.

SCHOOL OF LAW

A student in the School of Law in good standing who has failed a required course may repeat the course or take, with the approval of the Dean, a second examination without registration at the time a regular examination for the course is offered. Upon re-examination, if successful, the student receives the same credit for the course that it carried at the time the student was first examined. The previous grade will remain on the record, but only the new grade will be used in computing the student's grade-point average. Permission to repeat a course or to take a second examination without registration must be obtained from the Dean's office at the time of registration.

SCHOOL OF MEDICINE

The faculty of the School of Medicine does not usually recommend repetition of courses in cases of low scholarship and does not permit a student to repeat a year of work, except when illness or some other extenuating circumstance justifies an exception.

VETERANS

Prior approval must be obtained from the Office of Veterans Affairs before a course is repeated.

Grade-Point Average

The cumulative grade-point average is based solely on courses taken in residence at the University of Washington



and specifically excludes transfer and extension credits and credits earned by examination.

Computation of Grade-Point Average

The grade-point average (GPA) for graduation is computed by dividing the total cumulative grade points by the total credits attempted (TCA) for courses taken in residence at the University of Washington. 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 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 grade-point average, but they do count as credits earned toward graduation. Notsatisfactory grades, NS, do not count in the quarterly and cumulative grade-point averages and do not count as credits earned toward graduation.

A graduate student's grade-point average is calculated entirely on the basis of number grades in 300-, 400-, and 500level courses. The grades of S, NS, CR, NC, and N are excluded, as are all grades in courses numbered 600, 700, and 800, and at the 100 and 200 levels.

EXAMPLE 1

Course	Credits	Grade	Grade Points	
ENGL 171	3	CR		
OCEAN 101	5	2.7 =	13.5	
HST 111	5	4.0 =	20.0	
SCAND 100	_2	3.3 =	<u> 6.6</u>	
Total credits earned toward graduation	15			
Total graded credits attempted (TCA)	12	<i>.</i> .	40.1	
	-			

Grade-point average = $40.1 \div 12 = 3.34$

The total graded credits attempted, not the credits earned toward graduation, are used in computing the grade-point average.

EXAMPLE 2

Course	Credits	Grade	Grade Points	•
ENGL 121	5	2.3 =	11.5	
OCEAN 101	5	0.0 =	0.0	
SPHSC 100	3	2.7 =	8.1 ·	
H ED 250	3	I_{γ}	0.0	
Total credits earned		. *		
toward graduation	8			
Total graded credits				
attempted (TCA)	13		19.6	
•			•	

Grade-point average = $19.6 \div 13 = 1.51$

The student attempted 16 credits, but only 13 are graded, because the I is not computed in the grade-point average. The 0.0 for OCEAN 101 is computed in the grade-point average, but no credit is awarded toward graduation.

If the work in H ED 250 is not made up by the end of the next quarter, the I will convert to a numeric grade and the grade-point average will be recomputed.

Change of Grade

Except in cases of error, no instructor may change a grade that he or she has turned in to the Registrar. A student who finds administrative omissions or errors in a grade report must make application to the Registrar for a review not later than the last day of the student's next quarter in residence, but in no case after a lapse of two years. Time spent in military service is not counted as part of the two-year limitation. Students are not automatically notified of grade changes posted after the first of the quarter.

Grade Appeal Procedure

A student who believes he or she has been improperly graded first discusses the matter with the instructor. If the student is not satisfied with the instructor's explanation, the student may submit a written appeal to the Chairperson of the department, or in a nondepartmental college, to the Dean, with a copy of the appeal sent to the instructor. The Chairperson, or Dean, consults with the instructor to ensure that the evaluation of the student's performance has not been arbitrary or capricious. Additionally, some colleges have grievance committees to consider grade disputes. The instructor has final responsibility for the grade assigned.

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

Grade reports are automatically mailed to all students, except those in the School of Medicine, at the close of the quarter. The grade reports are sent to the mailing address supplied by the student at the time of registration. To ensure delivery of grades, any changes in this permanent mailing address should be reported to the Registration Office by the last day of instruction. Copies of the quarterly grade reports are also sent to each student's Dean and major department.

Nontraditional Grading Options

It should be noted that the possibility of future objective evaluation of the student's total academic record is reduced by the extent to which the record includes course work that is evaluated by a grading system other than the numerical system. A student should be aware that he or she may jeopardize future educational opportunities, particularly for graduate or postbaccalaureate study, when other systems of performance evaluation are used.

Credit/No Credit-Only as a Course Option

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

A student on the numerical grading system has CR entered on his or her transcript if the student passes. This grade is not used in the computation of the student's grade-point average. If the student receives no credit, NC is entered on his or her record. This grade is not used in the computation of the student's grade-point average.

Satisfactory/Not Satisfactory Grading Option

Certain students are eligible to choose that a limited number of their credits be graded satisfactory/not satisfactory rather than with regular numerical grades. Any student who wishes to register for a course satisfactory/not satisfactory should check first with his or her adviser to determine restrictions and eligibility, because colleges and departments vary in their rules concerning this grading option (e.g., students in the College of Arts and Sciences may not take courses *S/NS* until they have earned 45 or more college credits). In no case is a student allowed to register for more than 6 credits (or for one course, if that course is offered for more than 6 credits) on a satisfactory/not satisfactory basis in a given quarter. No more than 25 satisfactory/not satisfactory credits are applied to a four-year undergraduate degree.

Under no circumstance may a student switch to or from satisfactory/not satisfactory grading for a particular course after the first week of the quarter. Only students in good academic standing (i.e., not on academic warning or probation) are eligible for the *S/NS* grading option. Veterans should check- with the Office of Veterans Affairs before requesting these courses.

Scholarship

Scholarship and Grades in Professional Schools

The School of Dentistry uses the following University grade-point system: A=4, B=3, C=2, and E=0. The grade-point average is calculated by multiplying the grade points received in a course by the number of credits earned in the course, totaling these values, and dividing by the total number of credits earned.

Students are notified of their grades at the end of each quarter.

A student who has an academic deficiency in a course for which he or she is registered during any given quarter is referred to the Student Progress Committee of the school. If the work in a course is incomplete or inadequate, a grade of I may be given. This incomplete must be removed before September 15 if the student is to advance into the next year's class.

In the School of Law, grades are awarded in 1/10 increments from 3.9 to 0.7 and 0.0. Credit is awarded for grades of 1.3 or better. The highest grade is 3.9, and the lowest grade is 0.0. A 2.00 cumulative grade-point average is required for graduation.

The School of Medicine maintains a record of each medical student's performance and reports to the Registrar's Office grades of H (honors), S (satisfactory), or NS (not satisfactory).

Each department keeps careful records of student work. At the end of each academic year, or more frequently, the Academic Affairs Committee of the School of Medicine evaluates the accomplishment of the student. When general academic achievement is unsatisfactory, the student is subject to dismissal from the school. Although a student who has been dismissed from the School of Medicine may succeed in passing a medical school course he or she has previously failed by taking it as part of his or her course in another school or college, this is not regarded as evidence that a student's abilities justify readmission to the School of Medicine. A student who has been dismissed because of low scholarship can be readmitted only by action of the Academic Affairs Committee, and one who is readmitted must maintain a quality of work consistently above the minimum requirements. The faculty of the School of Medicine does not usually recommend repetition of courses in cases of low scholarship and does not permit a student to repeat a year of work, except when illness or some other extenuating circumstance justifies an exception.

Undergraduate Low Scholarship

Academic Warning

An undergraduate student whose grade-point average falls below 2.00 in his or her first quarter at the University receives an academic warning. If a cumulative grade-point average of at least 2.00 is not achieved by the end of the next quarter, he or she is placed on academic probation.'

Probation and Dismissal for Low Scholarship

An undergraduate student is placed on academic probation at the end of any quarter (except for the first quarter at the University, when an academic warning is issued) in which his or her cumulative grade-point average falls below 2.00. Once on probation the student must attain at least a 2.50 for each succeeding quarter's work until the cumulative gradepoint average is raised to a 2.00, or the student is dropped for low scholarship.

Reinstatement

Only under exceptional circumstances is a student who has been dropped under low-scholarship rules readmitted to the University. Such a student is readmitted only at the discretion of the Dean of the school or college to which readmis-



sion is sought. A student readmitted after being dropped under these rules re-enters on academic probation. The student's grade-point average is the same as when dropped from the University, and the student may not use grades from other colleges or universities or extension credit to raise his or her University of Washington grade-point average. A readmitted student is dropped if he or she fails to attain either a 2.50 grade-point average for the following quarter's work or a cumulative University of Washington grade-point average of 2.00 at the end of that quarter. The student is removed from probation at the end of the quarter in which a cumulative grade-point average of 2.00 or better is reached.

Senior in Final Quarter

A senior who has completed the required number of credits for graduation, but whose work in what would normally be his or her final quarter places him or her on probation, does not receive a degree until removed from probation. A senior who has completed the required number of credits for graduation, but whose work in his or her last quarter results in his or her being dropped for low scholarship, does not receive a degree until readmitted and removed from probation.

Undergraduate High Scholarship

Quarterly High-Scholarship List

The quarterly high-scholarship list includes the names of matriculated undergraduate students who have attained a quarterly grade-point average of 3.50 in the final grades for at least twelve graded hours, exclusive of lower-division ROTC courses. Appropriate high-scholarship entries are made on the student's permanent academic record.

Yearly Undergraduate Honors

Undergraduates who have achieved a grade-point average of 3.50 or better in twelve graded hours for each of three or four quarters during the academic year, exclusive of lowerdivision ROTC courses, have a high-scholarship notation entered on their permanent academic records.

Certificates of High Scholarship

Certificates of high scholarship are awarded to students in the sophomore, junior, and senior classes who have high scholastic records for their freshman, sophomore, or junior years, respectively. The Honors Committee determines the grade-point average required for certificates.

Baccalaureate Honors

Baccalaureate honors (summa cum laude, magna cum laude, cum laude) are awarded to recipients of a first baccalaureate degree. These honors are awarded to those students who have completed no fewer than 90 credits at this institution. At least 60 of the 90 credits must be on a graded basis.

The University's Honors Committee determines annually the grade-point requirement for each baccalaureate honor.

Sophomore Medal, Junior Medal, President's Medal

Annually, the junior having the most distinguished academic record for the first two years of his or her program receives the sophomore medal from the President of the University. The senior having the most distinguished academic record for the first three years of his or her program receives the junior medal from the President of the University.

The President's Medal, which is conferred at commencement, recognizes the graduating senior who has the most distinguished academic record. Only students who have earned at least 90 credits at the University of Washington may be considered.

ACADEMIC CREDIT

Credit

A credit is a measurement of curricular work completed satisfactorily. The number of academic credits awarded for a particular course is based on an estimate of the time commitment required of a typical undergraduate student in the course. The fundamental rule for determining academic credit is: 1 credit represents a total time commitment of three hours each week in a ten-week quarter, or a total of thirty hours in a single quarter, required of the typical student. Total time includes time spent in class, if any; time devoted to individual conferences with instructors, time devoted to reading or other study, problem solving, writing, laboratory work, exercises, or any other activity required of students. A specified number of credits must be earned for a degree.

Colleges and universities that operate on a semester basis (i.e., divide the academic year into two parts, exclusive of a summer session) give semester credit. Quarter credits multiplied by two-thirds equal semester credits. Semester credits multiplied by one and one-half equal quarter credits. For example, a student attending the University of Washington who earns 45 quarter credits during an academic year would have earned 30 semester credits at an institution operating on the semester plan.

There are three basic types of credit:

Residence credit is that academic credit associated with those courses offered by the University through the quarterly *Time Schedule*. To gain residence credit, students must register for such courses during either of the two official registration periods. Credit earned through satisfactory completion of such courses is applicable toward a University degree or professional certificate to the extent it satisfies specific school or college degree requirements.

Extension credit or credit earned through examination is credit earned by completing courses offered as extension courses or credit earned through special examinations. Grades earned in these courses are not included in the grade-point average, and only 90 credits earned in this manner may apply toward the baccalaureate degree.

Transfer credit is credit earned at another institution that is accepted by the University as being applicable toward satisfaction of degree requirements. The Undergraduate Admission and Enrollment section in this catalog may be consulted about specific limitations and guidelines.

Acceptance of Transfer Credit

The University of Washington reserves the right to accept or reject credits earned at other collegiate institutions. In general, it is the University's policy to accept credits earned at institutions fully accredited by their respective regional accrediting associations, provided that such credits have been acquired through university-level courses appropriate to the student's degree curriculum at the University. In no case, however, may a student apply more than 135 transfer credits to a 180-credit baccalaureate degree program. Transfer credits are not normally accepted for application toward the final year.

Community College Credit

The University limits to 90 the number of credits that may be transferred from a community college. Ordinarily, community college credits may not be applied toward the final year.

Extension and Independent Study Credits

No more than 90 extension credits may be counted toward the baccalaureate degree. No more than 45 credits earned in extension courses at other institutions may be counted toward the baccalaureate degree. Ordinarily, extension and independent study (correspondence) credits may not be applied toward the final year.

Duplicate Credit

Credit is awarded only once for repeated courses. Courses taken at another institution and repeated at the University will carry credit for only the University work. Courses repeated at another institution after being taken at the University will not affect the University of Washington gradepoint average.

Earning Credit by Special Examination

Regularly admitted and currently enrolled students may take special examinations, sometimes known as challenging a course, in subject matter offered by the University to gain credit without being enrolled in specific courses. Credit may be granted—

1. For independent study.

2. For work completed with private teachers.

3. For work completed in unaccredited institutions if a formal examination is deemed necessary by the Chairperson of the concerned department(s). (In some cases, credit may be validated without an examination. Students who wish to validate credit must make arrangements with the Office of Admissions.) The following restrictions apply:

a. No one may take a credit examination for a course in which he or she has received prior credit.

b. All credits earned by examination are counted as extension credit and are included in the 90-extension-credit maximum that may be applied toward the baccalaureate degree. No credit is allowed by examination if the grade earned is less than 2.0. Grades earned are not included in the gradepoint average.

c. No student shall receive credit by examination for a course for which the student would not be eligible to receive credit if the course were taken in residence.

d. No student is permitted to repeat any examination for credit.

e. No student may receive credit by examination for lowerdivision courses in the student's native language.

f. Credit by examination is not acceptable for application toward an advanced degree in the Graduate School.

A student who wishes to qualify for credit by examination must apply to the Graduation Office for a certificate of eligibility no later than Friday of the second week of the quarter. The student presents it for signed approval to an instructor responsible for the course in which the examination is to be taken, to the Chairperson of the department concerned, and/or to the Dean of the college or school concerned. It is then returned to the Graduation Office. Signed certificates and payment of \$25 per course to be challenged must be accomplished by Friday of the second week of the quarter.

Examinations are administered by the Educational Assessment Center no later than the fifth week of the quarter.

No student is permitted to take more than two examinations in 3-, 4-, or 5-credit courses, or more than three examinations in 1- or 2-credit courses in one day. Should the student plan to take more examinations in a given quarter, an additional day may be permitted and arrangements made with the Educational Assessment Center.

CLEP Credit

Credit for the general examinations of the College Level Examination Program (CLEP) is not accepted or awarded by the University (see Transfer Credits in the Undergraduate Admission and Enrollment section of this catalog).

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Advanced Placement and Advanced Placement Credit

The University grants advanced placement or credit on the basis of performance in the Advanced Placement Program of the College Board. Student records in the Advanced Placement Program are evaluated for possible credit by the department or college concerned.

The University also grants advanced placement or credit on the basis of performance in placement examinations established by the mathematics and foreign-language departments for entering students whose high school preparation in these fields has brought them to a level considerably above that typically expected of entering students.

A student who is placed in the third quarter of the secondyear University language sequence may receive 5 credits for the second quarter of the second-year course, provided the third-quarter course is successfully completed. Similarly, a student whose high school study has brought him or her to the level of the completion of the second year of University study may be granted 10 credits for the second- and third-quarter courses of the second-year sequence, provided an upper-division course in the language other than courses in English translation is successfully completed.

A student who is placed by examination at the level of MATH 125 or higher receives additional credits. If the student's first University mathematics course is MATH 125, credit for MATH 124 is given. A student whose first mathematics course is MATH 126 is given credit for both MATH 124 and 125.

A student must apply for advanced placement credits at the Grade Recording Department of the Registrar's Office after having completed the advanced course.

Full- or Half-Time Status Requirements

Some agencies require that a student have full-time status to receive maximum benefits or to retain a certain privileged status. To be classified as a full-time student by the University, an undergraduate must enroll for at least 12 credits per quarter and a graduate student must enroll for at least 9 per quarter. To be classified as a half-time student by the University, an undergraduate must enroll for at least 6 credits per quarter and a graduate student must enroll for at least 5 credits per quarter.

Students From Other Countries

A student attending the University on a student visa (F-1) must maintain a full course of study, or he or she must be reported to the Immigration and Naturalization Service. For this purpose, to maintain a full course of study as defined by the University:

1. An undergraduate, postbaccalaureate, or nonmatriculated student must register each quarter except Summer Quarter and must complete at least 36 credits each year. 2. A graduate student must register each quarter except Summer Quarter and must complete at least 27 credits each year. Final determination of a full course of study for graduate students is made by the Dean of the Graduate School. The staff of the Graduate School consults with the student's graduate program adviser when appropriate.

3. A student in the final quarter of his or her degree program needs to register for only those credits required for graduation.

4. The Immigration and Naturalization Service also requires the University to report such a student if he or she fails to register within sixty days of the expected initial registration date or if attendance at the University is terminated.

Students Receiving Social Security Benefits

A student who wishes to receive Social Security educational benefits must be enrolled as a full-time student in accordance with the general definition outlined above. A senior in his or her final quarter must register for only those credits required for graduation. Additional information may be obtained at the Graduation Office, 207 Schmitz.

TRANSCRIPTS

Official copies of student academic records at the University of Washington must bear the official embossed seal of the University, the signature of the Registrar, and the date of issue.

Transcript Fee

A charge of \$1, payable to the Transcript Office in advance, is made for each transcript. Grade sheets cost fifty cents. Partial transcripts are not issued. Each transcript must include all work taken at the University of Washington.

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 will not be returned to the student. Any student who desires transcripts of his work earned elsewhere must order official transcripts from the institution at which the work was undertaken. The University does not issue or certify copies of transcripts from other institutions.

GRADUATION

University Requirements for Baccalaureate Degree

To graduate, a student must meet University, college or school, and departmental requirements. Only University re-

quirements are listed in this section. Requirements of colleges, schools, and departments appear in the section pertaining to the college, school, or department concerned.

Filing an Application for a Baccalaureate Degree

A student should file with the Graduation Office, in Schmitz Hall, a written application for his or her degree three quarters before the expected date of graduation.

It is the student's responsibility to apply for a degree and/or certificate, because degrees are not automatically awarded when requirements have been satisfied. Application forms and diploma cards are available at the Graduation Office and in the major departments.

The signature of the department head or of an authorized adviser must appear on the application in the space provided for "Signature of major adviser." A student in the College of Arts and Sciences does not obtain the college Dean's signature, but leaves the application for a degree, along with the diploma card, at the Graduation Office after the student's adviser has signed it. The application is first approved by the Graduation Office, then sent to the Dean of the college for signature and returned to the Graduation Office. A student in any other college leaves the application at the college Dean's office for signature after obtaining the adviser's signature.

After the application is approved, one copy is mailed to the student, the second is sent to his or her department or college office, and the original is retained in the Graduation Office. Any required course listed on the approved application may be changed only by written notification to the Graduation Office by the student's departmental adviser.

If an applicant is ineligible to graduate because of a deficiency, the Graduation Office notifies the student.

Scholastic Standards Required

To be eligible for the baccalaureate degree, a student must earn a cumulative grade-point average of 2.00 for all work done in residence at the University,

The graduation grade-point average is computed when the student has completed all work for the degree and includes only University of Washington residence credits.

Credits Required

To be eligible for graduation from the University with the baccalaureate degree, a student must satisfy all other specific requirements and must offer a minimum of 180 academic credits.

Limitation on ROTC Credits

Credits earned in first- and second-year military training courses may not be counted in the basic 180 credits required for graduation. Some third- and fourth-year courses may count, depending on the student's college or school.

Limitation on Physical Education Activity Credits

No school or college allows more than three 100-level physical education activity credits to apply toward graduation.

Degrees With Two Majors

Some colleges allow a baccalaureate degree with two majors. The student's application for such a degree must show both majors and be approved by the advisers of both departments. Both majors appear on the permanent record.

Two Baccalaureate Degrees Concurrently

Two baccalaureate degrees, associated with different majors, may be granted at the same time, but the total number of academic credits earned must reach a minimum of 45 credits in excess of the number required for the first baccalaureate degree.

Second Baccalaureate Degree

A second baccalaureate degree may be granted, but a student must earn a minimum of 45 credits beyond the number required for the first baccalaureate degree. These credits usually must be earned in residence, with the granting of exceptions to the residency rule being the responsibility of the college or school awarding the degree. The student must achieve no less than a 2.00 cumulative grade-point average in the last 45 credits earned.

Students working for a second baccalaureate degree are not registered in the Graduate School, but in the academic division of the University with jurisdiction over the degree sought.

Final-Year Residence Requirement

To be recommended for a first or subsequent baccalaureate degree, a student must complete the final 45 credits as a matriculated student in residence at the University. The granting of exceptions to this rule is the responsibility of the Dean of the college or school awarding the degree. If an exception is granted, the student must still present a minimum of 45 credits taken in residence as a matriculated student to be awarded a University of Washington degree.

Catalog for Graduation Requirements

In general, a student graduates under the requirements of the current catalog. A student may, however, fulfill graduation requirements of the catalog in effect at the time he or she entered the school/college from which he or she is to graduate, provided that (a) not more than ten years have elapsed since the student's entry and (b) the school/college and department agree that the student may graduate under the earlier requirements.

If the student graduates more than ten years after enrolling in the school or college, the current catalog must be used for graduation purposes. Exceptions to this rule cannot be made without official University and college approval.

The above provisions do not apply to the requirements prescribed by the College of Education for teaching certificates.

Waiver of Graduation Requirements

A request for waiver of college or University graduation requirements is petitioned to the college graduation committee, which refers the petition to the University Graduation Committee if an all-University requirement is involved. These petition forms are available at the Graduation Office or the advisory office and should be filed with the application for degree or as soon as possible after the need arises. A student should see his or her academic adviser to initiate a petition. Because the University Graduation Committee meets only once each quarter, petitions involving University requirements should be filed early in the quarter.

An exemption from an all-University graduation requirement that is granted by the University Graduation Committee becomes void at the end of two calendar years from the date such exemption is granted if all degree requirements have not been completed within that period.

Graduation Requirements for ROTC Students

As a prerequisite for graduation from the University, students accepted for the third- and fourth-year advanced ROTC program must complete the advanced program unless excused or dismissed from this requirement by regulations prescribed by the Secretary of the Army, the Navy, or the Air Force, whoever has the authority in the individual case.

Advanced Degrees

Information on, and requirements for, master's and doctoral degrees appear in the Graduate School section of this catalog.

Requirements for Teaching Certification

The College of Education offers professional programs approved by the State Board of Education leading to teaching and other certificates. Additional information appears in the College of Education section of this catalog, or the student may write to the College of Education advisory office, 211 Miller.

Commencement

Formal commencement exercises are conducted only at the close of Spring Quarter. During April of each year, commencement information is sent to each student entitled to participate the following June.

Eligibility for Participation

Baccalaureate Degrees. All students who earned baccalaureate degrees the preceding August, December, or March or who are candidates for degrees in June or the coming August are entitled to participate in the exercises. Only the names of those who received degrees the preceding August, December, or March and the candidates in June are listed in the commencement program. The names of candidates for baccalaureate degrees who have been accepted for graduation the coming August do not appear in the program.

Graduate Degrees. All candidates of the Graduate School for master's and doctoral degrees in June and those to whom degrees were granted the preceding August, December, or March are urged to be present. Only those candidates who have actually completed their requirements during the year are eligible to participate.

Diploma Distribution

Diplomas are issued at the end of each quarter and are ready about twelve weeks after the end of the quarter in which they are earned. Diplomas are mailed to the address that is on the diploma card. A postcard is mailed if the student has indicated that the diploma will be picked up.

TUITION, FEES, AND SPECIAL CHARGES

The University reserves the right to change all fees without prior notice.

Enrollment Service Fee

A new or returning former student or continuing student in a new classification (e.g., undergraduate, postbaccalaureate [fifth-year], graduate, or nonmatriculated) is required to confirm his or her intention to enroll by paying a nonrefundable \$50 enrollment service fee (not required of nonmatriculated students). The \$50 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 given quarter but does not register in that quarter is not entitled to refund except in the situations listed below:

1. A new or returning matriculated student who is unable to obtain courses that are applicable to the requirements for the degree or certificate program to which the student has been admitted, and who does not enroll in or attend other courses, is refunded the \$50 enrollment service fee upon written request to the Registrar. Petitions should include a statement from an appropriate academic adviser certifying that no such courses are available. Petitions must be submitted by Friday of the second week of the quarter.

2. A new or returning matriculated student who, after meeting with an appropriate academic adviser or receiving a University *General Catalog*, determines that the program for which admission was granted differs substantially from what the student was led to expect based upon earlier available information, will be refunded the \$50 enrollment service fee upon written request to the Registrar. Such a request 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.

3. 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, is refunded the \$50 enrollment service fee upon application to the Registrar no later than two weeks after receipt of notice of the financial aid award.

4. 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, will be refunded the amount, if any, by which the enrollment service fee exceeds the amount of tuition and fees assessed at the time of withdrawal. Requests for refund must be submitted in writing to the Cashier's Office by the last day of the quarter for which the student was determined admissible and for which the enrollment service fee has been paid. Proper documentation is required.

Fee Payment

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

Except for Summer Quarter, payment of this obligation is due the fifteenth class day of the quarter (normally the Friday of the third week). Nonpayment of tuition and fees by the due date results in: (1) charge of \$15 for late payment, if payment is received within the one-week late payment period; (2) cancellation of registration, if payment is not made by the end of the fourth week. One-half of tuition and fees is assessed by the University and must be paid by the student when registration is canceled for nonpayment of fees. See Cancellation of Tuition and Fees for additional information and the Summer Quarter bulletin for summer payment schedule.

Specific instructions on how the payment is to be applied must accompany the payment when the payment is not in conformance with the tuition and fee billing. In the absence of such express directions, the University will make a reasoned interpretation of the student's intent and account for the funds accordingly. The student number must be specified on all payments.

Quarterly Tuition and Fee Rates Effective Autumn Quarter 1980

Undergraduate	Resident	Non- resident
(includes postbaccalaureate		
[fifth-year] and nonmatriculated students)		•
Full fee (more than 9 credits)	\$229	\$798
Minimum (first 2 credits)	45	158
Each additional credit	23	80 -
Graduate and Law		
Full fee (more than 6 credits)	257	912
6 or fewer credits:		·
Minimum (first 2 credits)	72	262
Each additional credit	37	130
Dentistry and Medicine		
Full fee (more than 12 credits)	343	1,253
12 or fewer credits:	• •	•
Minimum (first 2 credits)	57	197 [·]
Each additional credit	26	96

Fees are likely to increase each year.

Fee schedules for resident and nonresident students apply to the academic year (Autumn, Winter, and Spring quarters). Summer Quarter fees are listed in the Summer Quarter bulletin. The resident fee is charged nonresident students during Summer Quarter, except for students in the schools of Dentistry or Medicine.

Veterans: A special exemption program is available for "resident" Vietnam veterans (see section on residence requirements). Under certain conditions, a veteran of World War I or II who is not eligible for Veterans Administration benefits is fully or partly exempt from tuition.

Information concerning these exemptions may be obtained from the Office of Veterans Affairs, 180 Schmitz.

Other Fees

Auditors: There is no reduction in fees for auditors.

On-Leave Registration Fee: This fee of \$5, charged graduate students only, provides for a maximum on-leave registration period of four successive academic quarters or any part thereof and is not refundable.

Late Registration Fees: A registration service charge of \$15 is assessed a student granted permission to register after the last scheduled day of registration. A student who must reregister as a result of a cancellation for nonpayment of tuition and fees must also pay a \$50 fee. Waiver or refund of this service charge may be petitioned in the Cashier's Office.

Change of Registration Fee: A charge of \$5 is made for each change of registration or change of section, or number



of changes that are simultaneous after the official change of registration period.

Transcript Fees: A charge of \$1, payable to the Transcript Office in advance, is made for each transcript. Grade sheets cost fifty cents.

Athletic Admission Fees: A-ticket that admits its owner to all athletic events during the quarter or quarters covered: Autumn Quarter, \$21; Winter and Spring quarters, prorated \$1 per home varsity basketball game.

Certificate Fees: The fee for a teaching certificate is \$5 and does not include a legal registration fee of \$1, which must be paid to the county school superintendent who first registers the certificate.

Thesis and Dissertation Fees: Publication binding fee, \$35; abstract-only fee, \$25; copyright service fee, \$25.

Replacement Fees: Duplicate diploma, with paper folder, \$5; teaching certificate (typed copy), \$1; student identification card, \$5.

School of Medicine Filing Fee: A fee of \$10 is charged a nonresident student for filing an application for admission to the School of Medicine.

Credit by Examination Fee: In order to obtain credit for independent study, a student may take an examination prepared by the department concerned. The fee is \$25 per course. Appropriate forms must be obtained from the Graduation Office.

All fees are subject to change without notice.

Cancellation of Tuition and Fees

Registered students must pay full tuition and fees. Tuition and fees 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 fee cancellation or reduction results in an overpayment.

Continuing Students

1. A student who withdraws on or before the fifth class day does not pay tuition and fees and is not considered a continuing student the next quarter.

2. A student who withdraws after the fifth class day through the thirtieth calendar day of the quarter must pay one-half tuition and fees.

3. A student who withdraws after the thirtieth calendar day must pay full tuition and fees.

New and Returning Students

1. A student who withdraws on or before the fifth class day forfeits the \$50 enrollment service fee, but does not pay the regular tuition and fees.

2. A student who withdraws after the fifth class day through the thirtieth calendar day of the quarter must pay one-half tuition and fees or forfeit the \$50 enrollment service fee, whichever is greater.

3. A student who withdraws after the thirtieth calendar day of the quarter must pay full tuition and fees. The \$50 enrollment service fee is applied toward payment of tuition and fees.

Fee Forfeiture

A student who does not withdraw but is dropping one or more courses is eligible for a lower fee, depending on the total number of credits remaining after the course drop and on the time period when the drop was made. Tuition and fees for students making a course drop on or before the fifth class day are determined by the total credits remaining. Tuition and fees for students making a course drop after the fifth class day through the thirtieth calendar day of the quarter are computed on the total credits remaining plus one-half the difference between the old fee and the new fee. There is no cancellation or reduction in fees for courses' dropped after the thirtieth calendar day of the quarter. The fees of a new or returning student cannot be reduced below the \$50 minimum paid as an enrollment service fee.

Fee Refund

When a fee payment is made by check, a three-week 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.

Residence Classification Requirements

For tuition purposes, Washington State law on residence classification provides: "that application for a change in classification shall be accepted up to the *thirtieth (30th) cal*endar day following the first day of instruction of the quarter or semester for which the application is made." Applications filed or postmarked after the thirtieth calendar day cannot become effective for that quarter. A change in residence status may not become retroactive to a preceding quarter nor is a change in status automatic after a person has lived in the state of Washington for one year. No nonresident fees are charged for Summer Quarter.

The law defines "resident student" as follows:

"The term 'resident' student shall mean a student who has had a domicile in the state of Washington for the period of one year immediately prior to the time of commencement of the first day of the semester or quarter for which the student has registered at any institution and has in fact established a bona fide domicile in this state for other than educational purposes." (Washington State Law, Chapter 28 B. 15 RCW, as last amended by Chapter 149, Laws of

TUITION AND FEE EXEMPTIONS

The following categories of students may be exempted from all or part of tuition and fees. Students in these categories should contact the offices shown, either for information on the exemption or to obtain the appropriate form to apply for the exemption. Most of the exemptions must be renewed each quarter and should be renewed before the beginning of the quarter. The various categories of exemptions are established by legislative mandate and may be revoked by the legislature at any time.

Students classified as nonresidents are invited to contact the Office of Residence Classification, 320 Schmitz, to learn the requirements for permanent resident classification and to apply for classification as residents as soon as they might meet the requirements.

Students requesting information on the following exemptions should contact the Office of Veterans Affairs, 180 Schmitz:

•	Category	Based on Need?	Residency Required?	Other Cimitations	
World War II vete federal benefits	rans who have fully utilized	No	No	Enrolled prior to October 1, 1977	
Children of persor	ns who were POWs or MIA	No	No	Parent must have been a domiciliary	
Children of disabl	ed or deceased veterans	Nó	Yes	Must be between 16 and 22 years old	
Veterans who serv the period of Augu	ved in Southeast Asia during ust 5, 1964-May 7, 1975	No	Yes	Enrolled prior to May 7, 1983	
Students request	ing information on the following	exemptions sh	ould contact	the Scholarship and Loan Fiscal Office, 170 Schmitz:	
* Blind students		No	Yes		
Students participa	ting in the WICHE Program	No	No	Exempted from nonresident portion of tuition and fees	
Medical and denta WAMI Program	l students in the	No	No	Must be a resident of Washington, Alaska, Montana, or Idaho	
Students requesti	ng information on the following	exemptions sh	ould contact t	he Office of Residence Classification, 320 Schmitz:	
Military personnel	l	No	No	Exempted from nonresident portion of tuition and fees	
Student employees	S	No	No		
Nonresident vetera	ans	No	No	Final permanent duty station in Washington	
Students from Brit	tish Columbia	No	No	Undergraduate students only. Exempted from nonresident portion of tuition and fees	
Treaty traders	•	No	No	Exempted from nonresident portion of tuition and fees	
Displaced persons		No	Yes	Exempted from nonresident portion of tuition and fees	
Children of consul	ar officials	No	No	• Exempted from nonresident portion of tuition and fees. Parent must reside in Washington	
Students request Northeast:	ing information on the followin	ng exemptions	should conta	act the Staff Personnel Office, 4045 Brooklyn Avenue	
Faculty/Staff	· .	No	No	Limited to 6 credits or less	
Children and spou	ses of staff and faculty	No	No	Nonresident portion of tuition and fees	
Students requesti	ng information on the following	exemptions she	ould contact t	he Graduate School, 201 Administration:	
TA/RAs having or	ne-half-time appointments	No	No	Nonresident portion of tuition and fees	
Students requesti	ing information on the following	exemptions sh	ould contact (he Office of Student Financial Aid, 105 Schmitz:	
Undergraduate stu Exemption)	dents (University Tuition	Yes	Yes	None	

* Student employees are limited by University regulations to campus employment that does not exceed 19½ hours per week and, as a result of this limitation, are not eligible for tuition waiver or tuition reduction.



1972, first executive session.) A nonresident student enrolled for more than six hours per quarter is considered as attending for educational purposes only, unless that student proves that he or she has, in fact, established a domicile in the state for other than educational purposes.

The following statements are only general guidelines. Questions should be addressed to the Residence Classification Office, third floor, Schmitz Hall.

1. Students classified as nonresidents remain nonresidents until they apply for reclassification and are found to satisfy the necessary residency requirements. Applications for change in residency should be received before the quarter they are to become effective. Applications are not considered after the thirtieth day of the quarter.

2. *Residence* in the state of Washington is not necessarily the equivalent of *domicile*. Domicile connotes a present intention to maintain permanent residence, together with physical presence in the state, whereas residence may be of a temporary nature.

3. In determining a student's intent with regard to his Washington domicile, consideration is given to whether he or she is a registered voter of the state of Washington. If the student is a minor (under age eighteen), consideration is given to the voting registration of the parents or legal guardian. Voting in person or by absentee ballot in the state of previous domicile is considered inconsistent with, and contradictory of, intention to establish legal domicile in this state.

4. Temporary residence in the state merely for the purpose of attending school or for reasons of health or pleasure is not a basis for the establishment of legal domicile.

5. Conversely, a domicile in this state is not lost by temporary or occasional absence from the state to attend school, to perform military or other government service, or to pursue health or pleasure.

6. The establishment of a domicile in the state of Washington by a parent or legal guardian entitles a minor (under age eighteen) to classification as a resident student. When the parents of a minor are deceased, the minor's domicile follows that of the legally appointed guardian. When the parents are divorced or legally separated, the minor is entitled to classification as a resident student if one of the parents has established a domicile in the state of Washington.

7. A minor who is married is free to establish a domicile separate and apart from that of his or her parents.

8. The domicile of any qualified person, including a married woman, is determined by the individual's situation and circumstances, rather than by marital status or sex.

9. Regardless of age or domicile, the following persons are entitled to classification as resident students: persons em-

ployed not less than twenty hours per week by a state of Washington higher institution of learning, and the children and spouses of such persons; military personnel and federal employees residing or stationed in the state of Washington, and the children and spouses of such military personnel and federal employees; all veterans whose final permanent duty station was in the state of Washington, so long as such veterans are receiving federal, vocational, or educational benefits conferred by virtue of their military service.

10. Noncitizens of the United States who are entitled to pay resident tuition and fees are: (1) persons with immigrant visas, or approval of immigrant visas, provided such persons have been domiciled in the state of Washington one year after the date of application for their immigrant visas; (2) undergraduate students who are residents of the Canadian province of British Columbia; (3) immigrant refugees who have been domiciled in the state of Washington for one year prior to enrollment or the quarter of application for change of residence status, and their spouses and children; and (4) nonimmigrants with treaty trader visas (E-1) and their spouses and children; (5) students whose parent is temporarily assigned to a consular mission within Washington State.

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

Information on educational benefits and special exemption programs for veterans and their dependents is available at the University's Office of Veterans Affairs, 180 Schmitz.

Veteran's 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 complies with the standards of progress as required by the Veterans Administration and the State Approving Agency. A copy of those standards, as approved, is available for review at the Registrar's Office.

Financial Obligations

The Comptroller is authorized to place a hold (administrative) on the records of any student who fails to pay promptly 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 for a subsequent quarter as well as graduation from the University. Debts paid by cash, cashier's check, or money order will be released immediately. Those paid by personal check will be released three weeks after receipt of the check, if the check proves valid. In cases of serious financial delinquency, the Comptroller, with the consent of the Registrar, may order that the 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.

STUDENT RIGHTS AND RESPONSIBILITIES

Student Conduct Code

The University Board of Regents has adopted a *Student Conduct Code*, which applies to both academic and nonacademic conduct for students while in attendance at the University. The code specifies standards of conduct, jurisdiction for hearing disciplinary matters, and due process. Interested students may obtain copies through either their advisers or the Office of Student Affairs, 459 Schmitz.

University Policy on Student Education Records

The following section details the student's right to inspect his or her records at the University, as outlined under Washington Administrative Code (WAC). Copies of the WAC are available for examination at the Registrar's Office, Schmitz Hall.

University Policy on Student Education Records (WAC 478-140-010)

Public law 93-380, The Family Educational Rights and Privacy Act of 1974, requires that the University adopt guidelines concerning the right of a student to inspect his or her education records, and guidelines concerning the release of personally identifiable information to third parties. The act further provides that such a student has the right to a hearing in order to provide for the correction or deletion of inaccurate, misleading, or otherwise inappropriate data. The act also provides that students be informed annually of the types of education records maintained by the University that are directly related to students.

Consistent with that act, this policy on student education records is established to ensure that information contained in such records is treated in a responsible manner with due regard to the personal nature of the information.

Definition of a Student (WAC 478-140-015)

A student is defined as any person who is or has been offi-

cially registered at the University of Washington and with respect to whom the University maintains education records or personally identifiable information; except that a person who has applied for admission to, but has never been in attendance at, a component unit of the University (i.e., college, school, or department; undergraduate, graduate, or professional program), even if that person is or has been in attendance at another component unit of the University, is not considered to be a student with respect to the component unit to which an application for admission has been made but to which admittance was denied.

Education Records: Student's Right to Inspect (WAC 478-140-018)

A. A student has the right to inspect and review his or her education records.

1. The term "education records" means those records, files, documents, and other materials that contain information directly related to a student. Types of education records, and the University officials responsible for those records, include:

a. Official transcripts of courses taken and grades received; records relating to prior educational experience and admission records. The Executive Director of Admissions and Records, located in Schmitz Hall, is the official responsible for the maintenance of such records. In addition, the Graduate Admissions Officer, located in the Administration Building, is the official responsible for the maintenance of certain admissions and current education status records for graduate students.

b. Tuition and fee payment records. The manager of the Cashier's Office, Schmitz Hall, is the official responsible for the maintenance of such records.

c. Student disciplinary records are the responsibility of the Vice President for Student Affairs, located in Schmitz Hall.

d. Individual education records may be maintained by the departments and/or colleges throughout the University. Where such education records are so maintained, the respective Chairperson or Dean of the department or college is the University official responsible for maintenance of the records.

2. The term "education records" does not include:

a. Working papers concerning students that are maintained by faculty and graduate student service appointees, such as informal notes, memory aids, or other temporary records of a similar nature that are in the sole possession of the maker thereof and not accessible or revealed to any other person except a substitute. A substitute is defined as:

(1) A person who is providing instruction in place of the regularly assigned faculty member in a course in which knowledge of the performance of individual students is essential to the provision of instruction, or



(2) A person who is supervising a student's thesis or research progress in place of the regularly assigned faculty member during a prolonged absence.

b. If the personnel of the University Police Department do not have access to education records under WAC 478-140-024(A), the records and documents of the Police Department that (1) are kept apart from records described in WAC 478-140-018(A)(1), (2) are maintained solely for lawenforcement purposes, and (3) are not made available to persons other than law-enforcement officials of the same jurisdiction.

c. Records made and maintained in the normal course of business that relate exclusively to the person's capacity as an employee and are not available for any other purposes; provided, however, that records concerning graduate student service appointments shall not be considered to relate exclusively to a student's capacity as an employee.

d. Records on a student that are created or maintained by a physician, psychiatrist, psychologist, or other recognized professional or paraprofessional acting in his or her professional or paraprofessional capacity, or assisting in that capacity, and which are created, maintained, or used only in connection with the provision of treatment to the student, and are not available to anyone other than persons providing such treatment; provided, however that such records can be personally reviewed by a physician or other appropriate professional of the student's choice.

e. Records of an institution that contain only information relating to a person after that person is no longer a student at the University (e.g., information pertaining to the accomplishments of alumni).

B. 1. Recommendations, evaluations or comments concerning a student, whether or not provided in confidence, either expressed or implied, as between the author and the recipient, shall nonetheless be made available to the student, except as provided in paragraphs (2), (3), and (4) of this section.

2. The student may specifically release his or her right to review where the information consists only of confidential recommendations respecting:

a. Admission to any educational institution or component part thereof, or

b. An application for employment, or

c. Receipt of an honor or honorary recognition.

3. A student's waiver of his or her right of access to confidential statements shall apply only if:

a. The student is, upon request, notified of the names of all persons making confidential statements concerning him or

her, the dates of such confidential statements, and the purpose for which the statements were provided, and

b. Such confidential statements are used solely for the purpose for which they were originally intended, and

c. Such waivers are not required as a condition for admission to, receipt of financial aid from, or receipt of any other services or benefits from, the University.

4. Recommendations, evaluations, or comments concerning a student that have been provided in confidence, either expressed or implied, as between the author and the recipient, prior to January 1, 1975, shall not be subject to release under WAC 478-140-018(2)(a); provided, however, that upon request the student is notified of the names of the authors of all such confidential records, the dates appearing on such confidential records and the purpose for which each such confidential record was provided. Such records shall remain confidential and shall be released only with the consent of the author. Such records shall be used by the institution only for the purpose for which they were originally intended.

C. Where requested records or data include information on more than one student, the student shall be entitled to receive, or be informed of, only that part of the record or data that pertains to the student.

D. Students have the right to obtain copies of their education records. Charges for the copies shall not exceed the cost normally charged by a University of Washington copy center (except in cases where charges have previously been approved by regential action for certain specified services, such as transcripts and grade sheets).

E. The Registrar is the official custodian of academic records and, therefore, is the only official who may issue a transcript of the student's official academic record.

F. Student education records may be destroyed in accordance with a department's routine retention schedule. In no case will any record that is requested by a student for review in accordance with WAC 478-140-018 and WAC 478-140-021 be removed or destroyed prior to providing the student access.

Requests and Appeal Procedures (WAC 478-140-021)

A. A request by a student for review of information should be made in writing to the University individual(s) or office(s) having custody of the particular record.

B. An individual(s) or office(s) must respond to a request for education records within a reasonable period of time, but in no case more than forty-five days after the request has been made.

C. 1. After reviewing his or her record, a student may challenge the content of the records if they are felt to be in-

accurate, misleading, or otherwise in violation of the privacy or other rights of the student. In such cases the student should contact the appropriate Dean or director responsible for custody of the record.

2. In cases where a student has been unable to correct or delete such inaccurate, misleading, or otherwise inappropriate data, he or she may request a hearing by the University's Student Records Committee. The Student Records Committee will render its decision within a reasonable period of time following the hearing. The decision of the Student Records Committee shall be final.

a. If, as a result of the hearing, the University Student Records Committee decides that the information of which the student complained is inaccurate, misleading, or otherwise in violation of the privacy or other rights of the student, it shall amend the education records of the student accordingly and shall inform the student in writing of the action taken.

b. If, as a result of the hearing, the University Student Records Committee decides that the information of which the student complained is not inaccurate, misleading, or otherwise in violation of the privacy or other rights of the student, the student shall be given the right to place in the education record a statement commenting upon the information in the education record and/or setting forth any reasons for disagreeing with the decision of the University Student Records Committee.

3. In no case shall any request for review by a student be considered by the University's Student Records Committee that has not been filed with that body in writing within ninety days from the date of the initial request to the custodian of the record.

4. The Student Records Committee shall not review any matter regarding the appropriateness of official academic grades, in that each school or college within the University provides appropriate review procedures in this area.

Release of Personally Identifiable Records (WAC 478-140-024)

A. The University shall not permit access to, or the release of, education records or personally identifiable information contained therein, other than "directory information," without the written consent of the student, to any party other than the following:

1. University staff, faculty, and students when officially appointed to a faculty council or administrative committee, when the information is required for a legitimate educational interest within the performance of their responsibilities to the University, with the understanding that its use will be strictly limited to the performance of those responsibilities.

2. Federal and state officials requiring access to education records in connection with the audit and evaluation of a

federally- or state-supported education program or in connection with the enforcement of the federal or state legal requirements that relate to such programs. In such cases the information required shall be protected by the federal or state official in a manner that will not permit the personal identification of students and their parents to other than those officials, and such personally identifiable data shall be destroyed when no longer needed for such audit, evaluation, or enforcement of legal requirements.

3. Agencies or organizations requesting information in connection with a student's application for, or receipt of, financial aid.

4. Organizations conducting studies for or on behalf of the University for purposes of developing, validating, or administrating predictive tests, administering student aid programs, and improving instruction, if such studies are conducted in such a manner as will not permit the personal identification of students by persons other than representatives of such organizations, and such information will be destroyed when no longer needed for the purposes for which it was provided.

5. Accrediting organizations in order to carry out their accrediting functions.

6. Any person or entity designated by judicial order or lawfully issued subpoena, upon condition that the student is notified of all such orders or subpoenas in advance of the compliance therewith. Any University individual(s) or office(s) receiving a subpoena or judicial order for education records should immediately notify the Attorney General's Division.

B. Where the consent of a student is obtained for the release of education records, it shall be in writing, signed and dated by the person giving such consent, and shall include:

1. A specification of the records to be released.

2. The reasons for such release.

3. The names of the parties to whom such records will be released.

C. In cases where records are made available without student release as permitted by WAC 478-140-024 (A)(2), (3), (4), (5), and (6), the University shall maintain a record kept with the education record released, which will indicate the parties that have requested or obtained access to a student's records maintained by the University and which will indicate the legitimate interest of the investigating party. Releases in accordance with WAC 478-140-024(A)(1) need not be recorded. The records of disclosure may be inspected by the student, the University official responsible for the custody of the records, and other authorized parties.

D. Personally identifiable education records released to third parties, with or without student consent, shall be ac-



companied by a written statement indicating that the information cannot be subsequently released in a personally identifiable form to any other parties without obtaining consent of the student.

E. The term "directory information" used in WAC 478-140-024(A) is defined as student's name, address, telephone number, date and place of birth, major field of studies, participation in officially recognized sports activities, weight and height of members of athletic teams, dates of attendance, degrees and awards received, and the most recent previous educational agency or institution attended by the student. Students may request that the University not release directory information by so indicating on their registration form or through written notice to the Registration Department of the Registrar's Office, 225 Schmitz, Window 3, 1400 Northeast Campus Parkway.

F. Information from education records may be released to appropriate persons in connection with an emergency if the knowledge of such information is necessary to protect the health or safety of a student or other person(s).

University Records (WAC 478-140-050)

All University individual(s) or office(s) that have custody of education records will develop procedures in accord with WAC 478-140-010 through 060. Any supplementary regulations found necessary by departments will be filed with the Student Records Committee, which will be responsible for periodic review of policy and procedures.

A. Disciplinary records shall be kept separate and apart from academic records, and transcripts of a student's academic record shall contain no notation of any disciplinary action. Special precautions shall be exercised to ensure that information from disciplinary or counseling files is not revealed to unauthorized persons. Provision shall be made for periodic review and routine destruction of inactive disciplinary records of offices maintaining such records.

B. No records shall be kept that reflect a student's political or ideological beliefs or associations.

Student Records Committee (WAC 478-140-060)

The Student Records Committee shall be responsible for reviewing unusual requests for information and for assisting in the interpretation of these rules. The committee shall also be responsible for hearing appeals as defined in WAC 478-140-021. The committee shall consist of the Registrar, a graduate student, an undergraduate student, and two faculty and two University staff members. The committee will be advised by a representative of the Attorney General's Division.

Notice of University Records Policy (WAC 478-140-070)

Each year during Autumn Quarter, the University publishes a notice of students' rights under the Family Educational Rights and Privacy Act of 1974, and the regulations interpreting that act, and the University rules and regulations governing disclosure of student records implementing the act, in the University of Washington *Daily*. Copies of the University rules are printed and available through the Washington Administrative Code located in the reference stations throughout campus. In addition, the University of Washington bulletin, distributed to all new students upon entrance to the University, contains references to the University rules and regulations governing disclosure of student records.





THE GRADUATE SCHOOL: GRADUATE STUDY AND RESEARCH

Officers of the Graduate School

Ronald Geballe Dean

Morgan D. Thomas Associate Dean for Academic Programs

H. Myron Swarm Associate Dean for Research

Joan C. Martin Associate Dean for Student Affairs

Trevor L. Chandler Assistant Dean for Minority Education

James D. Linse Graduate Admissions Officer

Executive Committee of the Graduate School

Ronald Geballe, Chairperson

David C. Fowler, Group I

Phillip A. Yantis, Group II

Leon J. Slutsky, Group III

James B. Watson, Group IV

Kenneth D. Walters, Group V

Billy J. Hartz, Group VI

Richard A. Kronmal, Group VII

Pauline M. Bruno, Group VIII

201 Administration

The University of Washington awarded its first graduate degree, a Master of Arts in the field of classical languages, in 1885. In 1914, the University awarded its first Doctor of Philosophy degree, in the field of chemistry. The University has conferred approximately thirty thousand master's degrees and more than six thousand doctoral degrees, exclusive of medical, dental, and first legal doctorates.

The Graduate School was created in 1899 and achieved a permanent basis in 1910. Its purposes are to exercise leadership for the University of Washington in matters pertaining to graduate education, to facilitate the performance of research by its faculty and students, and to foster the integration of education and research to the benefit of both. Through graduate programs, the University fulfills several functions vital to a healthy society: by fostering research, it advances human knowledge; by educating scholars and teachers, it preserves and transmits our cultural heritage; by training professionals, it makes information and help available to the various sectors of the public; and by virtue of all of these, it contributes to the resolution of the problems and needs of society.

Graduate study and research is guided by the Dean of the Graduate School and a Graduate Faculty of sixteen hundred members, selected for their scholarly and research qualifications and their concern with graduate education. More than seventy-five hundred graduate students are now in residence, working toward master's or doctoral degrees; several hundred postdoctoral students and appointees also are in residence. Programs in the Graduate School leading to master's and doctoral degrees are offered in eighty-four departments or other organizational units of the University. The Graduate School directly sponsors nine interdisciplinary degree programs by organizing Graduate School groups of interested faculty members and assisting them in developing such programs. In some instances, a student works with a specially appointed faculty committee to dévelop an individual Ph.D. program.

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 entire Graduate Faculty in all aspects of the student's program, including various major evaluations such as the General and Final Examinations.

Acting through an elected council and an executive committee that advises the Dean, the Graduate Faculty establishes Graduate School policies. Each degree-offering unit within the University appoints a graduate program adviser, who serves as an important link between the unit and the Graduate School. Students are advised to seek the help of the graduate program adviser when questions concerning Graduate School and departmental degree requirements arise.

In addition to its primary concern with graduate students, Graduate Faculty, and programs leading to advanced degrees, the Graduate School has been given a number of responsibilities that relate to its primary ones. It promotes research throughout the University by administering the Graduate School Research Fund, which is composed of institutional funds and is available to support faculty and student activities. It coordinates all requests to outside agencies for the support of research and advanced training. It awards certain graduate fellowships and assistantships. It also administers a number of centers, institutes, and laboratories for advanced study, as well as such central facilities as the University of Washington Press. A particularly significant responsibility is the selection of scholars to occupy the Walker-Ames and the Jessie and John Danz distinguished visiting professorships.

The University has obligated itself to promote greater access to advanced study by women and members of ethnic minority groups. Within the Graduate School, the Minority Education Division actively solicits applications for admission, facilitates their review, and helps with various procedures related to the enrollment of minority graduate students. In conjunction with the University's Office of Minority Affairs, the division offers financial aid and tutorial programs to students who need such help. A special appropriation of funds by the Washington State Legislature permits the award of Graduate Opportunity Assistantships to encourage the recruitment and retention of women and minority students in areas of study where they are particularly underrepresented.

The following sections offer details of graduate degree programs, requirements, and other matters of interest to prospective and current graduate students.

GRADUATE PROGRAMS AND DEGREE POLICIES

Graduate programs leading to master's and doctoral degrees are offered in eighty-four departments or other organizational units of the University. A list of these programs and the degrees offered is provided later in this section.

The following sections contain detailed information concerning policies and procedures relating to admission into, and completion of, graduate degree programs. Students are advised to verify this information with the graduate program adviser and the supervisory committee.

Graduate Program Adviser

The graduate student's initial work at the University is guided by the graduate program adviser in his or her field. The adviser 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 adviser 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, students enrolled in the Graduate School 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 and the Graduate School, may be part of the graduate program. The Graduate School accepts credit in approved 300-level courses for the minor or supporting fields only; approved 400-level courses are accepted as part of the major as well as minor or supporting fields. Courses numbered 498 or entitled Special Topics or Special Projects normally are not applicable to graduate programs if these are addressed primarily to introductory content and undergraduate students. Undergraduate research (499) is not accepted as part of the graduate program.

Postbaccalaureate, nonmatriculated students, and undergraduate students may enroll in 500-level courses, provided that permission has been obtained in advance from the faculty member who will teach the class and from the departmental Chairperson or designated representative. See Graduate School Memorandum No. 36 for additional information on graduate courses.

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 being 4.0, 3.9, . . . and decreasing by one-tenth until 1.7 is reached. Grades below 1.7 are recorded as 0.0 by the Registrar and do not count toward residency, total credit count, or grade and credit requirements. A minimum of 2.7 is required in *each course* that counts toward satisfying the Graduate School requirement for 18 hours of course work numbered 500-700 at the master's level and for half of the course work at the 500-800 level for the doctoral degrees. A minimum grade-point average of 3.00 is required for graduation.

Correspondence between number grades and letter grades is as follows:

Numeric Grade-point	eric point Letter	
Equivalent	Grade	
4.0	Α	
3.9		
3.8		
3.7	•	
3.6		
3.5		
3.4		
3.3	•	
3.2	•	
3.1	•	

3.0 B 2.9 2.8 2.7 2.6 2.5 2.4 2.3 2.2 2.1 2.0 С 1.9 1.8 1.7 Lowest passing grade 1.6-0.0 Ε

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. A written statement giving the reason for the incomplete and indicating the work required to remove it must be filed by the instructor with the head of the unit in which the course is offered.

To obtain credit for the course, a student must convert an incomplete into a passing grade by the last day of the next quarter in residence. This rule may be waived by the Dean of the college in which the course is offered. In no case may an incomplete be converted into a passing grade after a lapse of two years or more.

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

S/NS Satisfactory/not satisfactory. A graduate student, with the approval of the graduate program adviser or supervisory committee chairperson, may elect to be graded S/NS in any numerically graded course for which he or she is eligible. The choice must be indicated at the time of registration or during the official change period; S/NS grades may not later be converted to numeric grades or vice versa. The instructor submits a numeric grade to the Registrar's Office for conversion to S (numeric grades of 2.7 and above) or NS (grades lower than 2.7). 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 class at the end of the quarter.

W Withdrawal. Official withdrawal from a course during the first ten class days of a quarter is not entered on the permanent academic record. After the first two weeks and through the seventh week of the quarter, a graduate student may withdraw from a course by filing a form with the Registrar's Office. A grade of W is recorded. No official withdrawal is permitted after the seventh week of the quarter except under the conditions described under Withdrawal Policy.

Unofficial withdrawal from a course results in a grade of 0.0.

The grade W counts neither as completed credits nor in computation of the grade-point average.

Of the minimum number of credits required for a graduate degree, a graduate student must show numerical grades in at least eighteen quarter hours of course work taken at the University of Washington. These numerical grades may be earned in 300-, 400-, and 500-level courses.

A graduate student's grade-point average is calculated entirely on the basis of number grades in 300-, 400-, and 500level courses. The grades of S, NS, CR, NC, and N are excluded, as are all grades in courses numbered 600, 700, and 800, and in 100- and 200-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 adviser or supervisory committee chairperson.

Withdrawał Policy

1. During the first two weeks of the quarter, graduate students may withdraw from a class for any reason by filing an appropriate form with the Registrar. No entry is made on the student's record.

2. After the first two weeks and throughout the seventh week of the quarter, a graduate student may withdraw from a course by filing an appropriate form with the Registrar. A grade of W is recorded.

3. No official withdrawal is permitted after the seventh

Graduate Degree Programs Offered

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Field	Graduate Degrees Offered	Field	Graduate Degrees Offered
Anthropology	M.A., Ph.D.	Kinesiology	M.S., M.S.Phys.Ed.
Applied Mathematics	M.S., Ph.D.	Health Education	
Architecture	M Arch	Physical Education	· ·
	MEA	Laboratory Medicine	- MTM
Aut Wistom	MA DED	Landrady Withhelie	MIL.M.
Art riskory		Landscape Architecture	
Asian Languages and Laterature	M.A., PB.D.	Law	. LL.M., Ph.D.
Astronomy	M.S., PI.D.	Librarianship	M.LIDT., M.LawLidt.
Atmospheric Sciences	M.S., Ph.D.	Linguistics	M.A., Ph.D.
Biochemistry	M.S., Ph.D.	Marine Affairs	M.M.A.
Biological Structure	M.S., Ph.D.	Mathematics	M.A., M.S., Ph.D.
Biology Teaching	M.A.T.	Microbiology and Immunology	M.S., Ph.D.
Biomathematics	M.S., Ph.D.	Music	M.A., M.A.T., M.Mus., D.Mus.Arts, Ph.D.
Biomedical History	M.A.	Near Fastern I anguages and Literature	MÁ
Botany	M.S., Ph.D	Nurring	MA MNumine BhD
Business Administration	MRA MRAC PhD	Nutritional Sciences and Testilas	MAL ME
Chemister	MC DLD	Automat Sciences and Textures	M.A., M.S.
Chemistry	M.S., FILD.	Occanography	M.S., M.D.
Classics	M.A., PD.D.	Oral Biology	M.S., Ph.D.
Communications	M.A., M.C., Ph.D.	Pathology	M.S., Ph.D.
Comparative Literature	M.A., Ph.D.	Pharmaceutical Sciences	M.S., Ph.D.
Computer Science	M.S., Ph.D.	Pharmacology	M.S., Ph.D.
Concurrent Degree	Various	Pharmacy Practice	M.S.
Dentistry	M.S.Den.	Philosophy	MA PhD
Doctor of Arts	D.A.	Physics	MSPhD
Dema	MFA	Division and Disphyrics	M.C. D.D.
Dunne Arte	Dh D	Physiology and Diophysics	M.S., FLD.
	MADED	Physiology-Psychology	Ph.D.
Economics		Political Science	M.A., Ph.D.
Education -	M.Ed., Ed.D., Ph.D.	Psychology	M.S., Ph.D.
Engineering	M.S.E., M.Eng., M.S.	Public Attairs	M.Pub.Admin.
Acronautics and Astronautics	M.S.A.&A., Ph.D.	Public Health and Community Medicine	M.S.P.H., M.P.H.
Ceramic Engineering	M.S.Cer.E., Ph.D.	 Biostatistics 	
Chemical Engineering	M.S.Ch.E., Ph.D.	Environmental Health	,
Civil Engineering	M.S.Civ.E., Ph.D.	Epidemiology	Ph.D.
Electrical Engineering	M.S.E.E., Ph.D.	Health Services	
Mechanical Engineering	M.S.M.E., Ph.D.	Pethobiology	
Metallurgical Engineering	M.S.Met.E., Ph.D.	Radiological Sciences	M.S. Red Sci
Nuclear Engineering	MSNE PDD	Pababilitation Medicine	M.S. M.Ossue Therman M. Dhue Therman
English	MA MAT PhD	Remember I compared and Literature	M.S., M.Occup. Incrapy, M.Phys. Incrapy
Eisharian	MC BD	Romance Languages and Literature	M.A., FU.D.
Fisherics	MC MED DOD	Schulinavian Languages and Literature	M.A., PD.D.
POICH RESOURCE	M.S., M.F.K., FILD.	Slavic Languages and Literature	M.A., Pb.D.
Geneacs	M.S., PD.D.	Social Welfare	Ph.D.
Geography	M.A., Pp.D.	Social Work	M.Soc.Work
Geological Sciences	M.S., Ph.D.	Sociology	M.A., Ph.D.
Geophysics Program	M.S., Ph.D.	Special Individual Ph.D. Program	Ph.D.
Germanics	M.A., Ph.D.	Speech Communication	M.A., Ph.D.
Health Services Administration and Planning	M.Hcalth Admin.	Speech and Hearing Sciences	M.S., M.Sp.Path.&Aud., Ph.D.
History	M.A., Ph.D.	Urban Planning	M.Urban Planning, Ph.D.
International Studies	M.A.Internat'l Studies	Zoology	M.S. Ph.D.
East Asian Studies			
Bussian and East Bussiann Studies			

For additional information see individual program descriptions elsewhere in this catalog.



week of the quarter except as follows: A student may petition the Registrar in writing to drop a course. The Registrar grants such a petition with the concurrence of the Graduate School if in his or her judgment (a) the student is unable to complete the course in question due to a severe mental or physical disability, or (b) unusual and extenuating circumstances beyond the student's control have arisen that prevented him or her from dropping by the end of the seventh week. Petitions must be filed promptly after the occurrence of the event that gave rise to the need for dropping.

4. The withdrawal schedule shown above applies to quarters of the regular academic year. The deadlines for Summer Quarter are established by the Dean of Summer Quarter.

5. Unofficial withdrawal from a course results in a grade of 0.0.

Scholarship

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

Failure to maintain a 3.00 grade-point average, either cumulative or for a given quarter, constitutes low scholarship and may lead to a change-in-status action by the Graduate School. See Graduate School Memorandum No. 16 for additional information.

Language Competence 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 researchoriented programs leading to the degrees of Master of Arts, Master of Science, and Doctor of Philosophy. It is assumed that students from English-speaking countries who are admitted to the Graduate School are competent in the English language; students from non-English-speaking countries must demonstrate a satisfactory command of English.

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 advisers for information and advice about desirable or required competence in foreign languages. Details of completion of this departmental requirement must be transmitted to the Graduate School by the graduate program adviser. When appropriate, students are urged to establish foreignlanguage 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 Testing Service (ETS). These examinations are given at the University and elsewhere throughout the United States on published dates. For other foreign languages, examinations are given at the University of Washington on the day before scheduled ETS examinations.

Residence

The residence requirement for the master's degree is one year (three full-time quarters). For the doctoral degree it is three years, two of them at the University of Washington, and one of the two years must be spent in continuous fulltime residence (three out of four consecutive quarters). The residence requirement for the doctoral degree cannot be met solely with summer or part-time study.

Once a student is admitted to a graduate degree program, a full quarter of residence is granted for any quarter in which at least 9 credits in graduate course, research, thesis, or dissertation work are acceptably completed.

Residence credit for students carrying fewer than 9 credits per quarter is figured by combining the part-time quarters to total 9 or more credits to make a full residence quarter equivalent.

Only courses numbered 400, 500, 600, 700, and 800 can be applied to residence or course credit in the major field for advanced degrees. Courses numbered 300 are not applicable to residence or course credit toward advanced degrees except when applied by permission of the graduate program adviser or supervisory committee toward the graduate minor or supporting courses. Courses numbered below 300 are not applicable to residence or course credit for advanced degrees.

Final Quarter Registration

A student must be registered as a full-time or part-time student at the University during the quarter the master's degree, the Candidate certificate, or doctoral degree is conferred.

A student who has been approved for the tentative degree list for a particular quarter and does not complete the requirements by the published deadlines (two weeks prior to the end of the quarter), but who does complete all the requirements by the last day of that quarter, receives the degree the following quarter without further registration.

Continuous Enrollment and On-Leave Requirement

Policy

Each student from the time of first enrollment in the Graduate School is to be registered or On-Leave each quarter until completion of all requirements for the graduate degree for which the student is working, including the filing of the thesis or dissertation, the passing of the master's or doctoral final examination, and the awarding of the degree. A registered graduate student must be enrolled as a full-time, parttime, or On-Leave student to maintain graduate status. 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 adviser or alternate. The student must have registered for, and completed, at least one quarter in the University of Washington Graduate School to be eligible for On-Leave status. An On-Leave student is entitled to use the University library 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 Former Student Enrollment Application (available at 225 Schmitz) before the deadline stated on the form, and register in person in the usual way as a full- or parttime student. See Graduate School Memorandum No. 9 for procedures.

Registration in Absentia

In unusual cases, a graduate student may need to work *in absentia* at a place distant from the campus and yet actively continue in correspondence or conferences with professors at the University and proceed with the thesis or dissertation research. In this situation the student enrolls and registers as a full-time student *in absentia* or a part-time student *in absentia* and pays the usual fees for a full- or part-time student, after previously having the proposed *in absentia* work approved by the student's graduate program adviser or supervisory committee chairperson. Periods of *in absentia* registration are counted toward completion of the requirements for residence by graduate students on the campus of the University of Washington.

Readmission

A student previously registered in the Graduate School who has failed to maintain continuous enrollment but who wishes later to resume studies must file an application for readmission to the Graduate School by the regularly published closing dates in person or by mail. 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 University of Washington, 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 of \$10.

Graduate Student Classifications

The following classifications are assigned to graduate students and postdoctoral appointees on the basis of their advancement toward, or completion of, graduate degrees:

Category Number Title

1 Premaster

2 Post-master

3 Precandidate

Candidate

5 Postdoctoral Appointee

Description

A premaster has been admitted to the Graduate School, but has not yet completed a master's degree or the equivalent.

A post-master has completed the master's degree or equivalent, but has not yet had a doctoral Supervisory Committee appointed.

A precandidate has had a doctoral Supervisory Committee appointed, which signifies admission into a doctoral program, but has not yet completed the Graduate School General Examinations.

A Candidate has completed the General Examinations, but has not yet completed the dissertation and Final Examination.

A postdoctoral appointee has completed a doctoral degree and is engaged in research or scholarly work in residence at the University, but is neither an enrolled student nor a member of the faculty.

Master's Degree

Summary of Graduate School Requirements.

Each aspirant of the master's degree must meet the following Graduate School 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 presented. Under a nonthesis program a minimum of 36 or more quarter credits of course work are required.

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 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 University of Washington. The Graduate School accepts numerical grades in (a) approved 300-level courses for the minor and supporting fields only, (b) in approved 400-level courses accepted as part of the major, and (c) in all 500-level courses. A minimum cumulative grade-point average of 3.00 is required for a graduate degree at the University.

4. A minimum of three full-time quarters of residence credit must be earned. Part-time quarters may be accumulated to meet this requirement (see detailed information under Residence).

5. A certificate or, where applicable, departmental verification of proficiency in a foreign language if one is required for a particular degree.

6. In a thesis degree program, a thesis, approved by the supervisory committee, must be prepared, unless specifically exempted in a particular program. A student must register for a minimum of 9 credits of thesis (700).

7. A final master's examination, either oral or written, as determined by the student's supervisory committee, must be passed.

8. Any additional requirements imposed by the graduate program adviser 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 adviser in the major department or the student's supervisory committee determines the requirements for the minor or supporting courses.

9. The graduate student must make application for the master's degree at the Graduate School within the first two weeks of the quarter in which he or she expects the degree to be conferred, in accordance with Application for the Master's Degree, as described below.

10. The graduate student must be registered either as a fullor part-time student at the University for the quarter in which the degree is conferred (see detailed information under Final Quarter Registration).

11. All work for the master's degree must be completed within six years. This includes applicable work transferred from other institutions.

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

Preparation and Advising

A graduate student is expected to be prepared for the graduate program into which he or she is admitted and should confer with the graduate program adviser in planning a study program and frequently thereafter during the course of graduate study.

Transfer and Extension Credit

A student working toward the master's degree may petition the Dean of the Graduate School for permission to transfer to the University of Washington graduate quarter credits taken while a graduate student in another recognized graduate school. Twenty-five percent of the course work degree requirements, or 9 credits, may be transferred. The petition must be accompanied by a written recommendation from the graduate program adviser.

In the same manner, the student may petition the Dean of the Graduate School for permission to apply up to 6 credits of work taken in extension classes, but only if taken at the University of Washington and if taken after the student has been officially admitted to the Graduate School here.

A combination of transfer and extension credits should not exceed twenty-five percent of the course work degree requirements to be applied to the master's degree. The minimum residence requirement of three quarters at the University of Washington, the 18 quarter credits of numerically graded course work, and 18 quarter credits of 500-leveland-above course work may not be reduced by transfer credit.

Extension credit may be applied toward 18 quarter credits of numerically graded course work only with the approval of the Graduate School. The student may petition for such action *after* the course work has been recorded on the transcript.

Credit neither by independent study through correspondence nor by advanced credit examinations is acceptable.

Thesis

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 forms signed by the members of the supervisory committee from the major department, must be deposited in the Graduate School at least two weeks before the end of the quarter in which the degree is to be conferred. The faculty in the department may require the student to present an additional copy for its own use. Instructions for the preparation of theses in acceptable form may be obtained at the Graduate School.

Nonthesis Programs

Some departmental faculties have arranged programs for the master's degree that do not require the preparation of a thesis. These 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, but not later than the time that the student's application for the degree has been approved, the faculty in the student's major department appoints a supervisory committee, ordinarily consisting of two or three members but not more than four. The committee chairperson arranges the time and place of the final examination, the results of which must be reported by the graduate program adviser to the Graduate School at least two weeks before the date on which the degree is to be conferred. The examination may be oral or written, and all members of the supervisory committee must certify its results. If the examination 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 period of further study.

Application for the Master's Degree

The student must make application for the master's degree at the Graduate School within the first two weeks of the quarter in which he or she expects the degree to be conferred. 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. The previous work taken by the student, together with the current registration as planned with the approval of the graduate program adviser in the student's department, must meet the requirements for the degree if the application is to be approved. The applicant is notified promptly if the minimum requirements for the degree cannot be satisfied at the end of the quarter. Once approved, the application is forwarded to the departmental graduate program adviser.

The master's degree application, reporting the final examination results and signed by the student's supervisory committee certifying that all departmental requirements have been met, must be returned by the graduate program adviser to the Graduate School at least two weeks before the end of the quarter of the initial application if the degree is to be conferred that quarter. If all requirements are completed *after* this deadline but *before* the last day of that quarter, the degree is conferred the following quarter without further registration.

Master's degree applications are valid for *two consecutive* quarters, and if requirements for the degree are not completed during the quarter of the initial application, the student's application may be retained by the graduate program adviser for the quarter *immediately* following (e.g., Autumn to Winter, Winter to Spring, Spring to Summer, Summer to Autumn) and returned to the Graduate School two weeks before the end of the second quarter. Thereafter, the application is void, and the student must file a *new* application for the degree in the Graduate School during the first two weeks of the quarter in which work for the degree is to be completed.

The student and the departmental graduate program ad-

viser 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, English, and music.

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 Arts, Doctor of Education, and Doctor of Musical Arts.

Aspirants for these degrees who have passed the Graduate School General Examination for admission to candidacy and who have completed all requirements for the degree except the dissertation and the Final Examination are awarded the appropriate Candidate's certificate: Candidate in Philosophy (Ph.C.), Candidate in Arts (C.A.), Candidate in Education (Ed.C.), and Candidate in Musical Arts (C.M.A.).

When an aspirant for the doctoral degree has been admitted officially to candidacy as described in a later section under the heading Admission to Candidacy for the Doctoral Degree, a Candidate's certificate signed by the President of the University and the Dean of the Graduate School is transmitted to the aspirant in recognition of the achievement of the status of Candidate.

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, the student must meet the following Graduate School *minimum* requirements:

1. Completion of a program of study and research as planned by the graduate program adviser in the student's major department or college and the Supervisory Committee. Half of the total program, including the dissertation, must be credits in courses numbered 500 and above. Every student is expected to take some work outside the major field, and the Supervisory Committee determines the requirements for minor and supporting courses.

2. Presentation of a minimum of three academic years of resident study (see detailed information under Residence), two of them being at the University of Washington with at least one year in continuous full-time residence. The continuous year may be satisfied with three out of four consecutive full-time quarters being completed at the University of Washington and is completed prior to the General Examination. Residence requirement for the doctoral degree cannot be met solely by part-time study.

3. Numerical grades must be received in at least 18 quarter credits of course work taken at the University of Washington. The Graduate School accepts numerical grades in approved 300-level courses for the minor or supporting fields only, in approved 400-level courses accepted as part of the major, and in all 500-level courses. A minimum cumulative grade-point average of 3.00 is required for-a graduate degree at the University.

4. Demonstration of a reading knowledge of one or more foreign languages related to the major field of study, if required for the student's particular degree program. Details of completion of this departmental requirement must be transmitted to the Graduate School by the graduate program adviser.

5. Creditable passage of the General Examination.

6. 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 is expected to register for a minimum of 27 credits of dissertation over a period of at least three quarters. Normally, two of these three quarters must come after the student passes the General Examination and before a warrant is authorized for the Final Examination.

7. Creditable passage of a Final Examination, which is usually devoted to the defense of the dissertation and the field with which it is concerned.

8. Completion of all work for the doctoral degree within ten years. This includes applicable work from the master's degree or a master's degree from another institution, if applied toward one year of resident study other than the continuous full-time year of study.

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

10. Satisfaction of the requirements that are in force at the time the degree is to be awarded.

Preparation and Advising

A graduate student is expected to be prepared for the graduate programs into which he or she is admitted. On admission to the Graduate School, a graduate student should confer with the departmental graduate program adviser in planning his or her program and frequently thereafter during the course of graduate study.

Special Individual Ph.D. Programs

Special Individual Ph.D. Programs may be arranged by permission of the Dean of the Graduate School for exceptionally able students whose objectives for study toward the Ph.D. degree do not fall within the scope of a single, Ph.D.-degree-offering unit.

A graduate student may request permission to pursue a Special Individual Ph.D. Program when he or she has completed the master's degree or identifiable equivalent, or has been admitted to the Graduate School and completed at least three quarters of full-time work at the University and has carefully planned an appropriate program of studies.

The graduate student should discuss the proposal with a Graduate Faculty member qualified to provide appropriate guidance. If the faculty member agrees that the program is feasible and desirable, he or she then establishes a special advisory committee. This committee will consist of at least three, but usually not more than five, other members of the Graduate Faculty representing the student's fields of interest, and it must include faculty members from at least two academic units of the University.

The student then submits a Special Individual Ph.D. Program Proposal, accompanied by the endorsement of the special advisory committee, to the Dean of the Graduate School. Graduate School Memorandum No. 25 contains additional information, proposal forms, and instructions, and is available from the Graduate School.

Concurrent Degree Programs

Concurrent programs are a pair of programs that may be taken at the University of Washington by a postbaccalaureate student with one program leading to a professional degree (i.e., Juris Doctor in the School of Law, Doctor of Medicine in the School of Medicine, or Doctor of Dental Surgery in the School of Dentistry) and the other leading to one of the graduate degrees offered by the Graduate School. Rather than sequentially completing first one and then the other degree, the student can conserve time and the University's resources by proceeding in a coordinated way toward completion of the degree objectives.

The Graduate School encourages such coordination of programs. Postbaccalaureate students desiring to work toward a master's or doctoral degree in the Graduate School, and concurrently toward the J.D., M.D., or D.D.S. degrees, should confer with the appropriate concurrent degree coordinator.

Doctor of Arts Degree

The policy of the Council of Graduate Schools in the United States declares that "preparation at the doctoral level for a career in the practice of undergraduate college teaching, ordinarily in one of the fields of the humanities or the social sciences or the natural sciences, may be recognized by the award of the degree of Doctor of Arts." The Graduate School of the University of Washington recognizes that further study leading to the Doctor of Arts degree may be appropriate for those who look forward to a career of professional practice in undergraduate or community college teaching and who desire to carry their preparation beyond the master's degree. Therefore, under certain circumstances the degree may be offered.

Inquiries concerning this degree program should be addressed to the Graduate School.

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. The Supervisory Committee, which should be appointed early in the student's career-but in any case no later than four months prior to the General Examinations-is expected to evaluate the student's performance throughout the program. Appointment of the Supervisory Committee indicates that the Graduate Faculty in the student's field finds the student's background and achievement a sufficient basis 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. If "preliminary" examinations are not an academic unit's requirement, it is appropriate to request appointment of the Supervisory Committee during the student's first year of study. See Graduate School Memorandum No. 13 "Supervisory Committees for Graduate Students."

Admission to Candidacy for the Doctoral Degree

At the end of two years of graduate study, the chairperson of the Supervisory Committee may present to the Dean of the Graduate School, for approval, a warrant 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. The warrant is approved by the Dean of the Graduate School only after the prescribed requirements of residence and study have been met and any specified language requirement has been fulfilled. The warrant should indicate time, place, and manner of examination, and must be received at least two weeks prior to the proposed examination date. Written and other examinations prior to the oral are the responsibility of the department and do not need Graduate School approval. During the oral examination, the chairperson and at least two members of the examining committee, as well as the Graduate Faculty representative, must be present.

If the student's performance is judged by the Supervisory Committee to be satisfactory, a warrant certifying the successful completion of the General Examination is filed in the Graduate School by the chairperson of the student's Supervisory Committee. 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 described earlier in this section. After achieving Candidate status, the student ordinarily devotes his or her time primarily to the completion of research, writing the dissertation, and preparation for the Final Examination.

It is expected a student usually will be registered at least two quarters at the University of Washington after passing the General Examination and before a warrant is authorized for the Final Examination.

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. Requirements for the preparation of the dissertation in acceptable form may be obtained from the Graduate School.

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 from among the members of the Supervisory Committee.

Once the Reading Committee is established officially with the Graduate School, a Request for Final Examination (signed by the Supervisory Committee chairperson and the members of the Reading Committee) may be presented to the Graduate School. Two weeks prior to the Final Examination date, and if the Candidate has met all other requirements, a warrant authórizing the Final Examination is issued by the Graduate School.

Using forms provided by the Graduate School, the Reading Committee prepares a report briefly summarizing the distinctive achievements of the research, the methods used, and the results. One copy of the report with the original signatures of the Reading Committee must be submitted to the Graduate School after the Final Examination.

If the Final Examination is satisfactory, the Supervisory Committee signs the warrant and returns it to the Graduate School at least two weeks before the end of the quarter in which the degree is to be conferred. 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.

Publication of Doctoral Dissertations

Doctoral dissertations are published in full on microfilm, and the abstract is published in "Dissertation Abstracts." Two weeks before the end of the quarter in which the degree is to be conferred, the Candidate must present two copies of his or her dissertation at the Graduate School. Each copy is to be accompanied by an abstract, not exceeding six hundred words in length, that has been approved by the Supervisory Committee at the time of the Final Examination. A receipt for the \$30 publication charge must be shown when the dissertation is presented. If the student wishes to register a copyright for the dissertation using the services of University microfilms, a receipt for the \$25 copyright fee must also be shown when the dissertation is presented.

The Candidate signs the publication agreement at the time the dissertation is presented to the Graduate School. Publication in microfilm does not preclude other forms of publication.

GRADUATE ADMISSIONS

In accordance with University policy, admission to graduate study in the University opens the opportunity to pursue programs leading to advanced degrees. The Graduate School is responsible for determining the requirements for admission to graduate study. The basic objective of the admission policy of the Graduate School is to admit those students deemed best able to contribute to, and benefit from, the educational programs and opportunities offered at the University. To achieve this objective, the process of admissions must be mindful of society's need for highly trained individuals from all segments of the population.* Within the limit imposed on overall graduate enrollment in the University, admission to a specific graduate degree program is limited to the number of students for whom faculty, staff, and facilities can provide graduate instruction and research guidance of high quality. Each graduate student must be admitted into a specific graduate program; the Graduate School does not permit general graduate enrollment.

Admission Procedure

Admission to the Graduate School is granted by the Dean of the Graduate School. Application for admission is made to the Office of Graduate Admissions. Each applicant must submit a completed University of Washington application form and arrange for the receipt of official transcripts by the office from all previously attended colleges, universities, and institutes. Each department or other unit authorized to offer a graduate degree program maintains a Graduate Admissions Committee consisting of not fewer than three Graduate Faculty members. The committee receives from the Office of Graduate Admissions all completed applications for admission to the unit. The Admissions Committee is responsible for the fair and complete evaluation of applicants and for recommending to the Dean of the Graduate School the names of applicants who are considered to be qualified for admission. The committee is expected to maintain files and to be able to demonstrate that full and fair consideration has been given to each applicant for admission.

Priority for admission of applicants into a graduate degree program is based upon the applicant's apparent ability, as determined by the University, to complete the program expeditiously with a high level of achievement and also upon the applicant's promise for success in his or her subsequent career. In addition, Graduate School admission policy requires the following:

1. No practice may discriminate against an individual because of race, color, national origin, handicap, sex, age, religious preference or background, or status as disabled veteran or Vietnam era veteran.

2. Sustained efforts shall be made to recruit qualified students who are members of groups that have been subject to discrimination or are underrepresented in certain disciplines.

3. Race or ethnic background or sex may be a favorable consideration in admitting to a unit individuals from its pool of qualified applicants. Such individual consideration is relevant where it:

a. Reflects prior adverse discrimination.

b. Has contributed to former educational disadvantage.

c. Involves direct knowledge of special cultural patterns or meets special educational objectives consistent with University policy.

4. All applicants to a degree-offering unit shall be processed through the same set of procedures to ensure that a comparative evaluation is made and that all applicants are evaluated on their individual merits.

5. A current statement of admission procedures used by each unit shall be on file in the Graduate School.

^{*} The two preceding statements have been adapted from the University of Washington Policy Statement on Admissions approved by the Board of Regents on February 9, 1979.

In developing a pool of qualified applicants for admission to the Graduate School, the following factors may be taken into account by a degree-offering unit:

1. Undergraduate grades, especially for subjects in, or closely related to, the field of the applicant's proposed graduate work (at least a B, or 3.00 grade-point, average is expected).

2. The applicant's consistency in proceeding through an undergraduate degree program.

3. Scores on the Graduate Record Examination verbal, mathematical, and analytical tests, and on the GRE advanced test or other tests related to the applicant's field and on other aptitude tests that may be required.

4. Personal interviews of the applicant by the department admissions committee.

5. The career objectives of the applicant and the extent to which the graduate degree program may be expected to prepare him or her for those objectives.

6. Written and oral recommendations from persons who are qualified to evaluate the applicant's academic record and promise.

7. The applicant's degree objective (i.e., master's degree, doctoral degree, or a master's degree followed by a doctoral degree).

Weights given to these factors may vary among academic units.

Admission to the Graduate School usually signifies admission into a program of graduate study leading to a master's degree or the equivalent, or into' post-master's study if the student admitted already has received a master's degree or has successfully completed equivalent graduate study. Admission does *not* imply acceptance of a graduate student into a program of study leading to a doctoral degree. A student becomes a Candidate for the doctoral degree only on the completion of specific requirements intended to demonstrate to the satisfaction of the student's unit and the Graduate School the apparent ability of the student to progress satisfactorily through the doctoral degree program.

Counseling and Financial Assistance

To assist in attracting individuals from low-income families into the qualified applicant pool, the Graduate School offers certain kinds of financial assistance and works with other University offices to arrange for counseling and financial aid.

Enrollment Limitation

Total Graduate School enrollment is determined by the University administration in furtherance of University intent to maintain proportions of graduate students and other categories of students appropriate to the role of the University in its particular setting. The Dean of the Graduate School, after consultation with other University offices and faculty, assigns enrollment targets to the graduate-degreeoffering units. These targets are based on the combined judgment of these parties as to the demand for the program and the resources available to it.

In assigning enrollment targets, the following factors are considered:

1. The scale of the graduate faculty, supporting staff, facilities, and other resources available.

2. The numbers of graduate students already in the various levels of graduate study in the program.

3. The number of applicants seeking admission in the field.

4. Circumstances outside the University that are specific to certain fields.

5. The total number of enrollment places assigned to the Graduate School.

First preference in enrollment is given to continuing graduate students (i.e., those who already have been admitted into a graduate program, who are in good standing, and who have maintained continuous enrollment as in-residence, *in absentia*, or on-leave students). After continuing graduate students are accommodated, the remaining places are available for the enrollment of new students or the reenrollment of former students who have not maintained continuous enrollment.

Visiting Graduate Students

A student who wishes to enroll in the Graduate School at the University of Washington and who intends thereafter to return to the graduate school in which he or she is working toward an advanced degree may be admitted as a visiting graduate student. This admission is contingent on available space and facilities.

Such a student must have been officially admitted to another recognized graduate school and be in good standing and actively pursuing a graduate program at present or during the past ten years at that institution. The student need not submit a full transcript of credits, but must apply for admission, pay the \$10 application fee, and ask the Dean of his or her graduate school to certify the applicant's status on a special form entitled Visiting Graduate Student— Certificate of Status, which may be obtained by writing to the University of Washington, Office of Graduate Admissions, AD-10, Seattle, Washington 98195.

Applications must be filed according to instructions on the application form prior to the following dates: July 1 for Autumn Quarter, November 1 for Winter Quarter, February 1 for Spring Quarter, and May 15 for Summer Quarter.



Admission to the University of Washington as a visiting graduate student *does not guarantee* admission to any particular course of study. A visiting graduate student is permitted to register only in those courses for which he or she is judged to be eligible by a faculty adviser or the instructor in the course and if space is available to accommodate registration.

If at any later time the student wishes to apply for admission to the Graduate School of this university to work toward a degree, he or she must make formal application and submit complete credentials. If a visiting graduate student is later given formal admission and begins work toward a degree at the University of Washington, he or she may petition the Dean of the Graduate School for allowance of credit for courses taken as a visiting graduate student to be applicable toward the graduate program.

How to Apply

Requests for the form Application for Admission to the Graduate School should be addressed to the graduate program adviser of the department in which the student expects to pursue a program of study or to the Office of Graduate Admissions. Other correspondence relative to admission procedures should be addressed to the University of Washington, Office of Graduate Admissions, AD-10, Seattle, Washington 98195.

Each applicant for admission to the Graduate School as a regular graduate student or as a visiting graduate student must pay an application fee of \$10. Payment, in United States currency only, must accompany the application. This fee is not refundable and is not credited against any other fees charged by the University.

Regular Graduate Students

The application for admission, the required transcripts in duplicate, and \$10 application fee must be filed in accordance with instructions appearing on the application form, prior to the following dates: July 1 for Autumn Quarter, November 1 for Winter Quarter, February 1 for Spring Quarter, and May 15 for Summer Quarter (these dates are subject to change by the University). Early application is advised, because some departmental targets are filled well in advance of these dates.

The foregoing dates apply to new students as well as to former students of the University who have not attended since receiving their baccalaureate degrees. A former⁶studént must apply as a new student for admission to the Graduate School or for admission to an undergraduate college as a postbaccalaureate student. In some cases, departments suggest that applications be submitted earlier than the dates herein set forth (note in this catalog the section pertaining to the appropriate department).

When the required application, official credentials, and \$10 application fee have been received, an evaluation is made and the applicant is notified of his or her admission status.

All records become a part of the official file and can be neither returned nor duplicated for any purpose. A student should obtain an additional copy of his or her official credentials to keep for advisory purposes. Failure to submit complete and accurate credentials may result in permanent dismissal from the University.

General information and instructions for registration are mailed to new students with the notice of admission. In the event of a discrepancy, these instructions supersede those found in earlier publications. The University assumes no responsibility for students who come to the campus before they have been officially notified of their admission.

The admissions credentials of applicants who do not register for the quarter to which they have been admitted are normally retained in the Office of Graduate Admissions for a period of one year from the date of application. At the end of this period, credentials on file are discarded unless the applicant has notified the Office of Graduate Admissions of a continued interest in attending the University. When an applicant who has served this notice wishes to reactivate admission procedures, he or she must submit a new application form together with the \$10 application fee in advance of the application closing date for the quarter desired. Credentials from the earlier file may be used. Should a student wish to renew the application after the one-year lapse, a new application and new credentials must be submitted and the \$10 application fee paid in advance of the dates given above for the quarter desired.

University of Washington students who are within 6 credits. of completing their undergraduate work, 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 graduate courses in addition to the last 6 credits they require of undergraduate work. This registration and these arrangements must be approved by the graduate department that the student will enter; however, students concerned are not reclassified as graduates until the baccalaureate degree has been granted and after their official admission to the Graduate School. At that point, it is necessary to petition the Graduate School to transfer the 6 credits. Only under these circumstances may graduate work taken as an undergraduate be applied toward an advanced degree. Further registration for graduate work is contingent upon completion of the requirements for the baccalaureate degree.

International Students

Students from abroad are expected to meet the same general requirements as applicants educated in American schools. The admission application, official credentials, and \$10 application fee must be received in the Office of Graduate Admissions at the University of Washington before the closing dates for domestic graduate students. In addition, applicants must demonstrate a satisfactory command of English and must have sufficient funds available in the United States to meet their expenses. The \$10 fee, which must accompany the application, must be payable in United States currency in the form of an international postal money order, a draft on a United States bank, or a traveler's check.

Students who meet the minimum language proficiency requirements and are accepted for Autumn Quarter admission prior to May 15 may register for intensive English through the Language Learning Center for the Summer Quarter. Information may be obtained from the graduate program adviser.

Veterans

Veterans and children of deceased or totally disabled veterans must meet the general admission criteria and follow the general procedures outlined for all applicants. Applications for, and questions about, government aid should be addressed to a Veterans Administration regional office.

Second Baccalaureate Degree or Standard Teaching Certificate

Students who wish to obtain a second baccalaureate degree or Standard Teaching Certificate, or both, register as postbaccalaureate students in the appropriate undergraduate college, not in the Graduate School.

REGISTRATION PROCEDURES

A regular graduate student: (1) has been granted regular admission to the Graduate School; (2) has developed a current program of studies satisfactory to the graduate program adviser; (3) has received medical clearance from the Student Health Service; and (4) has completed all of the required steps for registration, including the depositing of registration materials at Sections and the payment of tuition and fees.

Visiting graduate students follow regular registration procedures.

Graduate students are required to maintain continuous enrollment from the time of their first registration until completion of the advanced degree (see section on Continuous Enrollment).

All students currently attending the University who wish to attend a succeeding quarter should participate in preregistration. However, if this is not possible, students can make an appointment with the Registrar to go through inperson registration. Fee statements are mailed to students and must be paid by the stated deadline. Only Summer Quarter is an exception: Students are required to pay their entire fees at time of in-person registration, and preregistrants are billed prior to the first day of the quarter. Students are held responsible for knowing and observing the registration procedures, dates, and deadlines that appear in this catalog, in official notices in the University of Washington Daily, and on campus bulletin boards.

After new students are notified of their admission, the Registrar contacts them, requesting a \$50 enrollment service fee. If this payment is received by the date specified, the Registration Appointment Office will mail the new student a registration appointment and instructions for registering.

Advising

After notification of admission and before registration, the student should confer with the departmental graduate program adviser about the program for current registration. It is primarily to the graduate program adviser in the department that the student must look for individual counsel, guidance, and instruction in the scholarly study and research that characterize graduate work.

FINANCIAL AIDS 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 adviser of the appropriate department.

Fellowships, Traineeships, and Scholarships

A limited number of fellowships, traineeships, and scholarships are available through the Graduate School or through the graduate departments to outstanding students in all fields of study leading to advanced degrees. Application forms may be obtained from the graduate program advisers in the departments or from the Graduate Fellowship and Assistantship Division in the Graduate School.

The University also participates in the fellowship programs of the National Science Foundation, the National Institutes of Health, and other agencies, foundations, and institutes. Such fellowships are awarded on a national competitive basis, and application must be made directly to these foundations or organizations.

Graduate Student Service Appointments

The⁹ University provides for the employment of many graduate students as teaching, research, and staff assistants, predoctoral associates, predoctoral instructors, and predoctoral lecturers. Approximately two thousand such appointments were made during the past year.

The University's policy regarding these appointments is set forth in detail in Executive Order 28. Copies of this statement are available from the graduate program adviser or the Graduate School. Some of the information is provided below. Appointments are granted only to graduate students who have carefully defined educational goals and who exhibit the highest intellectual competence and attainment. Succeeding appointments may be made if the student maintains high scholarship and continues to make satisfactory progress toward the degree.

Graduate appointments are granted to graduate students only. An initial appointment may be offered to a student before being admitted formally to the Graduate School, but the appointment is contingent upon admission to graduate status before the beginning of the appointment.

1979-80 GRADUATE STUDENT SERVICE APPOINTMENTS (Students holding these appointments pay resident tuition and fees.)

Stipend for Half-time Service (20 hours per week)

		-	
Title of Appointment	One 'Month	Academic Year	
Teaching Assistant	\$582	\$5,238	Premaster*
Research Assistant	528	4,752	Post-master*
Graduate Staff Assistant	582	5,238	Precandidate* or Candidate*
Predoctoral Teaching			· · ·
Associate I	618	5.562	Post-master
Predoctoral Research			Precandidate
Associate I	558	5.022	or Candidate
Predoctoral Staff Associate I	618	5,562	
Predoctoral Teaching	•		
Associate II	656	5,904	,
Predoctoral Research			Candidate
Associate II	596	5,364	
Predoctoral Staff Associate II	656	5,904	

*Premaster: Admitted to the Graduate School, but not yet having completed a master's degree or the equivalent. Post-master: Completed the master's degree or equivalent, but not yet having a doctoral Supervisory Committee appointed. Precandidate: Having had a doctoral Supervisory Committee appointed, which signifies admission into the doctoral program, but not yet having completed the Graduate School General Examination. Candidate: Admitted as a Candidate, but not yet having completed a doctoral degree.

Graduate students appointed to the beginning level of graduate teaching appointments are not permitted to be in overall charge of a course, but are given an appropriate degree of responsibility and supervision of laboratory or classroom work so that they may be introduced to teaching activities gradually and effectively. Student appointees may also serve as assistants in research activities for which a faculty member is responsible.

Two special categories for teaching appointments and one for research appointments are provided above the predoctoral associate level: predoctoral instructor, for the graduate student who has achieved Candidate status and is ready for increased teaching responsibility; predoctoral lecturer, for a mature and competent graduate student who, though he or she need not be a Candidate, has had exceptional previous teaching or other professional experience; and predoctoral researcher, for the student who has special skills or qualities obtained outside of his or her experience as a graduate student or who carries major responsibilities in relation to research activities. For the 1979/80 academic year these appointments carry a minimum stipend of \$596 per month (half time) with no designated maximum so that the stipend may be adjusted to a level appropriate to the appointee's experience and his or her teaching and research responsibilities.

An additional series of appointments titled Graduate Staff Assistant and Predoctoral Staff Associates I and II is provided for University service activities that are not appropriately described as teaching or research but are closely related to the student's field of advanced study. Appointments of specific graduate students to these positions may not be made until after the position itself has been specifically approved.

Students who hold any of the above appointments are required to render twenty hours of service per week to the University. The appointments may be on a nine-month basis and ordinarily cover the period from September 16 through June 15. Some of these appointments may be extended to eleven or twelve months. Graduate student appointments do not provide for paid vacations or sick leave. Students who accept these University service appointments normally confine their employment to such appointments.

Spouses of graduate students who hold assistantship or associateship appointments as herein described and that require at least twenty hours service are permitted to register in day classes at resident tuition rates.

A graduate student service appointee must register for, and carry throughout each quarter except Summer Quarter, a minimum of 9 credits in formal courses or in research, thesis, or dissertation work. These credits must be in courses that are applicable toward an advanced degree.

Under exceptional circumstances and with the prior approval of the Graduate School, the above graduate appointments may be made on an hourly basis. Other hourly appointments for graduate students not employed on any of the above appointments are also available to assist faculty members in teaching and research. Readers are so classified, as are students who give routine assistance in research.

Employment Opportunities

The campus offers other job opportunities for graduate students. Students may apply directly to the Chairperson 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.

The University offers a number of full- and part-time employment opportunities in the secretarial, clerical, and technical fields for spouses of married students. These positions offer pay comparable to the prevailing salaries in the community, and some carry such fringe benefits as vacations, sick leave, and opportunities to enroll in University courses. In addition, nonresident graduate students may receive waiver of the nonresident portion of fees if their spouses are full-time employees of the University. Inquiries may be directed to the Staff Employment Office, 1415 Northeast Forty-fifth Street, Seattle.

Loans

Long-term educational loans are available to graduate students through the National Direct Student Loan and the Guaranteed Student Loan programs.

The National Direct Student Loan Program usually provides a maximum annual loan to graduate students of \$2,500 and bears an interest rate of three percent. There are certain cancellation provisions in the National Direct Student Loan Program for combat-zone veterans and teachers of the disadvantaged. Loan application forms for this program are available in the Office of Student Financial Aid, 105 Schmitz, and the application deadline is March 1 for the following Autumn Quarter.

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

The Guaranteed Student Loan Program provides for a longterm bank loan in which the graduate student can borrow up to a maximum of \$5,000 per year, depending on individual lending institutions' policies. This loan bears a seven percent interest rate, which may be subsidized by the government for the duration of full- or part-time, continuous enrollment to a stated degree completion date. Applications may be obtained at the student's bank or through the Office of Student Financial Aid. Lending institutions establish their own application deadlines and policies for making guaranteed student loans. An early inquiry to the student's bank is advisable. Nonresidents should check with the lending institutions in their home states. Six to eight weeks are usually required to process this loan.

Short-term emergency loan funds also are available through the Office of Student Financial Aid. A student must be enrolled full time in order to receive a \$50-\$100 loan for emergency expenses. It is possible to borrow the amount covering resident tuition under extreme emergency. Interest is computed at six percent, and the maximum duration of the loan is three months.

In addition, graduate students are eligible for the College Work-Study Program. Information is available from the Office of Student Financial Aid.

Financial Aid for Minority Graduate Students

Many fellowships and assistantships are open to men and women whose ethnic origin is either American Indian, Asian American, Black, or Hispanic American. These awards are generally made through the nomination and support of the department in which the student is enrolled. Supplemental fellowships ranging from \$250 to \$1,000 are also awarded by the Minority Education Division of the Graduate School, based upon an evaluation of the student's need as established by the College Scholarship Service.

Direct financial assistance from individual departments also may be available, and prospective students should apply directly to the Chairpersons of the departments in which they intend to do their graduate work.

Also available are a limited number of tuition scholarships for minority Washington State residents. Students may also apply for loans through the National Student Loan programs. Additional information can be obtained by writing the University of Washington, Graduate School, Minority Education Division.

All awards are contingent on the student's admission to the University of Washington Graduate School.

RESEARCH AND SCHOLARLY ACTIVITIES

Research is an essential part of graduate education in the University, and its furtherance is one of the primary concerns of the Graduate School. Grant and contract support of University activities is coordinated by the Graduate School. Additionally, the Graduate School administers certain public and private funds made available to encourage the research activities of faculty and students by support of their research and by securing the services of outstanding visitors to the campus.

External Support for Research and Training

The University of Washington is one of the nation's leading research institutions, receiving more than \$100 million annually in support of a wide array of research and training programs. Since 1968, the University has ranked among the top five (including two years as first) institutions in the United States with respect to receipt of federal awards. About ninety percent of the University's grant and contract funds comes from federal agencies, most of the remainder coming from foundations, industry, and other private sources. These funds are awarded in response to facultyinitiated, University-approved proposals for grants to support specific projects in accord with the University's educational goals and are apart from legislative appropriations for the basic operation of the University. Grant- and contractsupported programs employ about 3,600 employees and provide significant opportunities for graduate students who



work with faculty in the conduct of research as a vital component of graduate education.

In addition, private donations to the University, amounting to approximately \$7.5 million a year, add significantly to the opportunities of students and faculty to pursue scholarly interests.

Institutional Support for Research and Training

The Graduate School Research Fund (GSRF) provides support for special needs in graduate study and research, including, but not limited to: (1) initiation of research programs by new faculty members; (2) exploratory research by faculty members and their graduate students to establish a basis for seeking outside funding; and (3) colloquia, symposia, and other means of disseminating the results of research and scholarly contributions by faculty and students.

Support for the GSRF is derived from the following:

1. State monies that are provided in the University's regular biennial budget.

2. Grants to the University that permit some discretion to the institution in supporting its general programs.

3. A portion of the funds provided to the University as institutional allowances associated with graduate and post-doctoral fellowships and traineeships.

4. Private donations such as the Agnes H. Anderson Research Fund, which was established with the proceeds of a gift from two anonymous friends of the University.

5. Income from patents and royalties in which the University has an interest.

Information about the Graduate School Research Fund may be obtained from the University of Washington, Graduate School, 201 Administration, AG-10.

Special Lectureships and Professorships

The Walker-Ames Fund was established in the 1930s through a bequest from the estates of Maud Walker Ames and her husband, Edwin Gardner Ames. Its stated purpose is to enable the University of Washington "to guarantee to the state of Washington the scholarly and educational services of the most distinguished minds available in this and other countries."

Chaired by the Dean of the Graduate School, a committee of University faculty considers nominations from their colleagues and makes recommendations to the President for the appointment to Walker-Ames Professorships of distinguished scholars of national and international reputation. Since 1936, when the first Walker-Ames Visiting Professor was appointed, more than one hundred scholars and members of the professions have come to the University as temporary members of the faculty, enriching the intellectual life of the University community and the state.

The Jessie and John Danz Fund was established in 1961 by a gift and bequest from John Danz; an additional gift was made to the Danz fund in 1969 by his wife, Jessie Mohr Danz. The Danz fund is intended primarily to enable the University to bring to the campus each year one or more "distinguished scholars of national and international reputation who have concerned themselves with the impact of science and philosophy on man's perception of a rational universe."

The Danz fund supports special lectureships and professorships, appointments for which are arranged in a manner similar to the Walker-Ames Professorships, as well as other types of appointments or arrangements compatible with the terms of the Danz bequest (e.g., the publication and distribution of certain lectures given by Danz lecturers).

Questions pertaining to the Walker-Ames Fund and the Jessie and John Danz Fund may be directed to the Dean of the Graduate School.

Special Programs and Facilities

In addition to regular academic offerings, the University maintains a wide range of programs and facilities that provide special opportunities for graduate study and research. The following units are administered by the Graduate School:

Center for Studies in Demography and Ecology

Thomas Pullum, Director 202 Savery, DK-40

The center provides facilities and support personnel to stimulate faculty and student research on the determinants and consequences of human population trends and characteristics. Objectives include increasing the volume of demographic holdings in the University libraries, improving access to those volumes, increasing the availability of basic demographic data files, facilitating the processing of demographic data, and improving the preparation of research reports.

Center for Law and Justice

Joseph G. Weis, Director 1107 Northeast Forty-fifth Street, No. 505, JD-45

The Center for Law and Justice is a multidisciplinary research center established in 1975. Its goals are to engage in research, to contribute to the education and training of students, to offer consultation, and to provide liaison to the community in the areas of law and justice. To achieve these goals the center: (1) apprises faculty members of research opportunities and assists in the development of proposals; (2) involves students from different disciplines in research training and education and sponsors biweekly colloquia; (3) provides consultation to the criminal justice system and responds to the broader informational needs of the community; and (4) sponsors conferences and functions as the University's planning unit for the allocation of funds from the Law Enforcement Assistance Administration's state planning agency.

Division of Marine Resources

Stanley R. Murphy, Director 3716 Brooklyn Avenue Northeast, HG-30

The Division of Marine Resources (DMR) promotes the University's interest in exploration, development, and use of the resources of the seas and oceans. Interdisciplinary in nature, DMR is concerned with the physical, chemical, geological, and biological properties of the marine environment. It coordinates and supplements research and development efforts and provides advisory services in marine science and engineering. It cooperates in similar activities with outside agencies and institutions, coordinating the University's response to problems in marine commerce and engineering and the economic, legal, biomedical, and sociological problems that arise out of the management and utilization of marine resources.

In 1971, the University was designated by the Secretary of Commerce as a Sea Grant College, now one of twelve such institutions in the nation. DMR is responsible for the coordination and administration of the Washington Sea Grant Program, which includes research, education, and advisory services throughout the Puget Sound region, and it administers interdisciplinary research efforts in the polar regions.

Friday Harbor Laboratories

Eugene N. Kozloff, Acting Director Friday Harbor, Washington 98250 University Office: 208 Kincaid, NJ-22

The Friday Harbor Laboratories (FHL) is the principal marine science field station of the University of Washington. Its faculty is composed of members from various academic units of the University, including Botany, Fisheries, Oceanography, and Zoology, as well as visiting faculty from other institutions.

FHL, located approximately eighty miles north of Seattle near the town of Friday Harbor on San Juan Island, offers a biological preserve of 484 acres of wooded land with about two miles of shoreline. The island is one of the largest of the 172 that make up the San Juan Archipelago, located in the northwest section of the state of Washington between Vancouver Island and the United States mainland. In addition to the FHL site, the laboratories' administration has the responsibility for overseeing biological preserves leased or owned by the University on San Juan Island (False Bay and Argyle Lagoon), Shaw Island (uplands adjacent to Point George and Parks Bay; Cedar Rock Biological Preserve), and Lopez Island (Point Colville and Iceberg Point). Goose and Deadman islands, biological preserves owned by the Nature Conservancy, are under the stewardship of FHL.

The laboratories are close to seawaters that range from oceanic to those highly diluted by streams, some with depths to a thousand feet, others with bottoms varying from mud to rock, and water movements ranging from those of quiet bays and lagoons to those of swift tideways. The waters about the San Juan Archipelago abound in varied marine flora and fauna.

During spring, summer, and autumn, the laboratories offer opportunities for independent and supervised research, as well as a varied program of instruction for graduate and undergraduate students. Throughout the year, use of the laboratories' facilities for research in various areas of marine science is encouraged.

Joint Institute for the Study of the Atmosphere and Ocean

John M. Wallace, Director 608 Atmospheric Sciences-Geophysics, AK-40

Established by an agreement between the University of Washington and the National Oceanic and Atmospheric Administration, the institute is intended to facilitate and strengthen cooperation between the two organizations in research and other collaborative efforts in the oceanographic and atmospheric sciences. It will bring to the campus scientists from NOAA laboratories and from other nations to join with University faculty and students in research projects initially directed toward mechanisms of climate change and studies of estuarine processes.

Office of Scholarly Journals

Robert M. Smith, Business Manager 4045 Brooklyn Avenue Northeast, JA-15

The Office of Scholarly Journals provides assistance to members of the faculty who have editorial responsibilities for the publication of scholarly journals originating in, or associated with, the University of Washington.

Quaternary Research Center

Estella B. Leopold, Director 158 Quaternary Research-Geophysics, AK-60

Quaternary research focuses on the processes presently shaping the environment and those that have operated on it for the past several million years. To foster such study, the Quaternary Research Center was established at the University in 1967. Cooperating faculty members come from anthropology, atmospheric sciences, botany, chemistry, civil engineering, forest resources, geography, geological sciences, geophysics, oceanography, and zoology. They have in common a commitment to linking the past, present, and future through interdisciplinary study and research. The result is a broad spectrum of interdisciplinary study possibilities.

In addition to various geophysical laboratories, the Quaternary Research-Geophysics Building includes laboratories for palynology, potassium-argon dating, radiocarbon dating research, oxygen-isotope research, and periglacial studies.

University of Washington Press

Donald R. Ellegood, Director 4045 Brooklyn Avenue Northeast, JA-20

The University of Washington Press, the book-publishing division of the University, has more than nine hundred titles in print, with special emphasis on art, anthropology, Asian studies, biology, ethnology, history and government, language and literature, oceanography, and regional subjects. The Press publishes about fifty new books each year by members of the University faculty, as well as by scholars outside the University. In addition, the Press has a paperback reprint series, entitled Washington Paperpacks, and an import program that makes known important books in English published abroad. It produces and distributes phonograph records and films, most of which grow out of original research on campus.

Washington Energy Research Center

Daniel G. Dow, Director 357 Loew, FH-10

Sponsored jointly by the University of Washington and Washington State University, the center is located at the UW. It is charged with the responsibility for assessing the energy demands of the state and with coordinating research in the areas of energy production, transfer, conversion, and consumption, making use of the capabilities of the state's institutions of higher education. The center also serves as liaison with governmental and private agencies involved in energy research in the Pacific Northwest.

Washington Mining and Mineral Resources Research Institute

Donald L. Anderson, Director 325 Roberts, FB-10

The institute was established at the University in January, 1980. Its purpose is to promote and conduct research in fields related to mining and mineral resources, and by doing so to promote the education and training of engineers and scientists in these fields. Departments and individuals from the University of Washington, Washington State University, and other state universities are eligible to participate in institute programs. The institute is administered by an interdisciplinary and interinstitutional policy board and technical steering committee.

In addition to the Graduate School units described above, the following programs and facilities concerned with graduate education and research are administered by other University units:

Centers, Institutes, and Intercollege Programs

Aerospace and Energetics Research Program. An interdepartmental and interdisciplinary program within the College of Engineering.

Alcoholism and Drug Abuse Institute. Coordination of research and training in the fields of alcoholism and drug abuse; provides community consultation.

Applied Physics Laboratory. A research and development organization with capabilities in ocean and environmental sciences and engineering, arctic technology, energy resource research, biosystems engineering, and forest engineering.

Center for Bioengineering. Program of the College of Engineering and the School of Medicine that applies the concepts and techniques of engineering to problems of biology and medicine.

Center for Quantitative Science in Forestry, Fisheries, and Wildlife. A broad program in applied mathematics and in mathematical services concerned with quantitative descriptions of the management of both aquatic and terrestrial ecosystems.

Center for Research in Oral Biology. Assists in the national effort to reduce the toll of oral disease and to promote the general level of oral health.

Center for Social Welfare Research. Offers policy and practice research in such areas as health and mental health, child welfare, income maintenance, individual and family adjustment, corrections, and gerontology.

Child Development and Mental Retardation Center. Provides facilities for teaching and research programs related to mental retardation and child development.

Fisheries Research Institute. Conducts research in fisheries biology and aquatic ecology in the Pacific Northwest and Alaska.

Institute for Environmental Studies. An interdisciplinary educational unit established to develop environmentally related programs in teaching, research, and public services.

Institute of Forest Resources. The research, continuing education, and information branch of the College of Forest Resources.

Institute of Governmental Research. Coordinates and promotes the efforts of other University units to deal with problems of public policy and administration in the state of Washington and the Pacific Northwest.

Institute for Marine Studies. Offers graduate study and research on contemporary marine policy problems.

Regional Primate Research Center. One of seven throughout the nation; provides opportunities in biomedical research on nonhuman primates.

Social Management of Technology Program. A center for analyzing and managing technological systems, particularly in the public sector, in order to extract the intended benefits for mankind as well as to minimize the undesirable side effects.

Special Facilities (Seattle Campus)

Academic Computer Center. Provides instructional and research computing services for the University.

Arboretum. A living laboratory within Seattle devoted to the study of woody plants.

Burke Memorial Washington State Museum. An educational and cultural center whose function is to collect, preserve, research, exhibit, and interpret the natural and cultural objects of the human environment, particularly the Pacific Ocean, its islands, and mainland shores.

Drug Plant Gardens. Viable seeds and plants of medicinal and pharmaceutical interest are maintained for experimental purposes.

Henry Art Gallery. The art museum of the University of Washington.

John L. Locke, Jr., Computer. Provides computer services to the health sciences complex and to hospitals and clinics in the community for medical research, teaching, training, and patient-care programs.

KCTS Educational Television. The educational channel for the state of Washington, supported by state and local government and through public membership.

KUOW Radio. Broadcasts programs of an educational, cultural, scientific, informational, and public affairs nature; communicates information on University activities to students, alumni, and the public.

Nuclear Physics Laboratory. Houses a Van de Graaff accelerator and a cyclotron for research in physics, chemistry, cancer therapy, nuclear medicine, radiation biology, and related fields.

Observatory. Houses a six-inch refracting telescope, open for public viewing as well as for study and research.

Oceanographic Research Vessels. Operated for field study and research in Puget Sound and the Pacific Ocean.

Speech and Hearing Clinic. Serves as a center for research in speech science, speech and language pathology, and audiology, and provides services to the public.

University Hospital/Harborview Medical Center. The Health Sciences Center operates two major teaching hospitals: its own 320-bed University Hospital and, under contract with King County, the 300-bed Harborview Medical Center.

University Libraries. The largest research library system in the Pacific Northwest, it has a collection of more than two million volumes, four hundred thousand research reports, forty-seven thousand current serial subscriptions in a variety of languages, and numerous other research aids and services. The Pacific Northwest Bibliographic Center maintains a catalog of more than four and one-half million author entries from libraries throughout the Pacific Northwest.

Special Facilities (Off-Campus)

Big Beef Creek Laboratory. Located at Seabeck, Washington; provides opportunities for research and instruction in the College of Fisheries.

Forest Resources. The College of Forest Resources maintains a variety of field facilities throughout the state that provide a general natural science laboratory for research and teaching of natural resource behavioral patterns and management.

Joint Center for Graduate Study. Administered by the University of Washington and Washington State University, with Oregon State University participating in the academic program. Located at Richland, Washington, and offers graduate-level and upper-division courses in many fields; laboratories owned by the Department of Energy available for research.

Lake Wilderness Continuing Education Center (King County). A conference and continuing education facility.

Manastash Ridge Observatory (Kittitas County). A thirty-inch reflecting telescope and auxiliary equipment available for research in astronomy.

Primate Field Station (Medical Lake). A primate breeding facility maintained by the Regional Primate Research Center.

Washington Archaeological Research Center (Pullman). Established by the University of Washington, Washington State University, and the state's four other four-year academic institutions to provide information and archaeological expertise on the state's archaeological sites to state and federal agencies, local archaeological societies, schools, and private citizens. Washington Water Research Center (Pullman). One of fifty-one such centers in the nation; established by the University of Washington and Washington State University to coordinate water resources research, education, and public service activities in the state.

West Seattle Laboratories (Seattle). For research and instruction in electrical engineering and research in the School of Medicine.





CONTINUING EDUCATION

Vice Provost and Dean

Robert G. Waldo 322 Lewis

Learning is a lifelong activity rather than a terminal process. Continuing Education at the University of Washington is the instrument through which programs are developed to meet the lifelong learning needs of adults in the Puget Sound area and throughout the state: needs for nontraditional degree and certificate programs; and needs for professional updating, personal development, new knowledge, new competencies, fresh insights, and life enrichment and enhancement. Through Continuing Education, the University offers assistance to individuals, communities, organizations, and governments—federal, state, and local—by providing training and consultation.

Because of the greatly accelerated rate of change affecting all of us, because of the greatly increased number of life options before each of us, and because of the value placed on learning in our culture, universities are learning centers for adults throughout their lives. The University of Washington is such a learning center for the people of this state. The staff members of Continuing Education respond to inquiries from prospective students, enrolled students, and out-of-school adults. The sections that follow give brief descriptions of the various programs currently a part of Continuing Education.

Spectrum, the journal of Continuing Education, is mailed without charge to residents of the state, who may receive it

by telephoning (206) 543-2590, or by writing to: University of Washington, *Spectrum*, 400 Lewis, DW-27, Seattle, Washington 98195.

Division of Marketing and Communications

A first place to inquire about any aspect of Continuing Education at the University is the Division of Marketing and Communications. As publisher of *Spectrum*, this information division both answers questions about Continuing Education's activities and registration procedures and adds names to the quarterly mailing list of *Spectrum*. (206) 543-2590.

Division of Academic and Professional Programs

Three programs administered by Continuing Education offer academic credit that may be applied toward an academic degree. Evening credit classes are designed primarily for students with job- or family-related obligations that conflict with daytime class schedules. Eight undergraduate and two graduate degree programs may be completed entirely by attending classes on the campus in the evening.

Two of the credit programs do not require formal admittance to the University to enroll. Independent Study (instruction by correspondence) offers an opportunity to earn University credit without attending classes. Extension Credit usually schedules classes to meet the specific needs of professional or student groups, taught both off and on campus. The cost of Independent Study and Extension Credit classes is not included in the quarterly tuition. The payment of additional fees is required to enroll.

EVENING CREDIT CLASSES

In cooperation with academic departments, each quarter approximately two hundred University residence credit classes for regularly admitted students are offered during late afternoon and evening hours. Special efforts are made to provide courses and degree opportunities for persons who are unable to attend classes during the day. A student now may complete a baccalaureate degree entirely through evening classes in eight fields of study: communications, economics, English, history, mathematics, political science, psychology, and the general business emphasis in business administration. Master of Science degrees in civil engineering and physics are also available. An adviser is available to counsel persons interested in developing majors as part-time students.

Information concerning the Evening Credit Classes program may be obtained by telephoning (206) 543-2300. The Evening Classes bulletin is available at no cost by writing to: University of Washington, Division of Academic and Professional Programs, 222 Lewis, DW-20, Seattle, Washington 98195.

EXTENSION CREDIT AND PROFESSIONAL PROGRAMS

This unit offers classes for extension credit or for professional certification, held on campus and statewide. Extension credit classes are open to anyone of legal age who has a high school diploma or the equivalent.

Classes offering extension credit are from approved University curricula, and the credits may be applied toward a baccalaureate degree consistent with University regulations. This office also works with professional schools to develop programs oriented to satisfy specific professional continuing education needs.

Information about these programs appears in *Spectrum*, which is available by telephoning (206) 543-2590. Additional information may be obtained by telephoning (206) 543-2300.

INDEPENDENT STUDY THROUGH CORRESPONDENCE

Independent study offers the individual an opportunity to study at his or her convenience, free of requirements for classroom attendance. This office offers correspondence courses, frequently supplemented by audio cassettes, as well as media classes, which combine independent study with newspaper lectures, television or radio lectures, and optional on-campus seminar sessions. Most courses parallel similarly numbered undergraduate courses taught in the residence program and carry extension credit. All faculty members are approved by the respective academic departments. Certain noncredit courses required for University entrance are available to adults who wish to qualify for admission; others offer subject matter for professional continuing education. Enrollment for correspondence courses is open throughout the year.

A bulletin describing the program and enrollment procedures may be obtained by writing to: University of Washington, Office of Independent Study, 222 Lewis, DW-30, Seattle, Washington 98195, or by telephoning (206) 543-2350.

Division of Community Education

This division sponsors, plans, and administers a broad program of noncredit instructional offerings and cultural events on the campus and around the state for out-of-school adults, students, and young people. The program's aim is to enrich campus and community life and to offer opportunities for personal intellectual development. Admission to the University is not necessary for participation.

NONCREDIT STUDIES

Through courses, lecture series, workshops, and seminars, Noncredit Studies brings university-level programs and the University's faculty to adults within commuting distance of the campus. These programs are also open to enrolled students for a separate fee. Programs are announced quarterly in *Spectrum*. Registration information is available at 203 Lewis on the campus, or by telephoning (206) 543-2590.

LECTURES AND CONCERTS

Lectures and Concerts presents programs for the campus and the surrounding community, including those sponsored by the School of Music and its dance specialization, the programs of the Philadelphia String Quartet, the campus film series, the dance series, and an expanding array of events. A schedule of these events is listed in *Spectrum*. The most current information is available at the Lectures and Concerts office on campus in Meany Hall. Special student rates are available for many events; many complimentary concerts are offered each year. Additional information may be obtained by telephoning (206) 543-4880.

ALUMNI PROGRAMS

Continuing Education's professional staff develops and administers all Alumni Association continuing education programs, which are listed in *Spectrum*. Additional information may be obtained by telephoning (206) 543-2140 or by contacting University of Washington, Alumni House, 1415 Northeast Forty-fifth Street, Seattle, Washington 98105; telephone (206) 543-0540.

SPECIAL PROJECTS

The Office of Special Projects plans, implements, and administers experimental, special format, or developmentalstage noncredit educational programs, which extend the academic resources of the University to the local and statewide community, to special client groups, and to new underserved populations.


Elderhostel, ACCESS to credit classes for older adults, the Alumni Vacation College, statewide lectures and seminars, residential weekend seminars, and other special events are among programs offered. Information is available by telephoning (206) 545-0867.

Community Services seeks to extend resources of the University to communities, organizations, and individuals throughout the state and region. Concentration is on problem solving and on the management of change to improve the quality of the community's personal, corporate, and civic environments.

Division of Community Services

ARTS DEVELOPMENT

This office assists in strengthening and expanding the arts activities of community organizations and arts commissions of the Pacific Northwest through consultation and training, acts as a resource center, and provides arts education in conjunction with community arts organizations and schools. It also works closely with the State Superintendent of Public Instruction and school districts to coordinate arts in education conferences involving school personnel and community residents.

Additional information concerning this office may be obtained by telephoning (206) 543-6052 or writing to: University of Washington, Arts Development, 307 Lewis, DW-20, Seattle, Washington 98195.

CAREER AND LIFE PLANNING

Through individual counseling and specialized group guidance, out-of-school adults facing a variety of life decisions are assisted in focusing their resources for creative change. Courses and seminars to explore areas of educational and vocational choice are offered regularly. Field research and internships provide direct experience in selected fields.

Additional information may be obtained by telephoning (206) 543-4262 or writing to: University of Washington, Career and Life Planning, JB-15, 1209 Northeast Fortyfirst Street, Seattle, Washington 98105.

COMMUNITY AND ORGANIZATION DEVELOPMENT

Community and Organization Development offers a wide range of consultation and training services to communities, to local, state, and federal governments, and to nonprofit organizations throughout the state and region in such areas as planning, problem solving, needs assessment, citizen participation, and leadership development. Training and consultation programs are designed to meet the specific needs of groups and organizations with which Community and Organization Development works.

Additional information may be obtained by telephoning (206) 543-0980 or writing to: University of Washington, Community and Organization Development, 316 Lewis, DW-25, Seattle, Washington 98195.

MEDIA DEVELOPMENT

This office provides support and consultation services in the development of programs of media instruction for Continuing Education. These media programs are offered for both University extension credit and noncredit education and enrichment, and are available statewide and in the Seattle metropolitan area through media delivery systems.

Courses are offered statewide through the Washington Educational Teleconference Network, a two-way audio network tying together the six public universities and five other reception centers throughout Washington State. Courses, conferences, and seminars offered on the network are available through the academic department sponsoring the course at the University, or through the five other fouryear institutions in the state.

Within King County, courses are delivered on cable television from the campus of the University of Washington. The system links the two cable franchises in the Seattle area, providing programming simultaneously on Channel 3, Viacom, and Channel E, Teleprompter. Using cable television, the Office of Independent Study offers graduate and undergraduate courses for credit, and professional schools on campus offer courses geared for the graduate-level professional.

Additional information may be obtained by telephoning (206) 543-5381, or by writing: University of Washington, Media Development, DW-24, Seattle, Washington 98195.

RADIO BROADCAST, SERVICES AND KUOW

Radio station KUOW, FM 94.9, provides a professional quality cultural and informational broadcast service to the people of western Washington. Many programs are produced locally through use of the resources of the University and the surrounding community; in addition, KUOW has access to excellent national programs through the facilities of National Public Radio. KUOW serves as an originating station in the National Public Radio satellite interconnection system, transmitting programs that originate in the Pacific Northwest to stations throughout the United States. Students with vocational interests in broadcasting participate in KUOW activities as interns and professional-level trainees.

KUOW also possesses a subcarrier capability, known as the SCA channel, through which experimental programs can be designed to test and develop new broadcasting and teaching techniques, sometimes in combination with other delivery systems. The SCA is currently in regular use to provide special services for the blind.

Hours of broadcast are from 6:00 a.m. to midnight Sunday through Thursday, and from 6:00 a.m. to 1:00 a.m. Friday and Saturday. More information or a sample program guide can be obtained by telephoning (206) 543-2710, or by writing to: University of Washington, KUOW, 325 Communications, DS-50, Seattle, Washington 98195.

TITLE I, HIGHER EDUCATION ACT OF 1965

This office serves as the University liaison for community service and continuing education projects granted funding under this title.

Conference Management and Planning

Continuing Education provides, on a self-sustaining basis, conference management services for University academic departments and administrative units, as well as for community groups with University academic departments and administrative units and community groups with University sponsorship. Services include the arranging of all physical facilities and publicity and the collecting of registration fees. Consultative services and assistance with program development and planning are also available. A remote center at Lake Wilderness, forty-five miles south of the campus, can be reserved through Continuing Education for conferences and workshops sponsored by University or state agencies. Additional information may be obtained by telephoning 543-5280.

Management Services

LAKE WILDERNESS CONTINUING EDUCATION CONFERENCE CENTER

Maintained by the University of Washington, the center has served for the past nine years as a remote retreat at Lake Wilderness in Maple Valley for the purpose of augmenting on-campus educational facilities. Operated under the supervision of Continuing Education, the center is used by faculty, staff, students, governmental agencies, and other educational institutions for seminars, short courses, conferences, and workshops. It accommodates forty persons for overnight conferences and more than one hundred for daytime meetings.

Additional information may be obtained by telephoning (206) 543-5380 or 432-4282, or by writing to: University of Washington, Lake Wilderness Conference Center, 219 Lewis, DW-20, Seattle, Washington 98195.



PROGRAMS OF STUDY





ARCHITECTURE AND URBAN PLANNING

Dean

Myer R. Wolfe

Associate Dean Norman J. Johnston

The College of Architecture and Urban Planning brings together in one unit four departments charged with the education of professionals in the planning, design, and building of the physical environment: Architecture, Building Construction, Landscape Architecture, and Urban Planning. Their programs encompass a wide range of responsibilities that together constitute this complex matter of dealing with contemporary environmental issues. Thus, to the traditional design and technical considerations, our curriculums today add greater dimensions of social, economic, and psychological concerns, which in their own ways influence or provide greater insight toward understanding, preserving, developing, and enriching both our built and natural environments.

In a time of great competitive interest in the forms, directions, and character of environmental development and appropriate allocation of resources, today's professionals must have a sense of these issues and must create buildings, cities, and landscapes that not only serve their functions but also reflect and enhance the values and aspirations of the societies for which they have been created. As part of a university located in the heart of the major urban area of the Pacific Northwest, the college is able to use its environment as a laboratory for study. It also works closely with both the academic and the professional world to build its curriculums and faculty with the objective of serving students who one day will be responsible for interpreting our environmental needs. The presence of the four professional areas within the college is an acknowledgment of the mutual interests and responsibilities of these fields in the creation of an appropriate contemporary environment.

The college's programs in architecture and landscape architecture are accredited, respectively, by the National Architectural Accrediting Board and the American Society of Landscape Architecture. The Department of Architecture has been a member of the Association of Collegiate Schools of Architecture since 1925; the Department of Landscape Architecture holds membership in the National Council of Instructors of Landscape Architecture; the Department of Urban Planning is a member of the Association of Collegiate Schools of Planning and has been granted recognition by the American Institute of Planners; the Department of Building Construction is a member of the Associated Schools of Construction.

Facilities and Services

The College of Architecture and Urban Planning occupies two buildings on the campus. Architecture Hall originally was the art gallery for the 1909 Alaska-Yukon-Pacific Exposition, and it is the only remaining permanent building that was used by that event. Today, the college uses it for classrooms, design laboratories, seminar rooms, and faculty offices. Gould Hall, built specifically for the college, was first occupied in 1971. Designed around a great skylighted central court that serves as a dramatic focal space, the building houses the Dean's office and the college's four departments, with their classrooms, seminar rooms, design and research laboratories, and faculty and departmental offices. In addition, it contains various specialized facilities, including an extensive shop and a photographic laboratory,

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a computer terminal, and a remote sensing laboratory. Gould Hall houses the college's library, a branch of the University library system, and its collection of materials related to the college's programs. Included are approximately 15,300 volumes, 14,400 pamphlets and unbound reports, 28,000 current periodicals, and 28,000 35-millimeter slides, as well as a large file of manufacturers' catalogs and brochures.

Honorary and Professional Societies

The college has chapters representing two honorary societies specifically formed to recognize scholastic achievement within the college's professional degree program: Tau Sigma Delta for students in architecture and allied arts, and Sigma Lambda Chi for those in building construction. In addition, various departmental student organizations strengthen the relationships between students, classrooms, and the professions.

Scholarships and Financial Aids

Departmental scholarships and awards are given annually to undergraduate students who demonstrate outstanding scholastic ability and general excellence and who show financial need. These awards are announced during Spring Quarter for the following academic year. Teaching assistantships and some fellowship and scholarship support are available for graduate students in architecture and in urban planning. Inquiries should be directed to the respective departments.

Undergraduate Programs

Besides satisfying the usual requirements at the high school level for admission to the University, students who plan to enter the College of Architecture and Urban Planning should have taken a semester of trigonometry. Courses in the humanities, the social sciences, and freehand drawing are strongly recommended as electives.

On entering the University, students enroll in one of its several colleges or schools, whether or not an academic major has been chosen. Students majoring in building construction may transfer to that department from other units of the University or from two- or four-year colleges; a minimum of 45 credits is required. See admissions criteria for that department. Undergraduates are reminded that the professional degree in architecture is the Master of Architecture, for which separate admission processes are required. The Bachelor of Arts is the Department of Architecture's undergraduate degree. Those students who have received it are then eligible to be considered for admission to the graduate program of the department. Entering freshmen who plan to major in architecture must enroll in the College of Arts and Sciences for one year, then as premajors in the Department of Architecture for one year. Application may then be made for major status in the department. Entering freshmen who plan to major in landscape architecture or urban planning spend the first two years as premajors in the College of Arts and Sciences. Upon successful completion of the departmental requirements of those first two years, they apply for transfer to the College of Architecture and Urban Planning.

In some cases in which a student has completed some college-level course work at another institution and is transferring earned credits to the University of Washington, application to one of the college's programs may be concurrent with application for admission to the University.

Admission to the college is highly competitive, and enrollment preference is given to those applicants who, in the judgment of the department concerned, are the best qualified to undertake its programs. The departments of the college can answer any inquiries about their admission procedures.

Graduate Programs

Also see Graduate Programs and Degree Policies, page 48.

Within the college, graduate degree programs lead to the degrees of Master of Architecture, Master of Landscape Architecture, Master of Urban Planning, or Doctor of Philosophy in the field of urban planning. The College of Architecture and Urban Planning coordinates master's degree programs with a specialization in urban design. Students who intend to work toward one of these degrees must apply for admission to the appropriate department of the College of Architecture and Urban Planning and to the Graduate School and must meet the requirements outlined in the Graduate School section of this catalog.

Additional information on any aspect of the college's departmental programs can be obtained from the department in which the student has an interest.

ARCHITECTURE

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The role of architecture is to improve the human condition through the development and application of design skills to modify the physical environment. The architect, as one of a network of design professionals, normally operates at the building and building complex scale; thus, while larger or smaller design issues sometimes are the architect's province and almost invariably bear on the task, the design of buildings and building complexes constitutes the distinct focus of that task.

Architecture always has involved certain relatively constant, general areas of concern, including logical planning, technical soundness, esthetic quality, and the exploration of theoretical bases for new directions in the field. Some areas of concern, which may vary from time to time, include an increasing awareness and understanding of ways in which persons interact with their physical environments, the impact of buildings on the natural ecological balance, and the need to conserve natural resources. Other concerns focus on the development of more effective ways to solve increasingly complex problems and on the improvement of processes by which all segments of society may be served.

Faculty

Daniel M. Streissguth, Chairperson; Albrecht, Alden, Bonsteel, Bosworth, Curtis, Dietz (emeritus), Donnette, Heerwagen, Herrman (emeritus), Hildebrand, Jacobson, Johnston, Kelley, Kolb, LaTourelle, Lebert, Lewis, Lovett, Millet, Minah, Mithun. Nyberg, Onouye, Prussin, Pundt, Radcliffe, Rohrer, Rosner, Sasanoff, Schneider, Seligmann; Skirvin, Small, Sproule (emeritus), Staub, Steinbrueck (emeritus), Thiel, Vanags, Varey, Wise, Zarina, Zuberbuhler.

Undergraduate Program

Bachelor of Arts Degree

The undergraduate program in architecture is a nonprofessional, four-year program within the concept of a liberal arts education. The intention is to serve students of diverse backgrounds, interests, and aspirations who have not yet completed a baccalaureate degree. The program functions both as an end in itself for students whose goal is a baccalaureate degree, and as preparatory study for students planning to continue on to the graduate professional degree in architecture.

The department has two categories of undergraduate students: premajors and majors. Students may request premajor status if they have completed at least 45 credits of university-level work with a minimum 2.50 cumulative grade-point average and have no high school deficiencies. Both premajors and other students who have fulfilled all the admission requirements may apply for the major status. While premajors have priority in enrolling in the required introductory architecture course, they have no priority in subsequent admission to the major.

Admission requirements for the major (normally completed in the first and second years): Minimum 2.50 cumulative college-level grade-point average, no continuing high school deficiencies, and a minimum of 90 credits taken predominantly in the College of Arts and Sciences or in a twoor four-year college, distributed as follows: 20 credits each in humanities and social sciences, 15 credits in natural sciences (excluding courses considered mathematics-related by the department); 8 credits in the premajor introductory architecture course ARCH 498A (later to be designated as ARCH 200); either MATH 157 (5 credits) or MATH 124 (5 credits); and 10 credits in mathematics-related electives; and the remaining of the 90 credits in general electives. Admission to the major in architecture is highly competitive, because openings are limited by a departmental enrollment quota. Students should contact the department regarding admission procedures. Departmental applications from eligible students are reviewed four times each year and must be received by the following deadlines: May 15 for Autumn

Quarter entry, October 15 for Winter Quarter, January 15 for Spring Quarter, and April 15 for Summer Quarter.

Curriculum for the major (normally completed in the third and fourth years): a minimum of 90 credits to be taken as prescribed by the department in core architectural studies, one of the concentration options, and general electives. Currently, concentration options include Option I (Applied), Option II (Behavior, Experience, and Environments), and Option III (Theories of Architecture).

A more detailed description of the program and its requirements is available in the departmental prospectus.

Graduate Program

Master of Architecture Degree

Successful completion of the requirements for a professional degree in architecture from an accredited program is the normal educational requirement for qualification as an applicant for licensing (registration) as an architect.

At the University of Washington, the degree Master of Architecture is the professional degree. This graduate program accommodates three groups of undergraduate degree holders: (1) Persons holding the Bachelor of Architecture degree can usually complete the graduate program in one year, or four quarters. This program requires a 9-credit thesis and 36 quarter credits of graduate-level professional and free electives. (2) Persons holding a Bachelor of Arts degree in the field of architecture, or equivalent, normally require two years, or seven quarters, of study. The twoyear program requires completion of a minimum of 90 graduate credits, of which 36 are design laboratory/design studies options, 9 credits of thesis, and 45 credits that may be selected from a wide range of professional and free elective courses. (3) When the undergraduate degree is held in a field other than those mentioned above, it normally involves at least three years, or ten quarters, to complete the requirements for the degree. The three-year program may vary somewhat in duration and specific course work required, depending on entrance proficiency. Normally, however, it requires approximately 30 credits of architectural course work, preparatory to beginning graduate courses, 36 credits of design laboratory/design studies options, 9 credits of thesis, and 45 credits of professional and free electives.

These three programs may vary considerably in individual cases, depending on selection of concentration/study areas, including general practice and related professional studies.

Students entering any of the above three programs may be asked by the graduate program adviser to supplement their backgrounds in areas where additional work seems necessary.

Admission to the graduate program is highly competitive. Successful completion of the Bachelor of Arts degree program offered by the Department of Architecture does not ensure automatic admission to the graduate program. The primary criterion for admission to the graduate program is the applicant's apparent ability, as determined by the department and the Graduate School, to progress satisfactorily in graduate study. The applicant's scholastic achievement in undergraduate and/or follow-on graduate work is important. However, consideration also is given to other evidence submitted as required. Students are normally admitted to the graduate program in architecture only in Autumn Quarter, and all application materials should be received by the department no later than the preceding February 15. Notices of admission are given about April 1. The prospective applicant should note that Graduate Record Examination aptitude test scores, at least three letters of recommendation, transcripts of previous degree programs and additional academic study, and normally, a portfolio of accomplished work are required as part of the application, and should plan accordingly. Incomplete applications and those received after announced deadlines are not considered by the Graduate Admissions Committee.

A Certificate of Achievement in Urban Design is also offered within the Master of Architecture or Master of Urban Planning degree programs. This specialization at the master's degree level focuses on urban design theory, policy, process, and implementation.

BUILDING CONSTRUCTION

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The stated educational goals of the Department of Building Construction are (1) to provide education and training that will attract and prepare individuals for senior levels of management or technical positions in the building industry or related businesses or (2) to establish their own business operations. To successfully achieve these goals, building construction's educational program should develop in the student the following characteristics: the discipline to think and reason logically, the technical ability to visualize and solve practical construction problems, the managerial knowledge to make sound decisions and implement them on a prudent economic basis, the facility to communicate these decisions clearly and concisely, and the human understanding to cooperate with, and provide dynamic leadership for, the construction and related industries and the community.

To satisfy these diverse educational requirements for the building and associated industries, the Department of Building Construction—in addition to providing for the broader perspectives gained from the humanities and social and natural sciences—must offer core courses in three major areas: engineering, technology, and management. The engineering courses are concerned with the theory and utilization of inorganic properties of matter and physical forces for supplying human needs in the form of structures, machines, and manufactured products. Technology deals primarily with the application of scientific knowledge and methods to the fields of manufacture and buildings. Developing the understanding of the efficient coordination, utilization, and control of the elements of production in the building process (i.e., men, materials, methods, machines, and money) is the concern of the management courses.

This unique interdisciplinary combination of engineering, technology, and management is now acknowledged as an essential quality of managers in the complex building industry.

Faculty

Marvin J. Flaherty, Chairperson; Eberharter, Harrison, Hopkins, Ossinger, Rivet, Siqueland, Torrence, Twelker, Varey.

Undergraduate Program

Bachelor of Science in Building Construction Degree

The size of the applicant group and the limits of the department's resources require that the process of admission be selective. Selection is based on academic performance and potential, extent and quality of relevant experience, apparent aptitude, and personal motivation. Grade-point averages above 3.00 for sophomores and 2.50 for junior, senior, or fifth-year applicants are considered positive indicators for selection, but other criteria previously mentioned are also important factors in reviewing the total application. The admissions committee attempts to determine the potential of each applicant and to accept from the group of applicants those who, in its judgment, are best qualified to complete the building construction program and to become professionals who will contribute to the construction industry in accordance with the department's objectives. Full-time students receive priority over part-time students. The department encourages racial minority and women students to enter the field of building construction.

Admission to the department is by special selection process; (see Departments With Special Selection Procedures elsewhere in this catalog). Applicants must contact the department, 430 Gould, JO-24, 543-6377, for its individual application form. Closing date for receipt of applications by the department is April 1; however, the University admissions application and its necessary accompanying material should be filed at the admissions office at least four weeks before the department's closing date. Selection for acceptance into the program, which begins Autumn Quarter, is made each year in the spring, and all applicants are notified of the admissions committee results shortly thereafter. Because each application is valid only once, a student must reapply for consideration in subsequent years.

The Department of Building Construction admits two groups of students: some with sophomore standing and some with junior- or senior-level qualifications. It is the intent of the department to maintain up to twenty percent sophomore students within this enrollment quota. These applicants must have completed at least 45 credits acceptable toward the Bachelor of Science in Building Construction degree prior to beginning of Autumn Quarter and meet general University entrance requirements and all other requirements for entry into the program. Only those students who meet these qualifications and possess at least a 3.00 gradepoint average in university-level work are considered for admission to the major at the sophomore level.

All applicants other than those of sophomore standing as qualified above must have completed, prior to beginning of Autumn Quarter, 90 credits acceptable toward the Bachelor of Science in Building Construction degree (preferably lower-division requirements) and have met the University general entrance requirements to be considered for admission to the building construction major. Minimum acceptable grade-point average is generally 2.50. These standards and requirements are applied uniformly to the students transferring to the University and those already on campus who wish to enter the Department of Building Construction.

A student currently enrolled in the University who meets these qualifications must complete a departmental application form. If granted admisson to the building construction major, the student must then initiate a Change of College form to transfer records from his or her present college or department.

Transfer students may apply for admission to the building construction program concurrently with the application to the University for Autumn Quarter.

A former student in the Department of Building Construction who dropped out of school for one quarter only may be readmitted directly into the department, provided he or she applies to the University by the prescribed closing dates. A former student who dropped out of school for longer than one quarter may be admitted provided he or she meets the above admission requirements and provided he or she applies to the University by the prescribed closing dates. Admission to the department is always contingent upon admittance into the University. Thus, a returning student must complete the paperwork in the Former Students Office, Schmitz Hall, prior to applying to the Department of Building Construction.

The curriculum, established to fulfill these educational needs, exposes the building construction student to as many functions as possible in the building industry. This interdisciplinary exposure is an attempt to develop in graduates a broad perspective of the multifaceted industry in which they will participate. To achieve these ends, a building construction student—in addition to the basic social and natural sciences and humanities—takes many courses in engineering, technology, and management. The first two years of the program can be completed at the University in the College of Arts and Sciences, or at other four-year institutions or community colleges, and consists of the following University courses or their equivalents at other institutions: ACCTG 210, 220, 230; BG&S 200; CHEM 100 or 101; ECON 200; ENGR 161; English (writing) 5 credits; MATH 105, 157; PHIL 100; PHYS 114, 115, 116, 117, 118, 119; PSYCH 101; QMETH 200, 201; SOC 110; electives: 13 credits.

The following upper-division courses integrate the areas of engineering, technology, and management into a perspective of the building industry:

ARCH 310, 312, 320, 321, 322, 420, 421, 422; B CMU 301; B CON 301, 310, 330, 331, 332, 401, 420, 470, 480, 498A; CETC 405; ECON 340; OPSYS 301; URB P 300; electives: 28 credits.

Graduation Requirements

The Bachelor of Science in Building Construction degree program requires satisfactory completion of the four-year curriculum requirements with a minimum of 192 credits, a 2.50 minimum grade-point average in required building construction, architecture, and urban planning core courses, and a 2.30 cumulative grade-point average in the student's final six quarters. The last 45 credits must be earned as a matriculated student in residence at the University. Additionally, a graduating student must prepare a written evaluation of the building construction program and courses, reflecting his or her thoughts regarding their strengths and weaknesses.

Continuation Policy

The following criteria and procedures are applied to all undergraduate students for continuance in the Bachelor of Science in Building Construction degree programs:

1. Maintain a 2.50 minimum grade-point average in building construction core courses and a 2.30 cumulative gradepoint average in the final six quarters.

2. Demonstrate that he or she is actively progressing toward completion of degree requirements by (a) satisfactorily completing at least 9 credit hours each quarter in courses applicable to the Bachelor of Science in Building Construction degree and (b) continuous enrollment during each academic year (Autumn, Winter, Spring quarters).

Failure to maintain the above standards results in review of the student's records by the department Chairperson and/or faculty and may result in dismissal from the department. Students' records are reviewed quarterly by the department Chairperson.

Construction Practice

Although no internship is required for completion of the building construction degree program, every student is encouraged to seek summer employment in the building industry. This work experience lends reality to later, practice-

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oriented building construction courses and sharpens the student's perceptions of developing perspectives. Part-time positions during the academic year are often available to those students who also can meet class-related responsibilities.

The Department of Building Construction offers to a limited number of qualified students a formal work/study program with participating building companies. A student receives upper-division elective credits for successfully completing BCON 496 (Construction Practice).

LANDSCAPE ARCHITECTURE

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The expanding roles and opportunities for the landscape architect are directly related to the increasing public concern for the wise use of America's natural resources and for the quality of design for the built environment. These trends place great demands on schools of landscape architecture to train professionals who can deal with a wide range of landscape problems affecting environmental quality. Landscape architecture is primarily concerned with the planning and design of exterior environments. Landscape architects are concerned with understanding and protecting the natural environment. The profession seeks to balance human social, psychological, and physical landscape needs with the requirements of a properly functioning natural environment.

Landscape architects may be private practitioners or may be employed by various planning agencies, industrial firms, educational institutions, or public agencies. Their work varies from large-scale land- and water-use master planning to specific landscape projects. Services provided by landscape architects include preparation of site analysis, feasibility studies, alternative landscape plans, project designs, working drawings, specifications, cost estimates, and construction supervision. Landscape architects provide policy and technical guidance in the development and conservation of regional resources and in the protection of natural and designed landscapes. They are increasingly involved in the decision-making process affecting large areas of public lands for parks, recreation, open space, new town and subdivision design, urban design, transportation corridor selection, large facility siting, and natural resource management programs.

Faculty

Sally Schauman, Chairperson; Buchanan, Furtado, Gutter, Haag, Johnston, Jongejan, Kerr, Nakano, Small, Streatfield, Untermann.

Undergraduate Program

Bachelor of Landscape Architecture Degree

The five-year curriculum leading to the Bachelor of Land-

scape Architecture degree is the normal educational component for qualification for the professional practice of landscape architecture. Students take the first two years of the curriculum in the College of Arts and Sciences or its equivalent in a two- or four-year college, satisfying the distribution and elective requirements with a total of 90 credits as follows: a minimum of 20 credits each in social sciences, humanities (other than art, but may include a 3-credit art laboratory), natural sciences (10 credits in physical sciences-GEOL 101 and mathematics recommended; 10 credits in biological sciences-BOT 110 and 113, or BOT 313 or 350 recommended); a minimum of 30 credits in proficiency requirements such as: at the University of Washington ARCH 498 and 300 for 14 credits; ARCH 310, 311. or 314 for a minimum of 4 credits; and choices from ART 105, 106, 107, 109, 110, 259, 272 for a minimum of 12 credits; at other universities or community colleges, choices from an equivalent of ART 105, 106, 107, 110, 259, 272 for a minimum of 17 credits; choices from drama, music, painting, ceramics, ecology, drafting, and plane surveying for a minimum of 13 credits.

Admission to the department is competitive, and the number of openings is limited by an enrollment quota, with students normally admitted for Autumn Quarter. (Applications are considered for Winter and Spring quarters on a space-available basis.) Students should contact the department early and be aware of the departmental application requirements and scheduling. Students at the premajor sophomore level at the University may be granted selected premajor status by the department, enabling them to enroll in certain proficiency courses by arrangement with the departmental adviser.

For students without sufficient proficiency as exhibited by their portfolio material, a special proficiency course offered by the department in Summer Quarter may be required prior to admission as a major, and for these students final admission as a regular major is based on performance in this course.

Students admitted as departmental majors must satisfy the following: j

Third Year: L ARC 301, 302, 311, 331, 332, 352, 361, 403; BOT 331; FOR B 210; GEOL 313; and an environmental history elective. Total: 47 credits.

Fourth Year: L ARC 303, 401, 402, 411 or 412, 420 or 421, 423, 433; environmental history elective; geography elective; and other approved electives. Total: 45 credits.

Fifth Year: L ARC 404, 405, 406 or 474, 473; urban planning electives; forestry elective; sociology elective; environmental legislation elective; and other approved electives. Total: 47 credits.

During the fourth and fifth years of the B.L.A. curriculum, students may specialize in project design, regional land-

scape architecture, or urban landscape architecture. In addition, it is possible for certain courses in the normal B.L.A. curriculum to be substituted by other courses in the University, subject to departmental approval. Satisfaction of the professional curriculum for graduation requires completion of the curriculum's 235 credits with a 2.30 cumulative grade-point average and a 2.50 grade-point average in all required departmental courses.

Students with previous degrees: Students with prior undergraduate degrees may apply for admission to the Bachelor of Landscape Architecture degree program as postbaccalaureate second-degree candidates, or to the graduate program, providing they meet the prerequisite requirements. Advising is available in the department as to which program is best suited for students with prior degrees. Detailed descriptions of the programs and separate departmental application requirements and deadlines are available in the department.

Graduate Program

Master of Landscape Architecture Degree

The traditional purpose of graduate instruction in landscape architecture has been to train professionals who possess advanced skills and capabilities that can be used in proprofessional practice. At the University, the degree of Master of Landscape Architecture emphasizes regional/ metropolitan landscape issues. It is a structured program designed to train environmental professionals who can interpret concepts and data from the natural and social sciences and link them with the tools of environmental planning and design disciplines in the context of planning the public landscape. The curriculum deals with site-specific design and planning issues, because there is a reciprocal relationship between any site and its regional context. This ecological approach reflects a balance between planning based on consideration of natural processes and a concern for the cultural, historical, and esthetic dimensions of the landscape within political, economic, and social realities. There are three areas of focus from which students may select to follow in the completion of the degree requirements: coastal zone, inland watersheds, and wildland areas.

The program emphasizes a regional approach to the solution of large-scale landscape problems, with case studies drawn from the Pacific Northwest. However, because the theory and the tools on which this approach is based are universal in nature, the curriculum can serve the needs of students who may eventually practice in other geographic areas. Graduates of the program should be capable of assuming responsibility for environmental planning and management, research, and education in a private office, public agency, or academic institution.

Preparation for master's degree study may be in landscape architecture or in another environmental design field, such as architecture or urban planning, as well as in geology, botany, or other natural sciences or in geography, history, or other social sciences. For students with a prior baccalaureate degree in landscape architecture, the 1½-year program requires a minimum of 46 credits. Although the program can be adjusted in minor ways to meet the academic needs of students with diverse academic and professional backgrounds, all students accepted into the program should have attained a level of proficiency equivalent to a baccalaureate degree in landscape architecture prior to beginning the master's degree curriculum. Students with some professional or educational experience in design and planning usually are required to take eight quarters to complete the program. For those students with Bachelor of Science degrees in the earth and natural sciences, it usually takes a minimum of eleven quarters.

The primary criterion for admission to the graduate program is the applicant's apparent ability, as determined by the department and Graduate School, to progress satisfactorily in graduate study. The applicant's scholastic achievement in undergraduate or graduate work is important. However, consideration is also given to other submitted evidence, such as the portfolio, letters of recommendation, and a statement of interest. Students usually are admitted to the graduate program in landscape architecture only in Autumn Quarter, and all the application materials should be received by the department no later than the preceding February 16. Notices of admission are given about April 1. The prospective applicant should note that the Graduate Record Examination aptitude test scores, at least three letters of recommendation, transcripts of previous degree programs and academic study, and a portfolio of work are required as part of the application, along with a statement of career goals and objectives, and should plan accordingly. Those applications received or completed after the departmental deadline are considered on a space-available basis if, in fact, an opening should occur, providing that Graduate School deadlines as listed on the back of the Graduate School application have been met.

In addition to courses listed later in this catalog, it is anticipated that there will be added one additional studio dealing with regional landscape design and planning.

Detailed descriptions of the programs and separate departmental application requirements and deadlines are available in the department.

URBAN PLANNING

410 Gould

Urban planning is concerned with the rational organization and use of built environments and is based on an understanding of institutions, technology, and human aspirations and opportunities. It makes its contribution in the integrated application of knowledge from diverse fields. Planners conduct research on the nature of our environment and its changes, as well as work in the formulation of community programs dealing with human resource objectives. They develop alternatives, propose solutions to environmental and community problems, and develop and apply methods for evaluating alternatives. Planners exercise responsibilities for the administration of programs to prepare plans and to carry them into effect.

Faculty

D. H. Miller, Acting Chairperson; Amoss, Arenas, Bagne, Bell, Grey, Hancock, Horwood, Johnston, Ludwig, Norton, Rabinowitz, Ryan, Schneider, Seyfried, Shinn, Wolfe. C. Arenas, undergraduate program adviser; J. Hancock, graduate program adviser.

Undergraduate Program

Bachelor of Arts Degree

The major in urban planning is a program of study for the Bachelor of Arts degree granted by the College of Architecture and Urban Planning. A 90-credit program, the major curriculum is normally completed in two full-time years of study following suitable premajor preparation. The purpose of the program is to provide a core curriculum that deals with the field of urban planning: the development and guiding concepts of the profession; planning theories, methods, and processes; the issues and problems with which planning deals; and the framework in which planning is carried out. The core curriculum is supplemented by studio and seminar course work with focus on issues and solutions.

The curriculum is intended to serve those seeking liberal education oriented to urban issues and/or preparing to undertake graduate or professional training in a variety of areas, including urban planning.

Students take the first two years of the curriculum in the College of Arts and Sciences or its equivalent in a two-year or other collegiate institution, satisfying the following distribution and elective requirements:

Minimum of 20 credits each in social sciences, humanities, and natural sciences, among which the student is strongly urged to include at least one college-level course in each of the following subjects: economics, mathematics, American government, statistics.

Applications to enter the program are accepted quarterly (except for Summer Quarter) and may be made upon completion of 75 quarter credits, or when it is projected that the student will have completed the premajor 90 credits and distribution requirement by the quarter of entrance. Applicants are expected to have a minimum overall grade-point average of 2.00 to be eligible to apply.

Admission to the department's major program is by selection from a ranked list of applicants to fill openings in the departmental enrollment quota.

Students should contact the department about selection procedures. Program applications, available in the Urban Planning advising office, are due as follows: April 15 for Autumn Quarter entrance; October 15 for Winter Quarter, and January 15 for Spring Quarter for current University of Washington students.

Third and Fourth Years: Core courses (in their suggested sequence): URB P 300, 410, 411, 465, 481 (or alternate as described in program statement available from the department), and 407; 25 credits of urban planning electives; one course in environmental systems; and one course in a subject dealing with the problems and life-situation of one of America's racial/ethnic minority groups. The remainder of upper-division course work is elective. Total: 90 credits.

Required for graduation is satisfactory completion of 180 credits in the curriculum with a 2.50 grade-point average in major program course work and a 2.00 overall grade-point average.

Graduate Programs

Master of Urban Planning Degree

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

Preparation for master's study may be in urban planning or other appropriate fields, such as economics, geography, and other social sciences; civil engineering and environmental science and studies; or landscape architecture and architecture. Selective urban study and technique courses are taken to provide a basis for professional courses.

It is the primary objective of the curriculum to educate professional planners with a broad range of competence; a secondary objective is to provide opportunities for specialization.

Course requirements specify a core of knowledge embodied in required courses. Drawing on the electives in the Master of Urban Planning curriculum and with the advice of faculty members with similar interests, the student may put together an area of specialization. Current organized program opportunities include urban design, urban transportation, urban development, comparative urban development, and land-use planning. Other opportunities that may be developed by the student involve the cooperation of other University units, in consultation with the graduate program adviser and other faculty members.

Doctor of Philosophy Degree

The Doctor of Philosophy degree in the urban planning field indicates scholarly abilities, long-term intellectual interests, and substantial achievements related to the discipline of planning. The requirements leading to this degree



are devices through which students may demonstrate that they have these qualities and are capable of independent work worthy of the attention of their peers in the academic and professional planning communities. This doctoral program is not viewed as an additional level of training for professional practice.

Admission to the doctoral program is similar to admission to the Master of Urban Planning program, with the added understanding that the student is essentially interested in an academic or research career in a specialty within the planning field and has demonstrated a high degree of intelligence and academic competence.

For graduation, the program has a minimum of fixed requirements in the Department or Urban Planning in addition to those of the Graduate School. A preliminary examination is required before a Supervisory Committee is appointed to direct the student's specialized preparation for the General Examination, the first of two major requirements. The second is completion of a satisfactory dissertation and Final Examination.





ARTS AND SCIENCES

Dean

Ernest Henley B110 Padelford

Associate Deans

Joe S. Creager Richard L. Lorenzen S. Frank Miyamoto David Prins

A liberal education shapes man toward informed judgment and participation in a democratic society. The individual's acquaintance with both past and contemporary thought in the arts and sciences, his exploration of abstract ideas and their relationships, and his ability to manipulate them are the primary concern of the College of Arts and Sciences.

The college offers breadth and depth in the intellectual experience, unlimited by vocational or professional considerations. The departments and schools offer nearly one hundred curricula leading to the degrees of either 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.

Although some common patterns of study are required of all students, the objectives of the college permit a wide variability in education aims. Certain units of the college combine professional training with general study, but any special goals of a professional or vocational nature are regarded as extensions of the basic baccalaureate program.

The College of Arts and Sciences provides instruction to students in every unit of the University. Preprofessional programs are designed to enrich the general education of students who will enter the College of Architecture and Urban Planning, the College of Education, the College of Engineering, or the schools of Business Administration, Dentistry, Law, Librarianship, Medicine, Pharmacy, Public Affairs, Public Health and Community Medicine, or Social Work. Students enrolled in other undergraduate colleges of the University are often required to take a large part of their work in courses given in the College of Arts and Sciences, and they may elect additional courses as their degree programs permit.

UNDERGRADUATE STUDY

Admission to the College and to Specific Majors

For general University admission requirements, see Undergraduate Admission and Enrollment section of this catalog. Admission requirements for specific majors may be found in this section of the catalog.

Recommended High School Preparation

Students who include four years of English, at least three years of a single foreign language, and at least three years of college preparatory mathematics in their high school programs meet the basic proficiency requirement of the college degree program upon entrance to the University and are thus exempt from the 15 credits of courses in these areas normally required of students early in their college study.

In addition, intensive preparation in a particular academic area may be appropriate for students who have specific educational objectives. For example, students who expect to complete a major in mathematics or the physical sciences are generally urged to complete all of the standard mathematics courses offered by their high schools in order to avoid taking review courses, for some of which no college credit is given.

Graduation Requirements

To be awarded a baccalaureate degree, a student in the college must fulfill a basic proficiency requirement, a distribution requirement, and a major requirement. In addition, the student must present at least 90 credits outside the major department and must meet minimum grade-point average requirements as mentioned below.

Basic Proficiency Requirement

Students of the college are expected to have developed, either in their high school study or early in their college study, fundamental verbal and quantitative skills. These skills make advanced study more efficient and meaningful for the student, and requiring competence in them from all students enables the faculty to assume a minimum level of verbal and mathematical abilities in their courses. Although achievement in these skills is made a part of the degree requirements, many entering students will already have demonstrated an acceptable level of achievement in their high school study. Students whose high school preparation included four years of English, three years of a single foreign language, and three years of college preparatory mathematics are considered to have satisfied the basic proficiency requirement. They may, of course, wish to take additional courses in these fields as electives.

Students who do not satisfy the basic proficiency requirement in this way are expected early in their college study to complete 15 credits in the areas of verbal or mathematical skills, or both, as considered most appropriate to their needs and interests. Students may choose to emphasize one skill or refurbish more than one skill, as assessment of their own capabilities may dictate. Courses used to satisfy this requirement are chosen from English composition, foreign language, and mathematics. Advanced credit awarded in English, foreign languages, or mathematics on the basis of entrance or placement examinations may be used in the satisfaction of this requirement.

Students who first enter the College of Arts and Sciences with 85 or more acceptable credits are exempt from the proficiency requirement.

Distribution Requirement

The distribution requirement is the means by which the college seeks to develop a student's breadth of knowledge and appreciation for subjects different in content and method from the one in which the student will major.

College departments and programs, as well as some units outside the college, have identified courses especially suited for meeting this requirement. These courses have been divided into three large fields of knowledge: the humanities, social sciences, and natural sciences. Each student must select, from the Distribution List, at least 20 credits in courses from each of the three fields. The Distribution List appears in the Bachelor's Degree Planbook, available in advising offices throughout the campus.

No course from the department in which the student is pursuing a major may be used to satisfy this requirement. Courses presented to satisfy the basic proficiency requirement may not be counted toward the distribution requirement.

Major Requirement

Among the characteristics of thought that the College of Arts and Sciences attempts to develop in students are (1) the abilities to manipulate abstract ideas and to explore relationships deeply, (2) confidence in the power of their own intellects, and (3) awakened intellectual curiosity. These attributes come from thorough study of a subject, aimed at developing a depth of knowledge. This study leads them to both empirical and theoretical considerations, develops in them methods of independent study, and exposes them to significant problems yet unsolved. The college provides, through a "major" requirement, the means to satisfy these liberal purposes, as well as the desire of students to become proficient in some field. 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.

Credits Required Outside Major Department

So that the student will not be tempted to specialize prematurely, 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 degree. A department itself may 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 Bachelor of Arts or Bachelor of Science degree. These limits may be exceeded only by the amount that a department elects to require credits in addition to the 180 minimum for graduation, as in the case of certain curricula in art and music.

Grade-Point Average Required for Graduation

To be eligible to receive the baccalaureate degree, the student must achieve at least a 2.00 cumulative grade-point average in the major (some departments prescribe a higher minimum grade-point average for the major), as well as a 2.00 cumulative grade-point average 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. They may choose to graduate under the graduation requirements of the *General Catalog* published most recently before the date of entry into the college, provided that no more than ten years have elapsed since that date and provided that approval of the major department has been obtained. As an alternative, a student may choose to fulfill the graduation requirements as outlined in the catalog published most recently before the anticipated date of graduation. 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 1-credit 100-level physical education courses taken at the University of Washington, or their equivalents at other collegiate institutions, as elective credits toward graduation. At the present time, 1-credit physical education courses are not being offered at the University. Up to 18 credits in upper-division ROTC courses may also be counted as elective credits toward graduation, but no lower-division ROTC credits may be counted.

Certification for Teaching

Students following programs that lead to a baccalaureate degree in the College of Arts and Sciences may qualify for certification for public schools teaching in the state of Washington by including in their degree programs the courses required for certification as determined by the faculty of the College of Education.

All students seeking provisional certification are enrolled initially in the College of Arts and Sciences. Upon the completion of program prerequisites, they may apply for admission to the Teacher Certification Program. If accepted, they may then transfer to the College of Education.

Students preparing for certification at either the elementary or secondary level must compléte basic degree requirements and an academic major in addition to the Teacher Certification Program.

Information on the requirements for certification and admission to the certification program is available in the College of Education section of this catalog and from an education adviser in 211 Miller.

Office for Undergraduate Studies

C14 Padelford

Richard L. Lorenzen, Director

The Office for Undergraduate Studies coordinates a variety of college-wide undergraduate programs that fall outside existing academic departments. It also offers innovative and interdisciplinary courses. In creating the office, the college sought to encourage experimentation in curriculum development and to provide for the exploration of educational alternatives by faculty and undergraduates alike. The office is responsible for developing undergraduate opportunities in general education and, in particular, is responsible for the following programs:

Premajor and Preprofessional Programs Central Advising Office

B10 Padelford

Those students in the first or second year who do not make a definite choice of major when entering the University are designated premajor students. They should consult with an adviser in the Central Advising Office to design a program of studies that will both meet the general requirements of the college and provide them with information about possible major fields. Premajor students should make a selection of major whenever they are reasonably confident of their educational objectives. Ordinarily, a student will want to select a major by the end of the sophomore year to ensure completion of degree requirements in the normal period. Transfer to a department major from premajor status sometimes requires completion of prerequisite courses, attainment of a minimum specified grade-point average, or selection by the department from among a group of prospective majors.

For those students who would like to follow a basic course of study in preparation for training in professional schools, the college provides advising service in the following preprofessional programs: architecture, business, dental hygiene, dentistry, education, landscape architecture, law, medical technology, medicine, occupational therapy, pharmacy, physical therapy, podiatry, prosthetics and orthotics, social welfare, urban planning, and veterinary medicine. For requirements and additional information, all preprofessional students should consult advisers in the Central Advising Office, B10 Padelford.

General Studies Major

C14 Padelford

General Studies provides access to an individual degree program through the "atypical major," and organized interdisciplinary degree programs under directing committees. Additional information on the General Studies major appears below under Programs of Study.

General Studies (G ST) and Interdisciplinary Studies (GIS) Courses

C14 Padelford

The Office for Undergraduate Studies sponsors interdisciplinary and innovative courses not available in other departments. It supervises independent study (G ST 391) and independent fieldwork (G ST 340 through 350). It provides new courses experimental in content or design (GIS). It also sponsors the interdisciplinary writing program offered through variously numbered GIS courses.

Fieldwork Studies/Cooperative Education

C14 Padelford

Undergraduates in the College of Arts and Sciences may choose from a wide variety of experiential education options offered through the Fieldwork Studies office. Students who choose field placement internships may test careers, gain valuable work experience, provide service to people in the community, and relate theory and practice. Field experiences are highly recommended for admission to many graduate and professional schools. Students and employers alike attest to the benefits of attaining practical experience as part of an academic program. Fieldwork Studies offers an extensive file of nonprofit community agencies and private and public sector employers. The program provides students individualized supervision and counseling, contacts with field supervisors and faculty sponsors, as well as close liaison with, and evaluation of, placements.

Fieldwork Studies offers students elective General Studies credits for internship experiences, generally in community social agencies. Credits are granted for completion of agreed-upon field hours, consultation with faculty sponsor, and satisfactory completion of an academic project. Credits may be granted through G ST 350 (Independent Fieldwork) or through a variety of fieldwork seminars: Law (G ST 340-341), Health (G ST 342-343), Social Services (G ST 344-345), Career Exploration (G ST 346-347), and Special Topics (G ST 348-349). These seminars are two-quarter commitments that include nine field hours and a two-hour seminar per week. In general, credits are granted on the basis of three hours in the field per academic credit.

Cooperative Education assists students in finding paid, academically relevant positions in the private and public sectors. Students may work part-time over several quarters or may alternate periods of full-time work and school. Credits are granted on a sliding scale through G ST 350, with the active cooperation of appropriate faculty sponsors. Students from economics, mathematics, physics, computer sciences, as well as from the traditional liberal arts disciplines, have been able to find work experiences that they can relate to their academic interests. All students must be individually approved for placement by the Fieldwork Studies director and staff.

Interdisciplinary Writing Laboratory Program

C14 Padelford

The Interdisciplinary Writing Laboratory Program offers expository writing courses linked to specified lecture courses (e.g., Writing Laboratory/HST 112 or Writing Laboratory/SOC 110). Each writing laboratory is an independently credited composition course in which essay topics and illustrations of technique are drawn from the lectures and readings for a course in the social sciences or humanities. Writing laboratory assignments include essays that are also assigned in a linked course; instruction stresses organization, full development of ideas, and clear expression. These interdisciplinary courses bring writing teachers together with students who are interested in a particular subject and who share an immediate need to write about it. Writing laboratories regularly accompany survey courses in history, political science, and sociology; other program offerings vary. The writing laboratories available each quarter are listed in the *Time Schedule* under General and Interdisciplinary Studies.

College Honors Program

C14 Padelford

This four-year program features special counseling, honors courses, honors sections of regular courses, faculty/student colloquia, and opportunities for independent study. The program provides expanded opportunities for undergraduate education to those students best prepared to utilize the University's intellectual resources.

To be considered for admission to the Honors Program at entrance, students must apply during their final high school semester to the Director of Honors. Selection is based on high school records and scores on such examinations as those administered by the College Entrance Examination Board, National Merit, and the Washington Pre-College Testing Program. Students may also seek admission based on superior academic performance during their freshman year at the University.

Honors students are counseled by honors advisers. During their freshman and sophomore years, these students are expected to arrange approximately one-third of their schedules in honors courses. They must complete one of two interdisciplinary honors core courses-HA&S 200-201 (Humanistic Understanding and Human Culture) or H A&S 202-203 (Empirical Knowledge and Collective Action)and select additional credits from among a variety of special Honors Arts and Sciences courses. These include H A&S 300 (Introduction to the Professions), H A&S 398 (Honors Special Topics), and H A&S 350 (Honors Seminars). Additional credits to complete the lower-division honors requirement are drawn from among approved departmental honors courses. Honors Arts and Sciences courses are listed under "Honors" in the Description of Courses section of this catalog.

A student becomes a candidate for an honors degree upon acceptance, usually during the junior year, by a department that offers an honors curriculum. Information on departments that offer honors curricula is given in this section of the catalog. These students are graduated "With College Honors" in the appropriate discipline. Students who are not members of the college honors program but who demonstrate superior abilities in a particular field of study may, at the invitation of that department, participate in a departmental honors curriculum and receive a degree "With Distinction" in the major field.



GRADUATE STUDY

Also see Graduate Programs and Degree Policies, page 48.

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 School section of this 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. Additional information appears below and in the University of Washington *Graduate Study and Research* bulletin.

INTERDISCIPLINARY PROGRAMS

Certain interdisciplinary programs in the college offer specific undergraduate majors and/or graduate degrees. Other interdisciplinary programs are not offered as specific majors, but may be taken as degree programs under the title of a General Studies major. Descriptions of, and requirements for, these programs may be found below.

Programs of Study

AFRICAN STUDIES

See International Studies.

AMERICAN INDIAN STUDIES

C128 Padelford

Francis Svennson, Director

The goals of the American Indian Studies program are to increase the relevance of academic education for American Indian students, to promote an interest in American Indian communities and Indian cultures, and to increase the awareness and education of non-Indians about these communities and cultures. The program offers a series of courses on American Indian culture, history, and contemporary issues, with emphasis on developing knowledge and understanding of American Indian traditional, sociological, philosophical, and esthetic perspectives. An undergraduate degree in American Indian Studies is not offered. However, a General Studies degree is available to students interested in following a program in this area. Consult a General Studies adviser in B10 Padelford.

ANTHROPOLOGY

M32 Denny

Anthropology involves the analysis of the physical and cultural development, comparative biology, and social customs and beliefs of human beings. Primary fields include archaeology, physical anthropology, linguistics, and sociocultural anthropology.

Faculty

Robert C. Dunnell, Chairperson; Amoss, Atkins, Daniel, Dumont, Dunnell, Eastman, Eck, Garfield (emeritus), Grayson, Greengo, Harrell, Hunn, Hurlich, Keyes, Krieger (emeritus), Miller, Nason, Newell, Newman (emeritus), Nute, Ottenberg, Quimby, Read, Spain, Swindler, Watson, Wenke, Winans. C. F. Keyes, graduate program adviser.

Undergraduate Programs

Bachelor of Arts Degree

Admission Requirements: Completion of the College of Arts and Sciences proficiency requirement; a minimum of 85 credits; at least two of the following three courses, of which one must be with a grade of 3.0 or better: PHY A 201, ANTH 202, ARCHY 205.

Major Requirements: PHY A 201, ANTH 202, ARCHY 205, ANTH 445, plus 30 additional credits in anthropology selected from both upper- and lower-division courses, but excluding ANTH 100 and ARCHY 105, which may not be counted toward the major. At least 25 credits in the major must be with the grade of 3.0 or above. Courses in which 1.6 or less is received may not be counted toward the 50 required credits. Students who plan graduate work should elect one foreign language.

Honors Program: Baccalaureate degree "With College Honors in Anthropology" or "With Distinction in Anthropology." Consult honors adviser about requirements.

Teaching Program: Teaching major or minor in anthropology. Information on requirements appears in the College of Education section of this catalog.

Graduate Programs

Master of Arts Degree

Admission Requirements: The Master of Arts degree is a preparatory stage for the doctoral program. Except in museology, students pursuing graduate work are admitted only to the Doctor of Philosophy degree program. An undergraduate major in anthropology is not required. Applicants are judged on overall undergraduate performance and by the recommendations of professors who have supervised them.

Graduation Requirements: With Thesis—Requirements vary according to specialization in archaeology, physical

anthropology, or sociocultural anthropology. Students must demonstrate proficiency in one foreign language and complete a thesis embodying independent research, followed by oral examination. Requirements for specialization in museology are two years of course work, an acceptable thesis, and demonstration of proficiency in one foreign language. Museology specialization leads to a terminal master's degree and does not confer acceptance to the Doctor of Philosophy degree program in anthropology. Separate application for such admission is required. *Without Thesis*— Substitution of written examinations for thesis is permitted, except for the Master of Arts degree with specialization in museology.

Doctor of Philosophy Degree

Admission Requirements: Same as for the Master of Arts degree!

Graduation Requirements: Acquisition of a master's degree in anthropology or its equivalent; comprehensive written examinations; dissertation; teaching experience. An additional foreign language may be necessary. Requirements vary according to specialization in archaeology, physical anthropology, or sociocultural anthropology.

ART

104 Art

The School of Art is concerned with the practice, history, and teaching of the graphic and plastic arts. It offers undergraduate and graduate instructional and research programs in art education, ceramic art, graphic design, industrial design, interior design, metal design, painting, printmaking, sculpture, textile design, and general art.

Faculty

Richard R. Arnold, Director; Alps, Anderson, Arnold, Berger, Carraher, Celentano, Dahn, Dailey, DuPen, Dunthorne, Eiber, Erickson, Foote (emeritus), Fuller, Glaeser, Gonzales (emeritus), Hafermehl, R. Hill (emeritus), W. Hill, Hixson, Johnson (emeritus), Jones, Kehl, Koenig, Kottler, Lawrence, Lundin, Marshall, Mason, Miller, Moseley, Patterson (emeritus), Pawula, Penington (emeritus), Pizzuto, Praczukowski, Proctor, Ritchie, Smith, Solberg, Spafford, Sperry, Taylor, Tsutakawa, Wadden, Warashina, Welman, Whitehill-Ward. E. C. Pizzuto, graduate program adviser.

Undergraduate Programs

Admission Policy for Initial-Degree-Seeking Applicants

The Office of Admissions admits entering freshmen as art majors if regular University admission requirements have been met. Transfer students indicating art as their major are admitted initially as premajors in the College of Arts and Sciences. Those with a minimum grade-point average of 2.50 are accepted as art majors during the first meeting with an art adviser.

So that placement within art programs can be determined, transfer students with college-level art experience must submit representative examples of studio work in slide or photograph form with transcripts to the School of Art advisory office at least two weeks before the initial advisory appointment. Art majors may follow the general art curriculum without further review of work or record of accomplishment if a minimum grade-point average of 2.00 is maintained. All other studio majors are subject to the continuation policies appropriate to their major options.

Admission Policy for Postbaccalaureate Applicants

Postbaccalaureate art applicants must file an application through the Office of Admissions by the following deadlines: Autumn Quarter, July 1; Winter Quarter, November 1; Spring Quarter, February 1; Summer Quarter, May 15.

A supplementary information form is provided by the School of Art. By the above deadlines, this form and slides of studio work must be submitted by studio art applicants to the School of Art advisory office for an admission review. Following the review, applicants are notified by the Office of Admissions regarding their admissibility.

Postbaccalaureate applicants hoping to transfer to art from other schools, departments, or colleges on the campus may pick up a supplementary information form from the School of Art advisory office. In order for an applicant to be considered for admission, this supplementary form, a complete academic record, and slides of studio work are required and may be submitted to the School of Art advisory office at any time.

Bachelor of Arts Degree

Major Requirements

General Art: ART 105, 106, 107, 109, 110; ART H 201, 202, 203; 40 credits chosen from the following optional fields so that one option includes no more than 15 credits and the others no more than 9 credits each: all undergraduate art history courses except ART H 201, 202, 203; ART 300, 301, 302, 303, 304; 201, 202, 203, 353; 250, 253, 255, 340; 265, 325; 357, 358, 359, 457, 458, 459; 339; 256, 257, 259, 307, 360; 245, 345, 346, 347, 348, 349, 450, 451, 452, 453, 454; 272, 274, 332.

Art Education: ART 105, 106, 107, 109, 110; ART H 201, 202, 203; ART 211; 3 credits from ART 250, 253, 255; 256, 259; 201; 6 credits from 300, 301, 302, 303, 304; 3 to 5 credits from 245, 272, 258, 491 (3 credits); 11 to 13 credits of approved art electives. The College of Education section of this catalog outlines requirements for the Teacher Certification Program.

Textile Design: ART 105, 106, 107, 109, 110; ART H 201, 202, 203; 3 elective art credits; ART 250 (6 credits),



255 (6 credits), 301, 304, 340, 499 (5 credits); TSCS 325, 329, 439.

Bachelor of Fine Arts Degree

A minimum of 225 credits is required for graduation with a Bachelor of Fine Arts degree.

Major Requirements

Ceramic Art: ART 105, 106, 107, 109, 110; ART H 201, 202, 203; ART 201, 202, 203, 353 (15 credits), 485 (15 credits); 46 elective art credits.

Graphic Design: ART 105, 106, 107, 109, 110; ART H 201, 202, 203; ART 205, 206, 208, 230, 231, 366, 367, 368, 376, 377, 378, 466, 467, 468, 478, 479, 480; 20 elective art credits.

Industrial Design: ART 105, 106, 107, 109, 110; ART H 201, 202, 203; ARCH 300, 301, 302, 310, 311, 312, 313, 413; ART 316, 317, 318, 445, 446, 447; 253, 272 (6 credits), 321, 335, 337; M E 303, 342; ENGR 351; ECON 200; MKTG 300; PHYS 110, 111; SPCH 103.

Interior Design: ART 105, 106, 107, 109, 110, 162; ART H 201, 202, 203, 392, 393; ART 259, 261, 262, 263, 265, 310, 311, 312, 319, 320, 321, 472, 473, 474; 18 elective art or humanities credits; TSCS 428; TSCS 329 or ART 250.

Metal-Design: ART 105, 106, 107, 109, 110; ART H 201, 202, 203, 3 elective art history credits; ART 258, 357, 358, 359, 457, 458, 459, 460 (15 credits); 42 elective art credits.

Painting: ART 105, 106, 107, 109, 110; ART H 201, 202, 203, 391; ART 265 (9 credits); 256, 257 (6 credits), 259, 307 (6 credits), 309, 360 (9 credits), 463 (15 credits) or 5 credits of 325 may substitute for 5 credits of 463; 274; 18 studio art elective credits; 25 elective credits from art and/or art history.

Printmaking: ART 105, 106, 107, 109, 110; ART H 201, 202, 203; ART 245; 20 credits from 345; 346, 347, 348, 349; 20 credits from 450, 451, 452, 453, 454; 350; 455; 256, 257, 259, 265; 40 elective art credits.

Sculpture: ART 105, 106, 107, 109, 110; ART H 201, 202, 203; ART 272 (6 credits), 274, 332 (15 credits), 335, 337, 436 (15 credits); 253, 256, 257, 265 (6 credits); 31 elective art credits.

Graduate Program

Master of Fine Arts Degree

Admission Requirements: Same as the undergraduate degree requirements in the School of Art, with a 3.00 or better grade-point average in the undergraduate art major; presentation of samples of work in slide form; three letters of recommendation. Graduation Requirements: A minimum of 51 credits of scheduled classwork, 9 credits of thesis, and Graduate Advisory Committee approval. The thesis is a series of paintings, prints, photographs, films, sculptures, ceramic objects, or designs in metal or fabric, executed with background or research. A selection of the thesis may be reserved for inclusion in the annual Spring Quarter thesis exhibition. Undergraduate work beyond the basic minimum may be required to make up deficiencies. There is no foreign-language requirement.

Financial Aid

The studio divisions offer several scholarship and financial aid programs for students who qualify. These programs include the Ford Foundation Matching Funds Scholarships, endowments, and organizational and privately supported scholarships. Information concerning scholarships is available from the undergraduate and graduate program advisers. Also available to graduate students are teaching assistantships, usually awarded to a limited number of graduate students who have been in residence at the University for at least one year.

ART HISTORY

131 Art

Art history is the study of the creation and meaning of works of art in relation to the artists and societies that produce them. Comparative in nature, the history of art involves the interaction of styles, techniques, and ideas from different centers over long periods of time; hence, its study requires many different skills, including languages, bibliography, connoisseurship, and historic, iconographic, and stylistic analysis. Art History is a division of the School of Art.

Faculty

C. G. Christofides, Head; Bliquez, Bravmann, Christofides, Clausen, Grossmann (emeritus), Hildebrand, Holm, Kingsbury, Langdon, Opperman, Pundt, Reed, Rogers, Silbergeld, Webb, Weston, Wilson. C. G. Christofides, graduate program adviser.

Undergraduate Program

Bachelor of Arts Degree

Admission Requirements: The Office of Admissions admits entering freshman and transfer students into Art History. Postbaccalaureate applicants must file an application to the Office of Admissions and complete the supplementary information form provided by the School of Art advisory office by the following deadlines: Autumn Quarter, July 1; Winter Quarter, November 1; Spring Quarter, February 1; Summer Quarter; May 15. Major Requirements: ART H 201; 47 additional art history credits, including at least 5 upper-division credits in each of the following areas: Asian, Primitive and Tribal, Classical, Medieval, Renaissance, Baroque-Rococo, and Nineteenth-Twentieth Centuries; plus one of the following options: (1) ART 105, 106, 107, 109, 110; or (2) 15 upper-division credits in one of the following (exclusive of courses offered jointly with Art History): Ancient and Medieval History, Anthropology, Asian Languages and Literature, Classics, Comparative Literature, English (literature courses only), Germanics, History of the Americas, History of Asia, Modern and European History, Near Eastern Languages and Literature, Romance Languages and Literature, Scandinavian Languages and Literature, or Slavic Languages and Literature.

Graduate Programs

Master of Arts Degree

Admission Requirements: (1) Bachelor of Arts degree with major in the history of art, or equivalent; (2) three letters of recommendation; (3) a statement of professional objectives in the field; and (4) samples of the applicant's written work.

Graduation Requirements: 36 credits in art history courses numbered 400 or above, of which 27 are course credits and 9 are thesis credits (half of the 36 credits must be in courses numbered 500 or above); reading knowledge of French or German as tested by the Graduate School Foreign Language Test; passing of a comprehensive examination in art history at the level of a sound general survey; presentation and defense of a thesis, which may be an extension of a seminar paper, that demonstrates familiarity with sources and a capacity for synthesis and critical evaluation.

Doctor of Philosophy Degree

Admission Requirements: (1) Prior sound preparation at a general level, which usually means having acquired the Master of Arts degree in the history of art; students whose backgrounds are judged insufficient may be required to satisfy deficiencies before undertaking a full-scale graduate program; (2) three letters of recommendation; (3) a statement of professional objectives in the discipline; and (4) samples of written research work in art history.

Graduation Requirements: (1) minimum of 54 credits in art history and related fields (maximum of 15 in related fields) beyond the Master of Arts degree or equivalent, exclusive of thesis and dissertation credits; at least 18 must be in graded acceptable graduate-level courses, and at least 27 must be in courses numbered 500 and above; (2) reading knowledge of French or German as tested by the Graduate School Foreign Language Test, plus reading knowledge of one or more additional languages as determined by the student's Supervisory Committee; (3) a General Examination, written and oral, taken prior to enrollment for dissertation credits; this examination covers three fields of art history chosen from the following general areas: (a) East Asian, (b) South and Southeast Asian, (c) Primitive and Tribal, (d) Ancient, (e) Medieval, (f) Renaissance, (g) Baroque, (h) Modern (no more than two fields may be selected from the same area); (4) preparation and defense of a dissertation requiring a minimum of 27 additional credits at the 800 level. In most cases, the student must expect to work and travel abroad in order to acquire firsthand knowledge of the works of art involved in the dissertation research.

Financial Assistance

The Art History division offers the Samuel H. Kress Foundation Fellowship of \$6,000 each year to a student who is pursuing a graduate degree in the history of art. Limited Kress funds are also available for the assistance of art history graduate students. Also available are teaching assistantships for which graduate students may apply. It is a policy to award financial aid and assistantships only to students who have been in residence at the University of Washington for at least one year.

ASIAN AMERICAN STUDIES

B501 Padelford

Asian American Studies is an interdisciplinary program designed to study and transmit the experience of persons of Asian descent in America. Instruction is offered in three areas: (1) a general survey and contemporary issues class on the history and culture of Asian Americans; (2) courses focused on specific groups; (3) special topics courses, as well as courses listed jointly with other departments. An undergraduate degree is not offered; however, a General Studies degree is available. Consult a General Studies adviser in B10 Padelford.

Faculty

Tetsuden Kashima, Director; Bacho, Lee.

Teaching Program: Teaching major or minor in Asian American Studies. Information on requirements appears in the College of Education section of this catalog.

ASIAN LANGUAGES AND LITERATURE

225 Gowen

The Department of Asian Languages and Literature offers instruction in the principal languages and literatures of Asia, including the Far East, Southeast Asia, and the Indian subcontinent. Emphasis is placed on the roles of these languages within the cultures they serve and on linguistic analysis, particularly historic. Some courses on important Asian literary works in English translation, especially for nonmajors, are available. Languages include Altaic, Chi-



nese (Mandarin and Cantonese), Hindi, Indian, Japanese, Korean, Manchu, Pali, Sanskrit, Tagalog, Tamil, Thai, Tibetan, and Uzbek (Turkic).

Faculty

Frederick P. Brandauer, Chairperson; Brandauer, Cirtautas, Cooke, Hawley, Hiraga, Hsia, Knechtges, Li (emeritus), Lukoff, McKinnon, Miller, Niwa, Norman, Nornang, Poppe (emeritus), Rubin, Ruegg, Schiffman, Serruys, Shapiro, Shih (emeritus), Suh (emeritus), Tatsumi (emeritus), Thrasher, C-h. Wang, C-n. Wang, Wilhelm (emeritus), Wylie, Yen. J. Rubin, graduate program adviser.

Undergraduate Programs

Bachelor of Arts Degree

Major Requirements: East Asian languages (Chinese, Korean, Thai, Tibetan, Turkic)-55 credits in the language, 25 beyond the second-year level; 20 credits in literature and culture (in the case of Chinese, at least 10 credits must be taken in Chinese literature, excluding 499). Literature courses in English may not be counted toward language credit requirements. Japanese-45 credits in the language, 15 beyond second-year level; 15 credits in area-related humanities or social science courses, excluding 499. South Asian languages (Hindi, Sanskrit, Tamil)-60 credits in language, including 45 credits in the major language, 15 credits in the minor language; 15 area credits in HSTAS 201, 202, INDN 420 or 421: 15 credits in humanistic and social science disciplines, with South Asian focus, to be chosen in consultation with adviser from current elective courses (e.g., PHIL 286, ANTH 412, 464, MUSIC 428). Students majoring in Tamil and Hindi ordinarily use Sanskrit as a minor language, but may substitute a second Dravidian language or Persian, respectively, if relevant to their proposed course of studies and if they have the approval of their advisers.

Teaching Programs: Minor academic fields in Chinese and Japanese are available for those preparing to teach in secondary schools. Information on requirements appears in the College of Education section of this catalog.

Graduate Programs

Master of Arts Degree

The Master of Arts degree is offered with specialization in Buddhist studies, Chinese, Japanese, Korean, South Asian, Tibetan, and Turkic languages and literatures.

Admission Requirements: Bachelor of Arts degree in relevant Asian language or equivalent background, three letters of recommendation, and a statement of purpose.

Graduation Requirements: Proficiency examination in major language; graduate reading examination in one language other than major language. With Thesis—A minimum of 36 credits, of which 18 must be taken for a grade in courses numbered 500 or above, and a minimum of 9 thesis credits; successful completion and defense of thesis. Without Thesis—A minimum of 45 credits, of which 18 must be taken for a grade in courses numbered 500 or above; two papers, in the field of language and/or literature, approved by supervisory committee.

Doctor of Philosophy Degree

The Doctor of Philosophy degree is offered with specialization in Buddhist studies, Chinese, Japanese, Korean, Tibetan, and Turkic languages and literatures.

Admission Requirement: Master of Arts degree in relevant Asian language.

Graduation Requirements: Proficiency examination in language of specialization; graduate reading examination in one Asian language other than major language and in one European language; field examinations; successful completion and defense of dissertation. The graduate program adviser must be consulted about specific course requirements in the various language areas.

ASTRONOMY

241 Physics

Astronomy deals with the science of the objects making up the physical universe and with the study of their physical characteristics, compositions, motions, histories, and interrelationships and of the physical laws governing them. The principal disciplines include such specialties as celestial mechanics, solar system and planetary astronomy, stellar spectroscopy and spectrophotometry, stellar structure and evolution, interstellar matter, galactic structure, nucleosynthesis of the elements, extragalactic astronomy, and cosmology.

Faculty

George Wallerstein, Chairperson; Balick, K. Bohm, E. Bohm-Vitense, Boynton, Brownlee, Hodge, Jacobsen (emeritus), Sullivan, Wallerstein. K. H. Bohm, graduate program adviser.

Undergraduate Program

Bachelor of Science Degree

Major Requirements: ASTR 321, 322, 323; 431, 432, 433 or nine units of other astronomy 400- or 500-level courses; PHYS 121, 122, 123; 117, 118, 119, or 131, 132, 133; 221, 222, 223; 321, 322; MATH 124, 125, 126, 238; 327, 328; 205 or 302; 12 additional credits in courses at the 300 level or above in astronomy, physics, or related fields, approved by adviser (PHYS 323, 324, 325; 421, 424, 425, 426 recommended for students planning to do graduate work in astronomy); junior year (survey) and senior year (research) papers recommended as ASTR 499 projects, with emphasis on the senior paper for students planning graduate work. For those not planning on graduate study, a program directed toward applied science also is available. No grade lower than 2.0 is acceptable in courses fulfilling the above requirements. Undergraduates interested in advanced work in astronomy may wish to take a double major in astronomy and a related field, such as physics. Undergraduates interested in immediate employment at an observatory or other scientific institution should include computing and electronics courses as part of their program.

Graduate Programs

Master of Science Degree

Graduation Requirements: With Thesis—36 approved credits, of which 12 must be in astronomy courses at the 500 level or above and 9 are thesis research. Without Thesis—36 approved credits, of which 15 must be in astronomy courses at the 500 level or above. For either program, proficiency in one foreign language in which there exists substantial astronomical literature.

Doctor of Philosophy Degree

Admission Requirements: Passage of the departmental qualifying examinations. Entering students are expected to have a strong background in physics and mathematics.

Graduation Requirements: Master's degree in astronomy or equivalent knowledge; 24 credits of physics courses at the 400 level or above or equivalent knowledge; at least three quarters of teaching experience in astronomy; dissertation and Final Examination. Proficiency in one foreign language in which there is a substantial body of astronomical literature. Students interested in work in theoretical astrophysics may be required to take additional courses in physics and mathematics. Students working on other topics may take certain courses in related fields, such as astronautics, atmospheric sciences, geophysics, or electrical engineering. A knowledge of computer programming is useful.

ATMOSPHERIC SCIENCES

408 Atmospheric Sciences-Geophysics

Atmospheric sciences is concerned with the physical state of the atmosphere, with processes and changes occurring in the atmosphere, and especially with application of the fundamental principles of physics to atmospheric phenomena.

Faculty

Franklin I. Badgley, Chairperson; Badgley, Brown, Businger, Fleagle, Harrison, Hartmann, Hobbs, Holton, Houze, Katsaros, LaChapelle, Leovy, Radke, Reed, Untersteiner, Wallace, Weiss. J. B. Holton, graduate program adviser.

Undergraduate Programs

Bachelor of Science Degree

Major Requirements: 38 credits in atmospheric sciences courses numbered above 300, of which 20 must be in courses above 400; ENGR 141; MATH 124, 125, 126; PHYS 117, 118, 121, 122, 123, or equivalents; and two courses from the following: MATH 327, 328, A A 370, PHYS 221, 222, 223; a grade of 2.0 or better in each of the required courses in physics and mathematics; overall grade-point average of at least 2.20 in all courses taken in atmospheric sciences.

Honors Program: Baccalaureate degree "With College Honors in Atmospheric Sciences" or "With Distinction in Atmospheric Sciences." Consult honors adviser about requirements.

Graduate Programs

Admission to the graduate program requires a baccalaureate degree in a physical science, engineering, or mathematics, or its equivalent, as well as the Graduate Record Examination. The program of graduate study varies with each individual. Each student is required to take a qualifying examination after completing 24 credits, 12 of which should be numbered above 500. (Mathematics or physics courses numbered above 400 may be used to satisfy part of this 24-credit requirement.) The qualifying examination, normally given twice a year and taken after one year of graduate study, covers fundamental aspects of atmospheric sciences and the relevant mathematics and physics. A supervisory committee is appointed for each student passing this examination.

Master of Science Degree

Admission Requirement: Passing the qualifying examination satisfactorily.

Graduation Requirements: 27 graduate credits exclusive of research or thesis, of which 3 must be in applied mathematics or mathematical physics and 15 must be in atmospheric sciences courses numbered above 500; completion of satisfactory thesis. There is no foreign-language requirement.

Doctor of Philosophy Degree

Admission Requirement: Passing the qualifying examination with distinction.

Graduation Requirements: 72 graduate credits, divided between course work and research. Supporting courses in mathematics and physical sciences are encouraged. At least 15 credits in such courses (numbered above 400) should be earned prior to the General Examination. At least half the credits earned prior to the General Examination should be in courses numbered above 500. General Examination. Dissertation. Final Examination.

BIOLOGY

226 Johnson

Undergraduate programs leading to a baccalaureate degree are offered by the departments of Botany, Microbiology and Immunology, and Zoology. An interdisciplinary program leading to a baccalaureate degree in biology is described below. Baccalaureate degree programs with a strong biological orientation are also offered by the departments of Psychology and Oceanography, and by the colleges of Fisheries and Forest Resources. In addition to the departments and colleges already noted, undergraduate and graduate courses in the biological sciences are offered by departments in the College of Arts and Sciences (e.g., Anthropology and Genetics) and in the schools of the health sciences (Dentistry, Medicine, Nursing, Pharmacy, and Public Health and Community Medicine). The departments of Botany and Zoology jointly offer a major in biology for students in the College of Education (additional information appears in the College of Education section of this catalog). Interdisciplinary study of biology is supervised by the Biology Instructional Program Committee, of which Richard B. Walker is chairperson.

Undergraduate Programs

Bachelor of Science Degree

Major Requirements: The program leading to a Bachelor of Science degree is in cellular and molecular biology. It is designed for students who wish to obtain undergraduate. training that emphasizes the chemical and cellular aspects of biology. The program is particularly well suited to students who wish to pursue graduate work in the areas of genetics, biochemistry, microbiology, cellular physiology and anatomy, developmental biology, or molecular biology. The following courses are required: MATH 124, 125, and either MATH 126, STAT 311, or Q SCI 281; CHEM 140, 150; 231, 235, 236 or 335, 336, 337; one chemistry laboratory; PHYS 114, 115, 116 or 121, 122, 123; BIOL 210, 211, 212; BIOC 440, 441, and either 442 or GENET 455; GENET 451; and 15 credits of advanced biology course work selected in consultation with the biology adviser. CHEM 350, 351 or 455, 456, 457 are recommended.

Teaching Program: Teaching major or minor in biology. Information on requirements appears in the College of Education section of this catalog.

BLACK STUDIES

B504 Padelford

Black Studies is an interdisciplinary program drawing together courses in a variety of academic disciplines designed to broaden the student's knowledge about the Black experience. Students are offered the opportunity to understand and appreciate the social, economic, historical, and esthetic aspects of Afro-American culture.

Affiliated Faculty

Black, Bravmann, Chandler, Cooper, Eastman, Flint, Griffith, Johnson, Jones, Kelly, Lawrence, Locke, Macklin, McCoy, McElroy, Osborne, Russell, Slaughter, Spain, Spratlen, Steele, Stewart, Wagner, Williams, Wilson, Young.

Courses with content of interest to the student of Afro-American culture and history include ANTH 212, 213, 401, 402; ART H 205, 230, 436, 437, 438, 439; BLK S 200, 210, 230, 250, 280, 301, 310, 400, 490, 492; C LIT 261, 262, 263, 450; DRAMA 201, 202; EDC&I 269, 469; ENGL 358; GEOG 227; HST 351, 352, 361, 362, 450, 451; HSTAA 150, 443, 444; MUSIC 319, 331, 427; PHY A 381; POL S 210, 211; PSYCH 250, 260; SISAF 265, 300, 301, 302, 303, 304, 305, 306, 307, 308, 400, 401, 402, 406, 407, 408, 410, 444, 450; SOC 105, 362, 459, 463; SPAN 311, 312.

Undergraduate Programs

Bachelor of Arts Degree

Major Requirements: 70 credits distributed as follows—20 credits in core courses at the 100 and 200 levels; 15 credits in courses at the 300 and 400 levels; 5 credits in ethnic studies other than Black Studies; 30 credits in a single department relevant to Black Studies curriculum. Academic units relevant to Black Studies include anthropology, art, communications, comparative literature, drama, English, geography, history, music, philosophy, political science, psychology, Romance languages and literature, sociology, and speech communication.

Teaching Program: Teaching major or minor in Black Studies. Information on requirements appears in the College of Education section of this catalog.

BOTANY

246 Johnson

Botany is concerned with the structure, physiology, evolution, and classification of plants, with emphasis on both organismal and cellular biology. Special courses and programs in botany of the Pacific Northwest are shared with related departments.

Faculty

L. C. Bliss, Chairperson; Ammirati, Bendich, Bliss, Cattolico, Cleland, del Moral, Denton, DiMichele, Halperin, Haskins, Hitchcock (emeritus), Kruckeberg, Leopold, Meeuse, Norris, Stuntz (emeritus), Tsukada, J. R. Waaland, Walker, Whisler. M. F. Denton, graduate program adviser.

Undergraduate Program

Bachelor of Science Degree

Major Requirements: Minimum requirements include at least 59 credits as follows: CHEM 140, 150, and 231 or 101, 102; BIOL 101-102 and GENET 451 or BIOL 210, 211, 212; BOT 113; 371 or 472; 354 or 444 or 480; and either sequence I (320, and 360 or 445 or 446) or sequence II (441, 360, 446); a minimum of 10 credits of upper-division courses (excluding courses without prerequisites) in botany, zoology, microbiology, genetics, biology, and certain courses in oceanography, fisheries, or forest resources.

A program designed for students who plan to go to graduate school includes the following: at least CHEM 140, 150, 151; 231 and either 232 or 235, 236; BIOL 210, 211, 212; GENET 451; BOT 113, 320; 371 or preferably 472; 360 or 445 or 446; 354 and 355, or 444, or 480 and 481; and a minimum of 10 credits of botany courses chosen to provide some depth in one field (e.g., BOT 433, 434, 445, 478, 498, 569).

The following are strongly recommended for all students who plan to go to graduate school, but do not count toward the 59 credits: reading knowledge of a foreign language (German, Russian, or French); one year of physics; one year of calculus; Q SCI 281 or 381 (statistical methods) and Q SCI 340 (applications using computer).

Graduate Programs

Master of Science Degree

Admission Requirements: Equivalent of a baccalaureate degree in biological sciences; organic chemistry; some preparation in a foreign language (French, German, or Russian); Graduate Record Examination scores (verbal, mathematical, and either chemistry or biology); three letters of recommendation.

Graduation Requirements: Individualized programs, with or without thesis, are planned with a committee of three members. Reading knowledge of one foreign language in major area may be required by committee.

Doctor of Philosophy Degree

Admission Requirements: Same as for the Master of Science degree.

Graduation Requirements: General Examination plus demonstration of proficiency in two minor areas outside the thesis topic. Proficiency may be established by examination or course work. Committees require foreign-language reading in specialty. Most programs include study in related science departments.

CHEMISTRY

109 Bagley

Chemistry is a branch of natural science that deals principally with the properties of substances, the changes they undergo, and the natural laws that describe these changes.

Faculty

Alvin L. Kwiram, Chairperson; N. Andersen, A. Anderson, Borden, Cady (emeritus), Chilton, Christian, Crittenden, Davidson, Eggers, Eichinger, Epiotis, Fairhall, Field, Gouterman, Gregory, Halsey, Kowalski, Kwiram, Lingafelter, Macklin, McAlister, Meyer, Nist, Norman, Pocker, Rabinovitch, Raucher, Ritter (emeritus), Robinson (emeritus), Rose, Schomaker, Schubert, Schurr, Sivertz (emeritus), Slutsky, Vandenbosch, Weinstein, Woodman.

Undergraduate Programs

Special options: Within the traditional degree programs below, elective study options are available in biological chemistry, chemistry and business, chemistry and public policy, environmental chemistry, and polymer chemistry. Consult the Chemistry advising office for more information.

Bachelor of Science Degree

Admission Requirements: Suggested high school curriculum to include three units of German; at least three units of mathematics, including 1½ units of algebra and ½ unit of trigonometry; one unit of physics; and one unit of chemistry.

Major Requirements: CHEM 145 (or 140), 155 (or 150), and 160 (or 164), (students with inadequate backgrounds in laboratory work should include CHEM 151 in their freshman program; CHEM 157 and 167 may replace 151 and 321); CHEM 321; 335, 336, 337, 346, 347 (or 231, 235, 236, 241, 242, and a passing score in the standard American Chemical Society examination in organic chemistry); CHEM 455, 456, 457; 10 credits from CHEM 460, 461, 462, 463; 414 (or 416); 5 credits in English composition; one year of physics, including one credit of laboratory (PHYS 121, 122, 123, 118 recommended); MATH 124, 125, 126, and two additional courses numbered 200 or above (MATH 238 and 302 recommended); one year of German, French, or Russian or placement into second year on the language examination; 17 credits of upper-division science electives. Grade-point average of 2.80 in chemistry courses, with 1.7 or better in all required chemistry courses and a graduation grade-point average of 2.80 or better. Required science courses may not be taken on a satisfactory/not satisfactory basis.

Bachelor of Arts Degree

Admission Requirements: Same as for the Bachelor of Science degree.

96

Major Requirements: Chemistry requirements through 321 are the same as those listed for the Bachelor of Science degree; CHEM 231, 235, 236, 241, 242 (or 335, 336, 337, 346, 347); 350, 351, 455 (or 455, 456, 457); 6 credits from 460, 461, 462, 463; 414 (or 416) recommended; 5 credits in English composition; one year of physics, including one credit of laboratory; MATH 124, 125, 126. Grade-point average of 2.00 in chemistry courses, with 1.7 or better in all required chemistry courses. Required science courses may not be taken on a satisfactory/not satisfactory basis.

Honors Program: Bachelor of Science degree or Bachelor of Arts degree "With College Honors in Chemistry" or "With Distinction in Chemistry." Consult honors adviser about requirements.

Teaching Program: Teaching major or minor in chemistry. Information on requirements appears in the College of Education section of this catalog.

Graduate Programs

Master of Science Degree

Admission Requirements: Baccalaureate degree with major in chemistry. Placement (qualifying) examinations.

Graduation Requirements: With Thesis—36 approved credits with 18 in courses at the 500 level or above; 18 in courses at the 400 level or above (or at the 300 level in outside departments) taken for numerical grade; 9 credits in thesis research. Without Thesis—Same as with thesis, except that additional graded course work may be substituted for a part of the required research. Demonstration of proficiency in German or an alternate approved foreign language required for both thesis and nonthesis programs.

Doctor of Philosophy Degree

Admission Requirements: Same as for the Master of Science degree.

Graduation Requirements: 27 credits of approved courses at the 400 or 500 level, with 2.7 or higher grades in a minimum of 18; cumulative examinations covering area of specialization; foreign-language proficiency; dissertation; experience as a teaching assistant or predoctoral teaching associate.

Doctor of Arts Degree

Admission Requirement: Completion of requirements for Master of Science degree with thesis.

Graduation Requirements: 39 credits (2.7 or higher grades) including CHEM 550, 552, 530, 531, 415, 414 or 416, 508, 418, 427, 460, and selections from CHEM 532, 551, 553, 559, 410, 414 or 416, and 513; 18 credits (2.7 or higher grades) in approved electives outside chemistry; 9 credits (may be S grade) selected from CHEM 510, 520, 540, and 560 series; cumulative examinations in one or

more areas of specialization; teaching internship; dissertation.

CHICANO STUDIES

B523 Padelford

El Centro de Estudios Chicanos was developed to create an academic atmosphere on campus that is familiar to the Chicano student and to provide academic support and instructional resources to students and to the community in order to facilitate problem solving and program implementation in the Chicano community. El Centro de Estudios Chicanos assists in the recruitment and hiring of Chicano faculty, develops courses, conducts research, and supports community programs relevant to Chicanos. An undergraduate degree in Chicano Studies is not offered. However, a General Studies degree is available to students interested in following a program in this area. Consult a General Studies adviser in B10 Padelford.

CHINA REGIONAL STUDIES

See International Studies.

CINEMA STUDIES

C14 Padelford

Cinema Studies is an examination of the cinema as a medium of personal, artistic expression. The basic course sequence, CINE 201, 202, 203, provides an introduction to the elements of the cinematic art, followed by a historical survey of key works in the development of the art form. More advanced Cinema Studies courses explore in depth such subjects as the careers of important individual filmmakers, film genres, and aspects of film style.

Students may also pursue courses in national cinemas offered in the departments of Comparative Literature, Romance Languages and Literature, and Scandinavian Languages and Literature, and related film courses, including film production in the schools of Communications and Art and in the College of Education. A General Studies degree is available to students interested in following a program in Cinema Studies. Consult a General Studies adviser in B10 Padelford.

CLASSICS

218 Denny

Classics embraces the ancient Greek and Roman civilizations from prehistoric times to the Middle Ages. The department is concerned with both the Greek and Latin languages and their literatures, including poetry, drama, history, philosophy, rhetoric, and political theory, as well as classical art and archaeology.

Faculty

Daniel P. Harmon, Chairperson; Bliquez, Grummel, Harmon, Langdon, MacKay, McDiarmid, Northrup, Pascal, Read (emeritus), Rutland. D. Harmon, graduate program adviser.

Undergraduate Programs

Bachelor of Arts Degree

MAJOR REQUIREMENTS

Classical Studies: Greek or Latin through 307 and 312; 36 credits chosen with department approval from courses in 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. CLAS 101, 205, and HST 111 are not acceptable.

Classics: 18 approved credits in Greek courses at the 400 level; 18 approved credits in Latin courses at the 400 level.

Greek: 27 approved credits in Greek courses at the 400 level and 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. CLAS 101, 205, and HST 111 are not acceptable.

Latin: 27 approved credits in Latin courses at the 400 level and 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. CLAS 101, 205, and HST 111 are not acceptable.

Honors Programs: Baccalaureate degree "With College Honors" or "With Distinction" in Latin, in Greek, or in classics. Consult honors adviser about requirements.

Teaching Programs: Teaching major or minor in Latin and in Classical Studies. Information on requirements appears in the College of Education section of this catalog.

Graduate Programs

Master of Arts Degree

Admission Requirement: Two years of upper-division study in addition to the second year in either Greek or Latin.

Graduation Requirements: 27 credits in courses or seminars in Greek or Latin, or both, and in related subjects approved by the department; a reading knowledge of French or German; either a thesis or 9 additional credits in approved graduate courses and seminars and a research paper.

Doctor of Philosophy Degree

Admission Requirements: Two years of upper-division study in addition to the second year in both Greek and Latin, but less preparation in one language may be accepted if preparation in the other language is exceptionally strong. Admission to the doctoral degree program may be granted after satisfactory completion of the departmental requirements for the Master of Arts degree.

Graduation Requirements: 72 credits in courses or seminars in Greek, Latin, and related subjects approved by the department; a reading knowledge of French and German; examinations or approved courses in Greek and Latin composition; translation examinations on the reading list of both Greek and Latin authors; three research papers; an oral General Examination; dissertation and Final Examination. Graduate students must have teaching experience before completing requirements for their terminal degrees.

COMMUNICATIONS

127 Communications

The School of Communications offers undergraduate professional preparation in editorial journalism, advertising, radio and television broadcasting, broadcast journalism, and communication. Undergraduate majors are given training in communication skills and opportunities for practical experience in their fields. The undergraduate program is interdisciplinary with emphasis on the social sciences and humanities.

Faculty

Don R. Pember, Director; Ames, Baldasty, Bowen, Bowes, Carter, Christian (emeritus), Cranston, Dervin, Edelstein, Frazer, Gifford, Godfrey, Harsel, Heller, Jackson, Johnston, McHale, Pember, Roller (emeritus), Ryan (emeritus), Samuelson, Shadel (emeritus), Simpson, Smith (emeritus), Spenser, Stamm, Warner (emeritus), Yerxa. R. Simpson, graduate program adviser.

Undergraduate Program

Bachelor of Arts Degree

Admission Requirements: 75 credits completed with no more than 20 credits in School of Communications courses; two of CMU 150, 200, 214 (or equivalents); at least one full quarter of work at the University of Washington prior to application; a grade-point average in the past three quarters (or 45 credits), either at the University of Washington or any other collegiate institution, at least equal to the all-University cumulative average of the Spring Quarter preceding the quarter during which admission is sought; letters as required by faculty. Satisfaction of these minimum requirements ensures consideration; it does not guarantee acceptance.



Major Requirements: 10 credits from courses in literature; 35 credits in related social science courses as specified by school faculty, to include at least 20 credits in upper-division courses and 20 credits in one department; core requirements of at least 50 credits within the school, to include the following: two of CMU 150, 200, 214; 320; and two additional communications courses at the 400 level, with the exclusion of CMU 449, 495, 496, 497, and 498; and one of the following sequences of study: Editorial Journalism-CMU 321, 322, and 4 to 12 credits from among CMU 323, 324, 325, 327. Broadcast Journalism-CMU 321, 353, 354, 355, 356, and 357. Advertising-CMU 340, 341, 344, and 345. Radio-Television-CMU 349, 360, and at least 6 additional credits in radio-television courses. Communication-Students are expected to plan and complete a coherent program of study, consisting of courses largely at the 400 level and primarily within the School of Communications. The plan of study, which also should satisfy the requirement that a minimum of 50 credits be completed within the School of Communications, including core requirements, must be approved by the sequence chairperson. Suggested programs in communication research, public communication, etc., are available for examination.

Internship Programs: Internship credit does not fulfill any specific course requirements, nor does it apply to the 50 communications credits that must be earned for graduation. The internship is designed to augment, not replace, the formal course offerings.

Honors Program: Baccalaureate degree "With College Honors in Communications" or "With Distinction in Communications." Consult honors adviser about requirements.

Teaching Program: Teaching major or minor in editorial journalism. Information on requirements appears in the College of Education section of this catalog.

Graduate Programs

Master of Communications Degree

Admission Requirements: Above-average undergraduate record, Graduate Record Examination, letter of intent, and three letters of reference.

Graduation Requirements: 45 credits approved by the student's supervisory committee—12 credits in communications courses at the 400-500 level, 15 credits in a cohesive area outside communications, 9 credits for professional project, and 9 additional credits.

Master of Arts Degree

Admission Requirements: Same as for the Master of Communications degree, plus the Miller Analogies Test.

Graduation Requirements: 45 credits approved by the student's supervisory committee—15 credits, including at least two courses at the 500 level, from each of two communications fields, 9 credits for a thesis, and 6 additional credits. Information on the language requirement can be obtained from the student's adviser.

Doctor of Philosophy Degree

Admission Requirements: For new students, the same as for the Master of Arts degree; continuing students must reapply for admission to the program.

Graduation Requirements: Usually two academic years of study beyond the Master of Arts degree, preliminary written and oral examination, dissertation, experience in research and teaching relevant to the student's vocational choice. Information on the language requirement can be obtained from the student's adviser.

COMPARATIVE ARTS

131 Art

At present, the program in comparative arts consists of a faculty-approved and -guided self-designed interdepartmental curriculum in the history and esthetics of the graphic, plastic, literary, cinematic, and performing arts and their roles in world culture. Although an undergraduate degree in comparative arts is not offered, a General Studies degree is available to students interested in following such a curriculum. Consult the head of art history in 131 Art.

COMPARATIVE HISTORY OF IDEAS

C24 Padelford

Comparative History of Ideas provides for the interdisciplinary study of intellectual history by bringing together thematically related courses from fields such as literature, history, philosophy, the arts, and religious studies. Courses within the program have been chosen and designed to explore the history of specific ideas or themes, to examine the history of particular intellectual cultures (Western and non-Western), or to study comparatively the underlying assumptions and attitudes of different intellectual worlds. As a unique approach to liberal humanistic studies, the program provides a solid basis for postgraduate study in, for example, law, administration, medicine, education, journalism, or area studies.

Faculty Executive Committee

Hal Opperman, Chairperson; E. Behler, Boler, Hankins, Opperman, Toews, E. Webb.

Requirements for the program include 60 credits with a 2.50 grade-point average, distributed as follows: 30 credits of core courses in various areas; 20 credits of approved

electives in the history of intellectual cultures; and CHID 490 (Colloquium) and 491 (Senior Thesis), 5 credits each. At least 30 of the total 60 credits must be at the upper-division level. An honors program requiring advanced reading knowledge of a foreign language and a 3.50 grade-point average in program courses (3.30 overall) is available. Although an undergraduate degree in Comparative History of Ideas is not offered, a General Studies degree is available to students interested in following this curriculum.

COMPARATIVE LITERATURE

B531 Padelford

The Comparative Literature program, devoted to the study of literature, transcends the confines of a national literature and explores the relationships existing among several literatures. In addition, the program is concerned with the relationship of literature to the arts and fields of knowledge such as philosophy, religion, and political thought. Typical areas of inquiry include literary traditions and periods, motifs, and genres; patterns of influence and reception of literary works among national cultures; and the general principles of literary theory and criticism.

Faculty

Ernst Behler, Chairperson; Altieri, Ammerlahn, Andrews, D. Behler, E. Behler, Carpenter, Christofides, Ellrich, Grummel, Harmon, Hruby, F. Jones (emeritus), L. Jones, B. Kapetanic, Konick, Kramer, J. Leiner, W. Leiner, Loraine, MacKay, McKinnon, McLean, Rabago, Reinert, Rossel, Sehmsdorf, Steene, Vaughan, Wang, Webb, Willeford, Yarbro-Bejarano. O. Reinert, graduate program adviser.

Undergraduate Programs

Bachelor of Arts Degree

Major Requirements: 50 credits, including the following courses: CLAS 210 or any upper-division literature course in classics; C LIT 300, 301, 302, and two additional courses in comparative literature at the 300 or 400 level; and at least one course in a literature other than the student's native literature, studied in the original tongue. Remaining credits are to be earned, with few exceptions, in 300- and 400-level courses from among the offerings of Comparative Literature and the eight participating departments: Asian Languages and Literature, Classics, English, Germanics, Near Eastern Languages and Literature, Romance Languages and Literature, Scandinavian Languages and Literature, and Slavic Languages and Literature. Departmental courses in foreign literature in translation are listed under the respective departments.

Honors Program: Baccalaureate degree "With College Honors in Comparative Literature" or "With Distinction in Comparative Literature." Consult department about requirements. *Teaching Program:* Teaching major or minor in comparative literature. Information on requirements appears in the College of Education section of this catalog.

Graduate Programs

Master of Arts Degree

Information on this degree appears in the Interdisciplinary Graduate Degree Programs section of this catalog.

Doctor of Philosophy Degree

Information on this degree appears in the Interdisciplinary Graduate Degree Programs section of this catalog.

COMPARATIVE RELIGION

See International Studies.

COMPUTER SCIENCE

112 Sieg

Computer science is the study of information and algorithms within the context of real and abstract computing devices. Computer scientists are interested in: the representation and storage of information; algorithms to access, display, edit, and transform information; programming and mathematical languages to express algorithms; and hardware and software processors to execute algorithms. These concerns lead both to theoretical investigations of computers, algorithms, and data and to practical developments in computer technology and applications.

The Department of Computer Science offers an intercollege undergraduate program in which students can pursue a Bachelor of Science degree under the College of Arts and Sciences or a Bachelor of Science in Engineering degree under the College of Engineering. The graduate program offers Master of Science and Doctor of Philosophy degrees. For descriptions of the programs, see the Interschool or Intercollege Programs section of this catalog.

Faculty

Robert W. Ritchie, Chairperson; Almes, Baer, Dekker, Fischer, Golde, Kehl, Ladner, Lazowska, Noe, Ritchie, Ruzzo, Shaw, Tanimoto. D. B. Dekker, graduate program adviser.

DANCE

254 Meany

Dance, a division of the School of Music, offers instruction in ballet and contemporary dance techniques and in related background courses.

COLLEGE OF ARTS AND SCIENCES



Andersen, Boris, Green, Skinner.

Undergraduate Program

Bachelor of Arts Degree

Admission Requirement: Proficiency audition in both basic dance techniques.

Major Requirements: Core requirements—36 credits in ballet and contemporary dance techniques, 18 of which must be upper-division credits; DANCE 145, 240, 241, 242, 345; B STR 301; 3 credits in ethnic dance, at least two consecutive quarters of a single form; 20 credits in approved music electives. Option 1, add to core: 3 credits from DANCE 220, 223, 324; 9 credits from DANCE 271, 470, 471. Option 2, add to core: 9 credits of DANCE 365; 3 credits of DANCE 464. A 2.50 grade-point average in dance and music courses is required of all majors.

DRAMA

113 Drama-TV

The School of Drama is concerned with the whole continuum of acting, directing, designing, theatre history, and dramatic forms through which the human, dramatic imagination finds expression, from the spontaneous, imaginative play of children to the theatre arts of criticism.

Faculty

Paul S. Hostetler, Executive Director; Carr (emeritus), Conway (emeritus), Crider, Dahlstrom, Devin, Forrester, Galstaun, Gray (emeritus), Haaga (emeritus), Harrington (emeritus), Hobbs, Hostetler, Loper, Lorenzen, Lounsbury (emeritus), McCoy, Pearson, Scales, Siks (emeritus), Sydow, Turner, Valentinetti, Winchell, Wolcott, York, Zeder. J. Wolcott, graduate program adviser.

Undergraduate Programs

Bachelor of Arts Degree

Major Requirements: A minimum of 58 credits in drama courses. Three quarters of acting: DRAMA 251, 252, 253 or 351, 352, 353 or 451, 452, 453 (with 350 and 450 series, 3 credits of DRAMA 298 or 498 also required). One quarter of child drama: DRAMA 230. Three quarters of technical practice: DRAMA 210, 211, 212, 290, 291, 292. 25 credits in theatre history, dramatic literature, and criticism: DRAMA 102, 371, 372, 373, plus one course from DRAMA 416, 476, 494. Electives at the 300-400 level to complete the balance. Drama majors are encouraged to elect a movement class.

Bachelor of Fine Arts Degree

A minimum of 243 credits is required for graduation with a Bachelor of Fine Arts degree.

Admission Requirements: Complete, or be in the process of final completion of, two years of general college study (90

credits). Entrance determined primarily by audition and interview. Students may enter only in Autumn Quarter. Application deadline is February 1 for auditions that are held in the spring. The student should contact the school for additional material required for application.

Major Requirements: In addition to the 90 credits required for admission, 45 credits in elective courses, plus three quarters each of DRAMA 457, 458, 459, and 555.

Teaching Program: Teaching major or minor in drama. Information on requirements appears in the College of Education section of this catalog.

Graduate Programs

Master of Fine Arts Degree

Admission Requirements: Acting—Audition, three letters of recommendation, and a résumé. Directing—Directorial analysis, not to exceed ten pages of double-spaced typing, of a play as if preparing a production, a résumé, and three letters of recommendation. Design (Costume and Scenery) or Technical Direction—Portfolio of designs, technical plots, or working drawings, plus three letters of recommendation, a résumé, and a brief statement of purpose in acquiring a graduate degree. Children's Drama—Three letters of recommendation, a résumé, and a statement of purpose; if the applicant wishes to study children's theatre directing, a directorial analysis should be submitted.

Graduation Requirements: A minimum of 60 credits is required in all areas of emphasis. Acting-three quarters each of DRAMA 457, 458, 555, 600 (3 credits each) and 9 credits of DRAMA 700. Directing-DRAMA 414, 416, 419, 463 (three quarters), 466 (three quarters), 497, 551, 552, 553, 562 (two quarters), 563 (nine quarters), 581, 582, 583, and 700 (9 credits). Design (Costume and Scenery)-Minimum of 20 credits in DRAMA 410, 411, 412; 413, 416, 419, 420, 421, 510 (9 credits); 511 (6 credits), 517, 518, 519, 581, 582, 583, 599, 700 (9 credits), and combinations from 413, 415, 416, 418, 496, 497, 512, 513, 520, 600, ART H 392, 393, ARCH 350, 351, 352, Technical Production-Minimum of 20 credits in DRAMA 410, 411, 412, 413, 419, 420, 421, 491, 497, 510 (3 credits minimum), 512, 513 (three quarters), 517, 520, 700 (9 credits), and combinations from 415, 416, 417, 418, 491, 510, 511, 518, 519, ARCH 350, plus electives in drama history/literature courses. Children's Drama-DRAMA 433 (three quarters), 436, 438, 536, 537, 538, 539 (six quarters), 700 (9 credits), and combinations from 431, 432, 460, 461, 462, 463, 466, 492, 551-552-553, 599,600.

Doctor of Philosophy Degree

The Doctor of Philosophy degree program focuses on the relationship of theatre history and critical theory with the theatre arts. Students who enter the program are expected to have had some theatre experience, both practical and academic. Admission Requirements: A piece of written work that represents the applicant's best work; three letters of recommendation; a statement of background and purpose for seeking the degree; and Graduate Record Examination score (optional).

Graduation Requirements: DRAMA 571, 572, 573, 581, 582, 583, 575, 576, 577, 585, 586, 587, 600 (three quarters, 5 credits each), and 800 (three quarters, 9 credits each). Participants are expected to display competence in an area of the theatre arts while pursuing the degree. Proficiency in one foreign language is required. The General Examination consists of a series of essays prepared in tutorial with an adviser. The essays focus on the major field, and the oral examination concerns both the major field and a minor field.

ECONOMICS

301 Savery

The Department of Economics is concerned with the analysis of the ways societies organize the production of goods and services and the distribution of these among groups and individuals. Applied fields of study available to the student choosing the general economics option include: urban economics, money and banking, industrial organization, natural resource economics, labor economics, public finance, economic history, comparative systems and development, international trade, and econometrics. The department also offers a political economy option, which includes course work from economics and political science.

Faculty

Charles R. Nelson, Chairperson; Barzel, Bassett, Benjamin, Brown, Cartwright, Cheung, Cox, Crutchfield, Edlefsen, Gillingham (emeritus), Hadjimichalakis, Halvorsen, Hartman, Hashimoto, Heyne, Higgs, Hopkins (emeritus), Huber (emeritus), Kochin, Koenig, Leffler, Mah, Makin, McCaffree, McGee, Mendelsohn, Morris, Mund (emeritus), Nelson, North, Parks, Rao, Silberberg, Thomas, Thornton, Watts, Worcester. R. Hartman, graduate program adviser.

Undergraduate Programs

Bachelor of Arts Degree

Admission Requirements: A minimum of 45 college credits with at least a 2.50 cumulative grade-point average including the following courses: ECON 200, 201, and 281; one calculus course (MATH 124 or 157); and 5 credits in English composition. The grade-point average for these courses must be at least 2.50, with a minimum of 2.3 in each course.

GENERAL ECONOMICS OPTION

Major Requirements: ECON 200, 201, 281, 300, 301, and

25 additional credits in courses numbered 300 or above chosen from a minimum of four fields other than theory (the Description of Courses section of this catalog contains a list of fields). Mathematical and logical systems requirements: one calculus course (MATH 124 or 157), plus any two courses chosen from the following list: calculus (MATH 125, 126); logic (PHIL 120, 370, MATH 305); accounting (ACCTG 210); and statistics (STAT 341, 342, 381). A minimum grade-point average of 2.50 is required for economics courses, with a minimum of 2.0 in each course.

POLITICAL ECONOMY OPTION

Major Requirements: ECON 200, 201, 260, 281, 300, 301, 306, 409, 452, plus one elective course in economics approved by the adviser. Mathematics and political science requirements: one calculus course (MATH 124 or 157), POL S 201, 406, plus one more political science course chosen with approval of the adviser. A minimum gradepoint average of 2.50 is required for economics courses, with a minimum of 2.0 in each course. Admission to this option is limited.

Honors Program: Baccalaureate degree "With College Honors in Economics" or "With Distinction in Economics." Consult honors adviser about requirements.

Teaching Program: Teaching major or minor in economics. Information on requirements appears in the College of Education section of this catalog.

Graduate Programs

Master of Arts Degree

Admission Requirements: Recommended preparation includes intermediate microeconomic and macroeconomic theory as well as a background in calculus and statistics. Applicants are required to take the Graduate Record Examination Aptitude Test and are encouraged to take the Advanced Test in Economics.

Graduation Requirements: Core courses: theory (ECON 500, 501, 502, and 503); mathematical economics (ECON 410 or the equivalent and 411); statistics and econometrics (ECON 480 and either 482 or 580). Three additional 500-level courses in economics, only one of which can be in a "tool" area (mathematical economics, econometrics, microeconomics, or macroeconomics). A thesis may be substituted for the three courses. There is no foreign-language requirement.

Doctor of Philosophy Degree

Admission Requirements: Same as for the Master of Arts degree.

Graduation Requirements: Core courses: theory (ECON 500, 501, 502, and 503); mathematical economics (ECON

410 or the equivalent, 414, and 412); statistics and econometrics (ECON 480 and either 482 or 580). Three field examinations, at least one of which must be in an applied, or "nontool," area. Doctoral dissertation. There is no foreign-language requirement.

Fields of specialization include: advanced macroeconomic theory, advanced microeconomic theory, comparative systems and development, econometrics and statistics, economic history, finance, government regulation and industrial organization, international trade, labor economics, medical economics, natural resources, and public finance.

Formal interdisciplinary study and research can be arranged through the cooperation of the School of International Studies, the Institute for Environmental Studies, or other University areas.

ENGLISH

A101 Padelford

Courses in English present opportunities for all undergraduates to approach English and American literature and to select from a range of writing and language classes. English is a flexible discipline, applicable to many preprofessional programs and serving most vocational interests. Literary study and practice in writing expand historical and esthetic awareness, provide varied social and psychological perspectives, and challenge the student to find relationships of the theoretical and pragmatic. The central concern of the English graduate program is with the teaching of reading and writing on a scholarly level, together with the essential methods of research.

Faculty

Donna Gerstenberger, Chairperson; Abrams, H. Adams, R. Adams, Alexander, Allen, C. Altieri, J. Altieri, Banta, Bentley, Bialostosky, Blake, Blessing, Bowie, Brenner, Brown (emeritus), Burns (emeritus), Butwin, Clemens (emeritus), Coldewey, Cox, Culbert, Duckett (emeritus), Dunlop, Dunn, Eby (emeritus), Emery (emeritus), Ethel (emeritus), Fisher, Fowler, Freeman (emeritus), Frey, Gere, Gerstenberger, Gould (emeritus), J. Griffith, M. Griffith, Harris (emeritus), Hartman, Hatfield, Heilman (emeritus), Hilen (emeritus), Hudson, Irmscher, Johnson, Jones (emeritus), Kaplan, Kartiganer, Kolpacoff, Korg, LaGuardia, Lockwood, Longyear, Matchett, Matthews, McCracken, McElroy, Modiano, Mussetter, Palomo, Pellegrini (emeritus), Person (emeritus), Phillips, Reinert, Requa, Rivenburgh (emeritus), Russ, Sale, Schuster, Searle, Shulman, Simonson, Smith, Stanton, Stevick, Stewart, Stirling (emeritus), Streitberger, Vaughan, Wagoner, Webster, Willeford, Willis (emeritus), Winther (emeritus), Yaggy (emeritus), Zillman (emeritus). R. Blessing, graduate program adviser.

Undergraduate Programs

Bachelor of Arts Degree

MAJOR REQUIREMENTS

Language and Literature: At least 50 credits in English at the 200 level and above, including at least 30 credits in 300- and 400-level courses. These 50 credits must include 5 credits within the period Beowulf to 1600, through Shakespeare, 5 credits in English literature within the period 1600-1780, 5 credits in English literature within the period 1780 to the present, and 5 credits in American literature. Recommended are ENGL 267, 271, 301, 302, 390, one advanced writing course.

Composition and Advanced Writing: At least 50 credits in English at the 200 level and above, including at least 30 credits in 300- and 400-level courses. These 50 credits must include the courses required for the curriculum in language and literature, 10 elective credits in literature courses, and 20 credits in advanced writing courses (15 credits in upperdivision courses in at least two forms [e.g., short story, novel, drama, poetry, expository writing]).

Honors Program: Baccalaureate degree "With College Honors in English" or "With Distinction in English." Consult honors adviser about requirements.

Teaching Program: Teaching major or minor in English. Information on requirements appears in the College of Education section of this catalog.

Graduate Programs

Master of Arts Degree

Admission Requirements: Bachelor of Arts degree. Major in English equivalent to that at the University of Washington preferred. Graduate Record Examination aptitude and advanced literature in English tests. Two letters of recommendation. Writing sample required of candidates for advanced creative writing program.

Graduation Requirements: Literature—Intermediate level proficiency in a foreign language. 25 credits, of which a substantial number must be in courses numbered 500 or above. A maximum of 5 quarter transfer credits may be accepted if taken while a graduate student in another acceptable graduate school. An extensive 11-credit essay, researched and written over two quarters. Advanced Creative Writing—Intermediate level proficiency in a foreign language. 36 credits, of which 15 must be in advanced literature seminars. One of those seminars must be selected from courses numbered 506-509. At least 15 credits in advanced writing courses. A creative writing thesis for 10 credits. Final examination, usually oral.

Master of Arts for Teachers Degree

Admission Requirements: Same as for the Master of Arts degree, but usually including prior teaching experience.

Graduation Requirements: 40 credits, of which 25 must be in courses numbered 500 or above. ENGL 535, 553, and 580. A concentration of three related courses (e.g., in criticism, literature, language, rhetoric, advanced writing), or courses from outside the department, subject to approval and not to exceed 15 credits. A maximum of 5 credits may be transferred from an accredited graduate program elsewhere.

Master of Arts for Teachers Degree (English as a Second Language)

Contact graduate program adviser in English for current requirements.

Doctor of Philosophy Degree

Admission: By petition to Graduate Studies Committee upon (1) completion of a minimum 30 credits of English graduate course work at the University; (2) completion of the master's essay; (3) satisfaction of the Master of Arts degree language requirement. Students transferring into the program with a master's degree from other institutions may be required to submit an equivalent to the master's essay or to take a set of qualifying examinations. Admission is granted when the total record is a convincing indication of the candidate's capacities to complete the doctoral degree.

Graduation Requirements: No specific courses, although individual students may be required by their doctoral committee to take courses necessary for successful completion of their academic projects. 80 credit hours. (A total of 15 credits may be transferred from other departments. It is advisable to take a substantial number of 500-level seminars in accumulating 80 credit hours.) Fluency in at least one foreign language, plus whatever additional language study the doctoral committee thinks advisable. A General Examination, including departmental written examinations in four areas (historical period, major authors, modes of literary study, special topic) and an Oral Examination (a lecture by the student addressing a question set by the doctoral committee on a subject having close relation to the proposed dissertation). Dissertation. Final Examination based upon the dissertation.

ENVIRONMENTAL STUDIES

201 Engineering Annex

Gordon H. Orians, Director

The Institute for Environmental Studies is an interdisciplinary educational unit that integrates environmentally related programs at the University. It does not offer degree programs, but provides breadth and training through educational experiences for graduate and undergraduate students, who receive their degrees through established curricula at the University.

Undergraduate courses are directed toward the general contributions made by the humanities, social sciences, nat-

ural sciences, and professions to our conceptualization, understanding, and analysis of environmental problems. Senior-level courses focus on complex environmental issues that require input from many different fields of study for their understanding and resolution.

Internship programs are available for both undergraduates and graduates. The graduate program is particularly designed for students in the sciences and science-related professional schools who wish to prepare themselves for employment in agencies, industries, consulting firms, and citizens' groups. In addition, the institute offers graduate seminars that analyze the scientific and policy bases of environmental problems. An undergraduate and graduate environmental studies adviser is available at the Engineering Annex.

ETHNICITY AND NATIONALITY

See International Studies.

GENERAL STUDIES

C14 Padelford

The General Studies major provides students with an opportunity to pursue an interdisciplinary degree program suited to their individual academic goals. Students have the option of an individually designed atypical major, as well as interdisciplinary programs that also lead to a degree in General Studies. Among the latter are African Studies, American Indian Studies, Asian/American Studies, Chicano Studies, Cinema Studies, Comparative History of Ideas, Environmental Studies, Ethnomusicology, Jewish Studies, Medieval and Renaissance Studies, Scientific and Technical Communication, Social Theory and Ideology, and Women Studies. These programs are described elsewhere in this section of the catalog.

Undergraduate Programs

Bachelor of Arts and Bachelor of Science Degrees

Admission Requirements: An interdisciplinary program planned with several faculty members and a General Studies adviser.

Major Requirements: From 50 to 70 credits in courses related to the major. Ordinarily, no fewer than three quarters in the program. Completion of required senior thesis. Precise curriculum is determined in consultation with General Studies adviser and faculty sponsors. Awarding of the Bachelor of Arts or Bachelor of Science degree depends on each student's degree program.

Honors Program: Baccalaureate degree "With College Honors in General Studies" or "With Distinction in General Studies." Consult honors adviser about requirements.



J205 Health Sciences

Genetics undertakes to study the nature and function of the genetic material and its transmission from generation to generation, the application of genetic principles to problems of cellular and organismal development, and the study of human genetics and its relation to medicine.

Faculty

Herschel L. Roman, Chairperson; Byers, Clark, Doermann, Fangman, Felsenstein, Furlong, Gallant, Gartler, Hall, Hartwell, Hawthorne, Motulsky, Roman, Sandler, Sibley, Stadler. B. Byers, graduate program adviser.

Undergraduate Programs

An undergraduate degree is not offered. Students who desire an undergraduate curriculum emphasizing genetic subject matter are advised to enroll for the Bachelor of Science degree in biology. Other undergraduate programs acceptable for graduate work in genetics include majors in chemistry, physics, and mathematics.

Graduate Programs

Master of Science Degree

Admission Requirements: Acceptable undergraduate record in biology, chemistry, physics, and mathematics. Graduate Record Examination scores. Three letters of recommendation.

Graduation Requirements: GENET 551, 552, 553, and additional courses selected to meet needs of student. Acceptable research thesis.

Doctor of Philosophy Degree

Admission Requirements: Same as for the Master of Science degree.

Graduation Requirements: Successful completion of comprehensive written examinations at end of second year. Acceptable research thesis and defense of thesis. The student is expected to participate in the teaching program of the department. There is no foreign-language requirement.

GEOGRAPHY

408A Smith

The Department of Geography is concerned with the study of the location, spatial organization, and spatial interaction of both natural and human phenomena: ways in which environmental, economic, social, political, and other phenomena are structured spatially or regionally.

Faculty

Richard Morrill, Chairperson; Beyers, Chang, Fleming, Hodge, Hudson (emeritus), Jackson, Kakiuchi, Krumme, Marts, Mayer, Morrill, Sherman, Thomas, Velikonja, Youngmann, ZumBrunnen. W. Beyers, graduate program adviser.

Undergraduate Programs

Bachelor of Arts Degree

Major Requirements: Core requirements—GEOG 258 or 360; 226 or 426; three from 100, 200, 205, 207, or 277; one 300-level systematic and one 300-level regional; two 400-level systematic and one 400-level regional; maintenance of a 2.50 grade-point average within geography.

Students choose one of the following options. All options require the core courses mentioned above. Core courses count toward the number of geography credits required for each option. General Geography: 70 credits in geography, including a broad range of systematic, regional, and technical courses. Urban Geography and Regional Science: 50 credits in geography and 30 in closely related fields. Possible concentration in regional development; urban analysis; transportation; location theory; or regional political, social, and economic structure. Cartography/Spatial Analysis: 50 credits in geography, 30 in related fields. Environmental Studies (environmental perception, resource management, and conservation): 50 credits in geography, 30 in related fields (in cooperation with the Institute for Environmental Studies). Eurasian Studies (U.S.S.R., Europe, China, and Japan): 50 credits in geography, 30 in related fields (in cooperation with the School of International Studies).

Teaching Program: Teaching major or minor in geography. Information on requirements appears in the College of Education section of this catalog.

Graduate Programs

Master of Arts Degree

Graduation Requirements: 36 credits and a thesis, to be completed within six quarters. The student may pursue a broad Master of Arts degree program or more professional and interdisciplinary specializations as follows: Urban Geography and Regional Science—including regional planning and development, urban structure, transportation, location theory, regional political, social, and economic structure. Cartography/Spatial Analysis. Environmental Studies—environmental perception, resource management and conservation (in cooperation with the Institute for Environmental Studies). Eurasian Studies—U.S.S.R., China, Japan, Europe (in cooperation with the School of International Studies).

Doctor of Philosophy Degree

Graduation Requirements: At least two years of post-Master of Arts degree credit, after assurance of general competence in geography; departmental written diagnostic examination; General Examination; dissertation and Final Examination; normally, reading knowledge of one foreign language. Programs are as outlined under Master of Arts degree. Interdisciplinary studies are encouraged or required as appropriate to these specializations (e.g., a working knowledge of a language for Eurasian studies; economic theory for regional analysis; data processing for spatial analysis).

GEOLOGICAL SCIENCES

63 Johnson

Within the purview of geological sciences fall the collection and interpretation of careful and perceptive field observations as well as the integrated application of principles of physics, chemistry, biology, and mathematics to the study of the earth, its environment, its origin, and the processes by which it has been transformed and reconstituted through geologic time.

Faculty

John B. Adams, Chairperson; Adams, Barksdale (emeritus), Bostrom, Cheney, Christensen, Coombs (emeritus), Cowan, Dunne, Evans, Ghose, Gresens, Grootes, Hanson, Mallory, McCallum, Misch, Porter, Rensberger, Stewart, Stuiver, Vance, Washburn (emeritus), Wheeler (emeritus), Whetten. R. J. Stewart, graduate program adviser.

Undergraduate Program

Bachelor of Science Degree

Admission Requirements: CHEM 140, 150 (or 145, 155) and MATH 124, 125, and 126 (or STAT 311), all with grades not less than 2.0.

Major Requirements: GEOL 205, 301, 311, 320, 321, 340, 361, 401 plus 13 (biology option) or 15 credits at the 400 level in geological sciences, excluding GEOL 498 and 499; MATH 124, 125, and 126 or STAT 311; CHEM 145 or 140, 155 or 150; PHYS 121, 122, 123. Recommended: MATH 238, 327, 328, and PHYS 221, 222, 223, or BIOL 101-102. (Biology option: PHYS 121; BIOL 101-102 or two courses chosen from BIOL 210, 211, 212 may substitute for PHYS 122, 123.) All required courses must be completed with grades of not less than 2.0.

Graduate Programs

Master of Science Degree

Graduation Requirements: With Thesis—36 credits, of which 18 must be in courses at the 500 level or above and up to 9 may be for thesis (GEOL 700). Final examination consists of oral presentation and defense of thesis. Without Thesis—45 credits, of which 18 must be in courses at the 500 level or above, which includes a 5-credit research paper (GEOL 600). Final examination is written or oral and is administered by the supervisory committee. All students must present approved field courses or other approved field experience. A maximum of 9 credits of field geology may be applied.

Doctor of Philosophy Degree

Admission Requirements: Either Master of Science or Master of Arts degree in geological sciences or related field.

Graduation Requirements: Credits variable; one-half total program, including dissertation, must be in courses at the 500 level or above; a minimum of 27 credits for thesis (GEOL 800); at least 18 credits completed with numerical grade in courses numbered 300, 400, and 500. Completion of two years of graduate study, passage of General Examination (both written and oral parts), and admission to candidacy; completion of acceptable dissertation and passage of Final Examination.

GÈOPHYSICS

202 Atmospheric Sciences-Geophysics

Geophysics is an interdisciplinary physical science concerned with the nature of the earth and its environment. It seeks to apply the techniques of physics, mathematics, and chemistry to the structure and dynamic behavior of the earth and other planets. Included in this interdisciplinary area are a large number of complex and interrelated natural processes ranging from convection in the mantle to electron precipitation in the magnetosphere, with a wide variety of possibilities in between.

Faculty

Stewart W. Smith, Chairperson; Booker, Bostrom, Businger, Charlson, Christensen, Clark, Criminale, Crosson, Fairhall, Helms, LaChapelle, Leovy, Lewis, Lister, Merrill, Parks, Raymond, J. Smith, S. Smith, Untersteiner. R. Crosson, graduate program adviser.

Undergraduate Programs

An undergraduate degree is not offered.

Graduate Programs

Master of Science Degree

Area of Specialization: Solid Earth Geophysics—The earth's internal composition, structure, and dynamics, including seismology, tectonophysics, geothermal studies, and high-pressure properties of materials. Geomagnetism and Aeronomy—Origin and behavior of the earth's magnetic field, rock magnetism, investigations of the upper atmosphere, the ionosphere, and the magnetosphere. Geophysical Fluid Mechanics—Large-scale fluid motion in the atmosphere, ocean, and earth's interior. Glaciology— Dynamic behavior and structure of natural ice masses, including seasonal snow, glaciers, and sea ice.


Admission Requirements: Undergraduate degree in a physical science and a strong background in physics and mathematics. Graduate Record Examination or equivalent. Written qualifying examination to be taken following first year of residence.

Graduation Requirements—36 credits, of which 9 must be in geophysics courses at the 500 level. Course of study and thesis project must have approval of advisory committee.

Doctor of Philosophy Degree

Area of Specialization: Same as for the Master of Science degree.

Admission Requirements: Same as for the Master of Science degree.

Graduation Requirements: Three academic years of study. Dissertation. Information on the language requirement, if any, can be obtained from the student's adviser.

GERMANICS

340 Denny

The Department of Germanics is concerned with the German language, literature, and civilization, with emphasis on present-day Germany, its history, literature, and philosophy and their role in Western civilization; and linguistic analysis, especially historic, of the Germanic languages. The department offers in English some courses on wellknown authors and topics, designed especially for the nonmajor.

Faculty

Diana Behler, Chairperson; Ammerlahn, Ankele (emeritus), Barrack, D. Behler, E. Behler, Bopp, Buck, Hertling, Hill, Hruby, McLean, Meyer (emeritus), Peck, Rabura, Rey, Sauerlander (emeritus), Voyles, Wesner (emeritus), Wilkie (emeritus), Ziemann. W. Rey, graduate program adviser.

Undergraduate Programs

Bachelor of Arts Degree

Major Requirements: Traditional major—34 credits in core courses: GERM 301, 302, 303; 310, 311, 312; two from 401, 402, 403; two from 413, 414, 415; 18 credits of electives in upper-division German courses. German area studies—25 credits of lower-division college German or equivalent; 25 credits of upper-division German courses, including courses offered in English; 20 credits chosen from one of five interdepartmental areas of specialization; a senior thesis. At least a 2.0 grade must be earned in every upper-division German course; a 2.50 grade-point average must be maintained in these courses.

Honors Program: Baccalaureate degree "With College

Honors in German" or "With Distinction in German." Consult honors adviser about requirements.

Teaching Program: Teaching major or minor in German. Information on requirements appears in the College of Education section of this catalog.

Graduate Programs

Master of Arts Degree

Admission Requirements: Bachelor of Arts degree with major in German or equivalent background.

Graduation Requirements: A minimum of 36 credits, plus a final comprehensive examination, a master's thesis or two papers. Concentration on German literature, civilization, and philosophical traditions, with supplementary course work in at least one of the following three areas: philology and linguistics; stylistics, methodology, and pedagogy; related courses outside the Department of Germanics. Reading knowledge of one foreign language (usually German).

Doctor of Philosophy Degree

The Doctor of Philosophy degree curriculum serves the needs of the future professor at universities and colleges, stressing scholarship and research. The Graduate School offers the Doctor of Arts degree with an area of concentration in Germanics.

Admission Requirements: 36 credits of graduate studies in Germanics plus research thesis or equivalent of master's degree in Germanics.

Graduation Requirements: Study period of two years following the attainment of the master's degree (for a total of 90 credits). General written and oral examinations. Reading knowledge of a second language subject to approval by the department. A fourth year is reserved for writing the dissertation.

During the final two years of course work for the Doctor of Philosophy degree, concentration on either "Literature and Civilization" and "German Philosophical Traditions," or "Philology and Linguistics" and "Literature and Civilization," plus supplementary course work in other areas (philology and linguistics; German philosophical traditions; stylistics, methodology, and pedagogy; related courses outside the department).

HEALTH EDUCATION

112 Lewis Annex

Health education is concerned with the study of human behavior in terms of its health consequences for individuals, groups, and communities and with the study of educational processes that involve people in changing their healthrelated behavior through informed decision making to promote health and to prevent disease.

Faculty

Betty Mathews, Program Coordinator; Mast, Mathews, Mills (emeritus), Reeves (emeritus), Tonon. B. Mathews, graduate program adviser.

Undergraduate Programs

Bachelor of Arts Degree

Admission Requirements: 90 credits, including 45 credits of the College of Arts and Sciences distribution requirement; ZOOL 118 or 208; PSYCH 101; H ED 250; a cumulative grade-point average of 2.50 in biological and social sciences. Admission limited to Autumn Quarter only; application must be made no later than the first day of the preceding Spring Quarter.

Major Requirements: H ED 251, 321, 322, 421, 422, 472, 498, 499. Related-fields courses: HSERV 411; EPI 420; BIOST 472 or EDPSY 490. Options—liberal arts emphasis: 21 additional credits; professional emphasis: 21 additional credits.

Teaching Programs: Teaching major in health education with elementary or secondary school emphasis. Information on requirements appears in the College of Education section of this catalog.

Graduate Program

Master of Science Degree

Admission Requirements: The graduate curriculum is predicated on a baccalaureate degree in health education equivalent to that offered at the University of Washington. For applicants whose undergraduate work is in a field other than health education, prerequisite course work in health education is required. Prerequisite requirements are determined individually, based upon analysis of college transcripts. Additional requirements are a cumulative gradepoint average of 3.00 for all college credits in biological and behavioral science courses, Graduate Record Examination scores, applicant's statement of educational goals and plans, and letters of recommendation.

Graduation Requirements: Minimum of 40 credits of graduate-level course work, of which 22 credits must be in health education courses and a minimum of 9 credits in thesis. A comprehensive oral examination and an acceptable thesis.

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.

Faculty

Donald W. Treadgold, Chairperson; Alden, Bacharach, Behlmer, Bell, Bestor (emeritus), Boba, Bridgman, Burke, Butów, Bynum, Carstensen (emeritus), Conlon, Costigan (emeritus), Dull, Ellison, Emerson, Ferrill, Flint, Fowler, Gil, Griffeth, Griffiths, Hankins, Holt (emeritus), Johnson, Kapp, Katz (emeritus), Levy, Lytle, Miller, Palais, Pease, Pinkney, Pressly, Pyle, Rorabaugh, Saum, Solberg, Stanislawski, Sugar, Szeftel (emeritus), Thomas, Toews, Treadgold, Ullman, Waugh. D. H. Pinkney, graduate program adviser.

Undergraduate Programs

Bachelor of Arts Degree

Major Requirements: 50 credits in history with a gradepoint average of 2.00 or higher. At least 5 credits each of ancient, medieval, modern European, and American history (e.g., HST 111, 112, 113 and HSTAA 201 or upperdivision courses in the same subject areas; adviser must approve substitutions for the basic courses). At least 25 upper-division credits. Beyond the 20 credits of required subjects, the student may or may not specialize, depending on personal interests and career plans. In addition to all courses with the prefix HST, the history major may also include approved courses offered outside the Department of History. A short list of these courses is maintained by undergraduate advisers. Transfer students are required to complete a minimum of 25 upper-division credits in history at the University.

Honors Program: Baccalaureate degree "With College Honors in History" or "With Distinction in History." Consult honors adviser about requirements.

Teaching Program: Teaching major or minor in history. Information on requirements appears in the College of Education section of this catalog.

Graduate Programs

Master of Arts Degree

Admission Requirements: Strong undergraduate program in history; grade-point average above 3.00, especially in history and related subjects and particularly in the final two years of work; Graduate Record Examination verbal aptitude score in the eighty-fifth percentile or higher; evidence of ability to write cogently and lucidly and to interpret historical data; recommendations of three persons acquainted with applicant's academic abilities.

Graduation Requirements: Reading knowledge of one language in addition to English; satisfactory performance on written examinations in two fields of history; completion of a graduate seminar; thesis or two seminar papers.



Doctor of Philosophy Degree

Admission Requirements: Same as for the Master of Arts degree, except, in unusual circumstances, a Master of Arts degree in history, or the expectation of this degree, before the applicant enters the University.

Graduation Requirements: Reading knowledge of one language in addition to English and such other languages as are necessary for the program the student elects; satisfactory performance in written and oral examinations in four fields of history; completion of a graduate seminar; dissertation and satisfactory defense of the dissertation in an oral Final Examination.

INTERNATIONAL STUDIES

406 Thomson

The School of International Studies offers regional programs that stress interdisciplinary studies within the context of the historical cultures and languages of major world areas as well as interdisciplinary topical programs.

Faculty

Kenneth B. Pyle, Director; Jack L. Dull, Associate Director.

Honors Program: Baccalaureate degree "With College Honors in (area)" or "With Distinction in (area)." Consult advisers of individual programs about requirements.

Teaching Program: A teaching major or minor is offered in the following regional studies programs: Africa, China, Eastern Europe, Japan, Korea, Latin America, Russia, and South Asia. Information on requirements appears in the College of Education section of this catalog.

African Studies

M43 Denny

Faculty

David H. Spain, Chairperson; Bell, Bravmann, Crutchfield, Dubisch, Eastman, Eck, Gere, Griffeth, Hechter, Leiner, Morell, Osborne, Ottenberg, Prússin, Spain, van den Berghe, W. Williams, Winans.

African Studies focuses on the sub-Saharan regions of the continent. Offerings are primarily in the humanities and social sciences, but courses in architecture, nursing, and education are also available. Courses relevant to African Studies include: SISAF 265, 300, 301, 302, 303, 304, 305, 306, 307, 308, 400, 401, 402, 406, 407, 408, 410, 444, 450, 490, 499; ANTH 212, 213, 401, 402, 513; ART H 436, 437, 438, 439, 531; C LIT 261, 262, 263, 450; HST 351, 352, 361, 362, 426, 450, 451, 452, 464, 524, 551; HSTAA 150; MUSIC 206, 317, 427, 512; MUSAP 459;

NURS 361, 578, 579, 583; PHY A 375, 381, 388, 488, 489, 490, 570, 588, 589; POL S 430, 439, 446, 539; ROM 590; SOC 354, 454, 459. An undergraduate degree in African Studies is not offered, although a General Studies degree is available to students interested in majoring in African Studies. Consult a General Studies adviser in B10 Padelford.

China Regional Studies

405 Thomson

The aim of the China program is to produce a sound foundation in one or more aspects of the study of China. Most major disciplines and time periods are covered.

Faculty

Jack L. Dull, Chairperson; Brandauer, Chan, Chang, Dull, Harrell, Hsiao (emeritus), Kapp, Knechtges, Lieberman, Mah, Norman, Poppe (emeritus), Serruys, Silbergeld, Taylor (emeritus), Townsend, Treadgold, Wang, Wilhelm (emeritus), Williston (emeritus), Wittfogel (emeritus), Yen. J. B. Palais, graduate program adviser.

Undergraduate Program

Bachelor of Arts Degree

Major Requirements: Language training through the second year (30 credits or equivalent); additional language training recommended. HSTAS 211, 212, 213; SISEA 455; 25 credits in 300- and 400-level courses on China, including HSTAS 454; one course each in (1) premodern China and (2) Chinese arts and literature. Specialization (at least three courses) in one of the three fields of modern China, premodern China, and Chinese arts and literature.

Graduate Program

Master of Arts in International Studies Degree

Admission Requirements: Normally an undergraduate grade-point average of 3.00 in the junior and senior years. Scores on the aptitude section (verbal and quantitative) of the Graduate Record Examination, a statement of purpose, and letters of recommendation from three persons acquainted with applicant's academic abilities.

Graduation Requirements: Chinese language training through the third year of instruction; 26 credits (not including language instruction), of which 8 must be at the 500 level or above; SISEA 521-522; two seminar papers or a thesis; comprehensive oral examination.

Comparative Religion

318 Thomson

Comparative Religion programs are offered in History of Religions, Western Emphasis; History of Religions, Eastern Emphasis; Religion and Society; and Religion in Symbolic Expression.

Faculty

Eugene Webb, Chairperson; P. Amoss, Benin, Bynum, Conlon, Fowler, Harmon, Harrell, Hawley, Heer, Keating, Keyes, Potter, Roth, Ruegg, Stanislawski, Treadgold, Webb, M. Williams.

Undergraduate Programs

Bachelor of Arts Degree

Major Requirements: History of Religions. Western Emphasis-RELIG 201, 202, 380; one of RELIG 210, 220, ENGL 241, HST 307, N E 210; one of CLAS 445, N E 220; one of RELIG 410, ANTH 421, PHIL 267, PSYCH 448, SOC 457; one course in an Eastern religious tradition; five courses in Christianity, Islam, or Judaism (three of these must be courses in which religion is a central topic, as italicized in the list below: none may duplicate courses used to fulfill the preceding requirements). Courses in Christianity: RELIG 220, 301, 320, 321, 322, 325, 326, ENGL 241, 261, GERM 347, GRK 308, HST 307, HSTAM 441, 470, 471, 472, HSTEU 401, PHIL 467, ART H 202, 454, HSTAM 421, PHIL 321, 434, 469, RUSS 321. Courses in Judaism: RELIG 210, 311, 313, 315, 491, HEBR 411, 412, 413, 414, 415, 416, 423, 425, 426, 427, 431, 441, 442, 443, 451, 452, 453, 461, 462, N E 240, ARAM 401, ENGL 372, HSTEU 369, 464, SISRE 404. Courses in Islam: ARAB 404, 405, 406, 414, 415, HST 261, N E 210, 220, 320, 420, 430, 432, PRSAN 412, 413, HST 461, 462, 463, N E 422, 434, PRSAN 401, 402. Following is a short list of suggested courses in Eastern religions (in addition to RELIG 202) for students majoring in Western religions; RELIG 350, 352, 354, ART H 417, 418, PHIL 417, 418, SISEA 445.

History of Religions, Eastern Emphasis-RELIG 201, 202, 352, 380; one of RELIG 350, 354, PHIL 418; one of RELIG 410, ANTH 421, PHIL 267, PSYCH 448, SOC 457; one course in Christianity, Judaism, or Islam (see list at end of this section); plus five courses from the following list (three of these must be chosen from among the courses with numbers italicized; none may duplicate those used to fulfill the preceding requirements). RELIG 350, 352, 354, 450, ANTH 422, SISEA 445, PHIL 286, 412, 413, 415, 416, 417, 418, SNKRT 491, 492, 493, 494, 495, ANTH 404, 412, ART H 321, 417, 418, 419, SISEA 240, 443, HSTAS 201, 211, 212, 213, 421, 451, 452, 453, INDN 421. Following is a short list of suggested courses in Western religions (in addition to RELIG 201) for students majoring in Eastern religions: RELIG 210, 220, 320, 321, 325, HST 307, N E 210, 320.

Religion and Society—RELIG 201, 202, 380, ANTH 421, SOC 457; two of the following, consisting of one course each in one Western and one Eastern religious tradition: RELIG 210, 320, 321, 350, 352, 354, HST 307, N E 210, SISEA 445; four courses from the following: RELIG 491,

ANTH 404, 412, 421, 422, ARAB 405, 406, ENGL 372, HST 261, 461, 462, 463, 469, HSTAM 441, HSTEU 401, 464, N E 430, 432, POL S 430, PSYCH 448, SISEA 240, 443, 445.

Religion in Symbolic Expression—RELIG 201, 202, 380; one of RELIG 220, ENGL 241; one of ANTH 421, PHIL 267; two of the following, consisting of one course each in one Western and one Eastern religious tradition: RELIG 210, 350, 352, 354, HST 307, N É 210; four of the following: RELIG 410, ART H 202, 321, 417, 418, 419, 454, CLAS 430, 445, ENGL 261, 322, 372, GERM 343, HSTAM 470, 471, 472, HSTEU 464, ITAL 481, N E 434, 450, 451, RUSS 321, SCAND 330, 332, 390, PRSAN 401, 402, 412, 413.

Ethnicity and Nationality

144 Gowen

The program in comparative studies in Ethnicity and Nationality is designed to encourage comparative social scientific inquiry and teaching concerning the formation, transformation, and persistence of ethnic identities over time among diverse ethnic groups in different parts of the world. Although the program does not offer its own degree, opportunities for study are available through several departments. Faculty are drawn principally from the departments of Anthropology, Political Science, and Sociology and from the African Studies and South Asian Studies programs.

Faculty

Paul R. Brass, Chairperson; Brass, Chandler, Eastman, Hechter, Keyes, Ottenberg, Paul, Pool, van den Berghe.

Japan Regional Studies

405 Thomson

The program combines language instruction with history and interdisciplinary area training to give a sound basis in one or more aspects of the study of Japan.

Faculty

Kozo Yamamura, Chairperson; Beckmann, Butow, Haley, Hancock, Hanley, Harsel, Hellmann, Henderson, Hiraga, Kakiuchi, McKinnon, Niwa, Pyle, Roehl, Rubin, Tatsumi (emeritus), G. Webb, Yamamura. J. B. Palais, graduate program adviser.

Undergraduate Program

Bachelor of Arts Degree

Major Requirements: Language training through the second year (30 credits or equivalent); additional language training recommended. HSTAS 211, 212 (or a 5-credit course dealing with East Asia or some aspect of it that must not be entirely on Japan), 213; 25 credits in 300- and 400-level



courses on East Asia, of which 15 must deal with Japan; SISEA 451.

Graduate Program

Master of Arts in International Studies Degree

Admission Requirements: Normally, an undergraduate grade-point average of 3.00 in the junior and senior years. Scores of the aptitude section (verbal and quantitative) of the Graduate Record Examination, a statement of purpose, and letters of recommendation from three persons acquainted with applicant's academic abilities.

Graduation Requirements: Japanese language training through the third year of instruction (students must have at least one full year or 15 credits of Japanese language training at this university at the third year or beyond); 26 credits (not including language instruction), of which 8 must be at the 500 level or above; SISEA 555 and 559; essay of distinction; comprehensive oral examination.

Korea Regional Studies

405 Thomson

The Korea program combines language instruction with history and interdisciplinary area training for students interested in the culture and history of Korea.

Faculty

James B. Palais, Chairperson; Beckmann, Cumings, Lukoff, Palais, Suh (emeritus). J. B. Palais, graduate program adviser.

Undergraduate Program

Bachelor of Arts Degree

Major Requirements: Language training through the second year (30 credits or equivalent); additional language training recommended. HSTAS 211, 212, 213, 481, 482; 25 credits in 300- and 400-level courses on East Asia.

Graduate Program

Master of Arts in International Studies Degree

Admission Requirements: Normally, an undergraduate grade-point average of 3.00 in the junior and senior years. Scores of the aptitude section (verbal and quantitative) of the Graduate Record Examination, a statement of purpose, and letters of recommendation from three persons acquainted with applicant's academic abilities.

Graduation Requirements: Korean language training through the second year of instruction; 36 additional credits, including HSTAS 481, 482, POL S 544, and one graduate seminar in Korean history (either HSTAS 585 or HSTAS 582-583-584). 18 of the 36 credits must be at the 500 level or above. Essay of distinction or two seminar papers and a comprehensive oral examination.

Latin American Studies

206D Smith

Latin American Studies provides students with an in-depth understanding of the history, politics, socioeconomic structures, and cultures of Latin America, from pre-Columbian and peninsular origins to the present.

Faculty

Carl C. Solberg, Chairperson; Alden, Cartwright, Concha, Garfias, Gil, Greengo, Hunn, Krieger, Rabago, Rodriguez, Solberg, Subercaseaux, Ullman, Vargas-Baron (emeritus), Vasquez, Wilson.

Undergraduate Program

Bachelor of Arts Degree

Major Requirements: One year of Portuguese and two of Spanish, or two years of Portuguese and one of Spanish; 48 to 50 additional credits, including the following: ANTH 322 or 418, plus one elective; two from HSTAA 381, 382, 383; 9 credits in Spanish-American or Luso-Brazilian literature; SISLA 492, 493; and 13 to 15 credits in elective courses.

Near Eastern Studies

209B Denny

Faculty

Farhat J. Ziadeh, Chairperson; H. Amoss, P. Amoss, Andrews, Bacharach, Brame, Cirtautas, Clear, Heer, Jacobi, Loraine, MacKay, Sadiq, Sakata, Sheikholeslami, Sugar, Wenke, Ziadeh.

Near Eastern Studies does not offer a formal degree program. However, students with a special interest in the Near East and North Africa may take courses with a Near Eastern emphasis through the departments of Anthropology, History, Linguistics, Political Science, and Urban Planning, and the School and Graduate School of Business Administration. The Department of Near Eastern Languages and Literature offers courses in Arabic, Hebrew, Persian, and Turkish, and in Islamic and Semitic civilizations. The Department of Asian Languages and Literature offers courses in Turkic and Hindi.

Russian and East European Regional Studies

503 Thomson

The Russian and East European Regional Studies programs are designed for students who wish to study these regions in the framework of an interdisciplinary approach.

Faculty

Herbert J. Ellison, Chairperson; Augerot, Boba, Carpenter, Chirot, Cirtautas, Coats, Ellison, Gershevsky (emeritus), Gribanovsky (emeritus), Haney, Jackson, Kapetanic, Konick, Kramer, Legters, Micklesen, Paul, Reshetar, Sokol, Spector (emeritus), Sugar, Swayze, Szeftel (emeritus), Thornton, Treadgold, Velikonja, Waugh, West, ZumBrunnen. H. J. Ellison, graduate program adviser.

Undergraduate Programs

Bachelor of Arts Degree

Major Requirements: Russian Regional Option-Russian language through the second year (30 credits or its equivalent); four SISRE courses on Russia, of which two are at the 200 level, one at the 300 level, and one at the 400 level; 15 credits in a selected discipline of the area; 15 credits in 300- and 400-level courses on Russia distributed in social science and humanities disciplines and approved by the departmental adviser. East European Regional Option-Language training in one East European language (Bulgarian, Czech, Hungarian, Polish, Romanian, Serbo-Croatian) through the second year (30 credits or its equivalent); four SISRE courses on Eastern Europe, of which two are at the 200 level, one at the 300 level, and one at the 400 level; 15 credits in a selected discipline of the area; 15 credits in 300and 400-level courses on Eastern Europe distributed in social science and humanities disciplines.

Honors Program: Baccalaureate degree "With College Honors in Russian/East European Studies" or "With Distinction in Russian/East European Studies." Consult honors adviser about requirements.

Graduate Program

Master of Arts in International Studies Degree

Admission Requirements: Undergraduate grade-point average of 3.00 is a minimum prerequisite, but not a guarantee of admission. Scores of the aptitude section (verbal and quantitative) of the Graduate Record Examination strongly recommended. Statement of purpose and letters of recommendation from three persons acquainted with applicant's academic abilities.

Graduation Requirements: 39 credits in interdisciplinary course work (other than language), as follows: 15 or 20 credits in area-oriented courses in the discipline(s) or topic of concentration (at least 9 credits in courses numbering 500); 10 or 15 credits in at least two additional disciplines; 9 credits of thesis. Written examination; oral interdisciplinary examination on the area of specialization; thesis. Russian Regional Option—Equivalent of six quarters (30 credits) of instruction in Russian at this university and, as Candidate, language training through the fourth year (an additional 30 credits). East European Option—Knowledge of two languages, one of which must be a language of the area (exclusive of French, German, or Russian); the second language may be either an additional language of the area or a nonarea language that is useful to the area of concentration. Language competence in the two languages may be satisfied either by passing the Language Proficiency Test or by the equivalent of two years' training (30 credits for each language).

South Asia Studies

303 Thomson

The South Asia Studies program combines language instruction with history and interdisciplinary area training for students interested in Bangladesh, India, Népal, Pakistan, Sri Lanka, and Tibet.

Faculty

Karl H. Potter, Chairperson; Brass, Conlon, Curtis, Daniel, Emerson, Hawley, Keyes, Morris, Potter, Rogers, Ruegg, Schiffman, Shapiro, Thrasher, Wylie. K. H. Potter, graduate program adviser.

Undergraduate Program

Bachelor of Arts Degree

Major Requirements: Minimum of two years of study in one of the languages of South Asia—Hindi, Sanskrit, Tamil, or Tibetan (30 credits or its equivalent); HSTAS 201 and 202; SISSA 498; 30 credits in one of the following disciplines: anthropology, comparative religion, economics, history, linguistics, philosophy, or political science. Generally, courses relating to South Asia taught within the discipline of concentration are considered as fulfilling the 30credit requirement.

Graduate Program

Master of Arts in International Studies Degree

Admission Requirements: Normally, an undergraduate grade-point average of 3.00 in the junior and senior years. Scores of the aptitude section (verbal and quantitative) of the Graduate Record Examination, a statement of purpose, and letters of recommendation from three persons acquainted with applicant's academic abilities, and a sample of scholarly writing ability.

Graduation Requirements: A South Asian language through the third year of instruction; SISSA 510, 511; 26 credits in disciplines, 8 of which must be at the 500 level or above. At least 20 of these 26 credits must be in courses directly related to the study of South Asia. Two seminar papers in lieu of a master's thesis. Comprehensive oral examination.

JAPAN REGIONAL STUDIES

See International Studies.



B401 or C14 Padelford

Faculty

Edward Alexander, Chairperson; Alexander, Bacharach, Benin, Jacobi, Kartiganer, Stanislawski, Ullman.

Jewish Studies is an interdepartmental program covering related disciplines from ancient to modern times. Courses are offered primarily, but not exclusively, in Comparative Religion, History, and Near Eastern Studies. Requirements are 50 credits within the field, including two courses in Judaism and two in Jewish history; senior thesis; language competence at the level of two years of Hebrew. A General Studies degree is available to students interested in following a program in Jewish Studies. Consult a General Studies adviser in B10 Padelford.

Courses applicable to Jewish Studies include ENGL 372; GERM 181, 182, 183; HEBR 101-102, 103, 111-112, 113, 201, 202, 203, 311, 312, 313, 401, 402, 403, 411, 412, 413; HST 470, 471; HSTAA 436; HSTEU 369, 464; RE-LIG 210, 311, 313, 315.

KINESIOLOGY

Formerly Physical Education

101 Hutchinson

The major of kinesiology is oriented to the study of human performance and motor control, and to sports studies, with special emphasis on the biophysical, psychosocial, and sociohistorical influences on human movement, exercise, sport, and play. The body of knowledge covered by the courses that compose the major can be described as follows: biomechanics, exercise physiology, neuromuscular control, motor development, motor learning, social psychology, sport sociology, and sport history. Attention is given to the relation of these subject areas to human development, the functional status of the individual, and man's ability to engage in movement activities; the role of athletics, dance, and other forms of physical activity in culture, from both the historical and contemporary perspectives, and in both primitive and advanced structures of society; the contribution of such activities to the emotional adjustment, esthetic development, and physical condition of the individual.

Faculty

Robert S. Hutton, Chairperson; Abernathy (emeritus), Berryman, Broer (emeritus), Buckley (emeritus), Doolittle, Fox, Hardy, Horne (emeritus), Hughes, Hutton, Ingham, Kerr, Kidwell (emeritus), Kunde (emeritus), MacLean (emeritus), Miller, Nichols, Passer, Peek (emeritus), Purdy, Sembrowich, Smoll, Torney (emeritus), Wilson (emeritus). R. S. Hutton, graduate program adviser.

Undergraduate Programs

Bachelor of Arts Degree

HUMAN MOVEMENT STUDIES

For students who desire an individualized focus of study in preparation for advanced graduate work or careers in research. Areas of concentration: (1) human performance and motor control, including motor development, motor performance and learning, neuromuscular control, biomechanics, and exercise physiology; (2) sport studies, including sport psychology, sport sociology, and sport history.

Admission Requirements: 3.00 grade-point average at time of entry or after one year in residence after having completed a minimum of three required courses in the major; interview by an appropriate committee; written recommendation by a faculty member associated with the human movement studies program stating the academic qualifications and potential of the applicant.

Major Requirements: Core courses—KIN 301, 302, 303, 325, 331, 332 and 330, and 350; ZOOL 118 or 208; B STR 301; PSYCH 101 or 102; statistics. Beyond the specified core, 20 credits in kinesiology at the 300 level or above (no fewer than four courses at the 400 level or above) and satisfactory completion of at least one KINPE 200-level performance laboratory.

Teaching Programs: Teaching major or minor in physical education and coaching minor. Information on requirements appears in the College of Education section of this catalog.

LIBERAL ARTS EMPHASIS

For students who wish to pursue a broad curriculum of study and a major that is nonprofessional by design.

Major Requirements: Same specified core courses as for Human Movement Studies emphasis above; 20 approved credits beyond the core, including at least five departmental / courses at the 400 level or above.

Graduate Programs

Master of Science and Master of Science in Physical Education Degrees

Admission Requirements: Aptitude portion of the Graduate Record Examination; letters of recommendation; depending on emphasis, academic background in biological and social sciences and in humanities.

Graduation Requirements: Selection of one of the academic areas offered, involving a central core of course work plus additional requirements. Areas of emphasis include, for the Master of Science degree, a focus on human performance and motor control or on sport studies. Master of Science in Physical Education degree for the professional options is provided in the exercise sciences (cardiopulmonary rehabilitation and exercise prescription or athletic training) or in sport administration. Thesis required for the Master of Science degree.

KOREA REGIONAL STUDIES

See International Studies.

LATIN AMERICAN STUDIES

See International Studies.

LINGUISTICS

A207 Padelford

Linguistics is the scientific study of language, which is one of the most characteristic forms of human behavior. In contrast with other disciplines concerned with languages, linguistics deals with languages from the point of view of their internal structure as cognitive systems. Courses provide training in the method and theory of language analysis and description, as well as techniques for dealing with language change and genetic relationships.

Faculty

Joseph E. Emonds, Chairperson; Brame, Contreras, Emonds, Ioup, Kaisse, Newmeyer, Saporta. E. M. Kaisse, graduate program adviser.

Undergraduate Program

Bachelor of Arts Degree

Major Requirements: LING 200 or 400; 451, 452, 453; 461, 462, 463; at least one year of a non-Indo-European language; at least one year of an Indo-European language; 20 credits of specified courses in other departments or courses in linguistics.

Graduate Programs

Master of Arts Degree

Admission Requirements: Completion of 45 credits of undergraduate language study, implying attainment of proficiency in one language other than the student's native language, is recommended.

Graduation Requirements: Familiarity with several languages is desirable; 36 credits, of which at least 18 credits must be in courses at the 500 level or above, including 9 credits in LING 700; comprehensive examination; thesis. Attendance at the Linguistic Society of America Summer Institute is strongly recommended.

Doctor of Philosophy Degree

Admission Requirements: The department may grant a stu-

dent permission to proceed directly to work on the doctoral degree without having acquired the Master of Arts degree, or may first require an individual to satisfy the requirements for the Master of Arts degree.

Graduation Requirements: Completion of the Master of Arts degree program or 36 credits in linguistics and related areas; 54 additional credits, including 3 credits in LING 599 and 27 credits in LING 800; supervised teaching in phonology, syntax, historical linguistics; General Examination; dissertation; Final Examination.

MATHEMATICS

C138 Padelford

Mathematics is the basic language of physical science and engineering and a discipline in its own right with important applications in the social and natural sciences and in business administration.

Faculty

Robert Phelps, Chairperson; Adolphson, Arsove, Avann (emeritus), Ballard, Bass, Baxter, Beaumont, Benda, Bendersky, Birnbaum (emeritus), Blumenthal, Brownell, Bungart, Corson, Curjel, Curtis, Dekker, Dubisch, Duchamp, Durfee, Erickson, Folland, Gangolli, Glicksberg, Goldstein, Greenberg, Grunbaum, Haris, Hewitt, Hungerford, Jans, King, Kingston, Klee, Koblitz, Kottwitz, Lind, Marshall, McFarlan (emeritus), Michael, Miller, Monk, Moore, Morel, Morrow, Namioka, Ness, Nunke, Osborne, Ozols, Phelps, Ragozin, Ravenel, Rockafellar, Sarason, Segal, Stout, Sullivan, Warfield, Warner, Westwater, Zuckerman (emeritus). D. Ragozin, graduate program adviser.

Undergraduate Programs

Bachelor of Arts Degree

Admission: Four years of high school mathematics recommended.

LIBERAL ARTS OPTION

Major Requirements: 50 approved credits in mathematics, including MATH 124, 125, 126, 302, 303, 327, 328, and 9 credits in mathematics courses numbered 400 or above.

TEACHER PREPARATION OPTION

Major Requirements: 50 approved credits in mathematics, including MATH 124, 125, 126, 205 or 302, 327, 411, 412, 444, 445; STAT 341, 342; either QMETH 200, ENGR 141 or C SCI 241 or equivalent programming experience. The College of Education also has programs with a major or minor in mathematics.

In both options above, 2.0 or higher grades must be obtained in all mathematics courses presented to satisfy the



mathematics requirement, and a grade-point average of 2.00 or higher must be obtained in all mathematics courses taken.

Bachelor of Science Degree

Admission: Same as for the Bachelor of Arts degree.

MATHEMATICS OPTION

Major Requirements: 58 approved credits in mathematics, including MATH 124, 125, 126, 302, 303, 327, 328, 329, 402, 403, 404 and either 424, 425, 426 or 427, 428, 429 (302, 303 and 327, 328 and 329 should normally be completed by the end of the sophomore year); one year of freshman physics (preferably PHYS 121, 122, 123).

MATHEMATICAL STATISTICS OPTION

See Statistics.

NUMERICAL ANALYSIS OPTION

Major Requirements: 54 approved credits in mathematics, including MATH 124, 125, 126, 238, 239, 302, 303, 304, 327, 464, 465, 466 (upon request 407 may be substituted for 466); either ENGR 141 or C SCI 241 or equivalent programming experience; one year of freshman physics (preferably PHYS 121, 122, 123).

In all options, grades of 2.0 or higher must be obtained in all mathematics courses presented to satisfy the mathematics requirement and a grade-point average of 2.00 or higher must be obtained in all mathematics courses taken.

Honors Program: Bachelor of Science degree only "With College Honors in Mathematics" or "With Distinction in Mathematics." Consult honors adviser about requirements.

Graduate Programs

The degrees of Master of Arts, Master of Science, and Doctor of Philosophy are offered. The two master's degrees are equivalent in rigor and quality, but they serve students with different needs. 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. A teacher preparation option is offered. 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. A mathematical statistics option is offered. The Doctor of Philosophy 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.

Master of Arts Degree

MATHEMATICS OPTION

Admission Requirement: 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).

Graduation Requirements: With Thesis—36 credits in courses at the 400 level or above, of which 18 must be in courses at the 500 level or above, including 9 credits for thesis. At least 6 credits each in algebra, analysis, and one other field. Demonstration of proficiency in one of three languages—French, German, or Russian. Thesis is largely expository. Without Thesis—36 credits in courses at the 400 level or above, of which 18 must be in courses at the 500 level or above. At least 6 credits each in algebra, analysis, and one other field. The 18 credits in courses numbered 500 or above should be distributed over no more than three sequences. Language requirement as for thesis option.

TEACHER PREPARATION OPTION

Admission Requirement: Baccalaureate degree with background in mathematics.

Graduation Requirements: 36 credits; 33 at the 400 level or above, remaining 3 at the 400 level or above in mathematics or at the 300 level or above in another field; 18 credits must be at the 500 level or above, and at least 15 of these credits must be in mathematics courses; 9 credits must be in thesis. There is no foreign-language requirement.

Master of Science Degree

MATHEMATICS OPTION

Admission Requirement: Bachelor of Science degree with major in mathematics, Bachelor of Arts degree with strong major in mathematics or equivalent background.

Graduation Requirements: With Thesis—36 credits, including 9 credits of thesis; a minimum of 27 approved credits in courses numbered 400 or above, with at least 18 credits in courses numbered 500 or above. The courses must include at least 6 credits each in analysis, algebra, and one other field. Demonstration of proficiency in one of three languages—French, German, or Russian. Thesis should contain original research. Without Thesis—Formal admission to candidacy for the Doctor of Philosophy degree.

MATHEMATICAL STATISTICS OPTION

Admission Requirements: Bachelor of Arts degree with major in mathematics or equivalent background. Must include courses equivalent to MATH 394, 395, STAT 472, 473.

Graduation Requirements: 36 credits in courses at the 400 level or above; must include 9 credits of thesis research and 15 additional credits in mathematical statistics or probability at the 500 level or above, including STAT 581, 582. Demonstration of proficiency in one of three languages— French, German, or Russian.

Also see the Department of Statistics listing in this section of the catalog.

Doctor of Philosophy Degree

Admission Requirement: Mathematical training equivalent to a master's degree in mathematics.

Graduation Requirements: General Examination of basic graduate-level knowledge of three fields of mathematics; demonstration of proficiency in two of the following: French, German, Russian; dissertation; and Final Examination.

MEDIEVAL AND RENAISSANCE STUDIES

B434 Padelford

Medieval and Renaissance Studies is an interdisciplinary program designed to offer the student a broad and coherent exposure to the Western cultural tradition through the study of the art, history, literature, philosophy, and religion of the Middle Ages and the Renaissance. Working in close consultation with a committee of three faculty members chosen by the student, and drawing from the course offerings of more than twenty departments and schools, students in Medieval and Renaissance Studies have the opportunity to develop a wide variety of individualized curricula. Although an undergraduate degree in Medieval and Renaissance Studies is not offered, a General Studies degree is available to students interested in following a program in this area. Consult Prof. Miceál Vaughan or a General Studies adviser in B10 Padelford.

MICROBIOLOGY AND IMMUNOLOGY

G305 Health Sciences

The Department of Microbiology and Immunology is a basic biological science department concerned with microbiology and immunology. Microbiology is a branch of natural science that deals with microscopic organisms, including bacteria, viruses, fungi, protozoa, and algae. It is concerned with the nature and properties of these organisms and their effects on man and the environment.

Immunology is a branch of natural science that deals with specific and nonspecific resistance to tissue injury by both foreign and autochthonous substances. The mechanisms of resistance involve primarily the activities of leukocytes and antibodies, including those concerned with the specific immune response.

Faculty

John C. Sherris, Chairperson; Barnes, Bicknell, Champoux, Clagett, Corey, Coyle, Cramer, Crosa, Douglas, Evans, Falkow, Gilliland, Groman, Hakomori, I. Hellstrom, K. E. Hellstrom, Henney, Holmes, Kenny, Kiehn, Klebanoff, Lara, Laxson, Linial, Mannik, Memmer, Minshew, Nester, Newman, Nowinski, O'Connor, Parkhurst, Pearsall, Plorde, Pollack, Rohrschneider, Schoenknecht, Sherris, Staley, Stanton, Storb, Tompkins, Whiteley, Wright.

Undergraduate Programs

Bachelor of Science Degree

Admission Requirements: A minimum of 75 credits with overall grade-point average of 2.00 and, unless specifically waived, a grade-point average of 2.25 in required chemistry and biology courses. Students should complete departmental requirements in biology and in inorganic and organic chemistry before applying for admission to the major.

Major Requirements: 45 credits in biological sciences, including BIOL 210, 211, 212 (preferred) or an equivalent 10 to 15 credits in botany or zoology, or both; a minimum of 30 credits in microbiology courses and approved electives, including MICRO 400, 401, 402, 431, 441, 442, 443, and 496 (MICRO 101, 301, 302, 319, 351 cannot be used); a minimum grade-point average of 2.25 in the required microbiology and approved electives; PHYS 114, 115, 116 or 121, 122, 123; CHEM 140, 150, 151, 160; CHEM 231, 232 or 231, 235, 236 or 335, 336, 337 (three-quarter sequence preferred); CHEM 321; MATH 124 or 157 or Q SCI 281 or 291. Transfer students must complete at least 15 of the 30 credits of required microbiology and immunology courses at this university.

Double Degree Program in Medical Technology: A fiveyear program is offered by the Department of Microbiology and Immunology and the Department of Laboratory Medicine to a limited number of students. Consult the Microbiology and Immunology academic affairs office, G303 Health Sciences, for information on admission requirements.

Honors Program: Baccalaureate degree "With College Honors in Microbiology and Immunology" or "With Distinction in Microbiology and Immunology." Consult honors adviser about requirements.

Graduate Programs

Students who plan to pursue a graduate degree program in microbiology and immunology should consult the School of Medicine, Microbiology and Immunology, section of this catalog.

MUSIC

106 Music

Music is studied as a creative art, viewed through its literature and compositional techniques and in the laboratory of performance.



Instruction in dance is also administered by the School of Music (see Dance in this section of the catalog).

Faculty

Paul M. Palombo, Director; Alavedra, Babb (emeritus), Beale, Benshoof, Bergsma, Bissell, Bozarth, Carlsen, Chapple (emeritus), Clarke (emeritus), Conlon, Cooper, Cummings, Curtis-Verna, Dempster, Desimone, Eichinger (emeritus), Garfias, Geissmar (emeritus), Grossman, Guarrera, Harman (emeritus), Harnett, Harris (emeritus), Heinitz (emeritus), Hokanson, Irvine (emeritus), Jussila, Kaplan, Kechley, Kind (emeritus), Lieberman, Lishner (emeritus), Lundquist, McColl, McInnes, Moore, Munro (emeritus), O'Doan, Paglialunga, Palombo, Rafols, Rahn, Rosinbum, Sakata, Saks, Siki, Singher, Skowronek, Smith, Sokol, Starr, Stewart, Storch, C. Terry, M. Terry (emeritus), Thome, Troy, Tufts, Verrall (emeritus), Vokolek, Werner (emeritus), White, Woodcock (emeritus), Zetlin (emeritus), Zsigmondy. J. Conlon, graduate program adviser.

Clarification of Major Status: Major status in performance areas is accorded when, after proper admission is acknowledged and the required School of Music audition is completed, the student commences Applied Music study in the major area with a currently approved member of the faculty of the School of Music. Such study must be undertaken during the first quarter of registration and during each subsequent quarter of registration until the minimum program requirements 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. Mere acceptance into a program does not constitute major status.

In order to retain major status, the student must make and demonstrate consistent and acceptable progress at the annual required jury.

In academic areas and composition, the faculties of the particular areas determine the status of individuals accepted. Any departure from the above requirements must have the recommendation of the appropriate divisional chairperson and the written consent of the Director of the School of Music.

Undergraduate Programs

Admission Requirements: All students must audition to the level of private instruction in their principal performance areas to qualify as music majors and receive private instruction, and must pass an examination in basic piano. Students proficient in another instrument or voice, but deficient in basic piano, may begin their musical studies, but must enroll in MUSIC 136 until proficiency is established.

Core Requirements: The music theory-history core, required in each of the undergraduate curricula, is as follows:

Courses	Credits
MUSIC 110, 111, 112 First-Year Theory (3,3,3)	9
MUSIC 113, 114, 115 Ear Training (1,1,1)	3
MUSIC 210, 211, 212 Second-Year Theory (3,3,3)	9
MUSIC 213, 214, 215 Music After 1750 (3,3,3)	9
MUSIC 310 Modal Counterpoint (3)	3
MUSIC 311 Tonal Counterpoint (3)	3
MUSIC 312 Twentieth-Century Techniques (3)	3
MUSIC 313, 314 Music Before 1750 (3,3)	6
Music upper-division theory or history electives	10
	55

Bachelor of Arts Degree

General Requirements: A minimum of 180 credits of which 90 must be taken in departments other than the School of Music.

ETHNOMUSICOLOGY OPTION

Includes courses in Western music, ethnomusicology, anthropology, and linguistics. A major is available in ethnomusicology through General Studies. Students may also obtain a degree with an emphasis on ethnomusicology through the music theory-history option in the School of Music.

MUSIC THEORY-HISTORY OPTION

Major Requirements: Music theory-history core, plus 9 credits upper-division vocal or instrumental instruction, and six quarters ensembles, for a minimum of 69 credits; students who wish to pursue this option with emphasis in ethnomusicology should consult their music adviser regarding suitable electives, which include languages and area studies outside music; 2.50 grade-point average in music courses.

VOCAL OR INSTRUMENTAL OPTION

Major Requirements: Music theory-history core, excluding the 10 credits in theory or history electives, plus 9 credits in lower-division vocal or instrumental instruction, 9 credits in upper-division vocal or instrumental instruction, and eight quarters in ensembles, for a minimum of 70 credits; 2.50 grade-point average in music courses.

Bachelor of Arts and Bachelor of Music Degree (Concurrent)

General Requirements: A minimum of 225 credits, of which 90 must be in areas other than music; all College of Arts and Sciences graduation requirements must be met.

Major Requirements: 2.50 grade-point average in music courses.

COMPOSITION MAJOR

Courses	,					Credits
Music theory-history core					• •	55
MUSIC 191, 291, 391, 491 Composition (6,6	,6,6)			•	• •	24
MUSIC 487 Tonal Counterpoint (3)		•, •	•			3
MUSIC 280, 380, 381, 382 Conducting (1,1,	1,1)		•	•		4
Vocal or instrumental instruction			•			- 24
Music electives		·	۰.			6
Ensembles (twelve quarters)		•••••••••••••••••••••••••••••••••••••••	•	. •		12-24
· · · · · ·						128-139

MUSIC HISTORY MAJOR

Courses	Credits
Music theory-history core	55
5 credits from MUSIC 316, 317, 318	5
3 credits from MUSIC 400, 401, 402, 403	3
3 credits from MUSIC 404, 407, 410, 413, 416, 417, 420	3
3 credits from MUSIC 405, 406, 408, 411, 414, 418, 421	3
3 credits from MUSIC 409, 412, 415, 419, 422, 423	3
Music history-literature electives	9
Music electives	9
Vocal or instrumental instruction	24
Ensembles (twelve quarters)	12-24
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• •	126-137

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. For emphasis in ethnomusicology, consult the music adviser regarding suitable area studies other than music.

PIANO MAJOR

Courses	Credits
Music theory-history core	55
MUSAP 160, 260, 360 Private Instruction: Piano	27
MUSAP 460 (two years) Private Instruction: Piano	18
MUSIC 323, 324, 325 Accompanying (2,2,2)	6
MUSIC 326, 327, 328 Repertoire (2.2.2)	6
MUSIC 434, 435, 436 Pedagogy (2.2.2)	6
MUSIC 479 Senior Recital	1
Ensembles (fifteen quarters)	15-30
AND IN COLUMN AND A CATAON	134-148
STRING INSTRUMENT MAJOR	
Courses	Credits
Music theory-history core, to include	
MUSIC 487 Tonal Counternaint	55
MUSAP 161, 163, 164, 178, 261, 263, 264, 278, 361, 363	
364 378	•
Private Instruction: Violin-Viola Violoncello	
Viola da Gamba Contrabase	27
$\mathbf{M} \mathbf{I} \mathbf{S} \mathbf{A} \mathbf{D} \mathbf{A} \mathbf{S} 1 \mathbf{A} \mathbf{S} 2 \mathbf{A} \mathbf{S} \mathbf{A} \mathbf{A} 7 \mathbf{R} (\mathbf{true} \ \mathbf{true} \mathbf{T})$	21
Driveta Instruction: Violin-Viola Violoncello Controhoco	19
MISIC 470 Series Desite	10
MUSIC 477 Schol Rechan	1
MUSIC 434, 455, 450 Pedagogy (2,2,2)	0
MUSAP 140 Private instruction: Plano or	
MUSIC 236 Secondary Plano	0
MUSIC 280 Basic Principles of Conducting	1
Ensembles—orchestral (nine quarters), chamber music	
(ten quarters), elective (two quarters) for a total of	
twenty-one quarters	21-42
	135-155

Violinists should complete one quarter of viola.

VOICE MAJOR

Courses				Credits
Music theory-history core		 		55
MUSAP 162, 262, 362 Private Instruction: Voice .	•	 	 •	27
MUSAP 462 (two years) Private Instruction: Voice		 		18
MUSAP 140 Private Instruction: Piano or				
MUSIC 236 Secondary Piano	•	 	 •	6
MUSIC 233 Music Theatre Technique		 		1 ·
MUSIC 280, 380, 381, 382 Conducting (1,1,1,1)	•	 	 •	4
MUSIC 309 Advanced Music Theatre Technique .	• `	 		1
MUSIC 323 Accompanying		 	 •	2
MUSIC 326, 327, 328 Repertoire (2,2,2)	•	 	 •	6
MUSIC 434, 435, 436 Pedagogy (2,2,2)		 		6

MUSIC 479 Senior Recital	1
Ensembles-choral (six quarters), elective (six quarters)	
for a total of twelve quarters	12-24
1	39-150
Voice majors should establish proficiency in French	, Ger-

man, or Italian and complete an additional 15 credits in a second language from this group as well as 5 credits in SPHSC 300 (Speech Science).

ORGAN MAJOR

Courses				Credits
Music theory-history core, to include				
MUSIC 487 Tonal Counterpoint				55
MUSAP 165, 265, 365 Private Instruction: Organ				27
MUSAP 465 (two years) Private Instruction: Organ				18
MUSIC 479 Senior Recital				'1
MUSIC 323, 324 Accompanying (2,2)				4
MUSIC 326, 327, 328 Repertoire (2,2,2)	•			6
MUSIC 280, 380, 381 382 Conducting (1,1,1,1) .		•	•	· 4
Ensembles (twelve quarters)		•		12-24
			-	

139

ORCHESTRAL INSTRUMENT MAJOR

Courses	Credits
Music theory-history core	- 55
MUSAP 166 through 176, 266 through 276, 366 through 376	
Private Instruction	27
MUSAP 466 through 476 (two years) Private Instruction	18
MUSIC 479 Senior Recital	_ 1
MUSAP 140 Private Instruction: Piano or	
MUSIC 236 Secondary Piano	6
MUSIC 280, 380, 381, 382 Conducting (1,1,1,1)	4
Ensembles (twelve quarters)	21-42
	132-152

General requirements for each Music Education option:

MUSIC EDUCATION MAJOR

Courses	Credits
Music theory-history core (see special inclusions below)	55
MUSIC 340 Music in General Education	- 3
Two courses from the following:	6
MUSIC 432 The General Music Class (3)	
MUSIC 440 Music in Early Childhood (3)	
MUSIC 441 Music in Later Childhood (3)	
MUSIC 442 Instrumental Curriculum: Methods and	
Materials (3)	
MUSIC 443 Choral Curriculum: Methods and Materials (3)	•
MUSIC 280, 380, 381, 382 Conducting (1,1,1,1)	4
Major performance medium	18-24
Secondary performance medium	12-18
(Major and secondary performance media to total 36)	
Performance electives	6
Ensembles (twelve quarters)	
(minimum of three quarters of choral ensemble required)	12-24
	116-139

Information concerning special procedures for students pursuing teacher certification should be obtained from the Music Education office, 331 Music.

Requirements for specific options:

GENERAL MUSIC (ELEMENTARY AND SECONDARY)

Music theory-history core to include: 5 credits from MUSIC 316, 317, 318 (Music Cultures of the World). Music education methods to include: MUSIC 440 (Music in

Early Childhood); MUSIC 441 (Music in Later Childhood), for persons pursuing the elementary emphasis; MUSIC 432 (The General Music Class); MUSIC 442 (Instrumental Curriculum: Methods and Materials) or MUSIC 443 (Choral Curriculum: Methods and Materials), for persons pursuing the secondary emphasis.

The secondary or elective performance media, or both, must include the following or equivalent proficiency: MUSIC 232 (Percussion Techniques and Pedagogy); MUSIC 236 (Secondary Piano); MUSIC 237 (Class Instruction: Voice); MUSIC 240 (Guitar Techniques and Pedagogy): and MUSIC 241 (Recorder Techniques).

INSTRUMENTAL

Music theory-history core to include: MUSIC 334 (Band Arranging) or 490 (Orchestration). Major performance medium must be an orchestral or band instrument. The secondary or elective performance media, or both, must include the following or equivalent proficiency: MUSIC 136 (Basic Keyboard); 137, 138, 139 (Class' Instruction: Voice); and 16 credits from the following: MUSIC 220, 221, 222 (String Techniques and Pedagogy), MUSIC 226, 227, 228 (Woodwind Techniques and Pedagogy), MUSIC 229, 230, 231 (Brass Techniques and Pedagogy), and MUSIC 232 (Percussion Techniques and Pedagogy). Music education methods to include MUSIC 442 (Instrummental Curriculum: Methods and Materials) or equivalent. Major performance medium must total 24 credits.

CHORAL

Music education methods to include MUSIC 443 (Choral Curriculum: Methods and Materials). Major and secondary performance media must be piano and voice, or voice and piano.

Bachelor of Music Degree

Intended for a limited number of specially qualified students who wish to emphasize professional training in per-, formance within a four-year program.

General Requirements: A minimum of 180 credits of which 60 must be taken in departments other than the School of Music. The 60 credits must include the basic proficiency requirement of the College of Arts and Sciences and no fewer than 20 credits in each of two fields (humanities, social sciences, or natural sciences).

Major Requirements: Grade-point average of 3.20 in music courses; 54 credits in a theory-history sequence to include MUSIC 110, 111, 112, 113, 114, 115, 210, 211, 212, 213, 214, 215, 310, 311, 312, 313, 314, and 10 credits to complete the total.

PIANO MAJOR

Music theory-history core; 48 credits in MUSAP 160, 260, 360, 460; MUSIC 379, 479; twelve quarters in ensembles;

6 credits in approved music electives. Total music credits: 122-134.

ORGAN MAJOR

Music theory-history core; 48 credits in MUSAP 165, 265, 365, 465; MUSIC 379, 479; twelve quarters in ensembles; 7 credits in approved music electives. Total music credits: 123-135.

STRING INSTRUMENT MAJOR

Music theory-history core; 48 credits in MUSAP 161, 163, 164, 178, 261, 263, 264, 278, 361, 363, 364, 378, 461, 463, 464, 478; MUSIC 379, 479; twelve quarters in ensembles; 8 credits in approved music electives. Total music credits: 124-136.

VOICE MAJOR

Music theory-history core; 48 credits in MUSAP 162, 262, 362, 462; MUSIC 379, 479; twelve quarters in ensembles; 12 credits in approved music electives. Total music credits: 128-140.

ORCHESTRAL INSTRUMENT MAJOR

Music theory-history core; 48 credits in MUSAP 166 through 176, 266 through 276, 366 through 376, 466 through 476; MUSIC 479; twenty-one quarters in ensembles; 7 credits in approved music electives. Total music credits: 125-146.

COMPOSITION MAJOR

Music theory-history core; 24 credits in MUSIC 191, 291, 391, 491; twelve quarters in ensembles; 16 credits in vocal or instrumental instruction; 16 credits in approved music electives. Total music credits: 122-134.

Teaching Programs: Information on four-year programs leading to the baccalaureate degree and teacher certification at the secondary or elementary level appears in the College of Education section of this catalog.

Honors Program: Baccalaureate degree "With College Honors in Music" or "With Distinction in Music." Consult honors adviser about requirements.

Graduate Programs

Master of Arts for Teachers Degree

Admission Requirements: At least one year of teaching experience and permission.

Graduation Requirements: 36 credits, of which 18 must be in courses at the 500 level or above and 30 must be in approved music courses. Final written and oral examination.

Master of Music Degree

Areas of Specialization: Performance (piano, organ, voice, strings, other orchestral instruments), instrumental conducting, choral conducting, composition, opera production. Admission Requirements: Audition required for entrance to performance and composition. Entrance to other areas by permission.

Graduation Requirements: 36 credits, of which 18 must be in courses at the 500 level or above. Demonstration of proficiency in one language from French, German, Italian, and Latin. With Thesis—Program to include 9 credits in thesis. Without Thesis—A final oral examination is required.

Master of Arts Degree

Areas of Specialization: Music theory, historical musicology, ethnomusicology, systematic musicology.

Admission Requirements: Examination for entrance to music history or music theory. Graduate Record Examination for entrance to systematic musicology. Entrance to other areas by permission.

Graduation Requirements: 36 credits, of which 18 must be in courses at the 500 level or above and 9 in thesis. Demonstration of proficiency in one language from among French, German, Italian, and Latin.

Doctor of Musical Arts Degree

Areas of Specialization: Performance (piano, organ, voice, strings, other orchestral instruments), instrumental conducting, choral conducting, composition, opera production, music education.

Admission Requirements: Audition for performance and composition. Graduate Record Examination for entrance to music education. Entrance to other areas by permission. Demonstration of proficiency in one language from among French, German, Italian, and Latin.

Graduation Requirements: Three academic years of study; dissertation; in lieu of a full-length dissertation, a thesis in three parts may be substituted, of which one must be a research paper and two may be additional research papers, or musical compositions, or documented public performances, or lecture demonstrations, or the like.

Doctor of Philosophy Degree

Areas of Specialization: Historical musicology; systematic musicology; ethnomusicology; music theory.

Admission Requirements: Examination for entrance to historical musicology or music theory. Graduate Record Examination for entrance to systematic musicology. Entrance to other areas by permission. Demonstration of proficiency in German and a second language from among French, Italian, and Latin, or another such language as is necessary for research.

Graduation Requirements: Three academic years of study; dissertation.

NEAR EASTERN LANGUAGES AND LITERATURE

229B Denny

The program focuses on the languages and literary cultures of the Islamic and Semitic Near East with an emphasis on the cultural traditions, their ancient and medieval roots and, to a lesser extent, the relation between the traditions and recent cultural developments. Each of the languages offered represents the linguistic core of a major literature. Arabic, Persian, and Turkish are the languages of the most significant manifestations of Islamic culture, while Hebrew, Akkadian, Aramaic, and Ugaritic are the linguistic roots of the Old Testament and Judaic culture. The languages are taught in conjunction with their sociocultural contexts so that linguistic skills will be formed and enhanced by a broad and sympathetic understanding, and a firm foundation will be laid for both intellectual exploration and practical experience.

Faculty

Farhat J. Ziadeh, Chairperson; Andrews, Clear, Heer, Jacobi, Loraine, MacKay, Sadiq, Ziadeh. N. L. Heer, graduate program adviser.

Undergraduate Program

Bachelor of Arts Degree

Major Requirements: An approved program of 30 credits, excluding language courses, in courses offered by the department or courses on the Near East offered by other departments, or both, plus at least 9 credits in literature courses at the 400 level in the major language for which courses numbered 101-102, 103 and 201, 202, and 203 are usually prerequisites. Summer study opportunities in Tunisia and Egypt are available for a limited number of students on competitive basis.

Graduate Program

Master of Arts Degree

Admission Requirements: Statement of purpose; a sample of written work; three letters of recommendation, of which at least two must attest to scholarly ability. 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.

Graduation Requirements: Students may concentrate in Arabic, Hebrew, Persian, or Turkish and may choose as their field of specialization a civilization or literature related to their language of concentration, or, in cooperation with other departments, the contemporary Near East. Requirements include a reading knowledge of French or German; a seminar paper representing the student's best work; a written examination consisting of four parts: (1) on the



general culture of the Near East, (2) on the student's field of specialization, (3) on the student's language of concentration, (4) on a second Near Eastern language related to the language of concentration. Students who do not intend to continue their studies for a higher degree in Near Eastern languages and literature may elect to substitute an examination in a Near Eastern area subject for the examination in a second Near Eastern language. Fulfillment of these requirements usually entails the completion of two years (54 credits) of study.

NEAR EASTERN STUDIES

See International Studies.

NUTRITIONAL SCIENCES AND TEXTILES

203 Raitt

The School of Nutritional Sciences and Textiles consists of two divisions: (1) Human Nutrition, Dietetics, and Foods, which is concerned with assessment of nutritional status of individuals and groups, metabolism of nutrients and their interaction, nutrition education, quality and quantity of food intake, sensory and objective evaluation of foods, consumer food acceptance and protection, and maintenance of proper nutrition in health and disease. (2) Textile Science and Costume Studies, which involves the study of fiber structure, product performance and safety, textile economics, consumer acceptance and protection, textile structural design, preservation and restoration of historic textiles, historic and other cultural aspects of textiles and costume, and apparel design.

Faculty

Mary Louise Johnson, Director; Basche, Brockway (emeritus), Buergel, Childs, Dieken, Granberg (emeritus), Johnson, King, Martinsen, McAdams (emeritus), McDonald, Monsen, Omori, Peterson, Pipes, Rees, Ryesky, Shigaya (emeritus), Terrell (emeritus), Trahms, Valerio, Van Derpool, Wekell, Worthington, Yamanaka. M. Johnson and B. Worthington, graduate program advisers.

Undergraduate Programs

Bachelor of Science Degree

CLINICAL DIETETICS

The Coordinated Undergraduate Program prepares students for an area of specialization in clinical dietetics. Graduates are prepared to assume entry-level positions as clinical dietitians in hospitals, outpatient clinics, and community agencies. In all these settings, the major role is nutritional assessment, counseling, education, and modification of existing dietary patterns. Upon graduation, students are eligible to apply for membership in the American Dietetic Association and to take the registration examination.

Admission Requirements: (1) completion of at least 90 credits, including the following courses or their equivalents: MATH 105, ZOOL 118 and 119, CHEM 140, 150, 151, 231, 232, MICRO 301, 302, NUTR 321 and 340; (2) a minimum cumulative grade-point average of 2.50; (3) satisfactory health for full participation in the clinical portion of the program; (4) personal interview. Presently a maximum of twenty students is admitted each year.

Major Requirements: The last two years of the curriculum coordinate didactic learning with clinical experience in area health-care facilities and community programs. Required courses: NUTR 360, 414, 421, 422, 441, 442, 460-461, 463, 464, 465, 466, 467, 468, 469, 476; B CMU 301 or ENGR 331; BIOST 472 or EDPSY 490; BIOC 405, 406; P BIO 360; PSYCH 101 or SOC 110; ANTH 202 or 301 or SOC 240 or 330; ECON 200.

NUTRITIONAL SCIENCE AND FOODS

Students are prepared for graduate study and research and provided an introduction to the field of nutritional science and foods within the framework of a liberal education.

Admission Requirement: Minimum 2.50 college gradepoint average.

Major Requirements: NUTR 321, 340, 341, 400, 414, 421, 422, 440, 460-461; BIOC 405, 406; CHEM 140, 150, 151, 231, 232 (or 235, 236), 241, 242; MATH 105; MICRO 301, 302; BIOST 472 or EDPSY 490 or Q SCI 281; P BIO 360; 11 credits selected from anthropology, economics, psychology, sociology.

TEXTILE SCIENCE

Students are introduced to the broad field of textiles and prepared for graduate study and research or for entry-level, positions in the following areas: textile business and induse, try, consumer education and protection.

Admission Requirements: 2.50 grade-point average and completion of 45 credits, including the following: ART 105; CHEM 140, 150, 151; MATH 105.

Major Requirements: TSCS 325, 326, 329, 417, 418, 425, 426, 461 plus 15 approved Textile Science and Costume Studies credits; ART 109, BIOST 472 or EDPSY 490; CHEM 231, 232, 241; FOR P 403; MICRO 301, 302.

Bachelor of Arts Degree

COSTUME STUDIES

Three options are available: (1) textile structures: woven, nonwoven; (2) apparel design; or (3) historic costume. In addition to an introduction to the broad field of textiles, emphasis is given to ethnic, historic, and sociopsychological studies of costume and to apparel design. Students are prepared for graduate study and research or careers in structural design in textiles, apparel design, or textile and costume museology.

Admission Requirements: All options—ART 105, 106, 109; CHEM 101, 102; TSCS 233; minimum 2.50 cumulative grade-point average. Option 1, 'textile structures: woven, nonwoven: portfolio and personal interview. Option 2, apparel design: portfolio demonstrating satisfactory beginning-level skills and techniques in art and apparel design (TSCS 334 or equivalent). Option 3, historic costume: HST 111, 112, 113 or ART H 201, 202, 203. Recommended for all options: ANTH 100, ECON 200, PSYCH 101, and SOC 110.

Major Requirements: Core—TSCS 325, 326, 329, 334, 458, 461. Requirements for specialization: Option 1, textile structures: woven, nonwoven—TSCS 327, 429, 439, 482; ART 304; HST 111, 112, 113 or ART H 201, 202, 203 or equivalent; minimum of 8 credits from the following: TSCS 428, 432, 433, ART 255. Option 2, apparel design—TSCS 432, 433, 434, 436, 437, 460, 484; HST 111, 112, 113 or ART H 201, 202, 203; minimum of 3 credits from the following: TSCS 351, 439, 444; MKTG 300; ENGR 123. Option 3, historic costume—TSCS 432, 433, 436, 437, 439, 483; minimum of 10 credits from the following: TSCS 351, 429, 434.

Graduate Programs

Master of Science Degree

Admission Requirements: 3.00 junior-senior grade-point average; successful completion of undergraduate science prerequisites and specified major courses; Graduate Record Examination; letter of application and intent; two letters of reference.

Graduation Requirements: 45 credits, including minor of 12 credits in natural or biological science and thesis; proficiency in statistics; comprehensive examination. Human nutrition, dietetics, and foods option: proficiency in biochemistry and human physiology; minimum of 3 credits in NUTR 500. Textile science option: proficiency in chemistry (through organic); ECON 200.

Master of Arts Degree

Admission Requirements: 3.00 junior-senior grade-point average; successful completion of undergraduate major field prerequisites and undergraduate major courses; Graduate Record Examination; letter of application and intent; two letters of reference; interview and, for costume studies, portfolio.

Graduation Requirements: 45 credits, including minor of 12 credits in approved related field other than natural or biological science and thesis; proficiency in statistics or research methods (by permission); successful completion of comprehensive examination. Human nutrition, dietetics, and foods option: Especially for dietetic education. Proficiency in biochemistry and human physiology; teaching practicum for dietetic education. Costume studies option: Proficiency in art, history, or art history, economics, psychology.

OCEANOGRAPHY

108 Oceanography Teaching

Oceanography is the environmental science that examines processes in the ocean and the interrelation of the ocean with the earth and the universe. Study includes chemical composition of seawater; seawater in motion; interactions between sea and atmosphere, sea and land, sediments and rocks beneath the sea; physics of the sea and sea floor; and life in the sea. Studies in marine geophysics are offered jointly with the Department of Geophysics.

The University does not offer a major in marine biology, but courses related to that field are offered by the departments of Botany, Oceanography, and Zoology and by the College of Fisheries. Summer Quarter instruction is offered both on the main campus and at the Friday Harbor Laboratories on San Juan Island.

Faculty

D. James Baker, Chairperson; Dean A. McManus, Associate Chairperson for Instruction; George C. Anderson, Associate Chairperson for Research; Aagaard, Ahmed, Anderson, Baker, Banse, Barnes (emeritus), Carpenter, Coachman, Creager, Criminale, Delaney, Duxbury, Emerson, English, Fleming, Frost, Garmany, Gregg, Hedges, Henry, Hickey, Holloway, Johnson, Jumars, Landry, Larsen, Lewin, Lewis, Lister, Lorenzen, Martin, McManus, Merrill, Murphy, Murray, Nowell, Perry, Rattray, Richards, Sanford, Schoener, Smith, Sternberg, Taft, Welander, Winter.

Undergraduate Programs

Bachelor of Arts Degree

Admission: Suggested high school curriculum to include physics, chemistry, biology, four years of mathematics.

Major Requirements: MATH 124, 125, 126; CHEM 140, 150, 151, 160; PHYS 121, 122, 123, with laboratory if physical oceanography is principal option; principal option and two supporting options in oceanography, of which one must be physical oceanography.

Bachelor of Science Degree

Admission: Same as for the Bachelor of Arts degree.

Major Requirements: MATH 124, 125, 126; CHEM 140, 150, 151, 160; PHYS 121, 122, 123, with laboratory if physical oceanography is principal option; one principal option and three supporting options, which must include



physical oceanography and 5 to 10 credits in upper-division science or mathematics courses, depending on options.

PRINCIPAL OPTIONS

Biological

BIOL 210, 211, 212, 472; CHEM 231, 232, or 231, 235, 236; OCEAN 434, 435, 436, and 15 credits of biologically related courses approved by an adviser.

Chemical

CHEM 231, 235, 236, 241, 242, 321, 455, 456, 457, 460, 463; 3 credits above CHEM 402; OCEAN 341, 342, 421, 422, 423, 424, 451.

Geological (Geology)

CHEM 350; GEOL 205, 301, 320, 321, 340, 361; ENGR 141; OCEAN 406, 450, 451, 453, 457 and 3 credits in geological oceanography above 400; Q SCI 381.

Geological (Geophysics)

CHEM 350; GEOL 205, 320, 321, 340; MATH 238, 327, 328, 427; OCEAN 406, 450, 451, 452; PHYS 221, 222, 223, 321, 322, 323.

Physical

ATM S 301 (not required if atmospheric sciences sequence that follows is chosen); ATM S 340, 441, 442, or PHYS 321, 322, 323; MATH 328, 427; MATH 238 or OCEAN 341; MATH 327 or OCEAN 342; A A 470; PHYS 131, 221, 222, 223; OCEAN 417, 418, 419.

SUPPORTING OPTIONS

Biological

BIOL 101-102; OCEAN 433.

Chemical

CHEM 321; OCEAN 421, 423.

Geological GEOL 205; OCEAN 405.

Physical OCEAN 401, 402.

Honors Program: Bachelor of Arts or Bachelor of Science degree "With College Honors in Oceanography" or "With Distinction in Oceanography." Consult honors adviser about requirements.

Graduate Programs

Master of Science Degree

Admission Requirements: Grade records, letters of recommendation, and the results of the Graduate Record Examination. Students should acquire a broad background in science and mathematics and are encouraged to have knowledge of a foreign language. The student specializes in biological, chemical, geological, geophysical, or physical oceanography. Graduation Requirements: Program of study approved by the student's supervisory committee, including one principal option, three supporting options, and other courses in science and mathematics. Departmental comprehensive written examination. The supervisory committee must be consulted about language requirements. With Thesis-Thesis approved by the supervisory committee must be presented at a seminar. Without Thesis-Requires an approved research activity; written or oral reports are decided upon by the supervisory committee.

Doctor of Philosophy Degree

Admission Requirements: Same as for the Master of Science degree.

Graduation Requirements: Program planned by the student and his Supervisory Committee includes one principal option and three supporting options in oceanography and courses in science and mathematics. General Examination in oceanography and supporting fields. Dissertation. Final Examination.

PHILOSOPHY

345 Savery

Philosophy is the study of the basic concepts, fundamental principles, and leading arguments of the major intellectual disciplines. Its fields include logic, philosophy of science, epistemology, metaphysics, ethics, esthetics, political philosophy, the philosophy of religion, and the history of philosophy.

Faculty

Charles Marks, Chairperson, Boler, BonJour, Burke, Clatterbaugh, Coburn, Cohen, Crocker, Dietrichson, Keyt, Kirk, Marks, Mish'alani, Moore, Potter, Rader (emeritus), Richman. R. Richman, graduate program adviser.

Undergraduate Programs

Bachelor of Arts Degree

Major Requirements: 50 credits in philosophy, of which at least 25 must be earned at the University of Washington; at least four courses, selected by the student, at the 400 level or above, excluding transfer credits and reading courses (PHIL 484 and 584), which normally cannot be used to satisfy this requirement.

Honors Program: Baccalaureate degree "With College Honors in Philosophy" or "With Distinction in Philosophy." Consult honors adviser about requirements.

Graduate Programs

Master of Arts Degree

Admission Requirements: An undergraduate major in phi-

losophy is not required. Applicant's philosophical potential assessed primarily on the basis of a sample of written work in philosophy and secondarily on the basis of undergraduate record, Graduate Record Examination scores, and letters of recommendation. Reading knowledge of at least one foreign language is strongly recommended. *Alternate Program:* Same as above, but with admission restricted to those not interested in being professional philosophers.

Graduation Requirements: Twelve courses in philosophy. Among these, the student must select three fields from at least two areas and take two courses in one field and three in each of the other two. Proficiency in logic. Instead of a thesis, the student must submit three papers distributed over three areas. Alternate Program: Completion of 36 hours of graduate work with grade of 3.0 or better. Written departmental examination over materials covered in these courses.

Doctor of Philosophy Degree

Admission Requirement: Admission based on level of performance in the Master of Arts degree program.

Graduation Requirements: General Examination, dissertation, and Final Examination. Teaching experience as a teaching assistant. Ability to read primary sources in their original language required for work in certain areas and on certain philosophers. Language requirements are determined by the student's Supervisory Committee.

PHYSICS

215 Physics

Physics is the study of the fundamental structure of matter and the interactions of its constituents, as well as the basic natural laws governing the behavior of matter.

Faculty

David Bodansky, Chairperson; Adelberger, Arons, Baker, Bardeen, Blair, Bodansky, Boulware, Brown, Burnett, Clark, Cook, Cramer, Dash, Dehmelt, Ellis, Fain, Fairhall, Farwell, Fortson, Geballe, Gerhart, Halpern, Henderson (emeritus), Henley, Ingalls, Kenworthy (emeritus), Lord, Lubatti, L. McDermott, M. McDermott, Miller, Mockett, Moriyasu, Neddermeyer (emeritus), Peierls (emeritus), Peters, Puff, Rehr, Riedel, Rothberg, Rutherfoord, Sanderman (emeritus), Schick, Schmidt, Snover, Stern, Streib, Trainor, Uehling (emeritus), Van Dyck, Vilches, Weitkamp, Wilets, Williams, Young. D. G. Boulware, graduate program adviser.

Undergraduate Programs

Bachelor of Science Degree

Admission: Recommended preparation includes four years of college preparatory mathematics, one year of physics, and one year of chemistry.

Major Requirements: (1) Core courses-PHYS 121, 122, 123, 131, 132, 133, 221, 222, 223, 321, 322, 334, 335; (2) 3 credits selected from upper-division lecture courses in modern physics; (3) 3 credits selected from upper-division physics laboratory courses; (4) 8 credits selected from approved upper-division physics courses or approved courses in cognate subjects; (5) MATH 124, 125, 126, 238, 327, 328 or MATH 134, 135, 136, 234, 235, 236; (6) MATH 205 or 302; (7) basic computer programming skill (ENGR 141 or equivalent); (8) 9 credits selected from physical or biological sciences other than physics and mathematics, or from history of science or philosophy of science, in addition to any courses in these fields taken to fulfill requirement (4). Courses taken on a satisfactory/not satisfactory basis are not acceptable in fulfillment of requirements (1) through (6). Grades of 2.0 or better are required in all courses presented in fulfillment of requirements (1) through (4). Students who plan graduate study in physics are strongly advised to complete, in addition to courses listed in requirement (1), the following: PHYS 323, 324, 325, 328, 331, 421, 422, 423, 424, 425, 426, 431, 432, 433 and MATH 427, 428, 429.

Honors Program: Baccalaureate degree "With College Honors in Physics" or "With Distinction in Physics." Consult honors adviser about requirements.

Teaching Program: Teaching major and minor in physics. Information on requirements appears in the College of Education section of this catalog.

Graduate Programs

Master of Science and Doctor of Philosophy Degrees

Admission Requirements: Undergraduate preparation to 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 to include vector analysis, complex variables, ordinary differential equations, Fourier analysis, boundary value problems, and special functions. Admissibility 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. The undergraduate physics grades and the advanced physics Graduate Record Examination score are used to compute a predicted grade-point average. Students with a 3.30 predicted grade-point average and a score of 750 or better on the advanced physics Graduate Record Examination are normally admitted, provided their interests can be accommodated by the department. An applicant with a predicted grade-point average below 3.30 and/or an advanced physics Graduate Record Examination score of less than 750, or whose record does not allow the calculation of a predicted grade-point average, may be admitted in exceptional cases if the applicant's overall record suggests that the applicant is capable of successfully completing the physics master's or doctoral degree requirements. Students admitted without



an advanced physics Graduate Record Examination score or with a score below 750 are expected to obtain a score of 750 or above before being allowed to take the qualifying examination.

Master of Science Degree

Graduation Requirements: A minimum of 36 approved credits, of which at least 18 must be in courses numbered 500 or above. The 18 credits must include at least 3 credits in PHYS 600 and at least 12 in other physics graduate courses. A final examination is required. There is no thesis or foreign-language requirement.

Doctor of Philosophy Degree

Graduation Requirements: The student is expected to obtain, here or elsewhere, a background in physics equivalent to that contained in the following sequences of basic graduate courses: PHYS 505, 506; 513, 514, 515; 517, 518, 519; and 524, 525; and in specialized courses appropriate to each student's interests. The student is required to pass, successively, a written qualifying examination (in 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. This examination covers the area in which the dissertation research is planned. Teaching experience is required of all candidates. There is no foreign-language requirement.

Master of Science (Applications of Physics) Degree

Admission Requirements: This option is designed for students who are currently employed and whose backgrounds are in physical science, engineering, or mathematics. Admission is based on course grades in physics and related fields, adequacy of preparation in physics, and interest in areas of specialization offered in the physics department. Students are expected to complete the sequence of core courses PHYS 441, 541, 543 and to select appropriate specialized courses such as contemporary optics, and courses on aspects of condensed matter physics and physics instrumentation. Students are expected to undertake 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.

Graduation Requirements: A minimum of 36 approved credits, of which at least 18 must be in courses numbered 500 or above. The 18 credits must include at least 3 credits of PHYS 600 and at least 12 in other physics graduate courses. A final examination is required. There is no thesis or foreign-language requirement.

POLITICAL SCIENCE

101 Gowen

Political science is the study of the manner in which groups

regulate their social and economic affairs. This includes such problems as: how groups order the relations among members, how members participate in this governance process, how valuable resources are distributed, and how polit-. ical groups deal with each other. The field of political science contains a number of general approaches to these problems. Students are invited to think about the nature of politics from several perspectives, including: general theories about authority, society, and human nature; the comparative study of how political institutions are created and how they operate; the ways in which the institutions and processes of government affect the quality of human existence; the features of society and economy that create both the problems and the solutions of government; the ways in which culture shapes the identities of groups and the symbols and values to which they respond politically; and the formation and use of beliefs and ideologies in the process of understanding and changing the political world.

Faculty

Donald Matthews, Chairperson; Bennett, Bone (emeritus), Brass, Cassinelli, Chandler, Cole (emeritus), Gerberding, Gore, Gottfried, Hellman, Hitchner, Horowitz, Kroll, Lee, Lefberg, Lev, Levi, Matthews, May, McCrone, Modelski, Mosher, Olson, Paul, Pool, Reshetar, Riley (emeritus), Rohn, Scheingold, Sheikholeslami, Shipman (emeritus), Teuber, Townsend, Webster (emeritus). D. McCrone, graduate program adviser.

Undergraduate Programs

Bachelor of Arts Degree

Major Requirements: 50 credits in political science, including any three of the following: POL S 101, 201, 202, 203, 204. At least 10 credits in upper-division courses in each of the following three groups: Group I, Political Theory and Public Law; Group II, American Government, Politics, and Public Administration; Group III, Comparative Government and International Relations; 2.25 grade-point average in political science courses. Knowledge of one modern foreign language or of statistics recommended. Transfer students and postbaccalaureate (fifth-year) students must meet all major requirements and are required to complete a minimum of 10 upper-division graded credits in political science at this university. Political Economy Option: all major requirements must be completed, including the following required courses: POL S 201, 370, 406, 409, 416, ECON 200, 201, 260, and statistics. ECON 300, 306 recommended. Admission to this option is limited. Internship Program: Students are encouraged to gain experience through internships. 5 credits of political science internship experience may be counted toward the minimum 50 credits for the major.

Honors Program: Baccalaureate degree "With College Honors in Political Science" or "With Distinction in Political Science." Consult honors adviser about requirements.

Teaching Program: Teaching major or minor in political

science. Information on requirements appears in the College of Education section of this catalog. All students are required to complete a minimum of 10 upper-division graded credits in political science at this university.

Graduate Programs

Master of Arts Degree

Admission Requirement: Undergraduate major in political science or equivalent. Applicants judged on academic backgrounds, Graduate Record Examination aptitude scores, and written evaluations submitted by former professors or supervisors. Students with little training in political science may be required to complete preliminary work in undergraduate courses. Admission of new students usually occurs Autumn Quarter.

Graduation Requirements: 46 credits, of which 23 must be at the 500 level or above; an essay of distinction; comprehensive examination in three areas, including at least two of the following: political theory, comparative politics, international relations, and American politics.

Doctor of Philosophy Degree

Admission Requirement: Same as for the Master of Arts degree. Students with a Master of Arts degree from another institution are required to take an oral doctoral admission examination.

Graduation Requirements: 124 credits, of which at least 58 must be at the 500 level or above; 36 credits allowed for the dissertation. General Examination after completion of 88 credits, covering four fields. At least two fields must be selected from the following general fields: political theory, comparative politics, international relations, and American politics. The remaining fields may be selected from specialized fields within the department or from nondesignated fields within or outside the department. Dissertation and Final Examination. Minimum 3.00 grade-point average overall must be maintained; 2.7 is required in all courses used to satisfy field requirements. There is no foreign-language requirement.

PSYCHOLOGY

119 Guthrie

Psychology involves the scientific study of behavior and its causes and the management of human behavior in a variety of settings. Psychology is studied either as a natural science, in which stress is on physical and biological causes of behavior, or as a social science, in which stress is on how human behavior is affected by the social setting. Clinical, industrial, educational, and counseling psychologists translate scientific findings about behavior into applications in a wide variety of settings. Developmental psychology concerns itself with both the natural and social scientific study of how behavior develops from infancy through old age. The department has major areas of emphasis in the study of human cognition, animal behavior, physiological and sensory bases of behavior, quantitative techniques, personality and clinical psychology, developmental psychology, and social psychology. The department does not have programs in educational psychology (listed in the College of Education section of this catalog), counseling psychology, engineering psychology, or industrial psychology.

Faculty

Lee Roy Beach, Chairperson; Attneave, Barash, L. Beach, Becker, Beecher, Bernstein, Bolles, Boothe, Broedel, R. M. Brown, Carr, Carter-Saltzman, Culbert, Dale, Davidson, Diaz, Dobson, Doerr, Douglas, Edwards, Feldman-Summers, Fenner, Fiedler, Fields (emeritus), Greenberg, Horst (emeritus), Hunt, Jacobson, Keating, Kenney, Kohlenberg, Lansman, Linehan, J. Lockard, E. Loftus, G. Loftus, Loucks (emeritus), Lumsdaine, C. Lunneborg, P. Lunneborg, Makous, Marlatt, T. Mitchell, Nelson, Pagano, Perry, E. Robinson, H. Robinson, Rose, Sackett, Samson, Sarason, Sax, Simpson, M. Smith, R. Smith, Steele, Stotland, Strother (emeritus), Sue, Teller, Woodburne (emeritus), Woods. R. Rose, graduate program adviser.

Undergraduate Programs

Bachelor of Science Degree '

Intended primarily to prepare students for graduate study in psychology.

Major Requirements: 55 credits in psychology courses-PSYCH 101 or 102, 209, 231 or 361, 232 or 233, 217, 218, 3 credits of 499, plus 10 credits each in social science psychology and in natural science psychology (listed below), and electives to total 55 credits; 32-34 additional credits in other disciplines, to include MATH 105, 157 (or 124), 5 credits in physics or chemistry, 5 credits in physical anthropology, GENET 351 (or 451), 10 credits in biology or zoology; 3.00 overall grade-point average in all courses completed at the University and 3.30 grade-point average in all psychology courses. Transfer students must meet all above requirements but need complete only 15 credits in psychology at this university. Social science psychology courses-PSYCH 205, 210, 250, 257, 260, 304, 305, 306, 345, 355, 405, 410, 414, 415, 440, 442, 443, 444, 445, 446, 447, 449, 457, 488, and 489. Natural science psychology courses-PSYCH 200, 222, 357, 400, 403, 406, 407, 409, 412, 413, 416, 417, 418, 419, 421, 422, 423, 424, 425, 427, 430, 434-435, 441, 461, 462, 463, 465, 468, and 475. (Note: The courses listed above as "social science" or "natural science" psychology courses are so designated as fulfilling requirements for the psychology major, but not necessarily as fulfilling the College of Arts and Sciences distribution requirement. A list of psychology courses that apply to the College of Arts and Sciences distribution requirement appears in the College of Arts and Sciences distribution list.)



Major Requirements: 50 credits in psychology courses— PSYCH 101 or 102, 209, 231 or 232 or 233 or 361, 213 (or 217, 218), and electives to total 50 credits (497 recommended); 1½ years of high school algebra or equivalent is a prerequisite to PSYCH 213 but is not a required course; 2.00 grade-point average in all psychology courses. Transfer students must meet all above requirements but need complete only 15 credits in psychology at this university.

A student may earn either a Bachelor of Science or a Bachelor of Arts degree in psychology, but not both.

Honors Program: Bachelor of Science or Bachelor of Arts degree "With College Honors in Psychology" or "With Distinction in Psychology." Consult honors adviser about requirements.

Teaching Program: Teaching major or minor in psychology. Information on requirements appears in the College of Education section of this catalog.

Graduate Programs

Master of Science Degree

Optional degree choice for doctoral students.

Admission Requirements: Same as for the Doctor of Philosophy degree. Department does not admit to its graduate program those students whose sole intention is to obtain a master's degree.

Graduation Requirements: Completion of first-year graduate programs and an appropriate research program, including a research thesis. There is no foreign-language requirement.

Doctor of Philosophy Degree

Admission Requirements: Undergraduate degree in psychology is not required; some preparation in biological or social sciences is strongly advised. Applicants are judged on their academic and research backgrounds, on Graduate Record Examination aptitude scores, and on written evaluations, submitted by former professors or supervisors. Students with little training in psychology may be required to complete preliminary work in undergraduate courses. Admission of new students usually occurs in Autumn Quarter only.

Graduation Requirements: For graduate instruction, department is organized into several content areas—animal behavior; physiological, human experimental, quantitative, developmental, social, and clinical (general and child) psychology; and personality. Essential requirements include minimal competencies in four of the content areas mentioned above, experimental design, minor and major area requirements, independent research, General Examination, dissertation, and Final Examination. Minimum 3.00 gradepoint average overall must be maintained; 3.00 grade-point average required for all courses used to satisfy minimal competency and minor requirements. There is no foreign language requirement. First-year requirements—demonstrate competence in statistics and experimental design; complete two of the area minimal competency requirements; complete at least 3 credits in independent predoctoral research and report on that research at the department's Research Festival in June.

ROMANCE LANGUAGES AND LITERATURE

C104 Padelford

In Romance languages and literature, students study French, Spanish, Italian, Portuguese, Catalan, Provencal, Romanian, and Romance linguistics.

Faculty

Marcelino C. Penuelas, Chairperson; Anderson, Cartwright, Christofides, Concha, Creore (emeritus), Dale, David (emeritus), Ellrich, Field, Friedman, Friedrich, Hanzeli, Jones, Keller, Klausenburger, J. Leiner, Nostrand, Pace, Penuelas, Petersen, Predmore, Rabago, Salinero, Saporta, Shipley, Simpson (emeritus), Subercaseaux, Vargas-Baron (emeritus), C. Wilson, W. Wilson (emeritus), Wortley, Yarbro-Bejarano. A. Pace, graduate program adviser.

Undergraduate Programs

Bachelor of Arts Degree

MAJOR REOUIREMENTS

French: 59 credits beyond FREN 203. Required courses at the 300 level: FREN 301, 302, 303; 304, 305, 306; 350, 351, 352. Four approved electives in French at the 400 level: any four courses numbered 400-499 (except courses in translation) and ROM 401 may be used to satisfy this requirement. The department does not accept transfer courses at the 400 level or courses in translation.

Spanish: 47 credits in courses at the 300 and 400 levels, including SPAN 301, 302, 303; 304, 305, 306; two courses in the 350 group; 20 credits, none of which may be transfer credits, of literature courses numbered 400 or higher; one of these 400-level courses may be SPAN 409 or ROM 401. The undergraduate adviser for Spanish must be consulted to determine alternate ways of satisfying the 400-level requirement.

Italian: 50 credits in courses at the 300 and 400 levels, including ITAL 301, 302, 303; 6 credits of 327; 401; 404, 405, 406; 15 additional credits in literature courses at the 400 level.

Romance Linguistics: For admission, two college years (or equivalent) of study in each of two Romance languages. For graduation, 20 credits in third-year language courses in two Romance languages (recommended distribution: 10 credits each); 15 credits in literature, including a complete survey sequence at the 300 level; two 400-level courses in language structure; ROM 401 and 402; SPAN or FREN 474; a senior essay (2 credits). Recommended electives: general linguistics courses. Majors must begin course work in Romance and general linguistics by start of junior year.

Honors Programs: Bachelor of Arts degree "With College Honors in French/(Spanish)," or "With Distinction in French/(Spanish)." Consult honors adviser for French or Spanish about requirements.

Teaching Programs: Teaching major or minor in French or Spanish. Information on requirements appears in the College of Education section of this catalog.

Graduate Programs

Master of Arts Degree

Programs: French language and literature, Spanish language and literature, Italian language and literature, Romance linguistics. French includes a special option for practicing teachers.

Graduation Requirements: 50 credits, of which at least 20 must be in courses at the 500 level; reading knowledge of a second foreign language other than the major one. Master of Arts with thesis permitted upon prior approval by the departmental Graduate Studies Committee.

Doctor of Philosophy Degree

Programs: French language and literature, Spanish language and literature, Romance literature, Romance linguistics.

Admission Requirements: Appropriate Master of Arts degree and approval by a departmental Board of Graduate Advising and Admissions.

Graduation Requirements: 90 applicable course credits, of which at least 32 must be in courses numbered 500 or above; evidence of basic competence in bibliography and research methods, Romance linguistics, and history of one Romance language; reading knowledge of two languages other than the major one. Student must pass a departmental qualifying examination for admission to the General Examination.

RUSSIAN AND EAST EUROPEAN STUDIES

See International Studies.

SCANDINAVIAN LANGUAGES AND LITERATURE

C8B Padelford

The Department of Scandinavian Languages and Literature offers training in the skills of reading, speaking, and writing in Danish, Norwegian, and Swedish; study of respective literatures and cultures; linguistic study of the Scandinavian languages; courses given in English in such areas as Scandinavian culture, mythology, folklore, history, novel, drama, and film.

Faculty

Henning Sehmsdorf, Chairperson; Arestad (emeritus), Bonebrake, Conroy, Johnson (emeritus), Leiren, Rossel, Sehmsdorf, Sjavik, Steene, Warme. B. Steene, graduate program adviser.

Undergraduate Programs

Bachelor of Arts Degree

Major Requirements: At least 50 credits, of which 25 must be upper-division. Danish major: SCAND 380 or 381 or 382; 455 or 460 or 461; DAN 101-102, 103, 300, 301, 302, 450, and 490. Norwegian major: SCAND 380 or 381 or 382; 455 or 460 or 461; NORW 101-102, 103, 220, 221, 222, 300, 301, 302, 450, and 490. Swedish major: SCAND 380 or 381 or 382; 455 or 460 or 461; SWED 101-102, 103, 220, 221, 222, 300, 301, 302, 450, and 490. Other courses will be substituted with the approval of the adviser.

Honors Program: Bachelor of Arts degree "With College Honors in Danish/(Norwegian, Swedish)" or "With Distinction in Danish/(Norwegian, Swedish)." Consult honors adviser about requirements.

Teaching Programs: Teaching major or minor in Norwegian or Swedish. Information on requirements appears in the College of Education section of this catalog.

Graduate Programs

Master of Arts Degree

Admission Requirement: Bachelor of Arts degree with major in Danish/(Norwegian, Swedish) or equivalent background.

Graduation Requirements: A minimum of 36 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 nonthesis program.



Doctor of Philosophy Degree

Admission Requirement: Master of Arts degree with major in Scandinavian languages and literature or equivalent background.

Graduation Requirements: 72 credits in courses or seminars in Scandinavian languages and literature and related subjects approved by the department; a reading knowledge of French and German (other non-Scandinavian languages may be substituted with faculty approval); General Examination for admission to candidacy; an acceptable dissertation; a Final Examination on the dissertation.

SCIENTIFIC AND TECHNICAL COMMUNICATION

B10 Padelford

The program in Scientific and Technical Communication prepares the student to convey information clearly and accurately through various media to a wide spectrum of readers, ranging from the general public to experts in such fields as the sciences, engineering, medicine, and social sciences. The program combines a solid grounding in science and mathematics with preparation for serving as a writer or editor in technically oriented organizations. It provides the student an opportunity for exposure to the media available to the communicator-including publications, graphics, oral presentations, and audiovisual arts. An undergraduate degree in Scientific and Technical Communication is not offered. However, a General Studies degree is available to students interested in following a program in this area. (A degree in this area is also offered through the College of Engineering; see Humanistic-Social Studies in that section of the catalog.) Consult a General Studies adviser in B10 Padelford.

SLAVIC LANGUAGES

111 Thomson

The Department of Slavic Languages and Literature offers instruction in the principal Eastern European languages and literatures and in Slavic linguistics, working closely with the School of International Studies. Languages include Bulgarian, Czech, Polish, Romanian, Russian, Serbo-Croatian, and Ukrainian.

Faculty

Davor Kapetanic, Chairman; Augerot, Carpenter, Coats, Gershevsky (emeritus), Gribanovsky (emeritus), Gross,

Haney, Holdsworth, Kapetanic, Konick, Kramer, Micklesen, Pahn (emeritus), Polack, Sokol, Swayze, West.

Undergraduate Programs

Bachelor of Arts Degree

RUSSIAN LITERATURE AND LINGUISTICS OPTION

Major Requirements: RUSS 301, 302, 303, or the equivalent; RUSS 401, 402, 403, or the equivalent; RUSS 321, 322, 323; 15 credits from approved electives within the department; 10 credits from courses approved by the departmental adviser.

RUSSIAN LANGUAGE AND HISTORY OPTION

Major Requirements: RUSS 301, 302, 303, or the equivalent; RUSS 401, 402, 403, or the equivalent; RUSS 321, 322, 323; HSTEU 443, 444, 445; and either HSTEU 441 and 442 or HSTEU 438 and 439.

EAST EUROPEAN LANGUAGES OPTION

Major Requirements: Two years of a principal East European language, or the equivalent; one year of an additional East European language, or Russ 201, 202, 203, or the equivalent; course work in the literatures, history, and geography of the cultures involved, and in Slavic philology; senior research project.

Honors Program: Baccalaureate degree "With College Honors in Slavic Languages and Literature" or "With Distinction in Slavic Languages and Literature." Consult honors adviser about requirements.

Teaching Program: Teaching major or minor in Russian. Information on requirements appears in the College of Education section of this catalog.

Graduate Programs

Master of Arts Degree

Admission Requirement: Bachelor of Arts degree with major in Russian or Eastern European languages and literatures or equivalent background.

Graduation Requirements: Programs in Slavic literature or linguistics arranged by the student with a faculty adviser. Proficiency examination in the major Slavic language and reading examination in either French or German. Thesis not required.

Doctor of Philosophy Degree

Admission Requirement: Master of Arts degree with major in a Slavic literature or linguistics.

Graduation Requirements: Two years' residency beyond the Master of Arts degree; comprehensive written and oral examination; dissertation and Final Examination. Individual programs arranged by the student with a faculty adviser.

SOCIETY AND JUSTICE

203 Smith

Ezra Stotland, Director

The criminal justice system in our society is studied from a multidisciplinary, liberal arts, research-oriented point of view, and is directly observed through field experience. Because students have a wide range of courses from which to choose and because the content of the seminar, research, and field courses is influenced by individual students' interests, a wide range of student goals can be accommodated.

A curriculum in institutionalized crime, which includes such topics as white-collar crime, organized crime, and official corruption, is offered.

Undergraduate Program

Bachelor of Arts Degree

Admission Requirements: Sophomore standing (45 credits) and interview.

Major Requirements: Five courses in the context in which the criminal justice system operates, to be selected from lists of courses in political science, anthropology, philosophy, psychology, sociology, minority groups; four courses selected from lists dealing with the criminal and social problems with which the system deals; one of several courses giving an overview of the system; two courses on some student-selected aspect of the system; 15 credits dealing with research; two field courses, one involving field experience in the system and the other consisting of following a felony case; a senior seminar.

SOCIOLOGY

202 Savery.

Sociology involves the analysis of the forms, processes, and consequences of interaction among persons, groups, and organizations, and analysis of social structure, especially those features affecting social change, the integration of societies, the growth and distribution of population, the functioning of social institutions, and the individual in society.

Faculty

Frederick Campbell, Chairperson; Bainbridge, Barth, Black, Blalock, Blumstein, Campbell, Chirot, Cohen (emeritus), Cook, Costner, Crutchfield, Emerson, Faris (emeritus), Gross, Guest, Hechter, Hill, Larsen, McCann, Miyamoto, Pullum, Roberts, Roth, Schmid (emeritus), Schmitt, Schrag, Schwartz, Stark, van den Berghe, Wager, Weis. J. McCann, graduate program adviser.

Undergraduate Programs

Bachelor of Arts Degree

Admission Requirements: Minimum 2.00 overall gradepoint average.

Major Requirements: SOC 110, 223, and 40 additional credits in sociology, with a grade-point average of 2.50 in all sociology courses taken at the University. A minimum of 25 credits of sociology must be completed at the University.

Teaching Program: Teaching major or minor in sociology. Information on requirements appears in the College of Education section of this catalog.

Graduate Programs

Master of Arts Degree

Admission Requirements: Undergraduate major in sociology not required, but preferred. Applicants judged on performance in relevant courses and overall undergraduate grade record; Graduate Record Examination scores; applicant's statement of educational goals and plans; letters of recommendation.

Graduation Requirements: SOC 424-425, 428-429, one theory course, any four of six area courses designed for first- and second-year graduate students (SOC 513, 514, 516, 517, 518, 519), 9 credits of SOC 700 (Master's Thesis), and sufficient additional credits to bring the total graduate credits to 45. In addition, the student must present an acceptable thesis.

Doctor of Philosophy Degree

Admission Requirements: Applicants who receive a Master of Arts degree from this department are judged on performance in courses, on letters of recommendation, and on a master's thesis. Applicants with a master's degree in another field or from another university are judged on previous course work, letters of recommendation, master's thesis, Graduate Record Examination scores, and applicant's statement of educational goals and plans.

Graduation Requirements: A minimum of 9 credits in approved courses in a related or supporting field. Certification, by examination or other means, in research methodology. A major and a minor substantive area. Successful completion of a dissertation and Final Examination.

SOUTH ASIA STUDIES

See International Studies.

SOUTHEAST ASIA STUDIES

See International Studies.



SPEECH AND HEARING SCIENCES

21 Speech and Hearing Clinic

The speech and hearing sciences concern the processes and disorders of human symbolization and verbal communication. The areas of scholarly interest include: normal language acquisition; phonetics; speech production and transmission; hearing; speech perception; computer recognition and generation of meaningful speech; the nature of human communication disorders related to language, speech, and hearing; and the clinical processes involved in identification, prevention, and remediation of these disorders.

Faculty

Fred D. Minifie, Chairperson; Bailey, Branson, Carpenter, Carrell (emeritus), Coggins, Cooker, Delisi, Eblen, Flowers, Kuhl, Kriegsmann, Labiak, Larson, Miner (emeritus), Minifie, Oblak, Olswang, Palmer, Peterson, Prins, Reich, Shultz, Stoel-Gammon, Thompson, Tiffany, Till, Wier, Wilson, Yantis. P. A. Yantis, graduate program adviser.

Undergraduate Programs

Bachelor of Science Degree

Admission Requirements: 2.50 overall grade-point average. Recommended educational preparation includes high school physics or equivalent; introductory exposure to human learning, sensory, perceptual, and cognitive processes, general physiology and the physiology of behavior, and algebra.

Core requirements for all options: 28 credits in the following courses—SPHSC 201, 250, 302, 303, 307, 310, 311. Students following Options II, III, or IV below must have a 3.00 grade-point average in courses that make up the common core.

OPTION I, GENERAL ACADEMIC

Intended to provide broad perspectives of the field, but not to prepare students for professional careers in the speech and hearing sciences.

Major Requirements: Core requirements listed above; 25 credits in courses dealing with normal and abnormal language, speech, and hearing taken from the following: SPHSC 315, 330, 380, 401, 402, 410, 420, 430, 431, 450, 454, 484, 499.

OPTION II. BASIC SCIENCES

Intended for students who wish to continue graduate study in speech and hearing that leads to university teaching and research careers but does not include clinical training in audiology or speech pathology. *Major Requirements:* Core requirements listed above; 25 credits including SPHSC 401, 402, 410, 420, 499, and 6 credits in the speech pathology or clinical audiology areas; 16-20 credits outside the department, including a mathematics course that deals with calculus, and one course each in statistics, psychology (learning, memory, or cognition), and human physiology.

OPTION III, CLINICAL SCIENCES-AUDIOLOGY

Intended for students who wish to continue graduate study that includes clinical training in the area of audiology.

Major Requirements: Core requirements listed above; 40 credits including SPHSC 315, 330, 332, 350, 351, 370, 380, 391 (diagnostics and rehabilitation), 401, 420, 431; at least 9 credits outside the department, in psychology (deviant personality, cognitive development, developmental psychology, neural and sensory bases of behavior), educational psychology (behavior management, statistics), or mathematics (elementary functions).

OPTION IV, CLINICAL SCIENCES-SPEECH PATHOLOGY

Intended for students who wish to continue graduate study that includes clinical training in the area of speech pathology.

Major Requirements: Core requirements listed above; 43 credits including SPHSC 315, 330, 332, 350, 351, 370, 380, 391 (diagnostics) or 451 (audiology), 391 (rehabilitation), 401, 430, 431, 454; two courses outside the department in developmental psychology, deviant personality, or behavior modification.

Teaching Programs: A student desiring state certification as a communication disorders specialist should see the program listing in the College of Education section of this catalog.

Graduate Programs

Master of Science Degree

Open to all master's degree students who wish to complete a thesis. Recommended for students who plan to continue graduate study for the Doctor of Philosophy degree.

Admission Requirements: Courses equivalent to Options II, III, or IV in the undergraduate curriculum. Applicants are judged upon undergraduate scholarship records, Graduate Record Examination scores, letters of recommendation, and personal statement of professional goals.

BASIC SCIENCES CONCENTRATION

Graduation Requirements: Minimum of 42 credits beyond the baccalaureate degree, including a thesis, of which 18 must be at the 500 level or above and a minimum of 9 devoted to the thesis.

CLINICAL SCIENCES CONCENTRATION—AUDIOLOGY AND SPEECH PATHOLOGY

Graduation Requirements: A minimum of 45 credits, including a thesis, of which 18 must be at the 500 level or above and a minimum of 9 devoted to the thesis. Students in speech pathology and audiology also fulfill the academic and practical experience requirements for the Certificate of Clinical Competence of the American Speech and Hearing Association. These requirements necessitate more than the minimum 45-credit program for most students.

Master of Speech Pathology and Audiology Degree

Intended primarily for students who wish careers as speech and hearing clinicians but do not intend to continue graduate study for the Doctor of Philosophy degree.

Admission Requirements: Same as for the Master of Science degree.

Graduation Requirements: A minimum of 45 credits, of which 23 must be at the 500 level or above. Students also complete the academic and practical experience requirements for the Certificate of Clinical Competence of the American Speech and Hearing Association. These requirements necessitate more than the minimum 45-credit program for most students. No thesis is required.

Doctor of Philosophy Degree

Admission Requirements: Master's degree, potential for making significant contribution to knowledge in normal and/or disordered aspects of human communication, and approved research experience. If an approved research project has not been completed, a student may be admitted with the expectation that the research requirement will be met early during the doctoral program. Students concentrating in speech pathology or clinical audiology must have completed, or nearly have completed, the academic and practical experience requirements for the Certificate of Clinical Competence of the American Speech and Hearing Association. All applicants are judged upon scholarship records at the undergraduate and master's levels, Graduate Record Examination scores, and letters of recommendation.

Graduation Requirements: Students concentrate in one of three areas at the doctoral level: basic speech and/or hearing science, audiology, or speech pathology. Specific academic requirements are planned on an individual basis. Requirements for all concentration areas include: proficiency examinations, taken during the first year of doctoral study; direct research experience prior to the dissertation; participation in classroom, laboratory, or clinical teaching; a minimum of two departmental seminars; General Examination; dissertation; and dissertation oral defense. There is no foreign-language requirement.

SPEECH COMMUNICATION

107 Parrington .

Study in speech communication focuses on an understanding of the nature of speech as a form of behavior and a social process (theory), the development of appropriate analytical methods for critical evaluation of the varied uses of speech in both personal and societal settings (criticism), and the improvement of communication competencies for individual, social, and professional purposes (performance).

Faculty

Thomas M. Scheidel, Chairperson; Albrecht, Baskerville (emeritus), Bell, Bosmajian, Campbell, Crowell (emeritus), Franzke (emeritus), Hogan (emeritus), Klyn, Nelson (emeritus), Nilsen, Nyquist, Parks, Philipsen, Post, Rahskopf (emeritus), Scheidel, Shadow, Staton-Spicer, Stewart.

Undergraduate Programs

Bachelor of Arts Degree

Admission Requirements: Incoming freshmen may enter the major without meeting any special admission requirements. Students declaring a major after entering the University must have a cumulative grade-point average of 2.50 in all University courses. Students transferring from other schools must present a cumulative grade-point average of 2.50 in all courses taken at institutions previously attended. After two or more quarters at the University, eligibility for admission will be based on University grade-point average. Exceptions to the above policy may be authorized by the department.

Major Requirements: 60 approved credits, including 25 credits selected from SPCH 103, 140, 220, 270, 310, or 373; 400; 32 approved electives in speech, of which 15 credits must be in courses at 400 level (excluding 499); 2.50 grade-point average in all speech courses.

Teaching Programs: Majors in speech education should see the program listings in the College of Education section of this catalog.

Graduate Programs

Master of Arts Degree

Admission Requirements: Baccalaureate degree in speech communication or equivalent background.

Graduation Requirements: With Thesis—40 approved credits, including SPCH 501, of which 18 must be at the 500 level or above and 9 in thesis. Areas of concentration: rhetoric; public address; interpersonal, small group, and organizational communication; speech education. Supporting work in closely related areas, both within and outside the department. Without Thesis—45 approved credits, includ-



ing SPCH 501, one seminar in area of specialization, and 10 credits in supporting courses from closely related areas; a creative project in lieu of thesis. In addition to the areas of concentration listed above, a more general master's degree program is available.

Doctor of Philosophy Degree

Admission Requirements: Appropriate master's degree and departmental approval.

Graduation Requirements: General Examination, oral and written; dissertation; satisfactory defense of the dissertation in an oral Final Examination. Areas of concentration: rhetoric; public address; interpersonal, small group, and organizational communication. Supporting course work in the oral interpretation of literature and speech education.

STATISTICS

C340 Padelford

Statistical and probabilistic methods are used in almost every quantitative area of study to summarize, model, and draw inference from data. The Department of Statistics was established in 1979 to provide a focus for the diverse interests in statistical theory and application that exist on the campus. Pending approval of new degree programs, the degree programs of the Department of Statistics are offered at the undergraduate level through the Department of Mathematics and, at the graduate level, through the Department of Mathematics or the biomathematics group.

Faculty

Michael D. Perlman, Chairperson; Birnbaum (emeritus), Pyke, Shorack.

Undergraduate Program

Bachelor of Science Degree

Admission: Four years of high school mathematics recommended.

Major Requirements: (1) Core courses—STAT 381, 382, 383, 394, 395, 472, 473, 484, 485; (2) 3-credit approved computer language course; (3) Mathematics background—MATH 124, 125, 126, 327, 328, 302, 303; (4) 9 credits selected from approved upper-division courses in areas related to statistics. Grades of 2.0 or better are required in all courses presented in fulfillment of requirements (1) through (4). Strongly recommended: MATH 238, 329, 304, STAT 396.

Graduate Programs

The Master of Arts degree is appropriate for students who need a broad background in advanced statistics and who expect to continue working in statistics at approximately this same level in their careers. The Master of Science degree is appropriate for students who expect to work in more specialized areas of statistics of increasing complexity in their careers. The Doctor of Philosophy degree is appropriate for students who plan a career of research and/or teaching in statistics at the highest levels.

Related statistical programs are described under Biostatistics and Quantitative Science.

Master of Arts Degree

Admission Requirements: Bachelor of Science or Bachelor of Arts degree with strong background in mathematics and statistics.

Graduation Requirements: (1) requirements listed above for Bachelor of Science degree; (2) 18 credits of approved 500-level courses; (3) 3 credits of approved statistical consulting; (4) at least 1 credit per quarter of STAT 599; (5) demonstration of computer language proficiency; (6) 9 credits from either (a) STAT 700 or (b) approved 500level courses and consulting.

Master of Science Degree

Admission Requirements: Same as for Master of Arts degree.

Graduation Requirements: With Thesis: (1), (2) including 581 and 582, (3), (4), (5), and (6a) as described under Master of Arts degree requirements above. (7) 3 credits of approved measure theory from the Department of Mathematics. Without Thesis: Formal admisson to candidacy for the Doctor of Philosophy degree.

Doctor of Philosophy Degree

Admission Requirements: Training equivalent to a master's degree in statistics.

Graduation Requirements: Applied Pathway: appropriate General Examination of basic graduate-level knowledge in statistics and probability; approved performance in the statistical consulting program; MATH 424, 425, and either 426 or 527 as approved; demonstration of proficiency in either French, Russian, or German; dissertation; Final Examination. *Theoretical Pathway:* appropriate General Examination of basic graduate-level knowledge in statistics and probability; MATH 524, 525, 526; statistical consulting; demonstration of proficiency in either French, Russian, or German; dissertation; Final Examination.

WOMEN STUDIES

C254 Padelford

Sue-Ellen Jacobs, Director

Women Studies is an interdisciplinary program offering students the opportunity to select courses from a variety of academic disciplines while pursuing concentrated study in a particular department or track or within the program. Women Studies courses are planned to foster open, vigorous inquiry about women, to challenge curricula in which women are absent or peripheral, to question cultural assumptions in light of new information, and to create a supportive environment for those interested in studying women. Although an undergraduate degree in Women Studies is not offered, a General Studies degree with a concentration in Women Studies is available to students interested in the following program: An introductory survey course (WOMEN 200 or equivalent); 5 additional lowerdivision credits in Women Studies; 15 upper-division credits to be selected from the following courses: WOMEN 310, 353, 357, 490 and ENGL 375, or 376; either WOMEN 300 or ENGL 271, depending on the focus within Women Studies; one 3-5-credit course in an ethnic area; senior seminar (WOMEN 400) and senior thesis (G ST 493) reflecting work done in the student's area of focus. The remaining 30 credits may be satisfied under one of three options: (1) 30 credits in a single department relevant to Women Studies curriculum: (2) 30 credits in a Women Studies track (an interdisciplinary series of courses); or (3) 30 credits in an individual course of study arranged between the student and a Women Studies adviser, with approval by the Director. Students may elect to participate in the honors program of the College of Arts and Sciences.

ZOOLOGY

106 Kincaid

Zoology is that branch of natural science concerned primarily with the characteristics of animals, their development, structure, and function, and their relationships with their animate and inanimate environments.

Faculty

Donald S. Farner, Chairperson; Bakken, Cloney, Deyrup-Olsen, Edmondson, Edwards, Farner, Fernald (emeritus), Fields, Gorbman, Griffiths, Hille, Huey, Illg, Kenagy, Kohn, Kozloff, Laird, Martin, Orians, Osterud, Paine, Palka, Riddiford, Rohwer, Schoener, Schroeder, Schubiger, Slatkin, Snyder, Strathmann, Stuiver, Truman, Whiteley, Willows, Zaret. J. Edwards, graduate program adviser.

Undergraduate Programs

Bachelor of Science Degree

Major Requirements: A minimum of 50 credits, no more than 20 in lower-division courses, to include BIOL 210, 211, 212, (or BIOL 101-102 with grades of 2.7 or above; students who take this option will be required to take GENET 451, and may be required to take BIOL 210 as well); ZOOL 433, 434 (or 453-454), 455-456; 400-level lecture and laboratory courses in physiology and cell biol-

ogy to total 8 credits; BIOL 472; electives to be selected from approved upper-division biological courses. Additional requirements: CHEM 140, 150, 151, 231, 232 (or 231, 235, 236), 241, 242; GENET 451, if the student has not taken BIOL 210, 211, 212; MATH 124, 125, 126 (or 124, 125, Q SCI 281; or Q SCI 281, 291, 292); PHYS 114, 115, 116 (or 121, 122, 123); two years of collegelevel French, German, Chinese, Japanese, Russian, or Spanish (other languages must be petitioned). A 2.00 grade-point average in all courses taken at the University in zoology and in the related biological disciplines, and in all supporting courses except foreign language, is required. Approved lists of biology courses and alternatives to courses specified are available from the zoology adviser.

Bachelor of Arts Degree

Major Requirements: A minimum of 50 credits, no more than 20 in lower-division courses, to include BIOL 210, 211, 212 (or BIOL 101-102 with grades of 2.7 or above; students who take this option are required to take GENET 451, and may be required to take BIOL 210 as well), plus a program of upper-division courses in the major areas of biology to be selected in consultation with the zoology adviser. A 2.00 grade-point average in all courses taken at the University in zoology and in the related biological disciplines, and in all supporting courses except foreign language, is required. Additional requirements: CHEM 140, 150, 151, 231, 232 (or 231, 235, 236); GENET 451, if the student has not taken BIOL 210, 211, 212; MATH 157, or Q SCI 281 or 381, or MATH 124 and 125, or Q SCI 291 and 292. PHYS 114, 115, 116 recommended.

Honors Programs: Bachelor of Science or Bachelor of Arts degree "With College Honors in Zoology" or "With Distinction in Zoology." Consult honors adviser about requirements.

Graduate Programs

Master of Science Degree

Admission Requirements: Acceptance by the Graduate School and the department.

Graduation Requirements: Satisfy the requirements of the department for the Bachelor of Science degree. With Thesis—36 credits, of which 18 must be at the 500 level or above and 9 in thesis research; satisfy the departmental foreign-language and teaching requirements; thesis; final examination. Without Thesis—Substitute 9 credits of course work at the 500 level or above for thesis; satisfy the departmental foreign-language and teaching requirements; final examination.

Doctor of Philosophy Degree

Admission Requirements: Same as for the Master of Science Degree.

Graduation Requirements: A minimum of three academic years of study, one quarter of which is spent at a biological



field station; satisfy the departmental foreign-language and teaching requirements, as well as a requirement for appropriate extradepartmental course experience. General Exam-

ination; dissertation; Final Examination. A full statement covering current graduate programs in zoology is available from the department upon request.





BUSINESS ADMINISTRATION

Dean

Kermit O. Hanson 126 Mackenzie

Men and women embarking on business careers have the opportunity to involve themselves in the nuclei of many of the social, political, and economic forces in today's world. The School and Graduate School of Business Administration seek to provide students with a foundation upon which continuing learning experiences can respond to change. The School of Business Administration offers an undergraduate program leading to the degree of Bachelor of Arts in Business Administration. The Graduate School of Business Administration offers programs leading to the degrees of Master of Business Administration, Master of Professional Accounting, and Doctor of Philosophy.

Business Administration became an independent unit within the University system in 1917. Since 1921, it has been a member of the American Association of Collegiate Schools of Business, with its undergraduate and graduate programs accredited.

Facilities, Publications, and Services

Most business administration classes and activities are in two buildings. Balmer Hall, named for Thomas Balmer, former president of the University Board of Regents, contains classrooms, the business administration library, and the business administration computer users center. Mackenzie Hall, named in memory of Prof. Donald Mackenzie, Chairman of the Department of Accounting from 1949 to 1955, contains the Dean's office, the Office of Graduate Programs, the Office of Undergraduate Programs, faculty offices, and other business administration program offices. Two journals, as well as a number of monographs, are published. These include the *Journal of Contemporary Business*, published quarterly by the Graduate School of Business Administration, and the *Journal of Financial and Quantitative Analysis*, a specialized journal published each month jointly with the Western Finance Association. Monographs published by the Graduate School of Business Administration include topics of general interest to the business community, as well as topics of a scholarly nature.

To serve the continuing education needs of business persons, the School and Graduate School of Business Administration offer a number of short programs, either University initiated or cosponsored with various community and industry organizations. The management program is designed for middle-to-upper management and focuses on self-renewal in a society that is experiencing an accelerating pace of change. Offerings in the various small business series courses assist owners and managers of small businesses in planning, organizing, and operating their businesses. Other continuing education activities include the Tax Clinic for Small Business, the Entrepreneurship Symposium, Pacific Rim Bankers Program, Pacific Coast Banking School, and the Savings and Loan School for Executive Development. A number of special interest programs also are offered (e.g., Women in Management, Impasse Procedures and Collective Bargaining). Information on the continuing education program may be obtained from the conference coordinator, 543-8560, or the Office of Conferences and Institutes, 543-5280.

Student Organizations

Chapters of Alpha Kappa Psi, Beta Alpha Psi, Beta Gamma Sigma, as well as the Association of University Women in

Business, Finance Club, Association of Black Business Students, International Association of Students in Economics and Commerce, Marketing Club, Pan Xenia, and Student Advisory Council provide opportunities for undergraduate students to meet informally and to participate in a variety of projects and events. The goals and interests of graduate students are served by Beta Gamma Sigma, the Association of Black Business Students, Graduate Women in Management, the International Association of Students in Economics and Commerce, the M.B.A. Association, and the Ph.D. Association.

Undergraduate Program

Associate Dean

Warren W. Etcheson 139-140 Mackenzie

Undergraduate Office

137 Mackenzie 543-4350

The School of Business Administration, with admission at the junior level, offers a two-year program leading to the degree of Bachelor of Arts in Business Administration. The curriculum, building upon a basic foundation in the arts and sciences, provides exposure to a wide range of functional business areas and the opportunity for study in selected areas in some depth.

Bachelor of Arts in Business Administration Degree

Specific School Admission Requirements: A minimum of 90 credits with at least a 2.50 cumulative grade-point average, including the following (or equivalents): 20 credits in natural sciences, including 5 credits in college-level mathematics and 5 credits in calculus (MATH 157 or 124); 30 credits in social sciences, including 10 credits in macroeconomics and microeconomics (ECON 200 and 201) and 10 credits in anthropology, psychology, and/or sociology; 10 credits in humanities; ACCTG 210, 220, 230; Q METH 200, 201; BG&S 200; 10 elective credits. Applicants who meet the University and School of Business Administration requirements at the time they transfer are eligible to be placed directly in the school; those who meet the University entrance requirements, but not the business administration requirements, are eligible to be placed in the College of Arts and Sciences as prebusiness majors. A supplemental application form should be filed for admission to the School of Business Administration, and inquiries should be made early regarding quarterly deadline dates for submission of this application. If the number of eligible applicants exceeds that for which the space is available, acceptance will be competitive, based on grade-point average.

Specific Upper-Division School Requirements: B ECN 300, 301; MKTG 301; I BUS 300; OPSYS 301; BG&S 333; FIN 350; A ORG 420, 440; B POL 470 or 471 or 480; and a minimum of 16 credits of 300- or 400-level business administration electives (or area of concentration).

Specific School Graduation Requirements: (See also Graduate Programs and Degree Policies, page 48.) No more than 9 lower-division business elective credits; a minimum of 72 non-business administration credits, including those listed under Specific School Admission Requirements, and 72 business administration credits, including those listed under the preceding two requirement sections; and a cumulative grade-point average of at least 2.50 in all business administration credits earned at the University; and a cumulative grade-point average of 2.50 for all University credits.

Information on credits by examination or credits granted through the Armed Forces Training School or independent study may be obtained from the undergraduate office, School of Business Administration.

Double Baccalaureate Degrees and Second Baccalaureate Degree

Students who wish to earn double degrees should consult an adviser in the business administration office, preferably sometime during the junior year. Persons who seek a second baccalaureate degree 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. If the number of eligible applicants exceeds that for which space is available, acceptance will be competitive, based on the grade-point average of the junior and senior years, or last 90 credits.

Graduate Programs

Also see Graduate Programs and Degree Policies, page 48.

Associate Dean and Graduate Program Adviser

Fremont E. Kast 104 Mackenzie

Graduate Office

109 Mackenzie 543-4660

Admission

Qualified students who are graduates of the University of Washington or of other accredited colleges or universities may be admitted Summer Quarter or Autumn Quarter to graduate degree programs. Grade-point average, 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: University of Washington, Graduate School of Business Administration, Mackenzie Hall, DJ-10, Seattle, Washington 98195.

Application Procedure

In late February, the Admissions Committee begins review of applications for Summer Quarter and Autumn Quarter. A high percentage of admission decisions is made at that time, and these applicants receive notice of the decision soon thereafter. The formal deadline for applications is April 1.

Programs of Study

The Graduate School of Business Administration offers courses leading to the degrees of Master of Business Administration, Master of Professional Accounting, and Doctor of Philosophy. Graduate training is given in these areas: accounting; administrative theory and organizational behavior; business administration research methods; business economics; business policy; business, government, and society; finance; human resource systems; international business; marketing; operations and systems analysis; quantitative methods; and urban development.

The above listing should not be understood to exclude others that may become appropriate in special instances. There is no foreign-language requirement for the degrees of Master of Business Administration, Master of Professional Accounting, or Doctor of Philosophy.

Master of Business Administration Degree

The M.B.A. program is designed for students who have earned undergraduate degrees from accredited colleges. The nature of the undergraduate degree, however, is not a limiting criterion. In each entering class of students, diversity is sought from backgrounds in the social sciences, physical sciences, mathematics, law, engineering, medicine, or business, as well as other fields. Diversity is sought in terms of geographical, racial, and ethnic backgrounds.

Students are required to prepare themselves in calculus and BASIC computer programming *before* starting the program. Such courses are offered during Summer Quarter and may be taken by students who do not have this background, but are planning to start the program Autumn Quarter. In general, the program starts each Autumn Quarter for the majority of entering students. One section of approximately thirty students starts Summer Quarter.

A period of two academic years, or 72 academic credits, is required for most students to complete the M.B.A. program. The program consists of 36 credits of required firstyear courses in: accounting, administrative theory and organizational behavior, economics, finance, marketing, operations and systems analysis, public policy, and quantitative methods; 6 credits of required second-year courses in business policy and in business, government, and society; and 30 elective credits that are split between an area of concentration and other areas of interest. The student must take 12-18 elective credits in an area of concentration (6 of which may be a supervised M.B.A. research report) and at least two other areas. In addition, within the 30 elective credits the student must satisfy the research requirement by either writing an M.B.A. research report in the area of concentration or taking two electives designated by the faculty as satisfying the research requirement. In order for a given course or seminar to be so designated, forty percent or more of its graded requirements must consist of rigorous independent problem investigation and reporting.

When appropriate, some first-year courses may be waived. Such waivers are granted at the discretion of the department offering the course or courses in question. The granting of a waiver may be based on proficiency or qualifying examinations or other criteria as stipulated by the particular department.

There are joint degree programs with the schools of Law and Pharmacy.

Master of Professional Accounting Degree

In Autumn Quarter 1980 the Graduate School of Business Administration begins preliminary operation of the Master of Professional Accounting degree program. The M.P.Acc. is aimed at preparing high-level professional accounting specialists. The degree (1) provides an opportunity for graduate study in accounting beyond the typical undergraduate accounting major and in greater depth than that offered by an accounting concentration in an M.B.A. program, and (2) fosters a professional attitudes, ethics, and a sense of personal, public, and social responsibility develop and grow.

M.P.Acc. program graduates can be expected to obtain, in due course, managerial positions on the staffs of business enterprises, international certified public accountant firms, federal government agencies such as the Securities Exchange Commission or the Federal Trade Commission, accounting policy-setting boards such as the Financial Accounting Standards Board and the Cost Accounting Standards Board, financial institutions such as the World Bank System and the stock exchanges, the U.S. General Accounting Office, and state, county, and city controllers' and auditors' offices.

Admission to the M.P.Acc. program is competitive, and any baccalaureate graduate of an accredited college or university is eligible (neither an undergraduate accounting major nor a business major is necessary for admission). Those admitted must satisfy first-year M.B.A. core course requirements as part of the M.P.Acc. Program.

Integrated Summer Program in Administration

Students working for graduate degrees in other colleges may elect to take the 15-credit integrated program in administration offered every Summer Quarter. This program is specifically tailored to nonbusiness graduate students and may qualify the student for a minor in administration. Use of this program to fulfill minor requirements should be cleared through the student's graduate adviser in his or her own depar' ment.

Doctor of Philosophy Degree

Admissions are determined on a competitive basis with primary, but not exclusive, consideration given to graduate and undergraduate grade-point averages, Graduate Management Admission Test scores, letters of recommendation, and educational and professional objectives. Moreover, some attention is given to achieving a balance among entering students across areas of major interest, background, demographic characteristics, etc. Applications for admission to the doctoral program must be accompanied by three letters of recommendation, of which at least two must be from former instructors.

Requirements of Study: The doctoral program is designed to develop business-oriented scholarship and research skills in persons preparing for careers in teaching, research, business, or government. Since the inception of the program, the majority of its graduates have entered university teaching careers. Students who complete this program are expected to possess the professional administrative competency that is the objective of the M.B.A. program and are required to demonstrate academic competence in four areas of study, of which at least three normally are in the Graduate School of Business Administration. Within the program of study, students must also develop competency in research strategies and tools applicable to their area of interest. The program requirements consist of preparatory courses and independent study recommended by a Supervisory Committee of faculty, a General Examination, a doctoral dissertation, and a Final Examination.

Admission to Candidacy: The General Examination consists of written and oral parts in all of the prospective candidate's areas. A student may sit for all written examinations in a single quarter or for individual area examinations as scheduled during three consecutive academic quarters (excluding summer). Additional information may be obtained by writing to: University of Washington, Graduate School of Business Administration, Graduate Programs, 109 Mackenzie, DJ-10, Seattle, Washington 98195.

Areas of Study

Course work in both the School of Business Administration and the Graduate School of Business Administration is offered within five departments as follows:

ACCOUNTING

231 Mackenzie

Accounting involves development and communication of financial and operational information for business and nonprofit economic entities. Courses provide a foundation for careers in accounting (public, industrial, private, governmental, or institutional), for a general business career, or for professions such as law. The notation "Accounting" will be included on the permanent record, or transcript, of a student who graduates with a degree of Bachelor of Arts in Business Administration and who completes with a gradepoint average of at least 2.00 the following courses: ACCTG 301, 302, 303, 311, 411, 421, and 6 elective credits in 400-level accounting courses, except 401, 475, 490, and 499.

Faculty

Gary L. Sundem, Chairperson; Alkire, Berg, Bowen, DeCoster, Felix, Heath, Jiambalvo, F. Mueller, G. Mueller, Noreen, Prater, Pratt, Ramanathan, S. Rice, Roller (emeritus), Walker.

BUSINESS, GOVERNMENT, AND SOCIETY

370 Mackenzie

Business, Government, and Society encompasses an interdisciplinary approach to history, law, and the behavioral sciences in studying the institutional and ideological environment of American business. Also included in this department are the areas of risk and insurance and of urban development. Courses in risk and insurance not only provide a useful addition to concentrations in accounting, finance, and other areas of business, but also present principles and applications for efficient use of insurance and other risk-bearing techniques in business affairs or family financial management. Course work in urban development emphasizes analytical methods of allocation, use, and development of urban land resources, thus providing an understanding of the utilization of economic, social, and technological facilities, and social institutions of cities.

Faculty

R. Joseph Monsen, Chairperson; Barsh, S. Brown (emeritus), Chadwick-Brown, Gale, Goldberg, Hart, Jones, Lessinger, Robinson (emeritus), Seyfried, Strong, Walters, Wheeler (emeritus), Wickman.

FINANCE, BUSINESS ECONOMICS, AND QUANTITATIVE METHODS

270 Mackenzie

Finance, business economics, and quantitative methods facilitate understanding the financial, economic, and quantitative aspects of decision making. Business economics applies theoretical knowledge of economics to the maximization of firm goals and to an understanding of the economic environment within which business operates. The finance curriculum focuses on understanding the environment of the financial manager, problems and decision structure, allocation of capital within the firm, and view-

points of capital suppliers. Courses in quantitative methods concentrate on the mathematical and statistical tools, including the use of the computer, used to analyze administrative problems and to arrive at decisions,

Faculty

Nancy L. Jacob, Chairperson; Adolphson, Alberts, Bourque, Campbell, Castanias, Chiu, D'Ambrosio, DeAngelo, Diehr, Faaland, Frost, Haley, C. Henning, Hess, Higgins, D. Johnson, King, Narver, Page, Pigott, E. Rice, Schall, H. Scott, Tamura, Trivedi.

MANAGEMENT AND ORGANIZATION

155 Mackenzie

Management and organization provides an understanding of the processes and structures of organizations through courses in four main areas of management. Administrative theory and organizational behavior is concerned with an interdisciplinary development of concepts, skills, and attitudes, in both theory and application, to enable students to be more effective managers. Business policy supplements and integrates all work undertaken in other areas of the school, adding to the understanding of the executive viewpoint in management decisions by emphasizing problem analysis, decision making, planning and control, and the establishment and appraisal of objectives and policies. Human resource systems, formerly personnel and industrial relations, deals with employee selection, motivation, appraisal, compensation, and development; union-management relations; and evaluation of human resource systems. Operations and systems analysis focuses on the management of operating systems in organizations, including the study of managerial decision processes, decisions of systems structure, determination of systems effectiveness, and analysis of the dynamics of systems behavior.

Faculty

William T. Newell, Chairperson; Beard, Bell, Bradford, E. Brown (emeritus), Buck, Fenn, Fiedler, French, Gross, D. Henning, R. Johnson, Kast, Kienast, Klastorin, Knowles (emeritus), Knudson, LeBreton, Lopez, Meier, Mitchell, Peterson, Rosenzweig, Saxberg, Schmitt, Schreiber, W. Scott, Summer, Sutermeister (emeritus), Vesper, Woodworth.

MARKETING, TRANSPORTATION, AND INTERNATIONAL BUSINESS

156 Mackenzie

Marketing 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 and mix, promotion, and sales administration. International business 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 stress the writing dimension as it relates to business; also included are theory and techniques of effective communication in interpersonal relationships. The transportation curriculum offers a carrier orientation through examination of the transportation industry, or a logistics orientation through concentration on managerial aspects of the buying of physical distribution services.

Faculty

Douglas L. MacLachlan, Chairperson; Etcheson, Gordon (emeritus), Grathwohl, Harder, Johansson, Kolde, McAlister, Miller (emeritus), Moinpour, Moxon, Murphy (emeritus), Narver, Oshikawa, Roehl, Rustia (emeritus), Spratlen, Sullivan, Toy, Truitt, Wagner, Wheatley, Yalch.




DENTISTRY

Dean

Alton W. Moore D322 Health Sciences

Associate Deans

Kenneth N. Morrison, Richard A. Riedel

Assistant Dean

Dan G. Middaugh

In the School of Dentistry the student learns fundamental principles significant to the entire body of dental knowledge and is expected to acquire habits of reasoning and critical judgment that will enable implementation of that knowledge. To the School of Dentistry, the future development of the student is as critical as the professional training. The program of instruction is designed to equip the student, as a practicing dentist, with the knowledge and qualities necessary for solving problems of oral health and disease.

The School of Dentistry expects its students to learn the fundamentals of the basic health sciences, to master certain clinical skills, and to acquire a thorough understanding of professional and ethical principles. In addition, the program is designed to emphasize the modern concepts of dental practice that make appropriate use of dental auxiliary personnel. Emphasis is placed on the role of the dentist in the community and the professional obligations necessary to respond to the oral needs of the total population.

The School of Dentistry relies upon recruitment or referral of patients from the community to provide a pool of clinical experiences required by the educational program. A basic assessment of oral health-care needs will be scheduled for patients who contact the Patient Registration Office.

The School of Dentistry is approved by the Council on Dental Education of the American Dental Association and is a member of the American Association of Dental Schools. It is a participating member of the Western Interstate Commission for Higher Education.

The curriculum for the D.D.S. degree includes study in two main areas: basic sciences and clinical dental sciences. Instruction in the basic sciences is provided by the departments of Biological Structure, Microbiology and Immunology, Pathology, Pharmacology, and Physiology and Biophysics, and the School of Public Health and Community Medicine of the Health Sciences Division. In the clinical dental sciences the departments of Community Dentistry, Dental Hygiene, Endodontics, Oral Biology, Oral Diagnosis and Treatment Planning, Oral Surgery, Orthodontics, Pedodontics, Periodontics, Prosthodontics, and Restorative Dentistry provide instruction in the fields of general dental practice and dental specialization.

As an integral part of the School of Dentistry, the Department of Dental Hygiene has the same basic objectives, and it offers courses of instruction leading to the degree of Bachelor of Science with a major in dental hygiene.

Application Procedure

A student seeking admission to the D.D.S. degree programmust make application through the American Association of Dental Schools Application Service (AADSAS). This central application service is designed to facilitate and expedite the processing of materials for the applicant. An applicant is required to complete the AADSAS application booklet. The deadline for submission of the application is November 1 of the year prior to that for which the applicant is applying. Application materials and instructions are furnished by AADSAS. If the applicant has so requested, a copy of the application is forwarded to the University of Washington School of Dentistry Dental Admissions Office. This application becomes the basis of a file that will be reviewed by the admissions committee.

After the application has been received, the student will receive an acknowledgment of receipt of the application from the Dental Admissions Office and a request for the following supplementary materials: (1) Six letters of recommendation—two must contain personal evaluation by science instructors; two by humanities' instructors; one from a dental professional; and one character reference. (2) Dental Admissions Test scores. (3) An autobiographical résumé. (4) A list of courses currently being taken and those to be taken in the future.

Each applicant is required to take the Dental Admissions Test, which is given twice annually, usually during October and April. The test may be taken at numerous testing centers throughout the country and is scheduled through the American Dental Association Council on Dental Education. Forms and information pertaining to the Dental Admissions Test and the American Association of Dental Schools Application Service are available through the Dental Admissions Office and the School of Arts and Sciences advisory office.

Preselection Requirements

The School of Dentistry maintains as much flexibility as possible in predental requirements. It is unrealistic, however, to assume that the student will be able to master the dental school curriculum without adequate preliminary preparation in predental study.

BIOC 405 and 406 (Introduction to Biochemistry) and MICRO 351 and 302 (General Microbiology and Laboratory) or their equivalents are firm predental requirements. Other recommended courses are in general chemistry, organic chemistry, physics, zoology, and embryology. These, however, may be challenged by the applicant with equivalent and adequate background.

Equally important for the student is a background in the social sciences and the humanities. Developmental psychology, sociology, economics, English literature, physical or cultural anthropology, and philosophy are excellent scientific and humanistic studies for the predental student. However, there are no firm requirements in these subjects. They may range over a practically unlimited area, because professionals should be well informed and possess a wide cultural background. Moreover, these courses may provide knowledge, concepts, and skills that are helpful in both dental school and dental practice.

A prior degree is not required. A minimum of 135 preden-

tal quarter credits is required for admission. Currently, students accepted into the School of Dentistry have completed, on the average, more than 180 credits.

Selection Criteria

Historically, the admissions committee attempts to enroll enough qualified students from Washington to approximate seventy to seventy-five percent of the freshman class. The balance of the students come from elsewhere in the United States, with special consideration given to those states that are joined with the state of Washington in the Western Interstate Commission for Higher Education (WICHE) and those that have no schools of dentistry. With the Regional Dental Education Program (RDEP) activated, the admissions committee will select qualified students from participating states.

The most important single criterion sought in an applicant is scholarship. Without a high level of academic achievement as a standard in the school, professional levels of performance may suffer irrevocably. Measures of previous academic performance have been found to predict future academic performance. Undergraduate grade-point averages and performance on the Dental Admissions Test are given strong consideration in the selection process.

Also important to the admissions committee is the enrollment of a group of dental students who are aware of social and health problems and appreciate the responsibilities of health-care providers in our society.

The admissions committee actively urges qualified minorities and women to apply, secure in the knowledge that they will be evaluated on the same basis as other qualified applicants. The school is committed to improving opportunities for disadvantaged applicants and to improving services within dentally disadvantaged communities. An applicant in this group must have a reasonable chance of successfully negotiating the course of study. Special curriculums may be constructed for some of these applicants.

Knowledge of dentistry is considered a requisite. The experience of observing and/or performing dental activities and the appreciation of current dental issues are considered by the admissions committee. The awareness of the curricular opportunities in the school and the careful development of future career plans are also considered. Also viewed as an essential component is the ability of the applicant to communicate orally and in writing. The admissions committee attempts to identify and recognize a variety of unusual experiences and achievements of applicants. Many successful dental students have had in-depth research or teaching experience, long-term community service involvement, considerable dental or other health experiences, or awards for artistic or leadership abilities.

Recommendations from pre-dental science instructors, predental advisers, and dental professionals are given serious consideration in the selection process.



Selection Process

The school has a two-stage selection process. When the application is completed, two members of the admissions committee independently screen the credentials of an applicant. Applicants with the highest predicted dental school grade-point average (based on study of the performance of the previous classes of dental students) are screened first. Applicants remaining after the screening are contacted for a personal interview. Following the interview, the application is accepted, rejected, or held for further study. Each candidate is given written notice by July 1 of the status of the application. Prospective applicants receive a written explanation of the admissions committee criteria and the entire admissions process.

Regional Dental Éducation Program

The Regional Dental Education Program (RDEP) is an experiment in dental education. It is designed to provide dental education to the students in the region by combining the resources of this university's School of Dentistry with existing facilities at schools in Western states without dental schools.

RDEP students receive the first year of their dental education at a university in their home state. Their second and third years are spent at the dental school in Seattle. A portion of the fourth year is spent at clinical facilities in their home states, establishing professional relationships in the community and completing their graduation requirements.

The goals of the program include guaranteeing a number of student positions for the participating states, providing equitable sharing of the costs of dental education, and ensuring that equivalent instruction occurs at all sites.

RDEP is funded under federal contract HRA-232-79-0069. Additional information is available from University of Washington, School of Dentistry, Dr. Robert Canfield, Director, RDEP, SC-62, Seattle, Washington 98195.

Tuition Fee Deposit

Applicants accepted by the School of Dentistry are requested to pay a \$50 enrollment service fee to confirm their intention to enroll at the University. The \$50 payment is requested by, and should be returned to, the Registration Appointment Office, Schmitz Hall.

Academic Advancement

At the end of each academic quarter an evaluation committee of the School of Dentistry reviews each student's accomplishments to determine fitness for advancement. Scholastic standing and conduct consistent with standards determined by the faculty for the professional student are major requirements for advancement. The School of Dentistry reserves the right to dismiss any student from the school for any reason it deems sufficient.

Financial Aid to Students

Loan fund information may be obtained through School of Dentistry, Office of Student Affairs, C315 Health Sciences, or the Office of Student Financial Aid, 105 Schmitz.

Fees

Dental students, 1980-81: residents, \$343; nonresidents, \$1,253. Graduate dental students (according to number of credits): residents, \$72-\$257; nonresidents, \$262-\$912.

In addition to paying tuition, each dental student is required to purchase the dental issue of equipment and materials necessary for each year of the training period. Current estimates of the cost of the issue per year is as follows: first year, \$3,548; second year, \$2,954; third year, \$1,971; fourth year, \$1,529.

Scholarships, Honors, Awards

American Academy of Dental Radiology: A certificate is awarded to the senior student who has exceptional interest and accomplishment in dental radiology.

American Academy of General Dentistry: A certificate is awarded to the graduating dental student who has shown the most promise of being an outstanding general dentist.

American Academy of Oral Medicine: A certificate is awarded for outstanding achievement, proficiency, and promise in the field of oral medicine.

American Academy of Operative Dentistry: A certificate and one-year subscription to the Journal of Operative Dentistry is given to a senior dental student for excellence and outstanding achievement in operative dentistry.

American Academy of Oral Pathology: A plaque and a oneyear subscription to Oral Surgery, Oral Medicine, and Oral Pathology are awarded to the graduating student who has shown the greatest interest and effort in the field of oral pathology.

American Academy of Periodontology: This award is presented to a graduating dental student who has shown excellence in the field of periodontics. A certificate of merit and a one-year subscription to the Journal of Periodontics are awarded.

American Association of Endodontists: An award of a certificate of merit, a one-year membership in the association, and a one-year subscription to the Journal of Endodontics are presented to a student who has demonstrated exceptional ability in the area of endodontics.

American Association of Oral and Maxillofacial Surgeons: A certificate and one-year subscription to the Journal of Oral Surgery are awarded in recognition of the graduating senior that has demonstrated exemplary aptitude and achievement in the field of oral surgery. American Association of Orthodontists: A certificate is awarded to the senior dental student who demonstrates exceptional interest in the development of the orofacial complex.

American Dental Society of Anesthesiology: A certificate of recognition is presented to a senior dental student who has shown proficiency in the field of anesthesiology in dentistry.

American Society of Dentistry for Children: A certificate of merit, a one-year subscription to the Journal of Dentistry for Children, and a one-year membership in the society are presented to three graduating students who have shown outstanding interest in clinical pedodontics.

Pierre Fauchard Academy Student: A certificate of merit is awarded to the outstanding student who has achieved academic excellence in professional training, including clinical skills.

Prosthodontics Achievement Award: At the annual prosthodontic award banquet, a certificate is presented to the fourth-year dental student who, during the second, third, and fourth years, has demonstrated the highest academic and clinical excellence in prosthodontics.

Seattle Pedodontics Society, David B. Law: A plaque is presented to a graduating dental student who has shown excellence and clinical proficiency in the management of child patients.

Management Achievement Award: Each year one senior is selected to receive this award. Based on work in the applied dental practice course and clinic, the recipient is selected by demonstrated ability in the areas of planning, organizing, motivating, and evaluating.

Sigma Phi Alpha Membership: Sigma Phi Alpha is a national honor society established to promote scholarship and to honor character among students of dental hygiene. No more than ten percent of the graduating class may be elected to membership by the faculty.

Washington State Dental Hygienists' Association: A plaque is presented to a senior dental hygiene student whose clinical performance has been outstanding and who shows promise of those qualities of leadership necessary for the advancement of the profession.

University of Washington Student Table Clinic: A monetary award, established in honor of F. Lloyd Jacobson, is presented to those students who demonstrate excellence in the preparation of a student table clinic.

Washington State Dental Association Student Table Clinic: Four plaque awards are presented to students who have made a significant contribution to dentistry by developing a student table clinic presentation.

Mosby Awards: Scholarship book awards are given to three students who have made a significant contribution to dentistry. These certificates permit selection of any one Mosby Book with a catalog list price not exceeding \$50.

L. Kim Haglund Memorial: An annual award is presented to a faculty member or student who the Georgetown Dental Clinic Board feels has contributed the most to the community dental clinics in Seattle.

Alpha Omega Fraternity: A plaque is presented by the Alpha Omega national fraternity to the graduating dental student with the highest scholastic average for the four years of dental studies.

International College of Dentists: A plaque is awarded to the graduating dental student who has shown the most professional growth and development.

International College of Dentists Scholarship—Montana Chapter: A \$100 scholarship is awarded annually to a top senior student from Montana.

Berton E. Anderson Scholarship: An award of \$100 honoring a former associate dean of the School of Dentistry, Dr. Berton E. Anderson, is given by the Seattle Graduate Chapter of Delta fraternity to the third-year student who possesses the highest ideals of leadership, enthusiasm, and scholarship.

Charles V. Callihan Memorial Scholarship: Established in memory of Chuck Callihan, class of 1974. Two awards of \$200 to be applied toward tuition are presented to dental students.

Randy Carr Memorial Scholarship: The Class of 1971 established this award of \$200 for a third-year dental student in memory of a classmate, Randle L. Carr. Selection is based upon need, with emphasis on the recipient's sincerity, reliability, and enthusiasm.

Annual Scholarship Cooper Laboratories: An award of \$250 is given by the Oral-B Toothbrush Division to a thirdyear student deemed most worthy.

Maurice J. Hickey Aid Fund: Autumn Quarter tuition is awarded to three dental students by the University of Washington Dental Alumni Association in honor of Dr. Maurice J. Hickey, Dean Emeritus of the School of Dentistry.

Dr. Roy C. Hill Scholarship: At the annual prosthodontics awards banquet an award of \$150 is presented to the thirdyear dental student who, during the second and third years, has demonstrated the greatest interest, effort, and quality of performance in clinical prosthodontics.

Kirby Speyer Memorial Scholarship: A \$200 tuition schol-



arship is awarded to a full-time deserving and needy dental student.

Ben and Betty Zukor Scholarships: Four awards of \$200 each are presented to needy and worthy predoctoral students.

Washington State Dental Association: A plaque is presented to a graduating dental student who demonstrates character and leadership, together with high scholastic achievement, during the four-year dental curriculum.

Dennis P. Duskin Inspirational Award: This award, in memory of Dennis P. Duskin, D.D.S. (Class of 1964), is presented to a graduating dental student who has shown outstanding character, personality, and integrity throughout the four years. The recipient is selected by a majority vote of the graduating class:

Academic Programs

The School of Dentistry offers courses leading to the degrees of Doctor of Dental Surgery (D.D.S.), Bachelor of Science (B.S.), and Master of Science in Dentistry (M.S.D.), as well as certificates in endodontics, fixed prosthodontics, orthodontics, periodontics, and prosthodontics. The Department of Oral Biology offers graduate programs leading to the degrees of Master of Science and Doctor of Philosophy. In addition, programs leading to advanced degrees can be arranged in individual cases with the various basic science departments and with other schools.

Doctor of Dental Surgery Degree

Upon completion of the curriculum in the School of Dentistry, the D.D.S. degree is awarded to applicants who (1) have given evidence of good moral character; (2) have completed the last two years of dental training as regularly matriculated students in the School of Dentistry; (3) have completed satisfactorily all the required work; (4) have fulfilled all special requirements; and (5) have discharged all indebtedness to the University.

Bachelor of Science Degree

The curriculum leading to the Bachelor of Science degree is given by the Department of Dental Hygiene.

Master of Science and Doctor of Philosophy Degrees

The curricula leading to the degrees of Master of Science and Doctor of Philosophy are given by the Department of Oral Biology through the Graduate School.

Master of Science in Dentistry Degree

The curricula leading to the degree of Master of Science in Dentistry are given by various clinical departments of the School of Dentistry through the Graduate School.

Licensure

Admission to the practice of dentistry in any state is condi-

tional upon the applicant's meeting the requirements of its state board of dental examiners.

Information about Washington State licensure requirements and time of examinations may be obtained from the Division of Professional Licensing, Olympia, Washington 98501.

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Department Programs

COMMUNITY DENTISTRY

The Department of Community Dentistry is concerned with the social, legal, political, economic, and psychological aspects of dental health-care delivery.

्रत्यः Faculty

Peter Milgrom, Chairperson; Chapko, Conrad, Getz, Guild, Kiyak, Sharp, Weinstein.

ENDODONTICS

The Department of Endodontics provides training in the diagnosis and treatment of disease of the pulp of teeth. In addition to the courses for dental students, the department offers postdoctoral study for students in the Graduate School working toward the degree of Master of Science in Dentistry or a Certificate of Specialty Training in Endodontics.

Faculty

Eugene Natkin, Chairperson; Harrington, Oswald, Pitts, Van Hassel.

ORAL BIOLOGY

Oral biology is concerned with basic biological mechanisms in normal and diseased oral tissues and structures. The department offers courses for undergraduates, professional students in the health sciences, and graduate students. The department offers programs for graduate students working toward the degrees of Doctor of Philosophy, Master of Science, or Master of Science in Dentistry, as well as clinical training in oral pathology.

Faculty

Patricia Keller, Acting Chairperson; Alvares, Gordon, Izutsu, Morgan, Morton, Robinovitch, Tamarin.

ORAL DIAGNOSIS AND TREATMENT PLANNING

The Department of Oral Diagnosis and Treatment Planning provides training in diagnostic techniques, such as interrogation, examination, and radiographic interpretation. The student learns to correlate information gained in the various departments and to plan both ideal and practical treatment for the patient. The department offers postdoctoral study for students in the Graduate School working toward the degree of Master of Science in Dentistry or a Certificate of Specialty Training in Oral Medicine.

Faculty

Edmond L. Truelove, Chairperson; Brown, Guttu, Harvey, Menard, Middaugh, Miller, Morton, Prince, Schubert, Soltero, Sommers, Stiefel.

ORAL SURGERY

The Department of Oral Surgery provides training and clinical experience in the procedures used for all types of operations in the oral cavity and all phases of dental pain control. Instruction ranges from the handling of chronic pain problems to the use of intravenous sedation for routine dental procedures. Sedation experience for the students is provided in all clinical departments of the school. In addition to the courses for dental students, the department offers a residency training program that culminates in the award of a certificate.

Faculty

James R. Hooley, Chairperson; Bloomquist, Cohen, Collins, Gehrig, Gordon, Hohl, Myall, Whitacre, Worthington.

ORTHODONTICS

The objective of orthodontics is the prevention and correction of malocclusion of the teeth. In addition to the courses for predoctoral students, the department offers graduate study for students in the Graduate School working toward the degree of Master of Science in Dentistry or a Certificate of Specialty Training in Orthodontics.

Faculty

Donald R. Joondeph, Chairperson; Joondeph, Kokich, Little, Luschei, McNeill, Moffett, Moore, Riedel, Shapiro, Van Ness.

PEDODONTICS

The objectives of the Department of Pedodontics are to pro-

vide the student with a broad understanding of the growth and development of the child and the principles of preventive dentistry and with a working knowledge of the skills necessary for the maintenance of optimal dental health. In addition to the courses for predoctoral students, the department collaborates with Children's Orthopedic Hospital and Medical Center in providing clinical training and experience for residents in pedodontics and general practice.

Faculty

Peter K. Domoto, Chairperson; Anderson, Barriga, Blancher, Davis, Fey, Law, Lewis, Rolla.

PERIODONTICS

In the teaching program of the Department of Periodontics, students learn about the periodontium in health and disease, how to diagnose periodontal diseases, and how to treat diseases that affect the periodontal tissues. The department also offers graduate study for students in the Graduate School working toward the degree of Master of Science in Dentistry or a Certificate of Specialty Training in Periodontics.

Faculty

William Ammons, Chairperson; Clagett, Dale, Dixon, Drennan, Engel, Gartrell, Kegel, Levine, Osterberg, Page, Sapkos, Schluger (emeritus), Selipsky, Spektor, Williams.

PROSTHODONTICS

The Department of Prosthodontics provides instruction in the fabrication and maintenance of removable complete and partial dentures. The department also operates the maxillofacial prosthetic clinic, which is a service clinic available to the public and all departments of the University for treatment that lies in the maxillofacial field of prosthetics. In addition to the courses for predoctoral students, the Department of Prosthodontics offers graduate study for students in the Graduate School working toward the degree of Master of Science in Dentistry or a Certificate of Special Training in Removable Prosthodontics.

Faculty

Charles L. Bolender, Chairperson; Beder, Brudvik, Defreece, Frank, Nash, Smith, Stern, Toolson, Wands.

RESTORATIVE DENTISTRY

The Department of Restorative Dentistry is concerned with the restoration or replacement of tooth structure lost through disease or trauma and, consequently, is involved in



the study of the form and function of the masticatory structures. In addition to the predoctoral courses, the department offers graduate study for students in the Graduate School working toward the degree of Master of Science in Dentistry or a Certificate of Special Training in Fixed Prosthodontics.

Faculty

John Townsend, Chairperson; Adams, Andrews, Canfield, Cherberg, Faucher, Halpin, Hamilton, Harper, Hill, Hodson, Jacobson (emeritus), Lillywhite, Molvar, Morrison, Morton, Nicholls, Ostlund, Powell, Stamey, Stibbs (emeritus), Stoddard, Strand, Warnick, Weaver, Wills, Yuodelis.

DENTAL HYGIENE

The curriculum of the Department of Dental Hygiene offers a professional program leading to the Bachelor of Science degree with a major in dental hygiene. Two academic years of predental hygiene courses are required, followed by two additional years of enrollment in the dental hygiene program.

The undergraduate dental hygiene student receives didactic information and clinical experience in all areas of preventive dentistry through association with clinical patients, community dental health programs, and school health programs. The curriculum versatility allows undergraduate dental hygiene students the opportunity to gain experience in assuming positions as clinical dental hygienists, dental auxiliary program educators, community services program administrators, or research assistants. An effort is made to allow the curriculum requirements to apply to advanced degrees. The preventive, educational, and clinical skills taught include plaque control, patient education and communication techniques, techniques for prevention of dental caries, removal of soft and hard deposits from crown and root surfaces as well as root planing, polishing, and softtissue curettage procedures; exposing and processing radiographic surveys; administration of local anesthetics; placement of restorations in tooth surfaces prepared by a dentist; and performance of other preventive services delegated by the dental profession.

It is expected that the dental student will understand the role of dentistry in health-care delivery and that the profession's first obligation is service to society.

Faculty

Martha H. Fales, Chairperson; Anderson, Been, Haley, Hardwick, Hobbs, Hoople, McKanna, Small, Toney, Wells.

Pre-Dental Hygiene Education

The College of Arts and Sciences offers a predental hygiene program. For those students who would like to follow a ba-

sic course of study in preparation for training in dental hygiene, the college provides advising services. For additional information, consult advisers in B10 Padelford.

Admission to the two-year dental hygiene program requires the completion of the courses listed below. Because many courses are taken with dental students while in the dental hygiene program, the same prerequisites are stipulated: MATH 105 or equivalent (5 credits); CHEM 140, 150, 151, 160 (general) (14); CHEM 231, 232 (organic) (6); BIOL 210, 211, 212 (15); PSYCH 101 (5); SOC 110 (5); SPCH 103 (5); B STR 301 (4); plus electives to complete 90 quarter credits.

Students transferring into this program from other institutions should consult the Description of Courses section of this catalog, compare the courses listed with those offered in their colleges or universities, and seek the advice of the Director of Admissions for course equivalents. Because the number of students admitted to the program is limited, early communication with the Department of Dental Hygiene is strongly urged.

Application Procedure

Persons seeking acceptance into the program must submit the following to the Department of Dental Hygiene on or before March 1 of the year in which they wish to enter:

1. Completed dental hygiene application form, available from the Department of Dental Hygiene. Transfer students from other colleges and universities must also submit a separate application to the University's Office of Admissions by March 1.

2. Written statement of plan to complete pre-dental hygiene requirements should accompany the dental hygiene application form. It is to the applicant's advantage to have completed as many pre-dental hygiene requirements as possible before the personal interview. However, the student may be currently enrolled in required courses at the time of applying for admission.

3. Official transcripts of high school and college records, provided directly from the registrar's office at each institution in which pre-dental hygiene education is completed, sent to both the Office of Admissions at the University of Washington and the Department of Dental Hygiene. Additional transcripts (or grade reports from the University of Washington) are to be sent each quarter or semester up to the time of entrance into the dental hygiene program.

4. Two letters of recommendation, one from a business or professional person and one from a pre-dental hygiene science instructor. Each must contain a personal evaluation.

5. Completion of the dental hygiene aptitude test. The dental hygiene aptitude test is administered by the American Dental Hygienists' Association three times per year at testing centers located throughout the United States. For this program, the dental hygiene aptitude test should be completed in November or February prior to the March 1 deadline for application for admission into the dental hygiene program. Information brochure and application form may be obtained from the Department of Dental Hygiene or from the Testing Division, American Dental Hygienists' Association, Room 1212, 211 East Chicago Avenue, Chicago, Illinois 60611.

Applicants are selected for personal interview pending evaluation of points 1 through 5 above.

Admission Procedure

The Committee of Dental Hygiene Admissions examines the credentials of each applicant and bases its decision on the objective evaluation of preprofessional education, scholastic records, aptitude test scores, and residential status, as well as on the evaluation of personal attributes as determined by the personal interview. Candidates are be given written notice of the status of their applications prior to May 1.

Financial Aid and Scholarships

Loan fund and scholarship information may be obtained through the Office of Student Affairs, School of Dentistry, C315 Health Sciences, or the Office of Student Financial Aid, 105 Schmitz. In addition, the American Dental Hygienists' Association administers scholarships for senior dental hygiene students and an emergency loan fund. Both the scholarships and the loan funds are available only to students currently enrolled in accredited dental hygiene programs.

Tuition and Charges

Students enrolled in the dental hygiene program pay the undergraduate tuition of the College of Arts and Sciences. Expenses for textbooks, uniforms, instruments, and other equipment, which total approximately \$2,000 for the program, are in addition to the tuition fee.

Graduation Requirements

To qualify for the Bachelor of Science degree with a major in dental hygiene, the student must meet both the basic proficiency and distribution requirements of the College of Arts and Sciences and of the curriculum in dental hygiene. The total of 180 quarter credits required for graduation includes 90 pre-dental hygiene credits and 90 dental hygiene credits.

Degree Completion Program for Expanded Function Dental Auxiliaries-Teacher Preparation

The degree completion program is designed to provide opportunities to further enhance dental auxiliaries' present level of skills and career options. Included within this program are the following opportunities: completion of a baccalaureate or graduate degree program in a field related to dentistry (e.g., education, public health, oral biology, business administration, nutrition); development of skills in expanded functions that are legal in Washington; development of expanded function teaching skills. Each participant has an opportunity to meet with a counselor for guidance in designing a program to fit his or her unique education needs, goals, and scheduling constraints.

Individuals who meet the following criteria are eligible for admission:

Dental assistants who have completed a dental assisting course, are currently certified dental assistants, and who have been granted matriculated standing by this university.

Dental hygienists who have completed a two-year certified dental hygiene program, are licensed to practice in at least one state, and have been granted matriculated standing by this university.

Dental hygienists who have already earned a baccalaureate degree, are interested in earning credit for learning skills in expanded functions, are enrolled in a graduate program at the time of admission to this program, and have been granted matriculated standing by this university or another institution.

Master's Degree Programs

A master's degree program, which allows for specialization in dental hygiene education, is offered by the College of Education. Additional information is available from the graduate program adviser, College of Education. Some W. K. Kellogg Foundation and Allied Health traineeships are available.

A two-year master's degree program in oral biology has been designed to provide dental hygienists with the expertise to teach in certain basic and applied science areas. It calls for advanced course work in histology, oral histology, pharmacology, general pathology, and oral pathology. Additional information is available from the University of Washington; School of Dentistry, SB-22; Seattle, Washington 98195.

Both master's programs include options for course work to improve and extend clinical skills in advanced dental hygiene courses, as well as to study educational methods, guidance, and educational administration and internship opportunities.

CONTINUING DENTAL EDUCATION

Director and Assistant Dean

Dan G. Middaugh

Continuing dental education programs and courses are offered throughout the year to provide dentists, auxiliary personnel, and others involved in health care with current sci-



entific knowledge and methodology of patient treatment. Utilizing local, national, and internationally recognized experts, these programs provide a broad spectrum of information relevant to the needs of the dental health professionals. The instructional program consists of lectures, clinical and laboratory courses, study clubs, extended clinical training, and correspondence courses. Various programs are presented throughout the year in the Pacific Northwest, Alaska, and Hawaii.

A list of courses offered may be obtained from the University of Washington; School of Dentistry; Office of Continuing Dental Education, SC-62; Seattle, Washington 98195.

Graduate Programs

Director and Graduate Program Adviser Roy C. Page C315 Health Sciences

The School of Dentistry offers a variety of graduate programs, both for those holding a dental degree and for those holding a baccalaureate degree. Those holding the dental degree may enroll in graduate programs leading to the Master of Science, Doctor of Philosophy, or Master of Science in Dentistry degrees or a postgraduate certificate program. Those holding baccalaureate degrees may enroll in programs leading to the Master of Science or Doctor of Philosophy degrees.

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 operative skills to a level to permit the successful practice of their chosen specialty. Emphasis is placed on the basic principles of diagnosis and treatment that compose one of the clinician's most valuable assets. The seminar method of teaching is generally used. The purpose of the programs is not only to train students in the art of their respective specialties but also to encourage possible preparation for academic careers or for research. The research may be undertaken in basic or applied science. The opportunity for collaborative research is excellent because of the proximity and cooperation of the other colleges, schools, and departments in the University.

Master of Science Degree

A program leading to the Master of Science degree is offered by the faculty in oral biology. Applicants for this degree program should hold a Bachelor of Science or higher academic degree. The purpose of this program is to train qualified teachers and investigators in the clinical and basic science disciplines. This program requires a minimum of seven full-time quarters of in-residence study. The Master of Science degree program can be undertaken in conjunction with specialty training in clinical oral pathology and other dental specialties.

Doctor of Philosophy Degree

The Department of Oral Biology offers an advanced program of study and research leading to the Doctor of Philosophy degree. This graduate program prepares students for professional careers in universities and colleges, research institutes, hospitals, and government laboratories such as those of the National Institutes of Health. Students in this program receive broad training in oral biology and other biomedical basic science areas. Dissertation research is carried out under the guidance of members of the graduate faculty in oral biology. The laboratories of the Department of Oral Biology are excellently equipped for the conduct of biomedical investigations from a number of approaches, including morphological, ultrastructural, biochemical, physiological, and pharmacological. Combined programs of research and study leading to certification in a dental specialty and the Doctor of Philosophy degree in oral biology or the basic sciences are also available. A limited number of stipends are available. Students who intend to work toward a Doctor of Philosophy degree must meet the requirements of the Graduate School as outlined in the Graduate School section of this catalog.

Master of Science in Dentistry Degree

The Master of Science in Dentistry degree is granted to successful candidates in endodontics, fixed prosthodontics, oral biology, oral medicine, orthodontics, periodontics, and prosthodontics. Upon completion of the M.S.D. degree in the clinical disciplines, the student is awarded a certificate in the specialty. These degree programs are administered by the Graduate School.

Postgraduate Certificate Programs

In addition to the above degree-awarding graduate programs, the School of Dentistry offers postgraduate certificate training programs. Application procedures are the same as for the graduate programs. Following the successful completion of the prescribed courses by the postgraduate students a certificate in endodontics, fixed prosthodontics, oral medicine, orthodontics, periodontics, or prosthodontics is granted by the School of Dentistry.

Application Procedure

Application for the Master of Science in Dentistry degree and/or a certificate program must be submitted to the School of Dentistry Office of Academic Affairs on or before November 1 for consideration for entrance in the following Autumn Quarter. A concurrent Application for Admission to the Graduate School is filed for those programs administered by the Graduate School. International students are also required to submit TOEFL scores and financial statements before the November 1 deadline. This deadline has been established to ensure prompt attention to credentials and expeditious replies to correspondence.

Residence

A minimum of eight consecutive full-time quarters (twentyfour months) of residence is required for the Master of Science in Dentistry degree in the fields of endodontics, oral medicine, periodontics, and fixed prosthodontics; seven full-time quarters (twenty-one months) are required for orthodontics and prosthodontics.

For the postgraduate certificate programs, six consecutive full-time quarters (eighteen months) of residence are required for endodontics; seven full-time quarters (twentyone months) in oral medicine, orthodontics, prosthodontics; eight full-time quarters (twenty-four months) for periodontics, and fixed prosthodontics.

Class Schedules

The graduate programs of the School of Dentistry observe the quarter system of the University. For the graduate dental programs to be continuous, attendance is also required during Summer Quarter for the clinical programs.

Fees

Quarterly fees are the same for postgraduate training as for graduate training.

Residency Training Programs

Residency training programs are available in pedodontics, oral surgery, and hospital dentistry. Programs vary in duration and are integrated, providing for rotation through several of the University-affiliated hospitals.

Application, selection, and administration of each program is provided through the Department of Oral Surgery, the hospital dentistry program, or Children's Orthopedic Hospital and Medical Center.

Dean

James I. Doi 222 Miller

Associate Dean

John Jarolimek 201 Miller

Associate Dean

Roger G. Olstad. 206 Miller

Faculty

Abbott, Affleck, Anderson, Andrews, Banks, Bashey, Batie (emeritus), Beal, Bill, Billingsley, Bolton, Boroughs (emeritus), Brammer, Briggs (emeritus), Broedel, F. Brown, R. Brown, W. Brown, Burgess, Cope, Dimmitt, Dohner, Doi, Driscoll, DuBose, Edgar, Estler, Evans, Fea (emeritus), Fenner, Forster, Foster, Freehill, Frerichs, Gehrke, Giles, Gonzales, Gray, Hansen-Krening, Haring, Hawk, Hayden (emeritus), Hirabayashi, Hunkins, Jarolimek, Jenkins, Johnson, Juarez, Kaltsounis, Kelly, Kerr, Kersh, Klockars, Lavelle, Lawrence, Lovitt, Lowenbraun, Lumsdaine, MacDonald (emeritus), Madsen, McCartin, Meacham, Mizokawa, Monson, Morishima, Neel, Nolen, Odegaard, Olch, Olstad, Ostrander, Peckham, Powers (emeritus), Reitan, Ryckman, Salyer (emeritus), Sax, Schill, Sebesta, Settles, Smith, Standal, Strayer (emeritus), Thalberg, Thompson, Torkelson, Tostberg, Vasquez, Wholeben, A. Williams, D. Williams.

Affiliate Faculty

Dunnell, Winans (Anthropology); Arnold, Koenig (Art); Brandauer, Wylie (Asian Languages and Literature); Deyrup-Olsen, Piternick (Biology); Bliss, Haskins (Bot-

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EDUCATION

any); Kwiram, Woodman (Chemistry); Harmon, Pascal (Classics); Edelstein, Godfrey (Communications); Behler, Carpenter (Comparative Literature); Hostetler, Pearson, Valentinetti (Drama); Nelson, Worcester (Economics); Gerstenberger, Irmscher (English); Kakiuchi, Morrill (Geography); Adams, Stewart (Geological Sciences); Behler, Rabura (Germanics); Mathews (Health); Pressley, Treadgold (History); Dull, Pyle (International Studies); Fox, Hutton (Kinesiology); Hiatt. (Librarianship); Kingston, Phelps (Mathematics); Jussila, Palombo (Music); Arons, Bodansky, McDermott (Physics); Mathes, Rohn (Political Science); Beach, Lumsdaine (Psychology); Friedrich, Penuelas (Romance Languages and Literature); Bonebrake, Sehmsdorf (Scandinavian Languages and Literature); Augerot, Kapetanic (Slavic Languages and Literature); Stotland (Society and Justice); Bainbridge, Campbell (Sociology); Scheidel, Staton-Spicer (Speech Communication); Farner, Snyder (Zoology).

The several programs offered by the College of Education in undergraduate and graduate work are designed: (1) to help the prospective teacher to develop competence and sophistication in one or more teaching fields and to develop proficiency in the teaching process through study and practice; (2) to introduce students to the study of education as a basic social institution and to the profession of teaching; (3) through research, observation, and direct experience, to develop an understanding of growth and development of children, youth, and adults; (4) to develop an understanding of teaching and learning processes as they affect the selection, organization, presentation, and evaluation of curriculum materials and resources for various age levels and ability groups; (5) to prepare individuals for specialized professional roles in education, such as administrators and educational staff associates; (6) to promote and foster research and advanced study in the several branches of the

33 401 field of education for which postbaccalaureate work is appropriate; (7) to assist each student in developing a workable philosophy of education and an appreciation of the ethical responsibilities of a professional educator in a free society. An extensive schedule of classroom observation and directed teaching is made available through cooperative arrangements with the public schools in the greater Seaftle area.

Bureau of School Service and Research

Through the Bureau of School Service and Research, the college and the University provide a variety of professional services to the schools and communities of the state of Washington.

Robert A. Anderson, Director

Accreditation

The Teacher Certification Program is accredited by the National Council for the Accreditation of Teacher Education. The college also is a member of the University Council for Educational Administration.

Employment

The Placement Center, 301 Loew, provides assistance to students and alumni seeking teaching and administrative positions at all levels in public and private educational institutions. Placement files, which are necessary in educational job seeking, may be established and permanently maintained. Information concerning job openings, résumés, letters of application, interview procedures, etc., is available. Students should register during the first quarter of their final year. Registration and job-seeking Information are free; however, a \$10 fee is charged for creation of a permanent placement file.

UNDERGRADUATE DEGREE PROGRAMS

Office of Certification and Student Services

Norma M. Dimmitt, Director 211 Miller

The Office of Certification and Student Services assists students at any level (undergraduate, postbaccalaureate, graduate) who are interested in becoming certificated teachers in the state of Washington or in studying the field of education. Although students are not eligible for admission to the Teacher Certification Program until the junior year, early consultation with an education adviser enables them to plan a course of study that will be the most helpful for developing the teaching background needed for future employment. Assistance also is given certificated teachers working toward the Washington Standard/Continuing Teaching Certificate.

Admission to the College of Education

Undergraduate, transfer, and postbaccalaureate students may be admitted to the college when they have been accepted into the Teacher Certification Program or when they have received approval from a faculty committee of the Department of Education to begin a course of study leading to a noncertificate degree program. Students must have completed a minimum of 90 approved credits and be in good academic standing, in accordance with University regulations. Admission to the college is dependent upon admissibility to the University.

Bachelor of Arts Degree

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To qualify for the Bachelor of Arts degree, students in the College of Education, in addition to meeting University requirements, must complete proficiency requirements, distribution requirements, an approved academic major, and at least 10 credits in education courses with a minimum 2.00 grade-point average in all education courses taken following admission to the college. A minimum 2.00 cumulative grade-point average is required for the degree.

Basic Proficiency Requirements

All students are expected to attain proficiency in fundamental verbal and quantitative skills. This may be achieved by having done work beyond minimum University admission requirements at the high school level or by completing courses during the first year of college-level study. The requirement may be satisfied by (1) having completed in high school a minimum of three units (years) of college preparatory mathematics, three units (years) of a single foreign language, and four units (years) of English; or (2) completing 15 credits at the college level in English composition, foreign-language and/or mathematics courses; or (3) transfering to the College of Education with 85 or more acceptable transfer credits from another colleges of the University or other colleges or universities.

Distribution Requirements

For the purpose of general education and to develop a breadth of knowledge and appreciation in fields other than the major, students are required to complete at least 20 credits in each of the broad areas of humanities, social sciences, and natural sciences (a list of University courses divided into the three broad distribution areas is available in the Office of Certification and Student Services, 211 Miller). Students should consult an education adviser when selecting these courses, because some prerequisites for admission to the Teacher Certification Program and some certification requirements can be satisfied by course work used for distribution. Students completing secondary school teacher certification or those completing a degree-only program may use no courses required for the academic major to satisfy distribution requirements. Students completing elementary school teacher certification may include courses required for the academic major to satisfy distribution requirements.

COLLEGE OF EDUCATION



Academic Major Requirement

An academic major, approved by the College of Education as a teaching major, or an approved individually designed interdisciplinary major consisting of a minimum of 45 approved credits, must be completed for the Bachelor of Arts degree.

The individually designed interdisciplinary major is offered primarily to those students interested in noncertificated educational roles. However, an individually designed major may be used to meet initial teacher certification requirements. This requires the submission and ultimate approval of a formal petition prior to beginning the major. A minimum of fifty percent of the credits must be earned in upperdivision courses. Professional education courses required for initial certification are not normally included in the major. All individually designed majors must be approved by a faculty committee of the Department of Education; a faculty adviser is required for each student. Complete information and application materials may be obtained in the Office of Certification and Student Services, 211 Miller.

TEACHER CERTIFICATION PROGRAMS

Teacher education and certification in the state of Washington are controlled by the State Board of Education. All colleges and universities preparing teachers must conform to the general certification regulations established by the board. Requirements for the Provisional/Initial Certificate and the Standard/Continuing Certificate may be met at the University of Washington. Information on out-of-state certificates or emergency and special certificates can be obtained from the State Department of Public Instruction in Olympia.

Noncitizens should consult with an adviser concerning State Board of Education regulations relating to certification of noncitizens.

Teacher certification programs at the University of Washington are state approved. Therefore, graduates are legally qualified for certification in all states party to the Interstate Certification Compact. Information about these states is available in the Office of Certification and Student Services.

Provisional/Initial Teaching Certificate

The Provisional/Initial Certificate is the first level of certification in Washington. It is valid for either three or four years, as indicated on the certificate.

With the exception of students in experimental projects, provisional/initial teacher certification at the University requires completion of a multiquarter, performance-based, field-oriented program. This program functions in three patterns, with field placements made in three somewhat different social-ethnic-economic environments. The Northline Pattern consists of a consortium of two suburban school districts, Northshore and Shoreline, their respective teacher associations, and the University of Washington. The Seattle Pattern focuses on the city of Seattle itself and provides considerable choice of school environments within the city. The Metropolitan Pattern places teacher candidates throughout the area, including Seattle, and accommodates those preparing to teach special target populations (e.g., bilingual-bicultural students).

Each of the professional certification patterns provides a program that is consonant with the requirements of the State Board of Education. To qualify for a Provisional/Initial Certificate, a student must hold or be eligible for a baccalaureate degree; complete an academic teaching major; complete the certification program for elementary, secondary, or K-12; and finish related requirements as explained in the following paragraphs.

Teaching certificates may be earned by students registered in colleges of the University other than Education, provided all requirements for both the teaching certificate and the degree requirements of the other college are met.

Candidates for certification must achieve at least a 2.00 cumulative grade-point average in the academic major (some departments prescribe a higher minimum grade-point average for the major) and a grade of at least 2.00 in every additional course required for the certificate.

Students seeking a Provisional/Initial Certificate must complete 6 credits in socioethnic studies prior to the final quarter of the teaching practicum. A minimum of 3 credits must be in a course(s) that examines the general features of ethnic diversity, cultural pluralism, economic deprivation, and cultural differences. The other 3 credits must be in a course(s) that addresses the characteristics, contributions, and problems of a particular social or ethnic group in the United States. Additional information and a list of suggested courses that fulfill the requirements may be obtained from the Office of Certification and Student Services. Students are urged to complete the socioethnic requirement prior to admission to the certification program in order to concentrate on the professional sequence after admission.

Prior to the final quarter of the teaching practicum, each student must pass a performance test on the use of audio-visual equipment.

The Provisional/Initial Certificate at the elementary-school level requires completion of a professional minor in elementary education.

At the secondary-school level, the Provisional/Initial Certificate for science and mathematics majors requires completion of an academic minor. Although academic minors are not required, students with other majors are encouraged to broaden their teacher preparation by completing one or more minors or an area of teaching competence. Information on what course work can qualify as an area of teaching competence is available in the Office of Certification and Student Services.

At the secondary-school level, the Provisional/Initial Certificate for majors in a social studies field requires completion of course work in geography, economics, world history, United States history, and Washington State history prior to the final quarter of the teaching practicum.

Students who believe they can demonstrate competencies equivalent to any of the stipulated requirements, as indicated by previous experience or by the successful completion of advanced credit examinations, should see an education adviser for assistance. Courses in professional education completed more than ten years before admission or readmission to the Teacher Certification Program are not applicable. The applicability of such courses may be re-established by examination.

Standard/Continuing Certificate

The Standard/Continuing Certificate is valid as long as the holder continues teaching and seven years thereafter. The requirements for this certificate include three years of successful teaching as a certificated teacher as well as a postbaccalaureate year of study. Holders of the Provisional/Initial Certificate should consult an education adviser to develop an appropriate plan of study. All course work completed at other institutions is subject to review before acceptance. Approval prior to enrollment is urged.

Persons interested in earning the Standard/Continuing Certificate concurrently with a master's degree should discuss this option with an education adviser before planning the certification program.

Under state guidelines, if requirements for the Standard/ Continuing Certificate are not met by the Provisional/Initial Certificate expiration date, the original certificate can be renewed once. Information regarding Provisional/Initial Certificate renewal is available in the Office of Certification and Student Services.

Admission to the Teacher Certification Program

Admission to the Teacher Certification Program is based on general criteria prescribed by the college for all certification candidates and specific criteria established by screening committees for particular levels, majors, or patterns. Admission may depend on enrollment restrictions imposed by the University, availability of faculty, resources, and appropriate field placement. To be considered for admission to the Teacher Certification Program, students who are working toward a baccalaureate degree must (1) be in good academic standing at the University of Washington; (2) remove any University admission deficiencies and complete basic proficiency requirements; (3) satisfy all distribution requirements; (4) complete most of an approved major (at least seventy percent required); (5) have at least a 2.00 cumulative grade-point average in the academic major (some departments prescribe a higher grade-point average for the major) and a grade of at least 2.0 in every course specifically required for the certificate; (6) not have a physical, mental, or sensory handicap that would preclude ability to teach successfully; (7) provide a record of documented instructional experience at the appropriate level and in the appropriate area (EDUC 301, Introductory Practicum in Community Service Activity, may be used); (8) take a test for competency in the basic skills, administered by the Office of Certification and Student Services; (9) complete an extemporaneous essay written at the time of campus interview.

Students who already hold a baccalaureate degree must satisfy criteria 4-9 identified above.

Elementary-School Teacher Certification

In addition to the previously specified general requirements, students applying for the elementary-school Teacher Certification Program must complete the following prerequisite courses: ART 200 or DRAMA 200 or MUSIC 200, GEOG 100 or approved substitute, MATH 170, 5 credits in an approved laboratory natural science course (e.g., biology, chemistry, physics). Information on additional requirements for special emphasis areas (American Indian Teacher Education, Bilingual/Bicultural Chicano Studies, Special Education) may be obtained from the Office of Certification and Student Services.

Applications are accepted during the first two weeks of the quarter preceding the desired quarter of entry. Specifically: Autumn Quarter, the first two weeks of Spring Quarter; Winter Quarter, the first two weeks of Autumn Quarter; Spring Quarter, the first two weeks of Winter Quarter. There is no Summer Quarter admission. Applications for admission are available in 211 Miller and must be returned to an education adviser by the appropriate deadline.

Selection is based on successful completion of prerequisites and interviews with University faculty members and with public school personnel. Interviews are arranged after the application is accepted.

Secondary-School Teacher Certification

Admission to the secondary-school Teacher Certification Program involves a two-phase process. Completion of the first phase (field committee recommendation) establishes eligibility to proceed to the second phase (application to the Teacher Certification Program). Procedures for both phases follow.

In addition to the previously specified general requirements, students applying to the secondary-school Teacher Certification Program must meet specific requirements established by subject-area field committees, be recommended by their academic department, and be approved by the appropriate field committee. Although application for departmental recommendation generally is made by the second week of the quarter immediately preceding the entry



quarter, deadlines vary among departments. Students are urged to verify the deadline date with their departments. After recommendation by the appropriate field committee, applications to the Teacher Certification Program may be obtained in the Office of Certification and Student Services. Completed applications must be submitted to an education adviser by the end of the fifth week of the quarter immediately preceding the entry quarter. There is no admission Summer Quarter. Selection is based on successful completion of prerequisites and interviews with University faculty members and public school personnel arranged after the application is accepted.

The following is information related to the subject area field committees: advisory offices to be consulted regarding admission requirements, application procedures, and some specific requirements for each department or area.

APPLIED 'ARTS

Business Education (Business Education office, 115 Miller): (1) 2.50 minimum grade-point average in business education; (2) a minimum of three months' documented accumulated full-time business or office work experience, or approved equivalent; (3) personal interview.

Health Education (advisory office, 101 Hutchinson): (1) 2.50 minimum grade-point average in health education.

Physical Education (advisory office, 101 Hutchinson).

THE ARTS

Art (advisory office, 104 Art): (1) 2.50 minimum cumulative grade-point average; (2) 3.00 minimum grade-point average in art major courses; (3) personal interview; (4) a portfolio of art work (contact School of Art adviser for complete details).

Music (Music Education office, 331 Music): (1) 3.00 minimum grade-point average in music major; (2) personal interview; (3) three letters of recommendation; (4) evidence of work experience (contact School of Music adviser for complete details).

FOREIGN LANGUAGES

Foreign Language (for all foreign-language majors): see department for specific procedures.

Asian Languages and Literature* (Chinese, Japanese) (advisory office, 225 Gowan); Germanics (adviser, 340C Denny); Latin (Classics) (Department of Classics, 218 Denny); Romance Languages and Literature (advisory office, C108 Padelford); Scandinavian Languages and Literature* (adviser, C8B Padelford); Slavic Languages and Literature (advisory office, 111 Thomson).

LANGUAGE ARTS

Communications (Journalism) (Student Services Center,

* Teaching minors only; interested students should inquire at the Office of Certification and Student Services, 211 Miller. 118 Communications); Comparative Literature (advisory office, B536 Padelford); Drama (advisory office, 115B Drama-TV); English (advisory office, A2B Padelford); Speech Communication (2.50 minimum grade-point average in speech communication courses required; advisory office, 107 Parrington).

Language Arts (for all majors included under language arts): (1) a documented record of working with youth in out-of-school settings (EDUC 301, 3 credits, may be elected) (submit to major department); (2) three letters of recommendation (submit to major department); (3) a personal interview (arrange with major department); (4) a personal file containing examples of work, a statement of professional purpose, and copies of all transcripts (submit to major department); (5) evidence of aptitude in the major (check with major advisory office).

NATURAL SCIENCES AND MATHEMATICS

Biology (Office of Biology Educaton, 205 Johnson, Annex A): (1) 2.50 minimum grade-point average in biology major; (2) a personal interview; (3) one letter of recommendation (see biology teacher preparation adviser for specific details).

Chemistry (advisory office, 109 Bagley): (1) 2.50 minimum grade-point average in chemistry major.

Earth Sciences and Geological Sciences (science office, 115 Miller): (1) 2.50 minimum grade-point average in earth or geological sciences major.

Mathematics (advisory office, C36 Padelford): (1) 2.50 minimum grade-point average in mathematics major.

Physics (advisory office, 215 Physics): (1) 2.50 minimum cumulative grade-point average; (2) PHYS 407 and 408 (grade of 3.0 or higher required).

SOCIAL STUDIES

Students with any of the following majors should contact the College of Education Office of Certification and Student Services, 211 Miller: American Indian Studies, anthropology, Asian American Studies, Black Studies, Chicano Studies, economics, geography, history, International Studies, political science, psychology, society and justice, sociology.

Social Studies (for all majors included under social studies): (1) 2.50 minimum cumulative grade-point average; (2) a letter of recommendation from an adviser in major department; (3) two personal interviews of record—(a) either a College Field Committee member in the major department or a member of the Education Social Studies faculty; (b) a certificated secondary social studies teacher or social studies supervisor under current teaching contract; (4) documented experience with youth in out-of-school settings will be given special consideration.

Elementary-School Teacher Certification Program

The elementary-school teacher certification program is offered only in a four-quarter, field-oriented sequence. Field assignments are made in the Metropolitan, Northline, or Seattle patterns. The following table portrays the professional course work sequence across the four quarters. *Note:* Summer Quarter is not included.

Field-Oriented Elementary Program Sequence									
First Quarter		Second Quarter		Third Qua	rter	Fourth Quarter			
EDPSY 304, Learning	5 credits	EDC&I 355, Language Arts	3 credits	EDPSY 308, Evaluation [†]	3 credits	EDUC 402/3 or 502, Practicum (classroom)	17 credits		
EDC&I 496, Teaching Strategies	3 credits	EDC&I 361, Reading	3 credits	EDC&I 365, Social Studies	3 credits	EDUC 401 or 501, Practicum (related	3 credits		
EDC&I 360, Reading	3 credits	EDC&I 375, Mathematics	3 credits	EDC&I 370, Science	3 credits	school activities) (40 hours/week total,			
EDUC 302, 3 credits Practicum (6 hours/week)		EDUC 402/3, Practicum* (2-3 hours/day)	5-8 credits	EDUC 402/3, Practicum (3 hours/day)	8 credits	plus preparation time)			

The following must be completed by the beginning of the fourth quarter:

---Crucial Issues in Education (EDEPS 479), 3 credits.

-One course from art, drama, or music methods (EDC&I 317, 318, or 319), 3 credits.

-6 credits in socioethnic studies (a list of courses is available in 211 Miller).

-An audiovisual checkout prior to registration for fourth quarter.

* Metropolitan Pattern students may take 5 credits of practicum second quarter. They may also reverse the second and third quarter clinics.

† EDPSY 308 may be taken second or third quarter.

Note: A minimum 2.00 grade-point average must be earned in each course required for admission to, and completion of, the certification program (e.g., GEOG 100).

Students may earn an elementary teaching certificate with an emphasis in American Indian education, bilingual/bicultural Chicano Studies, or special education by completing all the requirements portrayed above, plus specified course work in the area of emphasis.[‡] Field placements, made in any of the three patterns, provide experience in both regular classroom environments and in the area of emphasis.

‡ See Elementary Education under the major and minor programs section for course work for these areas of emphasis.

Secondary-School Teacher Certification Program

The secondary-school teacher certification program is offered only in a three-quarter, field-oriented sequence. Field assignments are made in the Metropolitan, Northline, or Seattle patterns. The following table portrays the professional courses sequence for the three patterns. *Note:* Summer Quarter is not included.

To provide intake opportunity each quarter, some modification of the methods course sequence listed below may be necessary, because there are not sufficient students to justify offering the methods class each quarter. All other requirements follow the normal sequence.

Field-Oriented Secondary Program Sequence									
First Quarte	r	Second Quarte	er .	Third Quarter					
EDUC 302, Practicum (6 hours/week)	3 credits	EDUC 404, Practicum (24 hours/week including	12 credits	EDUC 404 or 502, Practicum (classroom)	17 credits				
EDPSY 304, Learning EDC&I 496, Teaching	5 credits 3 credits	seminar) EDPSY 308, Evaluation	3 credits 2-4 credits	EDUC 401 or 501, Community Service	3 credits				
EDC&I,* Teaching Methods	2-4 credits	Teaching Methods		school activities) (40 hours/week total)					

The following are required prior to the third quarter:

-Crucial Issues in Education (EDEPS 479), 3 credits.

-Reading in the Secondary School (EDC&I 462), 3 credits, for majors in language arts, social sciences, natural sciences, or mathematics.

-6 credits in socioethnic studies (a list of courses is available in 211 Miller).

-An audiovisual checkout (prior to registration for third quarter).

* As required for each teaching major; limited offerings may require a change in sequence.

Note: A minimum grade of 2.0 must be earned in all courses required for the certificate (e.g., socioethnic courses). A minimum cumulative grade-point average of 2.00 must be earned in major (some departments require a higher grade-point average).



MAJORS AND MINORS APPROVED FOR TEACHER CERTIFICATION

Listed below are the major and minor academic fields for students preparing to be elementary or secondary teachers. It is the responsibility of the student to consult the selected department to verify requirements and to obtain course approval where requested. These majors have been established only for students pursuing a certificate and degree program.

American Indian Studies

Teaching Major: Secondary or Elementary School

65 approved credits required.

INDIAN STUDIES BASIC CORE (30 CREDITS)

ANTH 333 or 334 or 335, 415 or 416 or 417; AIS 230, 335; EDC&I 464, plus 13 credits selected by the student and the director of Indian Teacher Education.

SOCIAL STUDIES CORE (30 CREDITS)

HSTAA 201, 432; HST 113; GEOG 100; ECON 200; POL S 210.

ELECTIVE SUPPORT COURSES (5 CREDITS MINIMUM)

ANTH 202; ARCHY 304, 320, 472; ART 101; AIS 101, 313, 314, 315, 413, 414, 415, 475, 499; EDUC 401; GEOG 342; GIS 340; POL S 211; PSYCH 250, 443; SOC 362; SOCWK 501.

Elementary Education Minor: American Indian Studies Emphasis

See Elementary Education.

Teaching Minor: Secondary School Emphasis

30 approved credits required; same as Indian Studies basic core.

Anthropology

Teaching Major: Secondary or Elementary School

To be admitted as a major in anthropology in the College of Education, each student must have completed all College of Education proficiency requirements; a minimum of 85 credits; and two or the following three courses, with a minimum grade of 3.0 in at least one of them: PHY A 201, ANTH 202, or ARCHY 205.

To graduate with a Bachelor of Arts degree in this curriculum from the College of Education, a student must have completed: 50 credits selected from both upper- and lowerdivision courses in the Department of Anthropology, including PHY A 201, ANTH 202, and ARCHY 205, and ANTH 445, but excluding ANTH 100; and a minimum of 25 credits of the required 50 with a grade of 3.0 or above. Courses in which a student receives 1.6 or below may not be counted toward the required 50 credits for the major.

Teaching Minor: Secondary School

To graduate with a minor in anthropology, College of Education students must complete 30 credits selected from both upper- and lower-division courses in the Department of Anthropology, including PHY A 201, ANTH 202, and ARCHY 205; and a minimum of 15 credits of the required 30 with a grade of 3.0 or above. Courses in which a student receives 1.6 or below may not be counted toward the required 30 credits for the minor. Courses below the 200 level may not be counted in the 30 credits.

Art

Teaching Major: Secondary School; Elementary School Specialization; Elementary and Secondary School Specialization (K-12)

70 approved credits required. Courses: ART 105, 106, 107, 109, 110; ART H 201, 202, 203; ART 201, 211; 3 credits from ART 250, 253, 255, 256, 259; 6 credits from ART 300, 301, 302, 303, 304; 3-5 credits from ART 245, 258, 272; 3 credits from 491; 11-13 credits of approved art electives; EDC&I 340 (options 1, 2, and 3), EDC&I 341 (options 1 and 3).

Teaching Major: Elementary School

50 approved art credits required. Courses: ART 105, 106, 107, 109, 110; ART H 201; 6 credits of approved art history electives; ART 201, 211; ART 250 or 255, 259; 9 credits from ART 300, 302, 303, 304; EDC&I 340; EDUC 301.

Teaching Minor: Secondary School

15 approved art credits required. Offered only in combination with art major.

Asian American Studies

1 1

Teaching Major: Secondary or Elementary School

69 approved credits required. Asian American Studies core courses: AAS 205 or 405 and 14-22 approved credits from AAS 206, 305, 360, 370, 400, 442, 443, 490, 499.

Related social studies courses: HSTAA 201, 432; HST 113; GEOG 100, 313; ECON 200; POL S 210; PSYCH 448 only when taught with an Asian American perspective; SISEA 210 or HSTAS 211 or 212.

Teaching Minor: Secondary School

22 approved credits selected from the core listing preceding.

Biology

Teaching Major: Secondary School

47-54 approved credits required. Courses: BIOL 101-102, BOT 320, 113 or BIOL 210, 211, 212, and either BOT 320 or 113; CHEM 102 or CHEM 231, 241, 232; GENET 451; MICRO 301, 302; and four approved courses from the five following categories (three must have laboratories): animal physiology, plant physiology, vertebrate zoology, invertebrate zoology, ecology/ethology. See adviser for approved courses. A grade of 2.5 or better must be achieved in each required course (all major courses must be graded).

Teaching Major: Elementary School

45-50 approved credits required. Courses: BIOL 101-102; BOT 320, 113; or BIOL 210, 211, 212; CHEM 102 or 231, 232, 241; 25 credits of upper-division courses that must include 5 credits in botany and 10 credits in zoology. (Also see natural sciences teaching major.)

Teaching Minor: Secondary School

29-30 approved credits required. Courses: 14-15 credits must be upper-division courses that include 5 credits in zoology, 5 credits in botany, and 4-5 credits in genetics or microbiology. See adviser for approved courses. A grade of 2.5 or better must be achieved in each required course (all major courses must be graded).

Black Studies

Teaching Major: Secondary School

62-65 approved credits required.

TRACK A: SOCIAL STUDIES

Courses: HSTAA 201, 432; HST 113; GEOG 100; ECON 200; POL S 210; SOC 105; plus 25 approved credits from the following Black Studies core courses: ANTH 212; BLK S 250; GEOG 227; HST 361, 362; HSTAA 443, 444; PSYCH 250, 260; SOC 362, 463; ENGL 358.

TRACK B: LANGUAGE ARTS

Courses: ENGL 358, 444, 212,* 271, 277, 391 or 393, 351 or 352 or 353. In addition, 30 approved credits from the following Black Studies core courses: DRAMA 490; C LIT-261, 262, 263; ENGL 251,* 211,* 355*; SPHSC 100; SPCH 140, 329.

• Sections in which Black literature is given special emphasis. Consult with an adviser regarding appropriate selection of sections.

Teaching Major: Elementary School

62-65 approved credits required. Courses: the same courses as for Teaching Major: Secondary School, Track A or Track B.

Teaching Minor: Secondary School

35 approved credits required. Courses: 35 approved credits from Track A or Track B required.

Business Education

Teaching Major: Secondary School*

54 approved credits required. Courses: ACCTG 210, 220; QMETH 200; BG&S 101, 200; ECON 200, 201; MKTG 300 or 301; B CMU 301; A ORG 460; BG&S 361 or B ECON 301 or MKTG 381 (may be deferred until fifth year); EDC&I 314, 315, 316.

Teaching Major: Elementary School

37 approved credits required. Courses: ACCTG 210, 220; QMETH 200; BG&S 101, 200; ECON 200; A ORG 460 or ECON 201; B CMU 301; EDC&I 314.

Teaching Minor: Secondary School*

35 approved credits required. Courses: ACCTG 210, 220; BG&S 101, 200; ECON 200; B CMU 301; approved elective in business or economics (3 credits); EDC&I 314, 315 or 316.

* For the secondary school major and minor, vocational certification is required for business education teachers in addition to regular teacher certification.

Chemistry

A grade of 2.0 or higher must be obtained in each required chemistry course or approved equivalent.

Teaching Major: Secondary or Elementary School

60 approved credits required. Courses: CHEM 140, 150, 151, 160, 170 or approved equivalent, 231, 232, 241, 242, 350, 351; PHYS 114, 115, 116, 117, 118, 119 or approved equivalent; MATH 124.

Teaching Minor: Secondary School

46 approved credits required. Courses: CHEM 140, 150, 151, 160, 170 or approved equivalent, 231, 232,* 241,* 321; PHYS 110, 111, 112 or approved equivalent.

* CHEM 350 may be substituted for CHEM 232, and CHEM 351 may be substituted for CHEM 241.

Chicano Bilingual-Bicultural Studies

Teaching Major: Secondary or Elementary School

79-83 approved credits required. Prerequisite: evidence of competency to teach in the Spanish language. All students to complete the Chicano Studies core plus either the social studies core or the Spanish language core.

CHICANO STUDIES CORE (49 CREDITS)

SPAN 231, 331, 359, 465; HSTAA 180, 181; PSYCH 250; EDC&I 453 or 454 (to be taken concurrently with EDUC 301); EDC&I 457; with approval of the bilingual adviser select an additional 10 credits from Chicano Studies or bilingual courses.



SOCIAL STUDIES CORE (30 CREDITS)

HSTAA 201, 432; HST 113; GEOG 100; ECON 200; POL S 210.

SPANISH LANGUAGE CORE (34 CREDITS)

SPAN 301, 302, 304, 305, 306, 409, 461; EDC&I 329, 335.

Teaching Minor: Secondary School

49 approved credits required. Prerequisite: evidence of competency to teach in the Spanish language. Course requirements the same as the Chicano Studies core listed previously.

Elementary Education Minor: Bilingual-Bicultural Chicano Education Emphasis

See Elementary Education.

Chinese

Teaching Minor: Secondary School

28 approved credits required. Proficiency in oral and written Chinese must be demonstrated by examination. Courses: CHIN 311, 312, 313, or 334 and a methods course in Chinese language, 3 credits. Elective courses: 10 credits from the following: CHIN 293 or 362; GEOG 336; ECON 493; HSTAS 454; PHIL 414; POL S 414 or 442.

Classical Studies

Teaching Major: Elementary School

64-66 approved credits required. Courses: GRK 101, 102, 103, 305, 306, 307, 310, 311, 312; or LAT 101, 102, 103, 305, 306, 307, 310, 311, 312; plus 36 credits chosen with the approval of the department from courses in 400-level Greek, 400-level Latin, classics in English, classical art and archaeology, ancient history, the history of ancient philosophy, and the history of ancient science. CLAS 101 and 205 and HST 111 are not acceptable.

Comparative Literature

Teaching Major: Secondary School

50 approved credits required.* Courses: C LIT 300, 301, 302; CLAS 210 or any upper-division classics course; at least two additional courses in comparative literature; at least one course in a literature other than English, studied in the original language; EDC&I 331, 332, 333, 334, 336, 338, 339, or 356; remaining credits to be elected from among the offerings of Comparative Literature and the eight participating language and literature departments.

Teaching Major: Elementary School

50 approved credits required.* Courses: C LIT 300, 301, 302; CLAS 210 or any upper-division classics course; at

least two additional courses in comparative literature; at least one course in a literature other than English, studied in the original language; LIBR 451; EDC&I 330, 335, 336, 338 or 339; remaining credits to be elected from among the same as secondary-school majors.

Teaching Minor: Secondary School

35 approved credits required.* Courses: C LIT 300, 301, 302; CLAS 210 or any upper-division classics course; at least one course in a literature other than English, studied in the original language; EDC&I 331, 332, 333, 334, 336, 338, 339, or 356; remaining credits to be elected from among the same as secondary major.

* Ordinarily, only 300- and 400-level literature courses may be applied toward the degree.

Drama

Teaching Major: Secondary School

58 credits required. Courses: DRAMA 251, 252, 253 or 351, 352, 353, or 451, 452, 453; with 351, 352, 353, or 451, 452, 453; 3 credits of 298 or 498; 230; 210, 211, 212, 290, 291, 292, 102, 371, 372, 373; 416 or 476 or 494. Electives at the 300-400 level to complete the balance. DRAMA 460, 461, 462, 530, although not required, are strongly recommended.

Teaching Major: Elementary School

49 credits required. Courses: DRAMA 251, 252, 253 or 351, 352, 353, or 451, 452, 453; 210 and 290 or 211 and 291 or 212 and 292; 102, 230; 373 or 476; 330, 331; 431 or 436; LIBR 451, 452; HSS 471 or ENGL 415. Electives to complete the balance to be chosen from 316, 338, 432, 433, 435, 438. EDC&I 318 is required in addition to the 49 credits.

Teaching Minor: Secondary School

30 credits required. Courses DRAMA 251, 252, 253 or 351, 352, 353, or 451, 452, 453; 102, 210, 211, 212, 230, 316, 460.

Earth Science

All required courses must be completed with a grade of 2.0 or higher.

GEOLOGICAL SCIENCES EMPHASIS

Administered by the Department of Geological Sciences.

Teaching Major: Secondary School

69 approved credits required. Courses: GEOG 205, 301, 311, 320, 321, 340, 361; CHEM 140, 150; PHYS 114, 115, 116 or 121, 122, 123; ATM S 101 or 201 or 301; ASTR 101 or 201 or 301; OCEAN 101 or 203.

OCEANOGRAPHY EMPHASIS

Administered by the Department of Oceanography.

Teaching Major: Secondary School

60 approved credits required. Courses: OCEAN 401 and 402 or 417, 418 and 419; 421; 405 or 406 and 450, 433 or 434 and 435; MATH 124, 125, 126; CHEM 140, 150, 151, 160; PHYS 121, 122, 123; ASTR 101 or 102 or 201 or 301; ATM S 201 or 301; GEOL 205.

ASTRONOMY EMPHASIS

Administered by the Department of Astronomy.

Teaching Major: Secondary School

60 approved credits required. Courses: 15 approved credits in astronomy; MATH 124, 125, 126; PHYS 114, 115, 116, 117, 118, 119 or 121, 122, 123, 131, 132, 133; ATM S 101 or 201; GEOL 101 or 205; OCEAN 101 or 203.

ATMOSPHERIC SCIENCES EMPHASIS

Administered by the Department of Atmospheric Sciences.

Courses: ATM S 101 or 201 or 301, 321, 351; PHYS 114, 115, 116, 117, 118, 119 or 121, 122, 123, 131, 132, 133; ASTR 101 or 102 or 201 or 301; GEOL 101 or 205; OCEAN 101 or 203; 10 to 14 elective credits in atmospheric sciences or mathematics.

GENERAL EMPHASIS

Administered by the College of Education.

Teaching Major: Secondary School

60 approved credits required. Courses: ASTR 101 or 102 or 201 or 301; ATM S 101 or 201 or 301; GEOL 101 or 205 or 301; OCEAN 101 or 203; elective in one of the above departments, 5 credits; BIOL 101-102 or 210, 211, 212 or equivalent; PHYS 114, 115, 116, 117, 118, 119 or 121, 122, 123, 131, 132, 133; CHEM 101, 102 or 140, 150, 151, 160.

Teaching Minor: Secondary School

25 approved credits required. This program is available only to students with a teaching major in a science field. Courses in each of the earth science departments (Astronomy, Atmospheric Sciences, Geological Sciences, and Oceanography).

Economics

Teaching Major: Secondary School

57-60 approved credits required. Courses: ECON 200, 201, 281, 300, 301; four electives in economics chosen from a minimum of three fields of specialization other than theory (20 credits); MATH 124 or 157; Two courses to be chosen from the following list: MATH 125, 126, 305; PHIL 120,

370, 470; ACCTG 210; and additional upper-division economics courses.

Economics Major: Elementary School

44 or 45 approved credits required. Courses: ECON 201, 281, 300, 301; three electives in economics chosen from a minimum of two different fields of specialization (15 credits); MATH 124 or 157.

Teaching Minor: Secondary School

35 approved credits required. Courses: ECON 200, 201, 300, 301; three electives in economics chosen from a minimum of two different fields of specialization, or ECON 281 and two electives in economics chosen from two fields of specialization (15 credits).

Elementary Education: Minor Only

General Teaching Minor

21 approved credits required. Prior admission to a fieldoriented teacher certification pattern required. Courses: EDC&I 317 or 318 or 319, 355, 360, 361, 365, 370, 375.

American Indian Studies Emphasis

29-32 approved credits required. Prior admission to Indian Teacher Education Program and Metropolitan Certification Pattern required. Courses: All courses listed for General Teaching Minor plus EDC&I 464; H ED 250; and EDPSY 447. EDPSY 447 may be deferred to the fifth year.

Bilingual-Bicultural Chicano Education Emphasis

30 approved credits required. Admission to Teacher Certification Program required. Evidence of ability to teach in the Spanish language required. Courses: All courses listed for General Teaching Minor plus SPAN 231; HSTAA 180, 181; EDC&I 333, 453 (to be taken concurrently with EDUC 301); and EDC&I 457.

Special Education Emphasis

33 approved credits required. Same as General Teaching Minor plus EDSPE 404, 499, 510, and 541 or 542 or 543.

English

Teaching Major: Secondary School

54-58 approved credits required. Courses: ENGL 270, 271 or 272; 5 additional credits in advanced writing or ENGL 441 or 444; ENGL 390 and one other language study course (391, 392, 393, 442, or 444); ENGL 212 or 5 credits in fiction, ENGL 212 or 5 credits in poetry, ENGL 213 or 5 credits in drama; 5 credits from ENGL 221, 222, 223, 231, 241, 251, 261, or 413, 414, 415, 416; HSS 480; 5 credits from ENGL 267, 351 through 358, 395, or 397; 5 credits from ENGL 301, 302, 311, 314, 315, 322, or 396;



5 credits from ENGL 371, 372, 375, 376, 417, 444 or LIBR 451; or 5 credits of literature in translation (e.g., CLAS 430); 3 credits of EDC&I 356.

Teaching Minor: Secondary School

38 approved credits required. Courses: 5 credits of ENGL 390; 5 credits in ENGL 270, 271, 272; 5 credits in ENGL 441 or 442; 10 credits from ENGL 267, 301, 302; 10 credits of electives (recommended: ENGL 211, 212, 213, 231); 3 credits of EDC&I 356.

Teaching Major: Elementary School

43-45 approved credits required. Courses: at least 18 credits in writing and language as follows: ENGL 270, 271, 272; 5 additional credits in advanced writing or ENGL 441 or 444; ENGL 390 and one other language study course (391, 392, 393, 442, or 444). ENGL 211 or 5 credits in fiction, ENGL 212 or 5 credits in poetry, ENGL 213 or 5 credits in drama; 10 additional credits from any two of the following four groupings: group 1—ENGL 221, 222, 223, 231, 241, 251, 261, or 413, 414, 415, 416, HSS 480; group 2—ENGL 267, 351 through 358, 395, or 397; group 3—ENGL 301, 302, 311, 314, 315, 322, 325, or 396; group 4—ENGL 371, 372, 375, 376, 417, 444 or LIBR 451 or 5 credits of literature in translation (e.g., CLAS 430).

English as a Second Language (ESL)

Teaching Major: Elementary or Secondary School

43-49 approved credits required. Prerequisite: Demonstrated competency in a language other than English. Proficiency through third-year college level or by special examination. This program is based on the availability of appropriate courses for the language preferred by the student. This major is limited only to those students who are seeking ESL certification. Autumn Quarter admission only.

LANGUAGE LEARNING CORE (20 CREDITS)

SPHSC 302; LING 400, 445; PSYCH 457 or LING 447; LING 449; ANTH 461 or LING 461.

SPECIAL REQUIREMENTS (23-29 CREDITS)

SPAN 231; AAS 205 or 305 or 206; ANTH 416 or 417; EDC&I 474 or equivalent; two approved courses on ethnic minorities; an approved course in structure or history of a language other than one's first language (a course in pedagogy is not acceptable).

French (Romance Languages and Literature)

Teaching Major: Secondary School

Courses or their approved equivalents: FREN 301, 302, 303, 304, 305, 306, 350, 351, 352, and four approved French courses at the 400 level; EDC&I 329; and EDC&I 330 or 331 or 332 when available.

Satisfaction of requirements must be certified by the Department of Romance Languages and Literature adviser before the student begins teaching practicum (EDUC 403 or 404). A grade-point average of at least 2.7 required in all courses in the major.

Teaching Major: Elementary School

Requirements same as for Secondary School major, except the four approved electives at the 400 level are not required.

Teaching Minor: Secondary School

Requirements same as for Elementary School major.

Geography

Teaching Major: Secondary School

50 approved credits required. Courses: GEOG 100, 205, 200 or 207, 258, 235 or 277, 300 or 342 or 350 or 303 or 370, 302 or 402; one systematic and two regional geography upper-division elective courses approved by geography adviser (15 credits).

Teaching Major: Elementary School

45 approved credits required. Courses: GEOG 100, 205, 200 or 207, 258, 235 or 277, 300 or 370, 302 or 402; one systematic and two regional geography upper-division elective courses approved by geography adviser (15 credits).

Teaching Minor: Secondary School

25 approved credits required. Courses: GEOG 100, 200 or 207 or 277, 205 or 370, 300 or 302 or 402; one upperdivision elective course approved by geography adviser (5 credits).

Geological Sciences

Teaching Major: Secondary School

Courses: see Earth Science, Geological Sciences Emphasis.

Teaching Major: Elementary School

48 approved credits required. 10 credits of electives may be taken during the fifth year. Courses: CHEM 140, 150; BIOL 101-102; GEOL 101 or 205, 301 or 361, 320, 340; 10 credits of approved upper-division geological sciences electives or approved courses in related fields.

Germanics

Grade-point average of 2.50 must be maintained in all Germanics courses in the programs.

Teaching Major: Secondary School

55 approved credits above the second-year level required.

The following courses fulfill 43 credits; the remainder of the required 55 credits may be chosen from other upperdivision courses offered by the department. Courses: GERM 301, 302, 303, 310, 311, 312, 401, 402, 403, 405, 413, 414; EDC&I 336.

Teaching Major: Elementary School

24 approved credits above the second-year level required. Courses: GERM 301, 302, 303, 310, 311, 312, 405; EDC&I 337.

Teaching Minor: Secondary School

30 approved credits above the second-year level required. Courses: GERM 301, 302, 303, 310, 311, 312, 401, 402, 403; EDC&I 336.

Health Education

Teaching Major: Secondary School

70 approved credits required. Courses: ZOOL 118, PSYCH 101, H ED 250, 251, 321, 322, 421, 422, 471, 498, 499; EPI 420; BIOST 472; HSERV 411.

Teaching Major: Elementary School

38 approved credits required: Courses: ZOOL 118; PSYCH 101; H ED 250, 251, 321, 322, 421, 422, 471.

History

Teaching Major: Secondary School

53 approved credits required. 2.50 grade-point average required in history courses taken at the University of Washington. Courses: HST 111 or HSTAM 201 or 202, HST 112, 113; HSTAA 432, and three United States history courses, at least two of which must be upper-division, and one upper-division modern Europe course; EDC&I 366; and two electives.

Teaching Major: Elementary School

50 approved credits required. 2.50 grade-point average required in history courses taken at the University of Washington. Courses: same as for Teaching Major: Secondary School, except that an elective may be substituted for the upper-division modern Europe course. EDC&I 366 is not required.

Teaching Minor: Secondary School

33 approved credits required. 2.50 grade-point average required in history courses taken at the University of Washington. Courses: HST 111 or HSTAM 201 or 202, HST 112, 113; HSTAA 201, 432; EDC&I 366; and one elective.

On occasion, equivalent courses may be substituted for the numbered courses if the permission of the Department of History is obtained.

International Studies

Certification students may choose from the following regional studies programs: Africa, China and Inner Asia, Japan, Korea, Latin America, Russia, East Europe, and South Asia.

The program elected should be pursued only after consultation with the appropriate program undergraduate adviser.

Teaching Major; Secondary School

45 approved credits required. Courses: as listed under individual programs in the College of Arts and Sciences Programs of Study section of this catalog. Students must meet all the requirements of the regional program elected with the exception of the language requirement; however, all students are urged to meet the language requirement, particularly students intending to continue in graduate programs. (For the Latin American Studies major, the language requirement is compulsory.)

Teaching Minor: Secondary School

30 approved credits required. Courses: as listed under individual programs in the Programs of Study in the College of Arts and Sciences section of this catalog. Students must complete 30 credits of approved courses within the regional program elected.

Japanese

Teaching Minor: Secondary School

37 approved credits required. Proficiency in oral and written Japanese must be demonstrated by examination. Courses: JAPAN 311, 312, 313 or 333; and a methods course in teaching Japanese. Electives: HSTAS 213; GEOG 437; POL S 435; HSTAS 423.

Journalism

Teaching Major: Secondary School

47-50 approved credits required. Courses: 10 credits from CMU 150, 200, 214; 320, 321, 324, 406, 414, 480 or 481; and 9-12 credits taken from the following electives: CMU 220, 291, 314, 325, 353, 400, 402, 411, 443, 450, 474, 480, 481, 483; SOC 443.

Teaching Major: Elementary School

47-50 approved credits required. Courses: same as for Teaching Major: Secondary School.

Teaching Minor: Secondary School

27 approved credits required. Courses: 10 credits from CMU 150, 200, 214; 321; and at least 13 credits from the following electives: CMU 400, 402, 406, 411, 414, 443, 450, 474, 480, 481, 483.

COLLEGE OF EDUCATION



Kinesiology

(Program in Physical Education)

Teaching Major in Physical Education: Secondary School

33 core course credits in kinesiology, 43-51 credits in specialization (professional) courses required. 17-20 credits in related fields prerequisite courses.

Core courses: KIN 301, 302, 303, 325, 331, 332 and 330 (laboratory), 350. Specialization courses: KINPE 292, 365, 366, 455, 460. Related fields prerequisite courses: B STR 301, ZOOL 118 or 208, PSYCH 101 or 102, and statistics.

Teaching Minor: Secondary School

Core courses: KIN 301, 325, 350, 331, 332. Related fields requirements: ZOOL 118 or 208, B STR 301. Approved specialization requirements: KINPE 320, 365, and 460. Electives: three KINPE 200-level performance laboratories, one 368.

Teaching Major: Elementary School

27 core course credits, 17-20 credits in required fields, 20 credits in specialization requirements, and 20%-22% in approved electives.

Core courses: same as those for Teaching Major: Secondary School. Specialization requirements: KINPE 292, 311, 314, 316, 365, 366, 478. Approved electives: four physical education 200-level performance laboratories, one KIN 368, and four courses from KINPE 203, 312, 460, KIN 420, 438, 498, 499 or DRAMA 338.

Coaching Minor: Non-Kinesiology Majors

29-32 approved credits required (excluding prerequisites). Completion of the minor requires documented extensive experience as a performer at or beyond the high school level in at least one sport for a minimum of two seasons. Courses required: KINPE 292, either 320 or 336, 368, 493, KIN 331, 332, either 301, 302, 303. Related fields courses: B STR 301, PSYCH 101, ZOOL 118 or 208.

Latin (Classics)

Teaching Major: Secondary or Elementary School

36 approved credits required. Courses: 27 credits in 400level Latin courses, and 9 credits chosen with the approval of the Department of Classics from courses in Greek, 400level Latin, classics in English, classical archaeology, ancient history, the history of ancient philosophy, and the history of ancient science.

Teaching Minor: Secondary School

18 approved credits required. Courses: any approved 400-level Latin courses.

Mathematics*

Teaching Major: Secondary School

50 approved credits in mathematics required. Courses: MATH 124, 125, 126, 205 or 302, 327, 411, 412, 444, 445. STAT 341, 342. QMETH 200, ENGR 141, or C SCI 241 or equivalent programming experience.

Teaching Major: Elementary School

36 approved credits in mathematics required. Courses: MATH 124, 125, 126, 170, 171, 205 or 302, 411, 412 and two courses from 301, 305, STAT 341 or 342.

Teaching Minor: Secondary School

30 approved credits in mathematics required. Courses: MATH 124, 125, 126, 205 or 302, 411, 412, 444, 445.

* The student must obtain grades of 2.0 or better in all mathematics courses presented to satisfy the mathematics requirement, and a grade-point average of 2.00 or higher must be obtained in all mathematics courses taken. EDC&I 378 is required for both the teaching major and minor with secondary-school emphasis.

Music

Teaching Major and Minor: Music Specialist

96 or 97 approved credits required.

INSTRUMENTAL AND CHORAL PERFORMANCE EMPHASIS

Courses: MUSIC 110, 111, 112, 113, 114, 115, 210, 211, 212, 213, 214, 215, 313, 314, 340 (prerequisites: EDUC 301 music section and admission to Teacher Certification Program); MUSIC 310 or 311 or 490; 280, 380, 381, 382; 442 or 443; 432 or 440 or 441 or 442 or 443; major instrument or voice (21-24 credits); minor instrument or voice (9-12 credits); major and minor instrument or voice to total 33 credits; ensemble (twelve quarters, minimum of one year choral ensemble required).

SECONDARY GENERAL MUSIC EMPHASIS

Courses: MUSIC 110, 111, 112, 113, 114, 115, 210, 211, 212, 213, 214, 215, 313, 314, 340 (prerequisites: EDUC 301 music section and admission to Teacher Certification Program); MUSIC 316 or 317 or 318; 432; 442 or 443; 108; 280; 380; major instrument or voice (15-24 credits); minor instrument or voice (9-18 credits); the combined number of credits in major and minor instruments or voice must total 33 and must include the equivalent of MUSIC 236, 237, 232, 240, 241; ensemble (twelve quarters, minimum of one year choral ensemble and one quarter of non-Western ensemble required).

ELEMENTARY GENERAL MUSIC EMPHASIS

Courses: MUSIC 110, 111, 112, 113, 114, 115, 210, 211, 212, 213, 214, 215, 313, 314, 340 (prerequisites: EDUC 301 music section and admission to Teacher Certification Program); MUSIC 316 or 317 or 318; 440, 441, 108, 280,

380; major instrument or voice (15-24 credits); minor instrument or voice (9-18 credits): the combined number of credits in major and minor instruments or voice must total 33 and must include the equivalent of MUSIC 236, 237, 232, 240, 241; ensemble (twelve quarters, minimum of one year choral ensemble and one quarter of non-Western ensemble required).

Music Major: General Elementary School

50 approved credits required. Courses: MUSIC 110, 111, 112, 113, 114, 115, 213, 214, 215, 330; EDC&I 319; music applied (18 credits to include not less than 3 credits in voice and 3 credits in piano); ensemble (six quarters).

Natural Sciences

Teaching Major: Elementary School

65-69 approved credits required. The natural sciences major for elementary school is offered jointly by the departments of Botany, Chemistry, Geological Sciences, Physics, and Zoology. Approval of the major may be obtained by the student from one of the following: Chemistry advisory office, Geological Sciences advisory office, Physics advisory office, or Dr. Leonie Piternick, Office of Biology Education. The office giving original authorization must continue to supervise until the approved program is completed. A grade of 2.0 or better must be earned in each required course.

Courses: CHEM 101, 102 or 140, 150, 160; PHYS 101-102, 103 (preferred), or 114, 115, 116, 117, 118, 119 or 121, 122, 123, 131, 132, 133; ASTR 101; ATM S 101; GEOL 101; OCEAN 101; Biological Sciences Track A: BIOL 101-102, BOT 320, ZOOL 118; Track B: BIOL 210, 211, 212, BOT 371 or ZOOL 330 or 362.

Norwegian (Scandinavian Languages and Literature)

A grade-point average of 2.50 must be maintained.

Teaching Major: Elementary School

36 approved credits required. Courses: NORW 220, 221, 222, 223, 224, 225; 300, 301, 302 or 350, 351, 352; 303, 304, 305; SCAND 455 or NORW 450; EDC&I 339.

Teaching Minor: Secondary School

42 approved credits required. Courses: NORW 220, 221, 222, 223, 224, 225; 300, 301, 302 or 350, 351, 352; 303, 304, 305, 450, 490; SCAND 455; EDC&I 339.

Physics

Teaching Major: Secondary School

A grade of 2.0 or better must be earned in each required course. 64 approved credits required. Courses: MATH 124, 125, 126 or 134, 135, 136; PHYS 121, 122, 123, 131, 132,

133, 221, 222, 334, 335, 407, 408; approved electives in mathematics, physics, or other natural sciences (minimum of 12 credits). Grades of 3.0 or better in PHYS 407, 408. Grade-point average of 2.50 or better at certification.

Teaching Minor: Secondary School

A grade of 2.0 or better must be earned in each required course. Track A: 35 approved credits required; Track B: 31 approved credits required. Courses: Track A (with biological science or nonscience major)—PHYS 114, 115, 116, 117, 118, 119, 210, 211, 212, 407 (grade of 3.0 or better required in 407); Track B (with physical science or mathematics major)—PHYS 121, 122, 123, 131, 132, 133, 221, 222, 407, 408 (grades of 3.0 or better in PHYS 407, 408). Grade-point average of 2.50 or better at certification.

* The Department of Political Science maintains a current list of approved courses for the three broad fields.

Political Science

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A minimum of 10 graded credits in upper-division political science courses must be completed at the University by all students pursuing a teaching major or minor in political science.

Teaching Major: Secondary School

50 approved credits required. Courses: any three of the following: POL S 101, 201, 202, 203, 204; and a minimum of 10 upper-division credits from each of the following broad fields:* (1) Political Theory and Public Law, (2) Government, Politics, and Public Administration, and (3) Comparative Government and International Relations, POL S 351 is recommended for teachers in the state of Washington. A grade-point average of 2.25 or better is required at time of certification.

The department strongly recommends that a student who intends to teach in senior high school elect a minor in history in addition to the major in political science, and that a student who intends to teach in junior high school elect a minor in geography and take HSTAA 201, in addition to the political science major.

Teaching Major: Elementary School

50 approved credits required. Courses: same as those for Teaching Major: Secondary School. A grade-point average of 2.25 or better is required at the time of certification.

Teaching Minor: Secondary School

30 approved credits required. Courses: POL S 101, 202; 5 approved credits from upper-division political science electives; and the remaining upper-division credits from each of the following broad fields:* (1) Political Theory and Public Law, (2) Government, Politics, and Public Administration, and (3) Comparative Government and International Relations. A grade-point average of 2.25 or better is required at the time of certification.

COLLEGE OF EDUCATION



Psychology

Teaching Major: Secondary School

50 approved psychology credits required. Courses: PSYCH 101 or 102; 209; 231 or 232 or 233 or 361; 213 or 217 and 218; psychology electives (one and one-half years of high school algebra or qualifying test or equivalent are prerequisites for PSYCH 213; MATH 157 or 124 is prerequisite for PSYCH 217).

Teaching Major: Elementary School

50 approved psychology credits required. Courses: same as those for Teaching Major: Secondary School.

Teaching Minor: Secondary School

30 approved psychology credits required. Courses: same as those for Teaching Major: Secondary School.

Russian (Slavic Languages and Literature)

Teaching Major: Secondary School

47-57 approved credits required. Courses: RUSS 203 or 210 or 250; 301, 302, 303 or 350; 401, 402, 403 or 450; EDC&I 338; 10 credits from the following list of approved electives: SISRE 243; RUSS 321, 322, 323; 351, 352; 421, 423, 451, 452; 461, 463; HSTEU 442 or 444, 423 or 445; SLAV 351.

Teaching Major: Elementary School

47-57 approved credits required. Courses: same as those for Teaching Major: Secondary School.

Teaching Minor: Secondary School

23 approved credits required. Courses: RUSS 301, 302, 303 or 350; EDC&I 338; and 6 credits from the above list of approved electives.

Society and Justice

Teaching Major: Secondary or Elementary School

Major requirements are the same as those described in the College of Arts and Sciences section. Student should check with the program in Society and Justice for complete information.

Teaching Minor: Secondary School

28-30 credits required. Courses: one of the following— BG&S 200; POL S 362; one of the following—SOC 270, 271, 371, 472, 473; PSYCH 305; one of the following— SOC 372, POL S 464 and one of the following—SOC 473; SO JU 430; and 10 approved credits in the social sciences or humanities.

Sociology

Teaching Major: Secondary School

50 approved sociology credits required. All students in good standing (2.00 overall grade-point average) are eligible to enter as sociology majors. The department encourages students who have decided upon a sociology major to declare it early in their academic careers by seeing an undergraduate adviser in sociology.

To graduate with a teaching major in sociology, a student must take 50 credits in sociology as stated below and have a cumulative 2.50 grade-point average in sociology courses taken at the University. Transfer and postbaccalaureate students must complete a minimum of the required 50 sociology credits at the University.

Courses: SOC 110, 223, and 40 credits in sociology electives.

Sociology Major: Elementary School

50 approved sociology credits required. Requirements are the same as those for Teaching Major: Secondary School.

Teaching Minor: Secondary School

Same entrance requirements as Teaching Major: Secondary School.

30 approved sociology credits required, with a 2.50 gradepoint average in sociology courses taken. Courses: SOC 110 and 25 credits in sociology electives.

Spanish (Romance Languages and Literature)

Teaching Major: Secondary School

45 approved credits required. Courses: SPAN 301, 302, 303; 350, 351, 352 (two of the last three courses); 304, 305, 306, 409; four 400-level literature courses, of which one or two may be ROM 401 or SPAN 409; EDC&I 329; 333 or 334 or 335.

Teaching Major: Elementary School

36 approved credits required. Courses: SPAN 301, 302, 303; 350, 351, 352 (two of the last three courses); 304, 305, 306; 409; one 400-level literature course; EDC&I 333 or 334 or 335.

Teaching Minor: Secondary School

36 approved credits required. Courses: same as those for Teaching Major: Elementary School.

EDC&I 333, 334, 335 may be given only during Autumn Quarter; students should inquire at the department advisory office for current information. Students are urged to take any one of the SPAN 350, 351, 352 series *before* beginning the SPAN 304, 305, 306 series.

Special Education (Minor Only)

In addition to the requirements listed below, students who incorporate certification in Special Education in their master's degree in Special Education also must present a regular teaching major. A Special Education emphasis also may be combined with elementary school teacher certification. See Elementary Education: Special Education Emphasis.

Teaching Minor: Hearing Impaired, K-12

55 approved credits required. Prior admission to master's degree program in Special Education. Courses: SPHSC 201, speech and hearing sciences elective (5 credits), EDC&I 317, 318 or 319; 365, 370, 375 (select two); EDPSY 490; EDSPE 435, 436, 510, 512, 515, 521, 530, 531, 532, 533, 534.

Teaching Minor: Handicapped Early Childhood, K-9

33 approved credits required. Prior admission to master's degree program in Special Education. Courses: EDC&I 317, 318, or 319; EDPSY 400, 490; EDSPE 404, 414, 419, 510, 514, 515, 565; 3 credits in course numbered 300 or above outside of education, dealing with handicapped children.

Teaching Minor: Severely Handicapped, K-12

42 approved credits required. Prior admission to master's degree program in Special Education. Courses: EDPSY 490; EDSPE 404, 505, 507, 509 or 525, 510, 511, 513, 514, 515; one course numbered 300 or above outside education; Special Education elective (6 credits). Appropriate sections of EDSPE 520 may be substituted for EDSPE 507 or 513.

Speech Communication

Students declaring a major in speech communication must present a grade-point average of 2.50 and are required to maintain a grade-point average of 2.50 or higher in all speech communication courses. For students transferring from other schools, University of Washington grades will take precedence after two or more quarters of attendance at the University.

Teaching Major: Secondary School

60 approved credits required. Courses: SPCH 102, 140, 203, 220, 270, 334, 368, 369, 373, 456; EDC&I 357; 13 credits in approved electives in speech including 5 credits at the 400 level, excluding SPCH 499. In the fifth year the student must elect an additional 15 credits in upper-division courses approved by the Department of Speech Communications.

Teaching Minor: Secondary School

35 approved credits required. Courses: SPCH 102, 203, 220, 368 and 369, or 373, 456, EDC&I 357; 8 credits in approved electives in speech communication, of which 5 credits must be in upper-division courses.

Teaching Major: Elementary School

48 approved credits required. Courses: SPCH 102, 140, 203, 341,* 368, 369, 373, 455, SPHSC 250; 15 credits of approved electives, of which 5 credits, excluding SPCH 499, must be at the 400 level.

* Or department-approved substitution.

Speech and Hearing Sciences

Teaching Major: Elementary School

51 approved credits required. Courses: SPHSC 201, 250, 302, 303, 307, 310, 311. 25 elective credits from the following: SPHSC 315, 330, 380, 401, 402, 410, 420, 430, 431, 450, 454, 484, 499. Designed for students in elementary education as an academic major that provides information concerning the nature, development, and disorders of human language, speech, and hearing.

Swedish (Scandinavian Languages and Literature)

A grade-point average of 2.50 must be maintained.

Teaching Major: Elementary School

36 approved credits required. Courses: SWED 220, 221, 222, 223, 224, 225; 300, 301, 302 or 350, 351, 352; 303, 304, 305; SWED 450 or SCAND 455; EDC&I 339.

Teaching Minor: Secondary School

42 approved credits required. Courses: SWED 220, 221, 222, 223, 224, 225; 300, 301, 302 or 350, 351, 352; 303, 304, 305, 450, 490; SCAND 455; EDC&I 339.

GRADUATE PROGRAMS

Graduate Program Adviser

Roger G. Olstad Office of Graduate Studies 206 Miller

Admission to the College of Education or to any of the programs within the college assumes and is dependent upon the student's eligibility for admission, enrollment, and registration at the University of Washington.

By means of its graduate programs, the College of Education provides for the continuing education of teachers and other specialists in various phases of education, including substantive areas of curriculum and instruction; for the preparation of school and college administrators and counselors; and for the scholarly study of the educational process itself—its history, philosophy, and organization, and the sociological and psychological foundations of its operation. In addition to the "fifth," or postbaccalaureate, year required by the state of Washington for the standard/ continuing teaching credential that may be part of an approved graduate program, certain of the special professional certificates for school personnel that require graduate study may be earned through the College of Education.

Students who intend to work toward advanced degrees must apply for admission to the Graduate School and must meet its general requirements together with any major field requirements that may be specified. For example, test scores are required and some fields require successful experience relative to the programs. Additional information may be obtained from the graduate program adviser, appropriate members of the faculty, or the Office of Graduate Studies, 206 Miller.

Graduate Degree Programs

The basic graduate programs offered by the College of Education lead to one of three advanced degrees: Master of Education, Doctor of Philosophy, or Doctor of Education. Students entering these programs are governed by requirements outlined below.

Master of Education Degree

Requirements for the Master of Education degree are: completion of an approved program of a minimum of 45 quarter credits, exclusive of prerequisites, that consists of a minimum of 15 quarter credits in an area of concentration in education; a minimum of 9 quarter credits in related courses in, and outside of, education; thesis: 9 quarter credits, or option of nonthesis: 9 quarter credits in field study, research seminar, or special assignment; final examination.

The Master of Education degree is currently offered in the following specializations: Curriculum and Instruction (includes art education, business education, early childhood education, educational communications, elementary education, environmental education, Indian education, language arts education, mathematics education, music education, reading, science education, secondary education, social studies education); Educational Administration; Educational Policy Studies (Foundations of Education, includes history of education, philosophy of education, sociology of education, and general studies); Educational Psychology (includes reading, reading disability, counseling, vocational rehabilitation, school psychology, learning and thinking, measurement and evaluation); Higher Education; Special Education (includes general curriculum, early childhood, mildly handicapped, severely handicapped, hearing impaired).



Doctor of Philosophy Degree

Assuming the student has completed the master's degree or its equivalent, requirements for the Doctor of Philosophy degree are: a minimum of two academic years of resident study, of which one must be as a full-time student, including 27 quarter credits for dissertation in addition to the course work specialization and course work outside of education; a General Examination, written and oral; a Final Examination after the dissertation has been satisfactorily completed.

Traditionally, the Doctor of Philosophy degree is offered with experiences tailored individually for aspirants to this degree. A student may concentrate studies and research with emphasis on one of a particular set of topics, such as educational communications, elementary education, general curriculum, language arts education, mathematics education, science education, social studies education, educational counseling and school psychology, learning-thinking and language processes, research design and statistics, measurement, educational policy studies (Foundations of Education) including history of education and philosophy of education, higher education, or special education including exceptional children.

Doctor of Education Degree

Assuming the student has completed the master's degree or its equivalent, requirements for the Doctor of Education degree are: a minimum of two academic years of resident study, of which one must be as a full-time student, including 27 quarter credits for dissertation* in addition to the course work specializations and course work outside of education; a General Examination, written and oral; a Final Examination after the dissertation has been satisfactorily completed.

The Doctor of Education degree is offered with experiences tailored individually for aspirants to this degree.

A student may concentrate studies and research with emphasis on one of a particular set of topics, such as educational communications, general curriculum development, language arts education, mathematics education, science education, educational administration, higher education, or special education including exceptional children.

Administrators' Certificates

The University of Washington currently conducts administrator certification programs that have been approved by the State Board of Education. The programs are monitored by a policy board consisting of eleven members representing professional administrator organizations and University of Washington faculty members and graduate students. The

^{*} An independent investigation of an area in the subject-matter field, leading to a suitably written dissertation. Such an investigation might take the form of research on pedagogical problems, a contribution to the teaching of the subject matter, or the synthesis of scattered materials that might have potential in teaching but have not yet been reviewed, digested, and made intelligible and useful in these areas of instruction.

responsibility for issuing an administrator certificate is that of the Office of the State Superintendent of Public Instruction (SPI); on satisfactory completion of a program of preparation, the University verifies to the SPI that the program has been completed and the certificate is then issued by the SPI. Each of these certificates includes academic requirements, experience requirements, and the satisfaction of generic standards of competency.

The programs for administrators' certification are: (1) Superintendent's certificate (a) Types: Provisional/Initial, Standard/Continuing. (2) Principal's certificate (a) Types: Provisional/Initial, Standard/Continuing. (b) Levels: elementary, secondary, general. (3) Program administrator's certificate (a) Types: Initial, Continuing. (b) Specializations: The program administrator certificate has been planned to meet the needs of persons responsible for the management of a district-wide activity or service involving the instructional program. At the University of Washington, programs are designed for administrators of curriculum, or special education, or pupil personnel services, or for business officials.

Information concerning admission to, and completion of, all of the above programs is to be obtained from the University of Washington, College of Education, Area of Educational Administration, 309 Miller, DQ-12, Seattle, Washington 98195.

Educational Staff Associate Certification

Communication Disorders Specialist

The Department of Speech and Hearing Sciences provides a major specifically designed for those students who wish to prepare for careers as communication disorders specialists (CDS) in schools. The undergraduate portion of this program is preprofessional in nature, culminating in a Bachelor of Arts degree, College of Education. In order to fulfill the professional aspects of the CDS major, a student must complete a minimum of 45 postbaccalaureate credit hours. Successful completion of the undergraduate and postbaccalaureate work enables the student to fulfill the academic and practicum requirements for the Initial Educational Staff Associate-Communication Disorders Specialist (ESA-CDS) certificate of the state of Washington and / the Certificate of Clinical Competence of the American Speech and Hearing Association. This ESA-CDS credential is required under the 1971 and 1978 state guidelines for speech/ language and hearing pathologists employed in the schools of Washington.

Admission to this major is limited, and those admitted to the CDS track follow a program approved by the Superintendent of Public Instruction (SPI). An advisory board of practicing professionals monitors the training program and certification of CDS. The responsibility for issuing a ESA-CDS certificate is that of the SPI. Candidates are awarded certification by the SPI on the basis of satisfactory completion of a program of preparation at the University and on the recommendation of the advisory board. Inquiries about the program and certification should be directed to the CDS program adviser or the undergraduate adviser at the University of Washington, Department of Speech and Hearing Sciences, 1320 Northeast Campus Parkway, HK-10, Seattle, Washington 98105 (543-5440).

Occupational Therapist

In order to provide occupational therapy services to any public educational program in the state of Washington, a registered occupational therapist must be certified by the State Superintendent of Public Instruction as an Educational Staff Associate.

Candidates for certification must demonstrate knowledge and competencies at acceptable levels of professional practice. They must be graduates of state, regionally, or nationally approved/accredited programs for the preparation of occupational therapists and registered by the American Occupational Therapy Association. In the state of Washington, the programs approved by the State Board of Education for the preparation of occupational therapists are the University of Washington and the University of Puget Sound.

Application materials and information packets may be purchased for \$5 from the University Book Store, 4326 University Way Northeast, Seattle, Washington 98105.

Physical Therapist

Physical therapists serving as support personnel in the Washington public school system must hold a valid certificate as Educational Staff Associates (ESA) through the Office of the Superintendent of Public Instruction.

A candidate for certification must be a graduate of an accredited educational program and must hold a license to practice physical therapy within the state. Candidates must demonstrate knowledge and competencies at approved levels of practice.

Both the University of Washington and the University of Puget Sound offer approved programs for the preparation of physical therapists at the initial level. The Physical Therapy Policy Board offers preparation and assessment opportunities leading to continuing level certification.

Application materials and information packets may be purchased for \$4.22 from the University Book Store, South Campus Branch, 301 South Campus Center, WF-15, Seattle, Washington 98195.

School Counselor

The College of Education offers a Master of Education degree leading to Educational Staff Associate certification in school counseling. The professional-scientific master's degree program in educational psychology includes specializations in either middle and secondary school counseling or elementary counseling that are designed to prepare



students to meet K-12 certification requirements. Applications for the master's degree program may be obtained from the University of Washington, College of Education, Area of Educational Psychology, 322 Miller, DQ-12, Seattle, Washington 98195.

School Psychologist

The College of Education offers a Master of Education degree leading to Educational Staff Associate certification in school psychology. The professional-scientific master's degree program in educational psychology includes a specialization in school psychology that is designed to prepare students to meet K-12 certification requirements. Applications for the master's degree program may be obtained from the University of Washington, College of Education, Area of Educational Psychology, 322 Miller, DQ-12, Seattle, Washington 98195.

Reading Resource Specialist

The College of Education offers two Master of Education degree patterns leading to Reading Resource Specialist

certification. Those patterns are the curriculum and instruction/educational psychology major in development reading and the educational psychology major in school psychology and reading disabilities. Students seeking certification under either pattern are advised that careful program planning is necessary in order to fulfill requirements for certification as well as for the graduate degree. Applications for Reading Resource Specialist certification program may be obtained from Area of Curriculum and Instruction, 122 Miller, or the Area of Educational Psychology, 322 Miller, College of Education, DQ-12, University of Washington, Seattle, Washington 98195.

Social Worker

Social workers who practice in public schools in Washington must be certified under the State Board of Education provisions for certifying Educational Staff Associates. Persons interested in seeking certification at the initial or continuing level as school social workers may address inquiries to University of Washington, School of Social Work, Assoc. Prof. Jack A. N. Ellis, 1417 Northeast Forty-second Street, Seattle, Washington 98105.



ENGINEERING

Dean Dale A. Carlson 371 Loew

Associate Deans

Reiner Decher Brian W. Mar James W. Souther

Today's engineers face many challenges. As in the past, they must be competent to use the principles of science and engineering in order to create things that people need or want. They also must apply ingenuity to devising products and processes that are both useful and economical. Today more than ever, they must strive to ensure that their work benefits mankind and is compatible with social and environmental constraints. Many of society's problems today can be solved only by a technology conceived and executed with a full sensitivity to human needs and with consideration of its long-range effects on men and women.

An engineer with the baccalaureate degree is immediately useful for beginning to solve technical problems in government and industry. However, those engineers who plan to take up research, college teaching, or creative activities on a professional level will need graduate study leading to the master's and doctoral degrees. Increasingly, the master's degree is coming to be considered as the first professional engineering degree.

For undergraduate students, the College of Engineering offers a flexible curriculum that suits the varied needs of many men and women, both in established departmental programs and in new interdisciplinary studies. Also, the college has active educational and research programs, both departmental and interdisciplinary, at every graduate level.

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. Progressively added were degrees in civil engineering (1901), electrical engineering (1902), mechanical engineering (1906), chemical engineering (1907), ceramic engineering (1919), aeronautical engineering (1929), and nuclear engineering (1955). In 1979, 3,800 undergraduate and 800 graduate students were enrolled in engineering programs taught by a faculty of nearly two hundred members.

College Facilities

Teaching and research activities of the College of Engineering occupy thirteen major campus buildings and portions of others. All except the hydraulics laboratory are grouped around the engineering quadrangle. These buildings, most of them relatively new, contain the college's offices, classrooms, and numerous research and teaching laboratories. A central engineering library that serves the college supplements the nearby chemistry, mathematics, physics, and main libraries in providing outstanding collections of books, periodicals, technical reports, and patents of interest to engineers. The University's Computer Center and computer terminals are convenient for many engineering studies.

Facilities of particular interest to students include a large wind tunnel, a/ one-hundred-kilowatt nuclear reactor, a forty-four-acre antenna site, a microwave laboratory, a large structural testing laboratory, an extensive hydraulics laboratory, a laboratory for heat-transfer studies, and a large interdisciplinary research laboratory.

Student Organizations and Activities

All of the major professional engineering societies have student chapters on the campus, and every engineering student is encouraged to join the chapter that represents his or her field of interest. The college also has student chapters of the Society of Women Engineers and the Society of Black Engineers. The Engineering Student Council, consisting of student representatives from all departments and professional societies, is the major college-wide student organization and participates actively in college affairs. Honor societies open to engineering students are Tau Beta Pi and Sigma Xi.

Students also serve with faculty members on engineering policy committees, which make recommendations concerning teacher evaluation, curriculum revisions, advising, grading systems, and other matters of interest to students and faculty.

Financial Aid

The college offers financial assistance to undergraduates through industrial scholarships and loan funds. Scholarship information is available at the college advising offices or at the Office of Student Financial Aid, 170 Schmitz. Most scholarships are given after a year in residence by the student. Qualified graduate students may obtain financial assistance through industrial and governmental fellowships, research assistantships, or teaching assistantships. A student seeking such aid should apply at the office of his or her major department.

UNDERGRADUATE PROGRAMS

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.

Admission

Students will be considered for admission to the engineering premajor category when they have completed 45 credits including MATH 124, 125, 126, and three quarters of physics and/or chemistry taken from PHYS 121, 122, 123, CHEM 140, 150, 160, or their equivalents. Details of admission to the University can be found in the Undergraduate Admission and Enrollment section of this catalog. Admission to the college requires qualifications that exceed those for admission to the University. All departmental major programs have individual admission criteria and enrollment limits.

Recommended High School Preparation

Students who intend to study engineering should choose high school electives that strengthen their background in mathematics, physical science, and communication. Mathematics through algebra and trigonometry, physics, and chemistry are prerequisites for first-year courses in engineering. A fourth year in mathematics and senior-level English composition are also recommended. Those who have not completed prerequisite courses in high school must take equivalent courses at the University in addition to the regularly required program, although this usually increases the time needed to earn a degree.

Advising Center

Executive Director Alan D. Miller 110 Engineering Library

The Engineering Advising Center assists engineering premajors in planning their educational programs and maintains their academic records until they have been admitted to a major department or have earned 75 applicable credits. At that time, the records are transferred to the major department, or the student is transferred to the College of Arts and Sciences, if not admissible to an engineering department. For students entering a nondepartmental program (B.S.E. or B.S. degrees), the records are maintained at the advising center, while advising is done by the student's individual faculty adviser under the supervision of a faculty committee.

In the advising center, faculty members from the various engineering departments are available for consultation and career counseling. In addition, students are urged to contact faculty members anywhere in the college for program, course, or career information and discussion. A first-year career-planning course (ENGR 110) is strongly recommended for all students who wish the most complete information on career alternatives. Students in other colleges contemplating a career in engineering may also consult the advising center for guidance and information.

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 Electrical Engineering). It is designed for students who intend to practice as professional engineers in a standard branch of engineering or who plan to undertake postgraduate study in that field. The curricula for these degrees are accredited by the Engineers' Council for Professional Development (ECPD), the principal engineering accrediting agency in the United States. Accreditation requirements stipulate that all graduates must meet certain specified distribution requirements. A description of how each of the accredited baccalaureate programs meets the ECPD requirements is available from the department office and from the Engineering Advising Center. Accredited four-



year curricula leading to baccalaureate degrees are offered in aeronautics and astronautics and in ceramic, chemical, civil, electrical, mechanical, and metallurgical engineering.

Application to a departmental program at the upper-division level is made at a time that lower-division requirements are satisfied, usually Spring Quarter of the sophomore year. Currently, enrollment limits imposed by faculty size and laboratory/classroom space available are such that entry into a specific department may be very competitive. In general, superior scholastic aptitude as evidenced by the attainment of average grades ranging from 2.5 to 3.4, depending on the department, in mathematics and science are used as criteria in the admission process. The student is urged to plan ahead by being aware of his or her future department's requirements, noting particularly which requirements must be fulfilled by the time the application is made. Some departments in the college have programs flexible enough for entry to be possible in any quarter of the year, while others may permit entry only during Autumn Quarter.

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. The curriculum might emphasize bioengineering, environmental engineering, mineral resources, nuclear engineering, ocean engineering, or another interdisciplinary or specially approved area. Graduates can practice as professional engineers in newly developing fields, or they may embark on postgraduate study in these or allied fields (see the Interdisciplinary Engineering Studies Program in this section of the catalog).

Nonprofessional Program

This program leads to a Bachelor of Science degree and is intended for students who wish to have a significant exposure to science and engineering courses, but who do not plan to engage in professional engineering practice. It provides preparation for work in specific areas such as environmental studies or scientific and technical communication. It also is excellent preparation for entry into professional schools of business, law, or medicine (see the Interdisciplinary Engineering Studies Program in this section of this catalog).

General Requirements for Graduation

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 the program or department.

All departments of the college have individual continuation policies that specify minimum rate of progress as well as minimum academic performance levels. These policies may be more restrictive than those generally applied by this university and may change in time. Information on current policy is available at the department office.

Selecting courses that fulfill graduation requirements is the responsibility of each individual. Students are urged to check carefully the course and credit requirements of the program in which they are enrolled.

The college requires a minimum number of credits within certain areas of study and some specific courses within certain areas. All programs require:

Mathematics: 23 Credits

Specific courses required are MATH 124, 125, 126, and 238. The remaining 5 credits must be taken at the 200 level or higher; MATH 205, ENGR 401, 402, 403, or MATH 327 are recommended.

Natural Science: 23 Credits

Chemistry (4 credits) at the level of CHEM 140 or equivalent and PHYS 121 and 122 (8 credits) are required. The 10 additional credits are often completed by further study in chemistry or physics, but students may elect advanced courses in other fields such as astronomy, atmospheric sciences, biology, geological science, geophysics, or oceanography. Elementary survey courses are not acceptable in this category.

Functional Techniques: 12 Credits

ENGR 141, Introductory FORTRAN Programming (4 credits), and a college-level writing course (e.g., ENGR 130 or 331 [3 credits]) are required. The remaining credits are to be selected from the following areas of study: visual presentation, written and oral communication, computational technology, design and synthesis, and laboratory techniques. At least three of the five areas must be represented by the courses used to meet the functional techiques requirement.

Engineering Science: 16 Credits '

No specific courses are required by the college. Courses may be selected from materials science, mechanics, linear systems, electronics, and thermodynamics. In special cases, and with the major adviser's approval, a student may include in the engineering science category various courses in mathematics, science; and engineering (usually upperdivision courses and not in the major field).

A major department may specify as many as 16 credits of particular courses, not already specified for all students, from the mathematics, natural science, functional techniques, and engineering science areas (see individual departmental requirements). Such courses are intended to provide the student with a strong background for his or her major field of study. Students who have completed 135 credits or more of their degree program may use courses numbered 100 to 200 to satisfy basic requirements of the College of Engineering only with their major adviser's approval. Engineering science and functional techniques requirements are normally satisfied by upper-division students with the substitution of 300- or 400-level courses that are not in the student's major department or professional program.

Humanities and Social Sciences: 30 Credits

A minimum of 10 credits is required in each area. Humanities include courses in literature, art, music, drama, philosophy, etc., which stress the essential qualities of individual forms of expression. Language courses must be concerned with literature, not skills; similarly, art or music courses must be devoted to music or art forms, not development of students' performing skills. Social sciences include courses in history, economics, psychology, sociology, etc., which stress the social nature of mankind and the development and analysis of societies and/or social institutions (see Humanistic-Social Studies in Undergraduate and Graduate Major Programs in this section of the catalog).

Upper-Division Engineering Courses of Study: 66 Credits

Major departments or specific programs may require as many as 78 credits in their curricula.

Special Programs

Cooperative Education (Co-op) and Internships

The Cooperative Education Program of the College of Engineering permits engineering undergraduate students in any of the engineering departmental programs to combine practical, on-the-job engineering experience with their academic studies. Freshmen who have completed one year of engineering study and transfer students who have completed one quarter of engineering at the University and who have a grade-point average of 2.50 or better may apply for entry into the engineering Cooperative Education Program. Minimum requirements for completion of the co-op program involve completing at least two work experiences totaling not less than 12 months. Students must register for 2 credits each quarter they are on work experiences in both the co-op and the internship programs. Up to three extra quarters can be required for a student to complete the Cooperative Education Program. However, the combination of the academic degree and related work experience is usually reflected in a better starting salary for co-op graduates.

Internships are available to seniors and graduate students. Graduate students interested in internships should obtain the support of their departments and then apply for admission to the internship program.

Employers participating in the co-op and internship programs include aerospace firms, electronic equipment manufacturers, consulting firms, utilities, machinery and mechanical equipment manufacturers, construction firms, and a variety of city, state, and federal agencies. Work periods with these employers are coordinated with the academic progress of the student and become more sophisticated as the student nears the end of the academic program. Frequently, students find actual on-the-job training experience helpful in selecting their major field of study. With the cost of education rapidly mounting, the co-op program can be an excellent method of earning a substantial portion of a student's college expenses. More important, however, are the educational advantages of cooperative education. The combining of academic and work experience often provides a relevancy for both. It gives reality to learning, increases educational motivation, develops greater human understanding, accelerates the student's progress toward maturity, and provides a valuable orientation to the world of work as well as many useful employment contacts.

Additional information on this program may be obtained from the University of Washington, College of Engineering, Director of the Cooperative Education Program, FH-10, Seattle, Washington 98195.

CONTINUING EDUCATION PROGRAMS

Rapid advances in applied mathematics and in the physical and engineering sciences make it especially important that practicing engineers who have been out of school more than ten to fifteen years continue to update their educations.

Consequently, the College of Engineering offers a variety of continuing education programs, which may be divided into two categories: (1) courses carrying Continuing Studies credit, and (2) noncredit courses, short courses, and conferences.

In general, both kinds of continuing education courses are offered according to need and are announced in *Spectrum*, in special circulars, and in the news media.

Courses Carrying Continuing Studies Credit

In 1966, the University of Washington established a category of courses that carry Continuing Studies credit. This specially designed credit is *not* intended for application toward a University degree. Instead, the program's aim is to satisfy the immediate needs, for example, of professional engineers and their employers. Quantitatively, 1 credit in Continuing Studies requires the same amount of work as is normally needed for one quarter of University credit within the degree programs. All successfully completed courses are entered on an official transcript available to the student as part of his or her educational record.

Short Courses and Conferences

To serve the needs of the state's engineering and scientific community, from time to time the University offers short, intensive courses on advanced topics. Because of the nature of these courses, formal evaluation of the participants is not possible; hence these courses usually do not carry Continuing Studies credit. Each course ordinarily covers a specialized topic and is offered on a level that approaches the forefront of current knowledge or technology.

GRADUATE PROGRAMS AND SPECIAL FACILITIES

Students who intend to work toward advanced degrees must fulfill the admission requirements of the Graduate School and of the department program in which they expect to major. Acceptance also depends upon the availability of the faculty and facilities for the program desired. Students must satisfy the departmental and Graduate School requirements for an advanced degree that are in force at the time the degree is to be awarded.

Department Graduate Programs

Graduate study leading to the Master of Science degree with departmental designation and to the Doctor of Philosophy degree is available in all departments of the college. Descriptions of these programs may be found in the individual departmental sections of this catalog.

College Graduate Programs

The college also offers graduate programs leading to the Master of Science in Engineering (M.S.E.), Master of Engineering (M.Eng.), and Master of Science (M.S.) degrees, without designation of a specific major. There are approved programs leading to the M.S.E. degree in civil, mechanical, electrical, and interdisciplinary engineering; an approved program leading to the M.Eng. degree in aeronautics and astronautics; and approved programs leading to the M.S. in civil engineering and in the Department of Mining, Metallurgical, and Ceramic Engineering.

As a minimum, admission requires a B.S. degree in science or engineering and substantial evidence of aptitude for graduate study. Submission of scores on the Graduate Record Examination is required. Application for admission should be made to the Graduate School.

Graduation requirements differ for the various programs and may be obtained from the office of the Dean, College of Engineering.

Office of Engineering Research

Coordinator

B. W. Mar 376 Loew

The Office of Engineering Research attempts to promote, stimulate, and coordinate research in all fields of engineering. Its primary role is to maintain records of grant and contract proposals and awards. It allocates limited resources to various college units to increase the amount of research



grants and contracts funding in the College of Engineering. These resources include funds to prepare proposals, to present proposals to possible funding agencies, and to locate potential sources.

Aerospace and Energetics Research Program

Director

Abraham Hertzberg

120 Aerospace Research and Engineering Laboratory

The Aerospace and Energetics Research Program is an interdepartmental and interdisciplinary program of the College of Engineering dedicated to high technology, fundamental science, and engineering research. Faculty and students from the College of Engineering and the College of Arts and Sciences are involved in an expanding program of research activities. The program emphasizes those areas of aerospace and energy research designed to serve the needs of mankind, not only in the present, but as they can be visualized in the future.

Currently, research is being carried out in the development of the technology of high-power lasers and their applications. These high-power lasers could prove to be an indispensable part in the creation of new approaches to controlled thermonuclear power plants. A program involving the application of advanced technologies to the generation of practical solar energy power is growing rapidly. These new technology approaches offer the potential of making solar energy an attractive source of electric energy as well as a source of useful, portable fuels. Active research is also under way in the application of the laser to bioengineeringrelated areas. The aeronautics area is presently concentrating on developing new concepts relating to fuel-efficient airplanes as well as to the technology of advanced research techniques in fluid flow problems. These are some of the typical research programs currently under way. Research support is obtained from the National Science Foundation, the Department of Energy, the National Aeronautics and Space Administration, and the Department of Defense.

Brittle Materials Design Center

Director

James I. Mueller 301 Roberts

The Brittle Materials Design Center is an interdisciplinary activity of the College of Engineering involving design methodology studies and research on the utilization of high technology ceramic materials in advanced structures for use in hostile environments.

The design methodology portion includes a unique academic program available to seniors and graduate students in aeronautics and astronautics, ceramic engineering, civil engineering, mechanical engineering, and metallurgical engineering. A series of courses involves teaching faculty from four different engineering disciplines that may be utilized to satisfy undergraduate design requirements in several departments. Detailed information on these courses is available in the descriptive material of each of the participating disciplines.

Interdisciplinary research involves faculty and students from the colleges of Engineering and Arts and Sciences. Support is obtained from the National Aeronautics and Space Administration, Department of Defense, Department of Energy, and several industrial organizations.

Ocean Engineering Laboratory

Director, Ocean Engineering Program

Bruce H. Adee 326 Mechanical Engineering

The diverse ocean engineering research program is housed in various areas around the campus. At the Applied Physics Laboratory, the emphasis is on underwater acoustics and instrumentation research, while wave channels and hydraulic modeling are the main facilities in use at the Harris Hydraulics Laboratory. In the Mechanical Engineering building, a large semisubmersible wave-measuring platform is under construction, and computer facilities, including a computer-controlled data-acquisition system, are available.

Research in the development of floating breakwaters, marine acoustics, submarine soil mechanics, marine hydrodynamics, coastal structures, marine materials, and marine transportation safety are among the activities undertaken by the faculty.

Washington Mining and Mineral Resources Research Institute

Director

Donald L. Anderson 325 Roberts

This state institute was established at the University in January, 1980. Its responsibilities include the conduct of research, investigations, demonstrations, and experiments of a basic and/or practical nature in relation to mining and mineral resources and the provision for the training of mineral engineers and scientists. The institute is under the direction of the Department of Mining, Metallurgical, and Ceramic Engineering.

UNDERGRADUATE PREMAJOR PROGRAM

Students are expected to complete most of the basic requirements in mathematics, natural science, functional techniques, and engineering science early in their college work, usually in the first two years. During the last two years of the undergraduate program, the student concentrates on the engineering course of study for the particular degree objective. A typical curriculum for the first two years is shown below.

First Year

Courses		•	•						Cm	atibe
MATH 124 125 126 Calculus With Analytical Geometry							15			
Salance ucually chemictry or physics	iyac		100	me	uy		•	•••	· .	1.1
Science, usually chemistry of physics .	• •		•	•	•••	•	·	•••	. 1.	2-14
ENGR 141 Introductory FOR I KAN PTC	ograr	nmi	ng		•••	•	•	•••	٠	4
ENGR 130 or college-level writing course	: .	• •	•	•		•	•		•	- 3
Engineering functional techniques		• •		•, •						4
Humanities, social studies, or electives .		• •								5
Career Planning										1
•										45
			•		-			2	•,	
Second Year							•		-,	
Courses						·			Crr	dits
MATH 238 Elements of Differential For	uatic	ins								3
Additional mathematics			•	•	•••	•	•.	•••	•.	5-6
Solance usually chemistry or physics	•••	• •	•	•	•	·	• ·	•••) I I
Encinee, usually chemistry of physics .	•••	• •	•	•	•••	•	•	•••	- -	7-11 > 12
Engineering science	• •	• •	•	•	•••	٠	·	••	.14	2-10
Humanities, social studies, or electives .	• •	• •	•	•	•••	•	•	• •	. 9) -15

Requirements in the areas of engineering functional techniques and engineering science are usually met by collegel courses, which are nondepartmental courses carrying the prefix ENGR and are taught by faculty members drawn from throughout the college. Some courses offered outside the college also are acceptable as courses in functional techniques. These courses provide skills essential to engineering and complement the mathematics and science included in the curriculum. They broaden the technical exposure of the student and demonstrate how similar principles are applied in the various engineering disciplines.

Engineering Functional Techniques Courses

VISUAL PRESENTATION

ENGR 123 Graphical Analysis ART 105, 106, 107 Drawing ARCH 310, 311, 312 Introduction to Design Graphics

WRITTEN AND ORAL COMMUNICATION

Skill courses in English composition and speech

COMPUTATIONAL TECHNOLOGY

- ENGR 141 Introductory FORTRAN Programming ENGR 341 Computer Applications of Numerical Methods
- ENGR 345 Advanced Topics in Digital Computing
- ENGR 346 Assembly Language Programming

DESIGN AND SYNTHESIS

ENGR 150 Introduction to Design

ARCH 300, 301, 302 Introduction to Design— Laboratory
COLLEGE OF ENGINEERING

LABORATORY TECHNIQUES

ENGR 140 Measurement and Experimentation CHEM 151 General Chemistry Laboratory CHEM 241, 242 Organic Chemistry Laboratory MICRO 301 General Microbiology MICRO 320 Media Preparation PHYS 117, 118, 119 General Physics Laboratory PHYS 131, 132, 133 Experimental Physics PHYS 331 Optics Laboratory PHYS 334, 335 Electric Circuits Laboratory

Engineering Science Courses

ENGR '170	Fundamentals of Materials Science
ENGR 171	Materials Science Laboratory
ENGR 190	Introduction to Logical System Design
ENGR 210	Engineering Statics
ENGR 220	Introduction to Mechanics of Materials
ENGR 230	Kinematics and Dynamics
ENGR 240	Introduction to Continuum Mechanics
ENGR 251	Analog and Digital Electronics
ENGR 260	Thermodynamics
	- -

Engineering Elective Courses

These courses provide both engineering and nonengineering students with a general technological component in their courses of study. Such courses as ENGR 307, Energy Controversies, and ENGR 305, Environmental Radioactivity, give students an opportunity to explore important present-day concerns about the impact of technology on society, including a rational analysis of the technical and social questions involved. Other courses, such as ENGR 345 (Advanced Topics in Digital Computing), provide an opportunity for students to extend skills and understanding in general areas of interest.

- ENGR 110 Career Planning I
- ENGR 161 Plane Surveying
- ENGR 270 Air-Water Interface Transportation Vehicles
- ENGR 305 Environmental Radioactivity
- ENGR 307 Energy Controversies
- ENGR 310 Social Constraints on Engineering Design
- ENGR 351 Inventions and Patents
- ENGR 360 Introductory Acoustics
- ENGR 401, 402, 403 Analytical Methods in Engineering



Undergraduate and Graduate Major Programs

AERONAUTICS AND ASTRONAUTICS

206 Guggenheim

Aeronautics and astronautics is based on an understanding of the engineering sciences and the use of these sciences to develop the engineering technology associated with transportation vehicles operating underwater, in air, in space, or at the interface of these environments.

Study of dynamics and of the mechanics of fluids, gases, and solids in the junior year provides the foundation for senior-level elective studies in the engineering technology of aeronautics and astronautics. Graduate studies retain the emphasis on understanding of the engineering sciences and on the application of these sciences to the advancement of newly developing technologies. The faculty is widely recognized for its contributions in many fields associated with aeronautics and astronautics, such as gas dynamics, propulsion, structural mechanics, orbital mechanics, stability and control, wind-tunnel testing, experimental stress analysis, and applied mathematics, as well as in continuum mechanics, high-energy laser devices, and low-pollution energy converters. Graduate students also can use the department affiliation as a base for a variety of interdisciplinary graduate studies in the college.

Faculty

David A. Russell, Chairperson; Bollard, Bossi, Bruckner, Christiansen, Decher, Eastman (emeritus), Fyfe, Ganzer (emeritus), Hertzberg, Holsapple, Joppa, Kevorkian, Mattick, Ness, Oates, Parmerter, Pearson, Rae, Street, Vagners.

Undergraduate Program

Bachelor of Science in Aeronautics and Astronautics Degree

Entrance into the department requires the equivalent of at least 45 credits with a 2.00 grade-point average and attainment of 2.0 in specified courses. Details of the entrance requirements may be obtained from this department or the University's Office of Admissions.

The department program begins in the junior year. The previous two years are spent in the preparatory college program, described in detail in preceding sections of this catalog.

The department has the following recommendations and requirements for technical preparation beyond those

courses required of all engineering students: In mathematics, MATH 327 and/or A A 370 are recommended. Consideration should also be given to ENGR 401, 402, 403, and MATH 205. In natural science, CHEM 150, PHYS 123, 221, and 222 are recommended. In engineering science, ENGR 210, 230, and 260 are required, of which 210 must be taken before Autumn Quarter of the junior year and 230 and 260 before Winter Quarter of the junior year. In addition, ENGR 170 and 240 are recommended in the first two years.

THIRD YEAR

First quarter: A A 300 (4 credits), ENGR 230 (4), A A 320 (2), A A 330 (4), electives. Second quarter: A A 301 (4), A A 311 (3), A A 321 (2), A A 331 (4), electives. Third quarter: A A 302 (4), A A 312 (3), A A 322 (2), A A 332 (4), electives.

FOURTH YEAR

A A 460 (3) and A A 410 (3) or 420 (3) are required, plus 24 credits of senior-level technical electives, with at least 21 credits chosen from departmental courses. Current offerings are: gas dynamics—A A 400, 401; aircraft design— A A 410, 411; spacecraft design—A A 420; structural mechanics—A A 430, 431; flight mechanics—A A 440, 441; space mechanics—A A 450, 451; propulsion—A A 460, 461; systems dynamics and aeroelasticity—A A 480, 481; environmental aspects of energy conversion—A A 424; applied mathematics—A A 470; special projects—A A 499. Each course is 3 credits except for A A 499, for which a maximum of 6 credits may apply.

Additional free electives may be needed to obtain the required 180 total credits for graduation; they may be technical and may include suitable courses from other departments. Appropriate subject areas include electronics, automatic control, mathematics, applied mathematics, computer science, physics, and astronomy. Additional applied mathematics would be particularly appropriate for those students planning to continue into the graduate program. Senior programs should be planned with the assistance of a faculty adviser and the department. The programs leading to the B.S.S.A. degree is accredited by the Engineers' Council for Professional Development, and all graduates must meet certain specific distribution requirements.

The department accepts the credit/no credit option for grading, but warns the student who adopts that option of the risk involved in later evaluation of his or her records in regard to employment or admission to graduate programs.

Graduate Programs

Graduate Program Adviser

Gordon C. Oates

Students who intend to work toward advanced degrees must

apply for admission to the Graduate School and meet the requirements outlined in the Graduate School section of this catalog.

Master of Science in Aeronautics and Astronautics Degree

Students who have earned a baccalaureate degree in engineering, physics, or mathematics are eligible for admission. Degree candidates must complete an approved program of study. This program is tailored to the needs and interests of each student. However, it must have breadth, through study of a variety of subjects, and depth, through extensive study of a chosen field of specialization.

The program may consist of either 39 credits of course work, or 30 credits of course work and a minimum of 9 credits for thesis. The following courses are suggested to provide the required breadth: A A 504, 516, 524 (or 527), 530, 567, 568, 569, 571, 575. The program usually includes 567, 568, 569, and three of the remaining six courses. Depth is obtained through a choice of electives from among the courses available in this department. A minimum of three quarters of full-time study or the equivalent is required.

Master of Engineering Degree

The Master of Engineering degree is intended to provide course work and research beyond that usually included in the program for the degree of Master of Science in Aeronautics and Astronautics. The student must complete an approved program of study and research, which usually consists of a prior Master of Science degree, followed by 30 credits of course work and a thesis, for which a minimum of 9 credits are given.

Doctor of Philosophy Degree

The doctoral program consists of lectures, seminars, discussions, and independent study, enabling the student to master a particular field and to demonstrate the ability to make original contributions in that field. The formal steps toward obtaining the degree are listed in the Graduate School section of this catalog. In addition to those requirements, the student is expected to be in continuous full-time residence for one academic year after advancement to Candidate standing.

Admission to the Graduate School does not imply admission to the Ph.D. program. A decision on admission to the Ph.D. program usually is based upon the performance in the first year of graduate study. Students who have achieved a 3.35 grade-point average are admitted to the doctoral program. In some cases, admission is determined by the department's evaluation of evidence of superior ability, achievement, and motivation for advanced study and research.

BIOENGINEERING

328 Aerospace Engineering and Research Laboratory

Bioengineering applies the concepts and techniques of engineering to problems of biology and medicine, and is jointly sponsored by the College of Engineering and the School of Medicine. For a description of this program, see the Interschool or Intercollege Programs section of this catalog.

CHEMICAL ENGINEERING,

105 Benson

Chemical engineering is concerned with processes for transforming raw materials into energy or into consumer goods such as petroleum products, synthetic fuels, pulp and paper, fertilizers, rubber, plastics, detergents, pharmaceuticals, and industrial chemicals. Most chemical engineers work on research and development of these processes, as well as the design and operation of chemical plants and equipment in which production is carried out. Today this must be done not only with efficiency and economy but also with concern for the environment and conservation of natural resources and energy. These constraints challenge the ingenuity of the engineer and require sensitivity to related social and political issues. Some chemical engineers also work in bioengineering, manufacturing industries (automobile, airplanes), and governmental agencies such as the Department of Defense and the Environmental Protection Agency.

The foundation of chemical engineering consists of the basic sciences of mathematics, physics, and chemistry. The chemical engineer then uses this base to develop competence in the use of fundamental tools for engineering analysis and design—thermodynamics, chemical kinetics and reactor design, fluid mechanics, heat and mass transfer, computer programming, and economics. At the University, the student studies intensively in these fields to provide knowledge and skills applicable in a variety of specialized fields and industries. The program also provides a solid basis for further professional study in graduate school.

Faculty

C. A. Sleicher, Chairperson; J. C. Berg, Associate Chairperson; Allan, Babb, Finlayson, Garlid, Hager, Heideger, Hoffman, Horbett, Hutchinson, Johanson, Krieger, McCarthy, Moulton, Ratner, Ricker, Sarkanen, Seferis, Uvelli.

Undergraduate Program

The Bachelor of Science in Chemical Engineering is a professional degree generally completed in four years, provided the student entering the program has no serious deficiencies. Completion of the degree should enable the **COLLEGE OF ENGINEERING**



graduate either to find employment in industry or to continue on to graduate work.

Advising in the Department

Any student who is considering chemical engineering as a major may, and is encouraged to, be advised in the department.

Admission and Application Requirements

University of Washington Students. Admission to the department is limited by a quota, and application requirements are subject to change. Students should consult an adviser about current requirements. Applications from women and minorities are encouraged. The applicant must ordinarily have completed at least 75 quarter credit hours applicable to the Bachelor of Science degree requirements of the Department of Chemical Engineering and must have completed or be enrolled in the following: MATH 124, 125, 126, 238 (18 credits); CHEM 140, 150, 151, 160 (14); PHYS 121, 122 (8). The applicant must have at least a 2.50 grade-point average for these specified courses, as well as an overall grade-point average of at least 2.50 for all courses applicable to the Bachelor of Science degree. (Courses taken twice count twice in these grade-pointaverage calculations.)

Transfer Students. An applicant who has taken course work at another institution must meet the foregoing requirements and must enroll in the University of Washington before transferring to the department. The student may transfer to the department after completing 12 credits applicable to the Bachelor of Science degree, at least 10 of which are mathematics, chemistry, physics, or engineering. The applicant's grade-point average at the University in these four fields collectively must be at least 2.50.

Application Procedure

Application is made by signing a Change of Major form. Applicants are selected by the admissions committee of the department by an objective evaluation of grades.

Most University of Washington students transfer into the department for Autumn Quarter of the junior year. Applications for this quarter are encouraged early in Spring Quarter, but July 1 is the deadline. A limited number of students with superior records are admitted prior to the preregistration period. All other admission decisions are made after the July 1 deadline and announced before July 15. Students who are denied admission at this time may apply again before November 1 for the following Winter Quarter (with transfer students) and will be permitted to take CH E 310.

Transfer students normally enter the college after the sophomore year and must apply for Winter Quarter admission to the department by November 1. They may preregister for departmental courses, but all students (University of Washington and transfer) who are denied admission to the department must withdraw from departmental courses during the change-of-registration period (first week of Winter Quarter).

Transfer students should note that they must complete MATH 238, ENR 260, CH E 310, and CHEM 455 by the end of the Autumn Quarter if they are to continue a normal chemical engineering program.

Admission for the Disadvantaged

While the sole purpose of the application requirement is an aid to limiting enrollment, the department recognizes that this may eliminate some applicants whose potential is high but who, through extenuating circumstances of their background, have experienced limitations in their access to the kind of early education that promotes superior performance on tests requiring experience in abstract reasoning. These students are encouraged to apply for admission by sending a letter and supporting material to the admissions committee of the department.

Bachelor of Science in Chemical Engineering Degree

During the first two years the student completes the basic requirements of the College of Engineering: CHEM 140, 150, 151, and 160 (14 credits) and PHYS 121, 122, and 123 are required to satisfy the natural science requirements. The college mathematics requirement (23 credits) is completed by taking 5 credits selected from MATH 205, 327, 328; STAT 341, 342; ENGR 401, 402 or other 300-400-level mathematics course with adviser's approval. MATH 327 and CHEM 231, 235, and 241 (9 credits) also are required and are a part of the engineering science requirement. ENGR 170 and 260, CH E 200, and ENGL 171 and 172 are also strongly recommended. CH È 310 may be taken in the third quarter of the second year if offered then.

THIRD YEAR

First quarter: CH E 310 (4 credits), CHEM 455 (3), technical electives (5), electives (3); total—15. Second quarter: CH E 326 (4), CH E 330 (4), technical electives (6); total—14. Third quarter: CH E 340 (4), CHEM 461 (3) or CH E 436 (3), CHEM 457 (3), electives (6); total—16.

FOURTH YEAR

First quarter: CH E 435 (4), CH E 436 (3) or CHEM 461 (3), technical electives (3), electives (5); total—15. Second quarter: CH E 437 (3), CH E 465 (3), CH E 485 (3), electives (6); total—15. Third quarter: CH E 486 (5), electives (10); total—15.

A minimum grade-point average of 2.00 in chemical engineering courses based on the first time each course is taken is required for graduation. At least one technical elective must be in the field of chemistry and may be satisfied by any course that requires at least one year of freshman chemistry as a prerequisite. At least 11 technical elective credits must be in engineering science.

Cooperative Education (Co-op) Program

The department participates in the Cooperative Education Program of the college, described earlier. However, most courses are given but once per year, which makes participation in the program difficult. If the faculty/student ratio improves, the department may once again have a viable co-op program, and the student should consult as adviser about the current situation.

Graduate Programs

Graduate Program Adviser

C. A. Sleicher

The Department of Chemical Engineering offers courses leading to the degrees of Master of Science in Chemical Engineering and Doctor of Philosophy. Students who intend to work toward advanced degrees must apply for admission to, and meet the requirements of, the Graduate School. Students with a baccalaureate degree in engineering, physics, or chemistry are eligible for admission to the graduate program. The department has a special program for chemists that permits them to enter the regular graduate program with a minimum loss of time.

Master of Science in Chemical Engineering Degree

With Thesis: The requirements for this program are a minimum of 39 credits, of which 30 credits are in formal course work and 9 credits are in thesis. The course work usually is divided in the ratio of about two to one between Chemical Engineering and other departments. At least half of these courses must be numbered 500 or above. Without Thesis: The requirements for this program are a minimum of 39 credits of course work, which may include 6 credits for a graduate-level design study (CH E 600). The courses' credits are elective and may be courses in engineering, chemistry, mathematics, and/or other fields, depending on the objectives of the student. At least 18 credits of the total must be in courses numbered 500 or above. No course required for the Bachelor of Science in Chemical Engineering degree can be taken for graduate credit.

Doctor of Philosophy Degree

In addition to meeting the general requirements of the Graduate School, students who wish to work toward the Ph.D. degree must pass a preliminary examination. This examination usually is taken after three quarters of satisfactory graduate study. It is designed to assess the student's comprehension of both undergraduate and graduate material and especially the student's ability to apply fundamental concepts to new and varied situations. Additional information may be obtained from the department.

CIVIL ENGINEERING

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Civil engineering is a very broad field that interfaces closely with the public in the planning, design, construction, and management of facilities serving the needs of society. These activities include all transportation modes: highways, aerospace, rivers, and harbors; water resources and ocean engineering; structures, mechanics, and geotechnical engineering; surveying, mapping, and photogrammetry; engineering hydraulics; urban planning and development; water supply, wastewater treatment, water quality management; and the chemistry, quality control, and management of the air resource.

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 civil engineer's work frequently provides close associations with the legal profession, urban and regional planners, economists, public officials, biologists, chemists, financial consultants, architects, and system analysts. An essential ingredient in education and practice is 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 better accommodate these wide areas of interest, the department is structured with three academic divisions: Structural Engineering and Engineering Mechanics; Transportation, Construction, and Geometronics; and Water and Air Resources. The high level of research funding held by the faculty serves to help support a number of graduate students and the eight teaching and research laboratories housed in More Hall, Roberts Hall, and the Harris Hydraulics Laboratory.

Faculty

Neil M. Hawkins, Chairperson; R. E. Nece, Deputy Chairperson; Baker, Benjamin, Bogan, Brown, Burges, Carlson, Charlson, Chenoweth (emeritus), Christensen, Clanton (emeritus), Colcord, Dunn, Elias, Evans, Ferguson, Gehner, Hammer, Hartz, Hennes (emeritus), Hoag, Horwood, Hou, Ishibashi, Kent, Konichek (emeritus), Larson, Lettenmaier, Macartney, Mahoney, Mar, Mattock, Meese, Miller, Mittet (emeritus), Nece, Nihan, Palmer, Perkins, Pilat, Rhodes (emeritus), Richey, Roeder, Rossano, Sawmill, Schneider, Seabloom, Sergev (emeritus), Sherif, Spyridakis, Stanton, Strausser, Sylvester (emeritus), Terrel, Vasarhelyi, Veress, Waggoner, Welch, Wenk, Wessmen (emeritus).

Affiliate Faculty

Baumgartner, Birkeland, Coate, Edde, Eikum, Hales, Hall, Hathaway, Klingberg, Olesen, Wilson.

Adjunct Faculty

Bereano, Brewer, Covert, Frank, Harrison, Zerbe.

Undergraduate Program

Adviser

Howard S. Strausser

Bachelor of Science in Civil Engineering Degree

.The first two years of the curriculum for the degree of

Bachelor of Science in Civil Engineering are administered by the College of Engineering. The junior year provides a strong core in civil engineering fundamentals, analysis, and design, with emphasis on the basic engineering science aspects. A flexible senior year enables the student to either specialize in one area of civil engineering or continue with the broad background commenced in the junior year.

Admission to the department is usually at the junior level after satisfactory completion of the required science and engineering college courses in the freshman and sophomore years, administered by the College of Engineering Advising Center. Student enrollment in the department is limited; those desiring entrance must formally apply and be accepted by an admissions committee. For consideration by the committee, applicants must have as a minimum at the time of application: 45 quarter credits and credit in the following courses with a grade of 2.0 or higher—MATH 124, 125, and 126; PHYS 121 and 122; CHEM 140; ENGR 210 and 220 (or 230); ENGR 141; and ENGR 130 or 331 (or ENGL 171). Additional details on entrance requirements may be obtained from this department or the University's Office of Admissions.

THIRD YEAR

First quarter: CIVE 316 (4 credits), CIVE 342 (4), CIVE 363 (4), CIVE 379 (3); total—15. Second quarter: CIVE 320 (3), CIVE 345 (4), CIVE 350 (4), CIVE 380 (3); total—14. Third quarter: CIVE 306 (3), CIVE 351 (3), CIVE 366 (4), CIVE 381 (3), CIVE 390 (3); total—45.

FOURTH YEAR

Civil engineering electives (21 credits), humanities and social sciences (15), upper-division engineering electives (12), free elective (1); total—49.

Graduate Programs

Graduate Program Adviser

Alan H. Mattock

The Department of Civil Engineering offers study programs 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 in Engineering and Master of Science degrees. Graduate work is offered in most areas of civil engineering through the divisions of Structures and Mechanics; Transportation, Construction, and Geometronics; and Water and Air Resources. Both day and evening programs are available.

Master's Degree Programs

The three master's degree programs are intended to accommodate the needs of three categories of students: The M.S.C.E. is for those who have an undergraduate degree in civil engineering and plan to continue with their professional training; the college-wide M.S.E. is for other engineering graduates who wish to do graduate work in civil engineering; and the college-wide M.S. 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 engineering. A nonengineer may take additional course work and obtain the M.S.E. degree. Thesis and nonthesis programs are available for the master's degrees.

Doctor of Philosophy Degree

Students working for the Ph.D. degree must complete an approved program of study and research that usually requires two or three years' study beyond the master's degree. Details are contained in a departmental advising guide.

COMPUTER SCIENCE

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Computer Science is the study of information and algorithms within the context of real and abstract computing devices. Computer scientists are interested in: the representation and storage of information; algorithms to access, display, edit, and transform information; programming and mathematical languages to express algorithms; and hardware and software processors to execute algorithms. These concerns lead both to theoretical investigations of computers, algorithms, and data and to practical developments in computer technology and applications.

The Department of Computer Science offers an intercollege undergraduate program in which students can pursue a Bachelor of Science degree under either the College of Engineering or the College of Arts and Sciences. The graduate program offers a Master of Science and Doctor of Philosophy degrees. For descriptions of the programs, see the Interschool or Intercollege Programs section of this catalog.

Faculty

Robert W. Ritchie, Chairperson; Almes, Baer, Dekker, Fischer, Golde, Kehl, Ladner, Lazowska, Noe, Ritchie, Ruzzo, Shaw, Tanimoto. D. B. Dekker, graduate program adviser.

ELECTRICAL ENGINEERING

211 Electrical Engineering

Electrical engineering is concerned with the utilization of electricity and the electric and magnetic properties of matter to provide society with useful, efficient, and economic products and services. The scope of activity ranges from the planning, design, implementation, and maintenance of large-scale processes, such as world-wide communication networks and regional power generation and distribution systems, to applied research in the development of microelectronic devices for signal processing in all branches of the physical and life sciences and engineering.

In the field of electrical engineering, where rapid technological innovation is the rule rather than the exception, preparation for a professional career requires a solid foundation in fundamental mathematical and physical principles, plus practice in the application of these principles to real problems. In addition, the important role of technology in contemporary society calls for significant emphasis on studies in the humanities and social sciences.

The department's undergraduate program provides the intellectual tools, analytical and laboratory skills, and humanistic-social studies for professional work. In addition, the program forms a basis for further professional development in graduate school through continuing education programs or via independent study. The core curriculum, which consists of required courses in the college and department, focuses on mathematical and physical principles and techniques that have applications to real problems. Electives then offer the opportunity to obtain breadth and depth in areas such as electronic devices and circuits, power systems and energy conversion, electrophysics, computer engineering, communication systems, automatic control, and signal processing.

Faculty

James S. Meditch, Chairperson; Robert N. Clark, Associate Chairperson; Acker, Afromowitz, Albrecht, Alexandro, Andersen, Auth, Baker, Bergseth (emeritus), Bjorkstam, Carlson (on leave), Clark, Cochran (emeritus), Damborg, Daniels, Dow, Eastman (emeritus), Ehrenberg, Golde, Guilford, Guy, Helms, Hill (emeritus), Hoard (emeritus), Holden, Hsu, Ishimaru, Jackson, D. Johnson, Lauritzen, Lewis (emeritus), Lytle, Marks, Martin, Meditch, Moritz, Noe, Noges, Peden, Pinter, Potter, Redeker, Reynolds, Robbins (emeritus), Swarm, Venkata, Yee, Zick.

Affiliate Faculty

Hassul, L. Johnson, Masreliez, Reid, Young.

Undergraduate Program

Adviser

W. W. Potter

Bachelor of Science in Electrical Engineering Degree

Due to the large demand for professional training in electrical engineering in the presence of limited space and resources, the Department of Electrical Engineering is unable to accept all qualified applicants for its undergraduate program. As a result, a separate application for admission to the undergraduate program in electrical engineering is required. Deadlines for submitting such applications are the same as the closing dates that are given in the Academic Calendar at the front of this catalog for all new and former student applications. To be eligible for consideration for admission, a student must satisfy the following conditions: (1) have applied and be admissible to the University or already be a student in good standing; (2) have completed a minimum of 45 quarter credits (i.e., sophomore standing) with a cumulative grade-point average of 2.00 or higher; (3) have successfully completed a year of college calculus (MATH 124, 125, and 126); two quarters of physics using calculus (PHYS 121, 122); and a quarter of college chemistry (CHEM 140), with a grade-point average of 2.00 or higher in each course.

In addition to the overall post-high school grade-point average and the grade-point average in the courses mentioned above, the selection process considers the grade-point average in other technical courses taken as well as any relevant work experience. The above requirements are minimum, and meeting all of them does not guarantee admission to the program.

Application materials and a copy of the admissions policy may be obtained personally or by mail from 213 Electrical Engineering.

In general, electrical engineering courses are not open to non-electrical engineering majors. Qualified students majoring in other disciplines may apply for permission to enroll in electrical engineering courses from the curriculum adviser in 213 Electrical Engineering.

The student advising office, 213 Electrical Engineering, is the source of most curriculum information. The curriculum adviser can give general academic advice and can assist with scheduling. For professional advice, consultation with faculty advisers during their posted office hours is available. An electrical engineering adviser is also on duty in the engineering advising center in the engineering library.

Copies of the *Bachelor's Degree Planbook*, which contains detailed curriculum requirements and suggestions for the design of an effective sequence of elective courses, are available in 213 Electrical Engineering or in the engineering advising office in the engineering library.

In addition to the College of Engineering requirements, the department requires the following courses:

PHYS 123, CHEM 150, ENGR 190 and 251 (16 credits); a core of specified electrical engineering courses: E E 231, 310, 312, 333, 335, 344, 355, 356, 371, 372, 381, and 383 (41); electrical engineering electives (17); and approved electives—non-electrical engineering (8). To graduate, a student must earn a minimum cumulative grade-point average of 2.00 in all electrical engineering courses taken with no grade below 1.0 in any of these courses. In addition, it is required that each student's program of study conform with the Engineers' Council for Professional Development requirement of at least 45 credits in Engineering Science and



23 credits in Engineering Design. The details of satisfying this requirement are given in the *Bachelor's Degree Handbook*, and assistance is available from the curriculum adviser in 213 Electrical Engineering. There can be no exceptions to any of the above requirements.

It is possible, but not required, that a student specialize in a particular subdivision of electrical engineering. The student is urged to consult with faculty advisers in the selection of electrical engineering elective courses. A student who plans to continue into graduate study should consult with the graduate program adviser well before completion of an undergraduate program.

Many scholarships specifically for electrical engineering majors are awarded each year, based on merit and financial need. Students interested in applying for these and other College of Engineering scholarships may obtain information from the Department of Electrical Engineering Scholarship Awards Committee chairperson.

Graduate Programs

Graduate Program Adviser

M. J. Damborg

Students who intend to work toward advanced degrees must apply for admission to the Graduate School. In addition to the entrance requirements outlined in the Graduate School section of this catalog, Graduate Record Examination scores for the aptitude test and for the advanced test in engineering are required of all applicants.

Although most graduate students in electrical engineering have earned their baccalaureate degrees in the same area, students from other physical sciences or from mathematics often are able to pursue graduate study in electrical engineering with some additional preparation. Persons coming from other schools or other backgrounds are encouraged to discuss the possibilities of a graduate program in this department with the graduate program adviser.

Master of Science in Electrical Engineering Degree

Two options are available: The nonthesis option requires 39 quarter credits of course work, carefully chosen and approved by a committee. In addition, a comprehensive examination is required. The thesis option requires 30 quarter credits of course work similarly chosen and approved, plus 9 or more credits of E E 700 (Master's Thesis). A satisfactory thesis reporting the results of a research or engineering project must be presented.

Some students may wish to pursue a program toward the degree of Master of Science in Engineering, described elsewhere in this catalog, which is interdisciplinary in nature. Such a program, which may be carried out under the supervision of an electrical engineering adviser, holds special interest for students with backgrounds in other disciplines or for those seeking education in interdisciplinary fields, such as biomedical instrumentation or ocean engineering.

Doctor of Philosophy Degree

The Ph.D. degree is a research degree. It is not conferred as a result of course work, no matter how faithfully nor how long pursued. The granting of the degree in this department is based on general proficiency and distinctive attainments in electrical engineering, particularly on the demonstrated ability to pursue independent research. Achieving the expected level of proficiency usually requires at least one year of course work beyond the Master of Science degree. As evidence of research making a definite contribution to knowledge, a dissertation presented with satisfactory literary skill is required.

Prospective candidates for this degree generally have obtained the master's degree. They must meet the requirements of the Graduate School (see the Graduate School section of this catalog) and are selected by the department after a series of examinations given each year during Winter Quarter.

HUMANISTIC-SOCIAL STUDIES

356 Loew

Because engineers are significant agents of social change, the College of Engineering desires that its students obtain an effective general education. The Department of Humanistic-Social Studies assists in achieving this goal. It offers courses designed to increase awareness of the full human setting in which the practice of engineering takes place.

Faculty

Myron L. White, Chairperson; Botting, Coney, Douthwaite, Elliott (emeritus), Higbee, Hyman, Leahy, Skeels, Souther, Trimble, Williams.

Courses offered by the department fall into three areas: the humanities, the social sciences, and scientific and technical writing.

Humanities and Social Sciences

All humanistic-social studies courses in the humanities and social sciences are appropriate for fulfilling the College of Engineering's requirement of 30 credits in these areas. In fulfilling this requirement, engineering students may take one or several humanistic-social studies courses, or they may choose to meet it entirely with these courses. However, they also may select courses approved by the College of Engineering from the following fields:

Humanities Area

Architecture, landscape architecture, African Studies, American Indian Studies, anthropology, art, art history, Asian American Studies, Asian languages and literature, Black Studies, Chicano Studies, China and Inner Asia, Cinema Studies, classics, classical archaeology, comparative history of ideas, comparative literature, dance, drama, English, Germanics, history, humanities, linguistics, music, Near Eastern languages and literature, textile science, and costume study, philosophy, political science, religious studies/comparative religion, Romance languages and literature, Russia and Eastern Europe, Scandinavian languages and literature, Slavic languages and literature, South Asia, speech communication, and women studies.

Social Sciences Area

Architecture; building construction; landscape architecture; urban planning; African Studies; American Indian Studies; anthropology; archaeology; Asian American Studies; Black Studies; Chicano Studies; China and Inner Asia; classics; communications; comparative history of ideas; economics; Environmental Studies; General and Interdisciplinary Studies; geography; health education; history; Japan and Korea Regional Studies; linguistics; Near Eastern languages and literature; textile science and costume study; philosophy; political science; psychology; Romance languages and literature; Russia and Eastern Europe; Scandinavian languages and literature; Slavic languages and literature; sociology; South Asia; speech communication; women studies; administrative theory and organizational behavior; business economics; business, government, and society; international business; transportation; urban development; educational policy studies; law; biomedical history; psychiatry and behavioral sciences; social work.

A list of courses acceptable for fulfilling the College of Engineering requirements for humanities and social sciences is available at the Engineering Advising Center or the department office.

To be sure that they are selecting appropriate courses in each area, students should check with the advising center, their departmental advisers, or members of the humanisticsocial studies faculty.

Scientific and Technical Writing

The department's offerings in scientific and technical writing are elective or special courses in which students of engineering and the sciences can increase their skill in communicating with others about their work. Students who wish to prepare for careers in scientific and technical communication should consult the description of the interdisciplinary program, Scientific and Technical Communication, which appears later in this section on the College of Engineering.

INDUSTRIAL ENGINEERING

143 Mechanical Engineering

Industrial engineering is invaluable to management in making decisions about problems that concern the best use of people, materials, equipment, and energy to achieve the



aims of an organization. The industrial engineer is engaged in management systems design and in collecting, analyzing, and arranging factual information that is economically useful to management. This activity applies to all types of industry, service organizations, and government agencies. Industrial engineers are a prime source of management talent and are sought in a wide variety of assignments.

Typical activities of industrial engineers include selecting operating processes and methods; developing work performance measures and standards; selecting proper tools, machines, and equipment; designing facilities and layout of buildings; designing control systems for financial planning and cost systems; and devising ways to improve productivity and worker morale.

The industrial engineering program is administered through the Department of Mechanical Engineering, and faculty members responsible for the program hold appointments in that department.

All inquiries concerning the industrial engineering program should be addressed to the industrial engineering adviser in care of the Department of Mechanical Engineering.

Undergraduate Program

Bachelor of Science in Industrial Engineering Degree

ENGR 141, 210, 230, 260, and 123 are engineering college program requirements for the B.S.I.E. degree. ENGR 140 and 170 are strongly recommended. Satisfaction of the minimum professional engineering requirements results from completion of the listed courses plus 9 credits of approved electives. A total of 180 applicable credits is required for graduation, with a grade-point average of at least 2.00 in all engineering courses taken at the University. Required courses in the program, as well as approved electives, may *not* be taken on a satisfactory/not satisfactory basis.

THIRD YEAR

First quarter: MEIE 315 (3 credits), MEIE 317 (4) and HSS 300 (1), M E 352 (4), electives (3); total—16. Second quarter: MEIE 313 (4), M E 343 (3), MEIE 351 (3), ENGR 341 (3), electives (3); total—16. Third quarter: M E 304 \cdot (3), OPSYS 441 (4), approved industrial engineering electives (3), electives (4); total—14.

FOURTH YEAR

First quarter: MEIE 408 (3), MEIE 410 (3), MEIE 412 (4), electives (5); total—15. Second quarter: MEIE 411 (3), MEIE 419 (3), OPSYS 443 (4), approved industrial engineering electives (3), electives (3); total—16. Third quarter: MEIE 420 (4), approved industrial engineering electives (3), electives (7); total—14.

Graduate Study

Graduate studies specializing in the industrial engineering area may be undertaken with the degree of Master of Science in Engineering being awarded upon satisfactory completion of 30 credits in course work and a 9-credit thesis. Students who intend to work toward this advanced degree must obtain admission to the Graduate School. By consultation with the industrial engineering adviser each applicant's academic program is tailored to the individual, but course work must include a basic course in management, operations research, accounting, and statistics.

INTERDISCIPLINARY ENGINEERING STUDIES PROGRAM

Advising Center

110 Engineering Library

Coordinator

T. W. Macartney

Preparation for many career opportunities is best achieved through interdisciplinary engineering studies. For students with such interests the Interdisciplinary Engineering Studies Program offers an opportunity to construct individual curricula designed to fill their particular educational goals. Two types of curricula are available for this purpose: the professional program, leading to the degree of Bachelor of Science in Engineering, and the nonprofessional program, culminating in the degree of Bachelor of Science.

A student in these programs does not join an engineering department. Instead, the Engineering Advising Center provides a base for his records and initial advising. The student must develop a personal program of study approved by a faculty adviser with similar interests. This program must be reviewed and approved by the faculty coordinator who oversees all interdisciplinary study programs in his field. Students are urged to contact the advising center for information on established procedures and guidelines for entry into the nondepartmental B.S.E. and B.S. programs.

Specific academic requirements must be met by students entering these programs. These requirements are available at the College of Engineering Advising Center.

Bachelor of Science in Engineering Degree

A student must satisfy all college requirements for a baccalaureate degree as specified earlier in this catalog. These consist of 104 credits divided among mathematics, natural sciences, functional techniques, engineering sciences, humanities, and social sciences. The student should select 66 credits to provide a professional program of study consistent with his or her career objectives. This program should include at least 36 credits of 300- or 400-level engineering courses, of which at least 18 credits must be at the 400 level. The remaining 30 credits may be chosen from University offerings in engineering, mathematics, or the natural sciences. The engineering and mathematics courses must be at least at the 300 level, but up to 15 credits of natural science courses may be at any level. Courses selected in the 66-credit program should provide a logical sequence aimed at the desired goal of the student.

The minimum University requirement for graduation is 180 credits. Therefore, 10 credits may be selected from among any courses offered by the University except those specific-ally excluded as free electives.

Two different uses of the B.S.E. degree are available:

1. Nondepartmental, but semiformalized, B.S.E. degree programs in bioengineering, energy systems engineering, engineering acoustics, engineering physics, environmental engineering, mineral resources, nuclear engineering, ocean engineering, and others that may evolve.

2. Individually designed B.S.E. programs proposed by students whose interests are not met by department or program offerings.

Students usually enter the program after completing 90 credits, but planning should start early in the first two years. A grade-point average of 2.80 in technical courses is required for entry. A student must complete a minimum of 75 credits after being admitted to the Interdisciplinary Engineering Studies Program before he or she may be awarded a B.S.E. degree.

Bachelor of Science Degree

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 fields such as technical writing, engineering sales, or environmental studies.

To obtain a Bachelor of Science degree, a student must satisfy the general college requirements (104 credits) in mathematics, natural sciences, functional techniques, engineering sciences, humanities, and social sciences. The minimum University requirement for graduation is 180 credits, and the student should select the remaining 76 credits to provide a program of study consistent with his or her career objectives. Of these 76 credits, at least 35 must be engineering, science, or mathematics courses numbered 300 or above, and at least 25 of the 35 must be in engineering courses. The remaining 41 credits may be selected from among any courses offered by the University, except for those specifically excluded as free electives.

MECHANICAL ENGINEERING

143 Mechanical Engineering

Mechanical engineering is a broad field, and the practitioners engaged in it perform a wide variety of tasks. Some are involved in the production of mechanical energy by transformation from other forms, some are engaged in the production and processing of materials, and others are involved in the design of complex interacting dynamic systems and their controls. Mechanical engineers are involved in almost every industry and government or private research laboratory. Many become specialists in a particular area, such as machine design, heat transfer, energy conversion, fluid flow, or controls.

The academic training necessary is based on a sound background in mathematics, physics, and chemistry, and on the basic engineering sciences of mechanics, materials, thermodynamics, and fluid mechanics.

A knowledge of computers, graphics, and English also is essential. This training is followed by problem-solving courses that apply the basic knowledge to specific engineering areas, such as machine design, heat transfer, manufacturing processes, automatic controls, and systems.

Faculty

Morris E. Childs, Chairperson; Adee, Alexander, Anderson, Balise, Bodoia, Calkins, Chalk, Chalupnik, Corlett, Crain (emeritus), Daly, Day, Depew, Drui, Emery, Firey (emeritus), Ford, Galle, Garbini, Gessner, Guidon, Holt, Huntsman, Jorgensen, Kieling, Kippenhan, Kobayashi, Love, Malte, Marshall, McFeron, McIntyre (emeritus), Merchant, Messer (emeritus), Mills (emeritus), Morrison, Murphy, Roberts, Sandwith, Schaller (emeritus), Sherrer, Spagon, Storch, Taggart, Vesper, Waibler, Wolak.

Affiliate Faculty .

Owens.

Adjunct Faculty

Hyman.

The department has an advising staff of regular faculty members, available in the mechanical engineering advising office. The advising staff is headed by the graduate program adviser and the undergraduate coordinating adviser, to whom inquiries should be directed.

Undergraduate Program

Bachelor of Science in Mechanical Engineering Degree

Entrance into the department program is by application and is limited to the number of students who can effectively be educated with the available faculty and laboratory facilities. The minimum entrance requirements are 45 credit hours of courses applicable to the degree, a minimum grade-point average of 2.50 to 4.00 in certain specific preparatory courses, and overall grade-point average of 2.00. Details of the current entrance requirements may be obtained from the department or the Office of Admissions of the University.

The Department of Mechanical Engineering requires that CHEM 150 and ENGR 170, 210, and 230 be included from the College of Engineering program. PHYS 123, 131-132-133, and CHEM 151 are strongly recommended. Students needing more work in engineering graphics should take ENGR 123 (Graphical Analysis). The mathematics required beyond MATH 238 (differential equations) may be satisfied with courses selected from MATH 327, 328, 329, ENGR 401, 402, or other mathematics courses after consultation with the undergraduate adviser.

Satisfaction of the minimum professional engineering requirements results from the completion of the listed courses plus 12 credits of mechanical engineering option courses (400 level). A minimum of 180 applicable credits and a minimum grade-point average of 2.00 in all engineering courses are required for graduation.

THIRD YEAR

First quarter: M E 320 (4 credits),* M E 352 (4),* M E 373 (4), electives (3); total—15. Second quarter: M E 323 (4), M E 374 (3), M E 343 (3), electives (5); total—15. Third quarter: M E 304 (3), M E 333 (4), M E 353 (4), E E 306 (5); total—16.

FOURTH YEAR

First quarter: M E 331 (4 credits), M E 469 (3), mechanical engineering option (3), electives (5); total—15. Second quarter: M E 495 (3), MEIE 315 (3), mechanical engineering option (3), electives (6); total—15. Third quarter: M E 434 (3), mechanical engineering option (6), electives (6); total—15.

Graduate Programs

Graduate Program Adviser

D. E. McFeron

Master of Science in Mechanical Engineering and Doctor of Philosophy Degrees

Master of Science in Mechanical Engineering and Doctor of Philosophy degree programs in mechanical engineering provide a balanced combination of formal instruction and independent research or design experience. Flexible requirements for course work provide opportunities for a broad scientific and professional background and for specialty training. Fields with active programs of teaching and research include heat transfer, fluid mechanics, experimental mechanics, fracture mechanics, acoustics, controls, combustion systems, dynamics and vibration, behavior of

* Students who have completed ENGR 220 and 260 will not take M E 320 and 352.



engineering materials, manufacturing processes, and fire research. Financial aid may be offered to full-time graduate students, the amount depending upon the availability of funds. This aid may be in the form of research assistantships from sponsored programs, traineeships and fellowships, or teaching assistantships.

Students who desire to work toward a graduate degree must fulfill admission requirements for the Graduate School (see the Graduate School section of this catalog). A Master of Science in Mechanical Engineering degree requires a 9credit thesis and a minimum of 30 credits of approved course work. The requirements for the Doctor of Philosophy degree include completion of an approved program of study and a research program that makes a definite contribution to knowledge.

MINING, METALLURGICAL, AND CERAMIC ENGINEERING

318 Roberts

The department offers courses leading to the degrees of Bachelor of Science in Metallurgical Engineering; Bachelor of Science in Ceramic Engineering; Master of Science in Metallurgical Engineering; Master of Science in Ceramic Engineering; and Doctor of Philosophy in the fields of metallurgical or ceramic engineering. The department also provides an option leading to the College of Engineering Master of Science degree.

Faculty

Douglas H. Polonis, Chairperson; Anderson, Archbold, Campbell, Fischbach, Lynch, Miller, Mueller, Polonis, Rao, Scott, Stang, Stoebe, Whittemore.

Affiliate Faculty

Gorum, Miller, Nelson.

CERAMIC ENGINEERING

Division Head

James I. Mueller

Ceramic materials are high-temperature resistant, chemically durable, strong, and rigid. The ceramic engineering program provides students with an understanding of the chemical, mechanical, and thermal properties of ceramics; of the processing methods and their effects on the structure and properties; and of the feasibilities and economics of manufacture of ceramic materials for engineering applications.

Undergraduate Program

Bachelor of Science in Ceramic Engineering Degree

Entrance to the division requires the equivalent of at least 45 University of Washington credits with a 2.00 gradepoint average and attainment of 2.0 in specified courses. Details of the entrance requirements may be obtained from this department or the University's Office of Admissions.

The course of study leading to the degree of Bachelor of Science in Ceramic Engineering includes a total of 67 credits. Required is the selection of CHEM 150 (4), ENGR 220 (4), and ENGR 251 (4), for satisfying part of the engineering science requirements. HSS 300 must be part of the functional technique requirement and be taken concurrently with CER E 203 or 300. Students must select either CER E 402 (2) and 403 (20), or CER E 496 (3) or CER E 499 (4).

THIRD YEAR

First quarter: CER E 300^* (5 credits), CER E 301 (4), CER E 306 (1), CER E 322 (3), MET E 322 (3); total— 16. Second quarter: CER E 302 (3), CER E 312 (4), CER E 323 (3), CHEM 350 (3), electives (3); total—16. Third quarter: CER E 303 (5), CER E 311 (3), CER E 399(1), CHEM 351 (3), electives (3); total—15.

FOURTH YEAR

First quarter: CER E 307 (1 credit), CER E 401 (3), CER E 411 (4), CER E 413 (4), CER E 441 (1), CER E 499 (2), and electives (1) or electives (5); total—16. Second quarter: CER E 414 (4), CER E 442 (1), CER E 470 (3), CER E 402 (2), and electives (5) or CER E 499 (2) and electives (5), or electives (7); total—15. Third quarter: CER E 404 (3), CER E 443 (1), CER E 403 (2), and electives (10), or electives (12), or CER E 496 (3) and electives (9); total—16.

Graduate Programs

Students may select courses and research in accordance with their special interests and objectives. Graduate work is mostly concerned with advanced physical sciences and engineering as applied to ceramics; however, courses that prepare for plant operation and management also may be selected. Eligible to work for the master's degree are graduates of accredited ceramic engineering curricula and graduates of other accredited engineering or scientific curricula who complete the basic undergraduate courses in ceramic engineering and in science.

Master of Science in Ceramic Engineering Degree.

A baccalaureate degree in engineering is required. If field of specialization is other than ceramic engineering, certain background courses are necessary. Two degree options exist, and a total of 39 credits are required for each. The thesis option requires the completion of a suitable research thesis for a minimum of 9 credits. The nonthesis option requires all credits be in academic or problem courses and the completion of a suitable report on a faculty-approved problem.

Master of Science Degree

Students with undergraduate majors in science, particularly chemistry or physics, may work for this degree after completing basic undergraduate courses in ceramics. The same academic and thesis program is required for this degree as is described for the degree of Master of Science in Ceramic Engineering.

Doctor of Philosophy Degree

Students who have completed at least one year of satisfactory graduate study may request an examination to determine their eligibility for work leading toward the Doctor of Philosophy degree. Accepted students must complete an approved program of study and a research program that makes a definite contribution to the knowledge of the field.

METALLURGICAL ENGINEERING

Division Head

D. H. Polonis

The field of metallurgical engineering is concerned with the processing, fabrication, and utilization of metals, alloys, and other engineering materials. Extractive metallurgy relates to the processing and refining of metals and their compounds. Physical metallurgy is concerned with the structure and properties of materials, the development of new materials with improved properties, and the application and performance of materials in modern engineering systems and design. Both of these aspects of metallurgical engineering strongly overlap modern physics, mathematics, chemistry, manufacturing, and economics.

Undergraduate Program

Bachelor of Science in Metallurgical Engineering Degree

Entrance to the program requires the equivalent of at least 45 University of Washington credits with a 2.00 gradepoint average with attainment of 2.00 in specified courses. Details of the entrance requirements may be obtained from this department or the University's Office of Admissions.

The list of required and recommended courses for majors in metallurgy should be considered in planning schedules to satisfy the engineering science and the natural science requirements during the first two years.

In the fourth year, students have an opportunity to plan their programs in accordance with individual goals and interests. The technical electives in the senior year must include at least 18 credits of senior-level courses in metallurgical engineering, exclusive of MET E 499.

Electives in labor relations, business administration, mechanical engineering, and economics are recommended for students interested in plant operation and administration.

* Not required if student has completed CER E 198, 202, 203.

Recommendations for Fulfilling Basic College Require-

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ments: The minimum college requirements include 23 credits of mathematics, 23 credits of natural sciences, 12 credits of functional techniques, 16 credits of engineering sciences, and 30 credits of humanities and social sciences. Required courses in these groups are MATH 124, 125, 126, 238; CHEM 140 or 145; PHYS 121, 122; ENGR 130 (or equivalent), 141, 170, 210, 220, 251. The remaining courses are to be selected with the adviser's approval from among those recommended by the division. MET E 198 and 202 are recommended electives for prospective metallurgical engineering majors. The 30 credits of humanities and social sciences are to include at least 10 credits in each area.

Department Requirement: Metallurgy majors must complete a 6-credit, upper-level science requirement, chosen with the adviser's approval. Recommended courses to fulfill this requirement include CHEM 350, 351, 455, 456, and PHYS 221, 222. The overall departmental requirements of 66 credits are listed by quarter as follows:

THIRD YEAR

First quarter: MET E 301 (3 credits), MET E 322 (3), MET E 361 (4). Second quarter: CER E 302 (3), MET E 325 (4), MET E 362 (4), metallurgical engineering science requirement (3). Third quarter: MET E 326 (3), MET E 363 (4), MET E 462 (3), metallurgical engineering science requirement (3).

FOURTH YEAR

First quarter: MET E 426 (3), MET E 461 (3), MET E 468 (1), technical electives (3). Second quarter: HSS 461 (1), technical electives (8). Third quarter: technical electives (9).

The 20 credits of technical electives, which are to be approved by a metallurgical engineering adviser, must include a minimum of 9 credits in metallurgical engineering classes at the 400 level, excluding MET E 499. In addition to the college and departmental requirements specified above, sufficient free electives must be completed to satisfy the minimum graduation requirement of 180 credits.

Graduate Programs

Master of Science in Metallurgical Engineering Degree

This degree is largely concerned with advanced materials science and engineering as applied to physical metallurgy, extractive metallurgy, or mineral processing. Courses that prepare for plant operation and management also may be selected. The minimum requirements for this degree include 30 credits of course work and the satisfactory completion of an M.S. thesis research problem (9 credits of MET E 700). At least 18 graded credits of 500- and 600level courses are required, including MET E courses 511, 524, 541, and 561; also required are MET E 421 and MET E 466 or their equivalents. Three full quarters of residence are required; a full quarter of residence is any quarter or combination of part-time quarters in which at least 9



credits of 400-to-800-level courses are acceptably completed.

The thesis research problem is generally selected by the student following consultation with the faculty members.

Master of Science Degree

Students with undergraduate majors in science, particularly chemistry or physics, may work for this degree after completing basic undergraduate courses in metallurgy. The same academic and thesis program is required for this degree as is described for the degree of Master of Science in Metallurgical Engineering.

Doctor of Philosophy Degree

Students who have completed one year of graduate work may request an examination to determine whether or not the faculty will advise proceeding to the General Examination for the degree of Doctor of Philosophy. A critical examination of the applicant's record, recommendations, and proposed course of study will be pertinent to this decision. In addition to course work, each student is required to prepare for a General Examination on a list of subjects selected by a Supervisory Committee. The General Examination is sufficiently comprehensive to demonstrate the student's ability to deal with broad aspects of materials science, as well as with a specialized subject area. Proficiency in basic research is of paramount importance. Each prospective candidate is required to present a written dissertation that makes an original and independent contribution to knowledge.

MINING ENGINEERING

Division Head

Donald L. Anderson

Mining engineering is a discipline that deals with mineral resources. It is directed toward all phases of the development and extraction of mineral raw materials, including alleviation of the environmental effects of mining. At the undergraduate level, a student may elect to pursue a program of studies leading to the Bachelor of Science in Engineering degree (mineral resources). At the graduate level, the Master of Science in Engineering degree (mineral resources) is available.

Both undergraduate and graduate students may expect to be associated with the Washington Mining and Mineral Resources Research Institute, established in January, 1980.

NUCLEAR ENGINEERING

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Nuclear engineering is concerned with the release, control, and utilization of all forms of energy from nuclear sources.

The discipline was created more than twenty-five years ago, when concerted efforts were begun for the development of peaceful uses of nuclear energy, such as central station power, ship propulsion, radioisotope applications, and space applications. Development of breeder reactors, controlled thermonuclear fusion reactors, and other cleanenergy sources provide additional challenges for nuclear engineers and maintain the already strong demand for engineers who have specific technical training in nuclear engineering. Not only will they need to solve technical problems, but future engineers also will have to provide solutions that preserve and enhance the environment. The successful engineering of these nuclear energy projects involves the use of skills and specialties in many areas other than the basic area of applied nuclear physics, such as heat transfer and fluid flow, metallurgy, stress analysis, automation and control, corrosion, thermoelectricity; thermionics, and chemical processing. Although the nuclear engineering program is administered by the Department of Nuclear Engineering, close relations exist with other engineering and science departments.

Faculty

A. L. Babb, Chairperson and graduate program adviser; Albrecht, Chalk, Garlid, McCormick, Ribe, Robkin, Vlases, Woodruff.

Affiliate Faculty

Clayton, Olsen, Omberg, Schmid, Shen.

Research Faculty

Audenaerde, Knox, Marrs, Pietrzyk, Reynolds, Uvelli.

Undergraduate Program

Bachelor of Science in Engineering Degree (Nuclear Engineering Emphasis)

The course of study for the Bachelor of Science in Engineering degree with a nuclear engineering emphasis provides a student with (1) a background in the fundamental mathematics and physics needed for nuclear energy applications; (2) an introduction to nuclear technology appropriate for either advanced study in nuclear engineering or employment at the baccalaureate degree level; and (3) a solid foundation in an area of engineering that complements nuclear engineering as a discipline.

The Department of Nuclear Engineering requires that PHYS 123, CH E 330, and either ENGR 260 or M E 320 be included in the engineering college program as technical preparation for department courses. The departmental requirements are: *Nuclear technology*: 18 credits minimum— ENGR 305, ENGR 307, NUC E 444, 477, 484, 485, 486, 488, 489 or 490, 498, 499. *Engineering mathematics and natural sciences*: 30 credits minimum—At least 9 credits from: MATH 327, 328, 329, 438; ENGR 401, 402, 403; PHYS 324, 325, 327, 424, 425, 426; A A 370, 470. The remaining 21 credits may be chosen from any University course offered in engineering, mathematics, or natural sciences at or above the 300 level, except that 15 of these credits may be from any level of natural sciences offerings. *Elective technology option:* 18 credits—This sequence of courses is prepared by the student and must be approved by his adviser and the Nuclear Engineering B.S.E. Coordinator. A description of the B.S.E. program requirements is found in the Interdisciplinary Engineering Studies section of the College of Engineering program. Fields of study that provide a sound complement to the disciplines of nuclear engineering include, but are not limited to:

Applied mathematics: This option involves the application of mathematical techniques to the solution of problems in nuclear engineering. Numerical methods and computer use are emphasized.

Chemical systems: In this area, emphasis is placed on the development and application of processes and equipment such as those used in the nuclear fuel cycles in which matter is treated to induce a change of state (or phase), energy content, or chemical composition.

Electrical/electronic systems: This area is concerned with the control of electricity and the electrical properties of materials with applications in system theory, computers, physical electronics, and instrumentation and control.

Environmental engineering: In this area, the student obtains an understanding of the growing problems of air, water, and land pollution. This includes the quality and quantity of present production of wastes, their known environmental effect, practical methods of control, and prospects for the future.

Materials technology: This area is oriented toward the materials sciences, with emphasis being placed on atomic, molecular, and crystalline structure, the physical properties of solids, thermodynamic properties of materials, reactions, and mechanical behavior. The preparation, properties, and applications of metals and alloys in various environments also are considered.

Thermal-hydraulic systems: This area provides the student with a strong background in thermodynamics, fluid flow, and heat transfer. It provides the necessary preparation for advanced work in the design and analysis of thermalhydraulic systems in nuclear steam-supply systems, and nuclear reactor safety analysis.

Graduate Programs

Graduate Program Adviser

A. L. Babb

Master of Science in Nuclear Engineering Degree

Students who have earned a baccalaureate degree in engineering, mathematics, chemistry, or physics are eligible for admission. A strong foundation in atomic and nuclear physics and in advanced mathematical analysis is recommended.



A total of 45 credits required: 36 in formal course work, including basic courses in nuclear reactor theory for both fission and fusion systems, nuclear engineering laboratory, nuclear reactor engineering, nuclear system design, and nuclear engineering seminars, including at least 6 credits in an advanced nuclear engineering option and at least 6 credits in an elective course sequence in mathematics, physics, or engineering science; 9 credits in a thesis project; foreign language not required.

Doctor of Philosophy Degree

Lectures, seminars, informal discussion, independent study, and research enable the student to acquire competence and to make original contributions in his or her chosen field. Approximately one full year of course work beyond the master's degree is usually essential. Courses are selected on the basis of a student's interest and background and may be chosen from offerings of other departments, as well as from the Department of Nuclear Engineering. Students may specialize in several areas, each representing an important aspect of nuclear technology:

Fission Reactor Systems: Concerned with the time-independent and -dependent analysis of light-water and other reactors. Includes fundamental studies on the migration of neutrons, criticality, stability, and control of nuclear reactors, noise analysis, safety and reliability analyses, and systems studies involving economic and fuel cycle considerations.

Controlled Thermonuclear Fusion Systems and Plasmas: Includes studies of plasma behavior with emphasis on fundamental concepts, such as confinement and heating, laserplasma interactions, and studies of fusion and fusion/fission reactor systems, with an emphasis upon neutronics, thermal analyses, materials problems, and resource considerations.

Engineering analysis of nuclear systems: A specialization concerned with the engineering aspects of nuclear systems, including such areas as thermal-hydraulics, materials, environmental engineering, and bionuclear systems.

Prospective candidates for the doctoral degree must pass, successively, a written and oral qualifying examination, a General Examination for admission to candidacy, and a Final Examination. A prospective candidate for the degree is expected to conduct an original and independent investigation in one of the fields of nuclear engineering. The dissertation must be a significant contribution to knowledge.

OCEAN ENGINEERING PROGRAM

326 Mechanical Engineering

Faculty

Bruce H. Adee, Director; Acker, Calkins, Childs, Ehrenberg, Francois, Hawkins, Mar, Merchant, Nece, Richey, Sandwith, Storch, Wenk. An interdisciplinary ocean engineering program has been established to provide students the opportunity to acquire the education and training needed to pursue careers in marine-related industries. Its location at the University provides a complete range of marine environments available for testing and research. Courses offered both within the College of Engineering and outside the college provide students with a broad range of opportunities for study and research. Undergraduate students may follow a program of study in ocean engineering by entering the interdisciplinary Bachelor of Science in Engineering degree program or through a departmental degree program.

Graduate study leading to the Master of Science in Engineering degree is offered by the Inter-Engineering Group. Students also may pursue a master's degree within the framework of one of the departments, with an emphasis on ocean engineering. Students who wish to work toward the Doctor of Philosophy degree must be admitted to one of the departmental programs.

Areas of concentration in ocean engineering include: Coastal and Harbor Engineering; Marine Structures; Social, Legal, and Economic Dimensions of Ocean Engineering; and Instrumentation, Data Gathering, and Analysis.

SCIENTIFIC AND TECHNICAL COMMUNICATION

356 Loew

Faculty

Myron L. White, Director; Coney, Souther, Williams.

An interdisciplinary degree program provides students with the education and training needed for careers in scientific and technical communication. Students with this career goal may earn a Bachelor of Science degree in the College of Engineering or a baccalaureate degree in the General Studies program of the College of Arts and Sciences. Following either of these paths, students meet the general requirements of their respective colleges, acquire a background in science and/or engineering, and combine this with a required set of core courses in scientific and technical communication, plus electives in related aspects of communication. For a description of the core and other Scientific and Technical Communication courses, see the Description of Courses section of this catalog under College of Engineering, Scientific and Technical Communication.

SOCIAL MANAGEMENT OF TECHNOLOGY

314 Guggenheim

Social Management of Technology is an interdisciplinary program devoted to analyzing interactions between technology and society. For a description of this program, see the Interschool or Intercollege Programs section of this catalog.



FISHERIES

Dean Douglas G. Chapman 204 Fisheries

Associate Dean

Donald E. Bevan 214 Fisheries

Faculty

Armstrong, Bailey, Bell (emeritus), Bevan, Bledsoe, Brannon, Brown, Burgner, Carlson, Chapman, Chew, Clark, Congleton, Conquest, DeLacy (emeritus), Devol, Donaldson (emeritus), Eggers, Erickson, Felton, Fletcher, Gales, Gallucci, Gunderson, Halver, Hardy, Hershberger, Hertzberg, Iwaoka, Landolt, Liston, Matches, Mathews, Mathisen, Miller, Nakatani, Nevissi, Pauley, Pietsch, Pigott, Richey, Rogers, Royce, Salo, Schell, Seymour (emeritus), Sibley, Smith, Stober, Swartzman, Taub, Thomas, Thorne, Van Cleve (emeritus), Welander (emeritus), Whitney, Wissmar, Wooster.

Affiliate Faculty

Amend, Anderson, Balsiger, Bergman, Bourne, Bousefield, Braham, Buckley, Cake, Calabrese, D'Aoust, Eberhardt, Estes, Fujimura, Fukuhara, Glude, Gould, Helfrich, Hodgins, Johnson, Joseph, Katz, Lord, Low, Mahnken, Malins, McCain, McCaughran, McKenzie, Mulcahy, Pereyra, Roubal, Sedell, Sparks, Stout, Tillman, Thompson, Towner, Utter, Watters, Weber, Wedemeyer, Woelke.

Adjunct Faculty Mar, Newell. The College of Fisheries is concerned in research and training with the investigation of possible ways to use stocks of fish and shellfish more effectively, to make better use of all waters to produce more food from living organisms, and to culture aquatic plants and animals more efficiently.

The college is also deeply concerned with the impact of pollution, of industry, and of human population pressure on the aquatic environment, as these affect both fisheries and other uses of our waters. In general, the program of the college provides opportunity for training, not only in fisheries but also in the management of natural resources and in the understanding and use of the aquatic environment.

Founded in 1919, the College of Fisheries has been intimately associated with the development and conservation of the fisheries of the northeastern Pacific Ocean. The college attempts to deal with whole problems rather than with isolated technical questions, an approach that involves many phases of biology with particular emphasis on the quantitative aspects. Full attention is given to political, social, legal, and economic problems associated with the use of resources. Although fishery problems of the Pacific Northwest are emphasized, they are examined as case histories, with many features applicable to problems of harvesting aquatic resources throughout the world. As a result, many foreign students register in the college.

Fishing and fish products are an important part of the total food industry. The Institute for Food Science and Technology offers undergraduate and graduate curricula to prepare food scientists for industry, government, and academia. The undergraduate program provides a broad coverage of all phases of food technology with some additional specialization in fisheries technology. Strongly based on microbi-

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ology, chemistry, biochemistry, physiology, and engineering, graduate programs emphasize an experimental approach to the solution of problems.

Although the food science teaching program concentrates on general principles applicable to a wide range of food products, courses in fishery technology are offered, and much of the research is concerned with marine and freshwater products of the Pacific Northwest. The program attracts many out-of-state and foreign students, particularly at the graduate level.

The College of Fisheries offers courses leading to the degrees of Bachelor of Science in Fisheries, Bachelor of Science with a major in fisheries, Bachelor of Science with a major in food science, Master of Science, and Doctor of Philosophy. The college programs are designed to provide both the scientific training and the professional competency necessary for graduates to satisfy the various needs of their chosen fields.

Fisheries Research Institute

Faculty

Robert L. Burgner, Director; Roy E. Nakatani, Associate Director; Bevan, Carlson, Devol, Eggers, Felton, Gunderson, Mathisen, Miller, Richey, Rogers, Salo, Smith, Stober, Thomas, Thorne, Wissmar.

Research Staff

Cederholm, Conrad, Cordell, Crumley, Dawson, DiJulio, Dinnel, Donnelly, Drew, Garrison, Graybill, Griggs, Harris, Kinney, Marshall, Martin, McClain, McComas, Poe, Prinslow, Rabin, Rogers, Simenstad, Synder, Stables, Steinfort, Thielk, Tornberg, Tyler, Wangerin, Whitmus.

The Fisheries Research Institute is a research branch of the College of Fisheries. Many of the college's grants and contracts in the field of fishery biology are handled by the institute under the direction of both teaching and research faculty. The research programs provide practical training opportunities for fisheries students as well as support and thesis research under the guidance of the faculty with the assistance of the technical staff. The research projects in the institute provide a wide spectrum of opportunities for thesis research, and financial support for these activities comes from diverse sources.

Research on Alaskan and Washington salmon runs is conducted under various industry, state, and federal contracts. Currently, the principal salmon studies are: population dynamics and ecology of lakes producing sockeye salmon; migration and abundance of salmon on the high seas; yield forecast; ecology of stream nursery areas; regulation for optimum yield; spawning, channel rearing, and behavior of chum salmon; effects of altered environmental conditions in freshwater and estuaries, and estuarine pen-rearing of salmon. Research related to impact of man's activities on the quality of our environment includes projects on effects of logging, offshore oil exploration, dredging in the marine environment, muncipal-industrial wastes, dams, and equalizing reservoirs. The institute is conducting ecological studies in the Lake Washington–Cedar River drainage to develop models for decision-making in rational use of forest and aquatic resources in the Pacific Northwest.

Aquaculture studies are supported primarily by Sea Grant and industry, with field activities centered at Big Beef Creek field station on Hood Canal. Selective breeding, development of hatching substrates, disease control, and estuarine pen-rearing of salmon and trout are directed toward assisting development of commercial aquaculture as well as sport fishing resources.

Another major program of activities is in the application of acoustical techniques to the assessment of fish stocks in lake and marine environments. Computerized sonar systems developed at the University are used in a wide variety of projects, ranging from local studies of hake, herring, and salmon, supported by Sea Grant and the Washington Department of Fisheries, to studies of coastal upwelling regions under the National Science Foundation, International Decade of Ocean Exploration Program.

The institute maintains headquarters and laboratory facilities on the University campus and semipermanent field stations at five locations in Alaska. The campus headquarters and the Big Beef Creek station are used for work in Washington.

The *Kumtuks*, a ninety-nine-foot floating physiology laboratory, is used in Puget Sound and on nearby waters for the study of fish. It contains large well-equipped laboratories, aquaria, and living quarters for several students and staff.

The motor vessel *Malka*, thirty-eight feet long, is used for inshore oceanographic and biological work in Washington. It is equipped with winches for handling specialized fishing or sampling gear.

The thirty-two-foot *Iliamna*, thirty-foot *Sa-yak*, and thirty-foot *Kakhonak* are stationed on Lake Iliamna, the largest lake in Alaska and a major producer of sockeye salmon in North America. They are equipped for studies of limnology and of the fish populations. A large amount of field and laboratory equipment is available together with an extensive collection of fishery records from the Pacific Northwest and Alaska. Provision is made to conduct research on fishery problems in collaboration with other colleges, schools, and departments of the University.

Institute for Food Science and Technology

Faculty

John Liston, Director; Iwaoka, Matches, Pigott, Taub.



The Institute for Food Science and Technology incorporates the teaching, research, and advising programs in food science into a single unit. The teaching program includes undergraduate and graduate instruction described elsewhere in this catalog.

The research activities within the institute are concentrated in food microbiology, food chemistry, food engineering, seafood technology, food safety, radiation processing of foods and other materials, biochemical processes in foods, marine microbiology, aquatic microsystems, and nutrition. At least one specific research project usually is active within each of these areas. These projects provide opportunities for research training for both the undergraduate and graduate students in food science.

Industrial research is undertaken on an *ad hoc* basis by the institute at the request of food companies. Such research, which is paid for by the companies, is encouraged.

Advice and consultation, particularly on problems of seafood technology, are provided under formal and informal arrangements. The principal formal program in this area is operated jointly with this university's Division of Marine Resources. A seafood specialist, qualified at the Master of Science degree level and with several years of industrial experience, is employed to maintain contact with individuals and companies in the seafood business and to assist them, as well as other interested persons, in resolving problems associated with seafoods and seafood processing.

A center of information in seafood technology is maintained in the institute. The institute, usually working with the seafood specialist, offers workshops and other such programs from time to time for the seafood industry. Workshops on more general food science topics are also offered from the institute. The involvement of students in these industry-contact programs is encouraged to the greatest extent possible, because it provides them with excellent experience in industrial conditions and operations.

Laboratory of Radiation Ecology

Faculty

Nakatani, Nevissi, Schell, Sibley.

Research Staff

Lusk, Tornberg, Vick.

The Laboratory of Radiation Ecology undertakes research programs related to contaminants in marine and freshwater environments, including man-produced radionuclides, naturally occurring radionuclides, and heavy metals. Interdisciplinary in nature the programs involve a combination of field and laboratory studies conducted by faculty and graduate students from the College of Fisheries and from other colleges and departments on the campus. The field programs are complemented by research projects in the laboratory. Originally, most of the fieldwork was related to biological studies of nuclear detonation or reactorproduced radionuclides in marine environments remote from the University, but in recent years studies of naturally occurring radionuclides and heavy metals in Washington waters also have been undertaken. The laboratory has excellent equipment and facilities for the measurement and identification of alpha-, beta-, and gamma-emitting radionuclides, and of heavy metals in animal, plant, soil, sediment, water, and air samples.

The laboratory's current contract research programs with the Nuclear Regulatory Commission, Environmental Protection Agency, National Institutes of Health, Battelle Northwest Laboratories, and Lawrence Livermore Laboratories are conducted by a core staff that is strongly supported by undergraduate and graduate employees. These programs often provide the subject materials and support to graduate students for their degree program research project. Current research programs include: (1) bioenvironmental studies of the radionuclides in the Central Pacific, in New York State, in offshore waters of the United States, and at Amchitka, Aleutian Islands; (2) biogeochemical studies of transuranic elements and of natural, alpha-emitting radionuclides in marine environments; (3) age dating of sediments by isotope ratios; and (4) the identification and measurement of heavy metals in Puget Sound.

Washington Cooperative Fishery Research Unit

Faculty

Richard R. Whitney, Unit Leader; Gilbert B. Pauley, Assistant Unit Leader; James L. Congleton.

Cooperators in the Washington Cooperative Fishery Research Unit are the United States Fish and Wildlife Service, the Washington State departments of Fisheries and Game, and the University of Washington. Research projects are funded by the cooperators, as well as other agencies, to benefit the management of recreational fisheries in Washington State.

The unit research program emphasizes lake fisheries. Since the unit was established in 1968, life history studies have been completed for most of the major fishes in Lake Washington. The response of warm-water fish populations to removal of aquatic vegetation is currently under investigation. Other studies deal with estuarine and marine fishes and invertebrates. Utilization of salt marshes by juvenile salmon is being studied on the lower Skagit River, and another project is assessing the contribution of artificial reefs to recreational fishing in Puget Sound. In addition, Dr. Whitney serves as technical adviser to the federal district court in relation to Judge George H. Boldt's decision on Indian fishing rights.

Offices of the unit are in 220 Fisheries Center. Facilities of

the cooperating agencies can be made available for use by students through the unit.

Aquaculture

Faculty

Brannon, Chew, Halver, Hardy, Hershberger, Landolt.

The college has a major research and teaching program in both salmonid and shellfish aquaculture. An annual run of several thousand salmon has been developed and is maintained at the college by the release of thousands of fingerlings each spring. Brood stocks of rainbow trout, catfish, and carp are maintained at the college facilities for research and training.

In progress are long-term studies on the culture of salmonids and warm-water fish, on environmental effects on salmonids during embryonic development, on dietary requirements of the cultured brood stock and young fish, and on selective breeding.

The college has many activities under way that relate to shellfish aquaculture: (e.g., clam seed planting, raft culture, intertidal beach studies, and parasite studies). A genetics program is in progress to develop the resistance of Pacific oysters to disease. One of the recent emphases in aquaculture is in the area of disease control. The college now has research and instruction under way in this aspect of both fish and shellfish, as well as more broadly on the pathology of these species, both for their own sake and as they affect man. While many of the aquaculture studies are carried on in the college hatchery and laboratories, other work is carried on at various outlying research stations (e.g., Fern Lake, Manchester, Big Beef Creek).

RELATED PROGRAMS

Programs in the College of Fisheries benefit from the fact that a regional office and laboratories of the National Marine Fisheries Service, as well as branches of the Bureau of Sport Fisheries and Wildlife, are located in the city of Seattle. In addition, the headquarters and research staff of the International Pacific Halibut Commission are located on the campus. The Washington State Department of Fisheries maintains offices in the Fisheries Center, and close contacts also exist between the college and the research staff of both the Department of Fisheries and the Department of Game in Olympia. Many of the senior research members of these organizations and some from industry are lecturers or affiliate faculty members in the college.

The College of Fisheries is actively engaged in water resource management activities through the participation of its faculty in the interdisciplinary programs. The college is represented in the State of Washington Water Resources Center. The Institute of Marine Studies provides coordination between the diverse marine activities throughout the University, as well as conducting interdisciplinary programs that relate marine sciences to social sciences and to other disciplines. The Division of Marine Resources supervises the University's Sea Grant program, which provides support for research and extension services in problems of the marine environment, particularly fisheries.

INTERCOLLEGE PROGRAMS WITH THE COLLEGE OF FOREST RESOURCES

Center for Quantitative Science in Forest Resources, Fisheries, and Wildlife

Faculty

Bare, Bevan, Bledsoe, Chapman, Conquest, Dowdle, Fletcher, Gales, Gallucci, Greulich, Hatheway, Hertzberg, Mathews, Rustagi, Schreuder, Swartzman, Turnbull.

Research Staff

Clark, Lindsay, Mesmer, Mobrand, Somerton.

Adjunct Faculty

Mar, Newell.

Affiliate Faculty

Eberhardt, Estes, Tillman.

The Center for Quantitative Science in Forestry, Fisheries, and Wildlife is an intercollege academic unit sponsored by the College of Forest Resources and the College of Fisheries. The center offers a broad program in applied mathematics and in applied statistics directed principally to the two resource colleges and to other life science departments of the University. The center's applied mathematics program is concerned with quantitative descriptions for the management of both aquatic and terrestrial ecosystems.

The center's teaching program consists of five areas of course offerings: (1) computer programming with particular emphasis on the problems of the management of living resources, (2) quantitative ecology including population, community, and systems ecology, (3) operations research with particular focus on the utilization of renewable resources, (4) applied statistics with emphasis on statistical inferences and experimental design for the biological sciences, and (5) applied analysis consisting of differential and integral calculus applied to the life sciences. Courses in each of the five areas are interrelated in such a way as to meet a wide range of student interests and needs.

The faculty of the center participate in the research activities of several academic units of the University. These include, in addition to the two resource colleges, the Biomathematics Group, the College of Engineering, the College



of Arts and Sciences, including the departments of Economics, Geography, and Oceanography, and the graduate schools of Business Administration and Public Affairs, and the Institute for Marine Studies.

Both the teaching and the research programs of the center are designed to bring together living systems, mathematics, and the computer for purposes of understanding and management. Particular emphasis is placed upon the use of the computer for quantitative descriptions of both terrestrial and aquatic ecosystems and resource management. Computerization makes possible a study of the impact of exploratory management policies on simulated resource systems embedded in backgrounds of interrelated physical, biological, and economic activities, and under numerous institutional constraints. Computer-based models have been successfully employed in the management of forest stands, control of insect pests, management of fish and aquatic mammal stocks, and in the descriptions of complex ecosystems.

Wildlife Science Program

Committee

Fisheries: Donald E. Bevan, Chairperson; Mathews, Salo.

Forest Resources: Driver, Gessel, Scott, Taber.

Teaching and Research Faculty

Erickson, Manuwal, Taber.

The colleges of Fisheries and Forest Resources, through the Wildlife Science Committee, jointly administer an undergraduate degree program in wildlife science. This interdisciplinary program requires training in biological and quantitative science, as well as work in fisheries and forest resources. Students interested in the aquatic aspect of wildlife should register in the College of Fisheries. The student who obtains a Bachelor of Science degree with a major in wildlife science will be able to apply his training to management of wildlife resources and the related environment, or he may proceed to do graduate work for advanced management or to fill a research position. An undergraduate interested in this field may prefer to major in a broader area (fisheries, forest resources) and to select an elective concentration in wildlife science. Additional information may be obtained from a member of the committee.

COLLEGE FACILITIES AND SERVICES

The Fisheries Center on the Lake Washington ship canal contains classrooms, laboratories, and general facilities, as well as several research organizations. Located in the Oceanography Teaching Building nearby is the Fisheries-Oceanography Library, a branch library of research materials in fisheries, food science, oceanography, and wildlife science. The collection of fishes and shellfish maintained by the college for research and teaching purposes contains more than three hundred thousand cataloged specimens. These are mainly northern Pacific Ocean marine fishes and northwestern freshwater fishes. However, the collection also includes extensive material from the Philippine Islands and the southern Pacific Ocean, as well as representative collections from other parts of the world.

An annual run of several thousand salmon has been developed by, and is maintained at, the college by the release of thousands of fingerlings each spring. Returning adults utilize a fish ladder to enter the college's experimental fish hatchery. The run is the basis for both instruction and research on the life cycle of Pacific salmon. In progress are long-term studies on the effects of chronic irradiation of salmon during embryonic development, on dietary requirements of the young fish, and on the selective breeding of both salmon and rainbow trout. A saltwater aquarium also is maintained by the college. Cold or warm recirculated seawater may be supplied to a battery of aquaria, as well as to a unique three-thousand-gallon annular tank.

Other laboratories provide for the study of the physiology, biochemistry, and behavior of fish and of the effects of pollutants on fish. These include a separate room containing troughs and tanks in which water temperature may be maintained at various levels. Physiological facilities include equipment for surgical procedures and for biochemical analysis of body fluids from both freshwater and marine fish.

The College of Fisheries and the Fisheries Research Institute maintain an extensive library of computer programs for processing biological data. The Fisheries Analysis Center of the college provides service in programming and data entry, and assistance with the use of the computer; the college maintains a CDC 200-user terminal to provide ready access to the larger computers in the Computer Center, CDC 6400 and CDC CYBER-73. With the cooperation of a multidisciplinary group of national and international experts, faculty and staff of the college and of the Center for Quantitative Science have developed a comprehensive set of resourcemanagement teaching games. The games are being employed as "Link trainers" in a number of courses. They supplement traditional methods by providing students with opportunities to experience management decision making and to test their analytical skills on a variety of simulations of national resource-management problems.

A research trawler is available for instruction and research in Lake Washington, Puget Sound, and the North Pacific Ocean. It is capable of trawling to a depth of a thousand fathoms and is equipped for other types of fishing carried on in the North Pacific, as well as for handling a variety of experimental gear. It has facilities for marine microbiological studies and for technological investigations at sea. These include freezing and other refrigeration equipment and a small laboratory unit. Periodic training cruises introduce students to shipboard operations, including the use of various types of sampling equipment and acquaintance with a diversity of marine habitats. The college also uses the *Malka*, a diesel-powered, 40-foot, seine-style vessel, for instructional and research work on Puget Sound and Lake Washington. She is capable of a variety of research work, including tow-netting, purse seining, hydro wire, bottom grabs, and various sizes of otter trawls to depths of one hundred fathoms. Other fishing gears and sampling equipment have been successfully utilized from the *Malka*.

The headquarters of one of the Pacific Coast's largest fishing fleets is located within two miles of the campus. Besides serving as a base for the world-famous salmon, crab, and halibut fisheries, Puget Sound has extensive bottom fish and commercial oyster, clam, and shrimp operations. Sport fishing, particularly for trout, is available in the Pacific Northwest's many lakes and streams, and the college takes full advantage of the proximity of these natural resources in research and teaching. A College of Fisheries field station at Big Beef Creek on Hood Canal provides additional opportunities for class field studies and research in stream and estuarine ecology. The stream contains established runs of chum and coho salmon and steelhead trout. Research facilities include a salmonid spawning channel, estuarine rearing ponds, and stream observation channels. Other field activities are carried on at stations in both Washington and Alaska.

Food Science facilities include separate well-equipped laboratories for food microbiology, food biochemistry, and food analysis. The food-processing and -engineering laboratory pilot plant complex comprises several separate facilities containing equipment for teaching and experimental work in applied areas of unit operations and processing. These include thermal processing (e.g., canning), drying, smoking, and freezing equipment and machinery for studying process parameters as well as for preparing commercial-type food products.

A unique feature of the Food Science laboratories is the Cobalt-60 research food irradiator (Mark II), which is designed for irradiation of large quantities (one hundred pounds or more) of food or other materials by gamma rays at a high dose rate.

Facilities for graduate studies in nutrition, including experimental work with vertebrates and invertebrates, are provided in the Institute for Food Science and Technology, Laboratory and shipboard facilities for graduate studies in the field of marine microbiology are maintained in the Institute for Food Science and Technology.

In 1971, the University of Washington was named a Sea Grant institution under the national Sea Grant College and Program Act, which is administered by the National Oceanic and Atmospheric Administration. The College of Fisheries participates actively in this program, with research projects concerned with the living resource of the northeastern Pacific Ocean and the changing environment of Puget Sound, with advisory services to industry, and with a variety of courses.

Fisheries Club

Since its formation by the students of the College of Fisheries in 1922, the Fisheries Club has been the center of extracurricular social and educational activities for the college students.

Monthly meetings offer varied programs that include speakers from the industry and motion pictures that deal with fisheries all over the world. In the past years, the students have organized the open house of the College of Fisheries. In addition, the club has an annual picnic, a steelhead derby, and other social gatherings, as well as a variety of other projects beneficial to members.

Financial Aid

Through industrial and private scholarships, the college offers limited financial assistance to undergraduates and graduates. The *Handbook of Scholarships*, obtainable from the Office of Student Financial Aid, 170 Schmitz, lists available scholarships.

Employment

The College of Fisheries maintains a file of both permanent and summer job opportunities for its students. Summer or part-time employment during the scholastic year is frequently available with the research organizations that are associated with the College of Fisheries on or near the campus or elsewhere in the Pacific Northwest. The Fisheries Research Institute usually hires students for summer work in the field and often has several part-time positions available during the school year. Similar work is available in the Washington State Department of Game, the Washington State Department of Fisheries, the United States National Marine Fisheries Service, the International Pacific Halibut Commission, the Laboratory of Radiation Ecology, the Oregon Fish Commission, the International Pacific Salmon Fisheries Commission, and the Alaska Department of Fisheries. Some of these jobs are located within the state of Washington, but many take students to Alaska or elsewhere in the United States. These agencies usually interview students at the College of Fisheries during Winter Quarter, seeking both permanent employees and summer-only employees. Fisheries students are encouraged to seek summer work in the field to gain valuable experience in fishery biology or in fisheries or food technology.

Undergraduate Programs

Degrees offered

Fisheries Science: Bachelor of Science in Fisheries and Bachelor of Science with a major in fisheries.

Food Science: Bachelor of Science with a major in food science.

COLLEGE OF FISHERIES



High School Preparation

Although the College of Fisheries does not have specific high school requirements other than those of the University, students are urged to take intermediate algebra and trigonometry, because these are prerequisites for the first courses in mathematics included in all College of Fisheries curricula. If possible, students who plan to enter the college should complete these courses in addition to elementary algebra and plane geometry, which usually are the two units of college preparatory mathematics. The study of chemistry, physics, and biology in high school is useful preparation.

Admission

Admission as a premajor: Students entering the University directly from high school and indicating intent to major in fisheries or food science are automatically placed in premajor status. Students transferring from other colleges in the University or from other institutions will, if they have not completed the equivalent of the courses in the premajor program listed below with a 2.30 grade-point average and at least 75 quarter credits in total, also be accepted as fisheries or food science premajors. Fifth-year students must meet the requirements for major status to be admitted for a second baccalaureate degree. In general, students on probationary status are not accepted as transfers.

Premajor Program

Prior to becoming a fisheries or food science major, a student must complete the quarter credits in the subjects shown below:

Fisheries Science: General biology (15 credits); general chemistry (10); organic chemistry (5); English (advanced expository and technical writing) (5); mathematics (algebra, calculus) (13); statistical methods (5); speech, public speaking (5); total--58.

Food Science: General biology (10 credits); general chemistry (14); qualitative and quantitative chemistry (5); organic chemistry (10); English (advanced expository or technical writing (5); mathematics (algebra, calculus) (13); statistical methods (5); general physics (12); total—74.

FISH 101 and courses in humanities, social sciences, and physics, or in the use of computers are recommended for additional credits. The student must earn 10 credits in foreign-language study unless two units already have been taken in high school.

Students at the University of Washington may refer to subsequent pages in this catalog for the numbers of specific courses required or recommended for the fishery science and food science curricula. Students at community colleges in Washington should consult the most recent *Transfer Guide for Community Colleges in Washington*. Students at other institutions should take equivalent courses. Students in the College of Fisheries must finish the premajor program or obtain permission from the instructor before entering a 400-level course in fisheries or food science other than FISH 401.

Admission as a Fisheries or Food Science Major

After completing 75 credits, including requirements of the premajor program, a student may apply for admission to the College of Fisheries with major status. Application forms may be obtained from the college office.

When more applicants than can be accommodated apply, satisfaction of minimum admissions standards does not guarantee acceptance. Criteria of acceptance include gradepoint average, appropriateness of completed course work, academic objectives, motivation, references, and personal interviews with advisers.

Applicants for major status must have earned a minimum grade-point average of 2.30 in the courses required for the premajor program.

Minority and women students are urged to consider potential futures in this field. The college cooperates with the Educational Opportunity Program in giving special aid to students who have not received the usual educational advantages.

Advising

After receiving notification of admission and before registering, new students should visit or write to the College of Fisheries for help in planning their course programs. Academic and other counseling of fisheries students is given by faculty advisers in the College of Fisheries.

Graduation Requirements

Students who do not include two units of foreign language in their college preparatory programs are required to achieve equivalent competence in a foreign language as a graduation requirement. This requirement may be fulfilled by successful completion in the University of 10 credits of a foreign language or by passing an appropriate placement examination.

If not more than ten years have elapsed since the date of entry into the college, the student may elect to follow the requirements set out in the *General Catalog* published most recently prior to entry or those in the most recent catalog. However, this option is subject to approval of the faculty and Dean and to the procedures of the *Faculty Handbook*. All responsibility for fulfilling graduation requirements rests with the student concerned.

The University requires 180 academic credits for graduation, of which 36 must be taken in fisheries or food science. At least 60 of the 180 credits must be in upper-division courses, those numbered 300 and above. Advanced ROTC courses do not count toward upper-division credit, and no more than 18 credits in advanced ROTC courses may be counted toward graduation. For graduation, a student must have a cumulative grade-point average of 2.00 in fisheries and food science courses and an overall average of 2.00 in all courses. Additional graduation requirements associated with specific degrees are given below.

The total number of credits that may be taken S/NS is 25. But only 5 of these credits may be for core curriculum courses. Any credit/no credit courses presented at the time of transfer into the College of Fisheries reduces the number of S/NS credits that may be taken. A combined total of no more than 25 CR/NC or S/NS credits are accepted for a baccalaureate degree program.

Students who transfer from other institutions to the College of Fisheries are required to earn at least 10 credits in their major subject in this college.

FISHERIES SCIENCE

Adviser

George W. Brown, Jr. 228 Fisheries Center

A baccalaureate degree requires completion of a common core curriculum and no fewer than 36 credits in fisheries. The normal program includes the subjects listed below or their equivalents.

Core Curriculum

Basic Science: (30 credits minimum) Biology, general— BIOL 210, 211, 212 (BIOL 101, 102 and BOT 113 or 320 may also be accepted though some courses in fisheries require BIOL 210, 211, 212). Chemistry, general—CHEM 140, 150, 151. Chemistry, organic—CHEM 102 or 231, 232.

Mathematics and Statistics: (13 credits minimum, beyond MATH 105, Elementary Functions) Mathematics (Calculus)—Q SCI 291, 292 or MATH 124, 125. Statistics— Q SCI 281 or 381.

Environmental Sciences: (11 credits minimum) BIOL 472 (Ecology) and 473 (Limnology). Also, OCEAN 203 (Introduction to Ocean). or BIOL 474, 475 (Laboratories for Ecology, Limnology).

Fishery Science: (14 credits) FISH 101, 311, 401.

Social Sciences: (11 credits minimum) The following courses are recommended: ECON 211 (General Economics), ECON 435 (Natural Resources Utilization and Public Policy), POL S 471 (Administrative Processes) or A ORG 440 (Organization Theory). *Functional Techniques:* (20 credits minimum) ENGL 271 (Advanced Expository Writing), or ENGR 130 (Introduction to Technical Communication) and ENGR 331, or STC 401; FISH 314, 340, 395; SPCH 220 (Introduction to Public Speaking).

Bachelor of Science in Fisheries Degree

In addition to the core curriculum, students select any *two* sets of prescribed courses from the following eight sets:

1. Fish Culture: FISH 444, 450, 451, 452, 453, 454, 460, 467, (3, 3, 3, 3, 4, 3, 4, 5); Q SCI 382, 383 (5, 5) Statistical Inference in Applied Research.

2. *Invertebrate Culture:* FISH 405, 406, 454, 459 (5, 5, 3, 5); Q SCI 382, 383 (5, 5); ZOOL 330 (5) Natural History of Marine Invertebrates.

3. Recreational Fisheries: FISH 367, 467, (4, 5); FOR M 451 (3), Outdoor Recreation Economics; FOR M 452 (3), Sociology of Leisure and Outdoor Recreation; Q SCI 382, 383 (5, 5); SOC 110 (5), Survey of Sociology, SOC 330 (5) Human Ecology.

Choose at least 5 credits from: FISH 425, 460, 499 (5, 4, 1-5); FOR M 467 (3), Economics of Forest Land Use; Q SCI 480 (3), Sampling Theory for Biologists; URB P 412 (3), Forecasting Methods in Urban Planning.

4. Aquatic Resource Management: FISH 379 (3), 425 (5), 463 (5); FISH 451 (3) or 405 (5) or 406 (5); Q SCI 456 (4), 457 (4); Q SCI 382 (5), 383 (5).

5. Water Quality: CHEM 321 (5); CEWA 456 (3), 457 (3); BIOC 405, 406 (3, 3); FISH 415 (3), 477 (3). Choose additional courses (9 credits) from among the following to total at least 31 credits in this option (exclusive of courses in other options). The further courses from which selections may be made are: BOT 446 (5); CHEM 160 (4), 350 (3); CEWA 442 (3), 485 (3); FISH 430 (5), 456 (5), 459 (5), 460 (4), 472 (3), 473 (3); FISH 434 (3/5), 435 (3); OCEAN 451 (2). (For this set, choose CHEM 231, 232 from the core curriculum.)

6. Fish Processing: CHEM 321 (5), Quantitative Analysis; FD SC 380, 381, 481, 484 (3, 3, 4, 3); MICRO 301, 302 (3, 2); MICRO 400, 401 (3, 3), Fundamentals of General Microbiology. (For this set, choose CHEM 231, 232 from the core curriculum.)

7. Environmental Studies: Two of FISH 430 (5), 434 (3/5), 435 (3); two of FISH 405 (5), 406 (5), 415 (3), 425 (5), 463 (5), 467 (5), Q SCI 382 (5), 383 (5). Choose additional courses from those listed above within this option or those below to total at least 31 credits exclusive of courses taken to satisfy other options. The further courses from which selections may be made are: FISH 456, 459, 472, 473, 475 (5,5,3,3,3); FD SC 381 (3); WLF S 350 (4), FOR B 493 (2); ENV S 352 (5), 361 (5), 425 (3), 441 (3),



453 (3-5), 481 (5), 482 (3-5); CEWA 450 (3/5); GEOG 444 (3).

8. Biometrics-Quantitative Fishery Biology: Q SCI 391, 392, 393 (3, 3, 3) or MATH 238, 239 (3, 3) may be substituted for 392, 393. Q SCI 382, 383 (5, 5), 480 (3) or 486 (3). Q SCI 456 (4); FISH 457 (4), 458 (4).

Bachelor of Science Degree with a Major in Fisheries

Students who wish to enlarge their opportunities for choice of electives may pursue this option. In addition to the core curriculum, he or she selects any single set of prescribed courses from the above eight sets. Electives sufficient to bring total credits to 180 and credits in fisheries to 36 are subject to approval by the college.

FOOD SCIENCE

Adviser

John Liston 213 Fisheries Center

Bachelor of Science Degree with a Major in Food Science

The food science program provides a curriculum leading to a Bachelor of Science degree with a major in food science. It is recommended that the entering student will have completed mathematics, including advanced algebra and trigonometry, and laboratory science, including chemistry and physics.

In addition to the core requirements (of the premajor), the following courses must be taken:

BIOC 405, 406 (3, 3), Introduction to Biochemistry; FISH 395 (3); FD SC 350, 380, 385, 481, 482, 483, 484, 485, 486, 498 (3, 3, 3, 4, 3, 3, 3, 3, 3, 2-6); 395, 491, 492, 493, 494, 495, 496 (1, 1, 2, 2, 3, 2, 2); MICRO 301 (3), General Microbiology; 302 (2), General Microbiology Laboratory; and either ENVH 440 (4), Water and Waste Sanitation; or ENVH 441 (3), Food Sanitation.

Students intending to proceed to graduate study should consult with an adviser about the substitution of more advanced-level courses in certain areas for those listed in the outline.

A suggested sequence of courses for the four-year curriculum in food science is as follows:

First Year: First quarter—CHEM 140 (4), MATH 105 (5), elective (6). Second quarter—CHEM 150, 151 (4, 2), MATH 124 (5) or Q SCI 291 and 292 may be substituted, electives (4). Third quarter—CHEM 160 (4), MATH 125 (5), or Q SCI 291 and 292 may be substituted, electives (6). Second Year: First quarter—CHEM 231, 241 (3, 3), ENGL 271 (5), or ENGR 130, 331 (3, 3), PHYS 114 (4), electives (1). Second quarter—CHEM 232, 242 (3, 3), PHYS 115 (4), electives (5). Third quarter—CHEM 321 (5), Q SCI 281 (5), PHYS 116 (4), electives (1).

Third Year: First quarter—MICRO 301, 302 (3, 2), ENVH 440 (4), FD SC 350 (3), electives (3). Second quarter—FD SC 380, 385, 395 (3, 3, 1), BIOC 405 (3), electives (5). Third quarter—BIOC 406, 426 (3, 3), FD SC 481, 491 (4, 1), electives (4).

Fourth Year: First quarter—FD SC 482, 484, 492, 494, 498 (3, 3, 2, 3, 2), FISH 395 (3). Second quarter—FD SC 483, 493, 485, 495, 498 (3, 2, 3, 2, 2), electives (3). Third quarter—NUTR 321 (5); FD SC 496, 498 (2, 2); electives (6).

Electives should include ten hours of biology.

Graduate Programs

The Graduate Student Guide of the College of Fisheries should be consulted for more complete information.

Admission

Basic requirements for admission to the graduate program in the College of Fisheries are a baccalaureate degree from an institution of recognized standing, a grade-point average of 3.00 in the junior and senior years of college work, approval of the College of Fisheries, and approval of the Graduate School. Applicants must also take the Graduate Record Examination (general only) and submit the score with the application for Graduate School. Preference is given those with a strong background in the basic sciences. A student admitted with a baccalaureate degree is accepted initially for a Master of Science degree program.

The College of Fisheries is now under an enrollment quota imposed on the entire University. This limits the number of students who can be admitted to a number approximately equal to those who graduate. Prospective students should obtain current information on the procedures used to evaluate applications for admission from the graduate program adviser or the Dean's office so as to make the best presentation of their talents and experience in their application for admisson.

Graduate Program Adviser Donald E. Bevan

214 Fisheries

Graduate students in the College of Fisheries are required to take a minor or a minimum number of supporting courses in selected departments of the University. The nature and number of such courses are determined by the student's supervisory committee.

Master of Science Degree

At least one year of approved study, with the completion of a research project, leads to the master's degree. A minimum of 45 upper-division or graduate credits must be earned, including 18 credits for FISH 700 or FD SC 700, 3 credits in FISH 520 and 3 in 522, and 6 additional credits in courses numbered 500 or above; or 3 credits in FD SC 521 for food science majors. The degree requirements must be completed within six years.

Doctor of Philosophy Degree

Students must complete at least three years of graduate study, including a dissertation. Certain credits earned for a master's degree may be applied toward the doctoral degree. The master's requirements for FISH 520, 522 and FD SC 521 must be met, if not achieved as part of a master's program. Preparation of a dissertation requires registration for 36 credits in FISH 800. Requirements must be completed in no more than ten years.

Foreign-Language Requirements for Advanced Degrees

The foreign-language requirement for the master's degree will be satisfied by any one of the following:

1. One year of foreign-language study in college with passing grades.

2. Independent study courses equivalent to 1. above.

3. Summer intensive courses at the University of Washington with passing grades.

4. Educational Testing Service examination with passing (minimum 50 percentile) grade.

5. Two years of foreign-language study in high school with passing grades.

6. Completion of secondary school education in a language other than English.

The foreign-language requirement, if any, for the Ph.D. degree, in addition to fulfillment of the master's degree requirements, is determined by the student's Supervisory Committee.

Financial Aid and Employment

In addition to that contained in the *Handbook of Scholar-ships*, obtainable from the Office of Student Financial Aid, 170 Schmitz, information concerning graduate student support is available at the office of the Dean. Many scholar-ships, fellowships, and teaching and research assistantships are available for qualified graduate students. Students requiring financial support should make application at the office of the Dean.

The specific fishery orientation of the college program is supported by a unique combination of subject interests among the faculty, wide range of equipment, and physical facilities. These factors, together with the active research program, put graduate students in a very favorable position to pursue programs leading to advanced degrees.

In addition to the opportunities for graduate work at the College of Fisheries, opportunities exist in international, federal, and state fishery and water research agencies on or near the campus. Graduate students, besides finding financial support from such agencies, may, under special arrangements, carry out research that, upon approval, may be used to satisfy the thesis requirements for the advanced degrees.



FOREST RESOURCES

Dean

James S. Bethel 102A Anderson

Associate Dean (Instruction)

Thomas R. Waggener 130 Anderson

Associate Dean (Research)

Stanley P. Gessel 107B Anderson

Faculty

Agee, Allan, Bare, Bethel, Bledsoe, Bradley, Brockman (emeritus), Brubaker, Bryant, Burke, Burns, Carson, Chapman, Cole, Dowdle, Driver, Edmonds, Erickson (emeritus), Field, Fritschen, Gara, Gardner (emeritus), Gessel, Greulich, Grier, Hatheway, Hinckley, Hrutfiord, Lee, Leney, Leopold, Manuwal, Marckworth (emeritus), McCarthy, McKean, Morison, Oliver, Pearce (emeritus), Pickford, Robertson (emeritus), Rustagi, Sarkanen, Schaeffer (emeritus), Schiess, Schreuder, Scott, Sharpe, Smith, Stenzel (emeritus), Stettler, Taber, D. Thomas, Turnbull, Ugolini, van Klaveren, Waggener, West, Witt, Wooldridge, Zasoski.

Affiliate Faculty

Atkinson, Clark, Darley, DeBell, Eaton, Fahnestock, Johnsey, Larson, Medcalf, Morey, Neogi, Odegaard, Pitman, Russell, Sandberg, Steinbrenner, Stonecypher, B. Thomas, J. Walker, Williston, Wilson, Winjum.

Adjunct Faculty

Gallucci, R. Walker, Jorgenson, Landolt.

Studies in forest resources include natural and social sciences applied to the uses of forest, range, and recreational lands and the technology necessary to provide forest-based goods and services.

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 unique opportunities for field classes and research, actual management of forested lands, exposure to woodbased industries, and awareness of resource-use issues. College enrollment is approximately 535 undergraduates and 250 graduate students, taught by more than fifty faculty members. Thus, students enjoy small classes and close association with faculty, as well as the diversity and superior facilities of a large university.

The College of Forest Resources is accredited by the Society of American Foresters (SAF). Most curricula are flexible enough to provide qualification for SAF and the Forester rating for U.S. Civil Service. Students should consult with advisers in planning their schedules to include the specific class requirements for SAF and civil service qualification.

The college provides assistance to its majors in obtaining summer employment while in school and permanent employment upon graduation. Summer work is available through federal and state agencies and in the numerous private companies in the wood-using industry of the region. Although field experience is not required for graduation, students are strongly urged to seek summer employment relevant to their major and career goals. As in any applied technical field, practical experience is as important as academics in preparing for a professional career.

The College of Forest Resources offers curricula leading to a Bachelor of Science in Forest Resources degree and, through the Graduate School, the degrees of Master of Forest Resources, Master of Science, and Doctor of Philosophy.

MANAGEMENT AND SOCIAL SCIENCES DIVISION (MSS)

Chairperson

David P. Thomas 123 Anderson

Faculty

Bare, Bradley, Burns, Dowdle, Field, Hinckley, Lee, Pickford, Rustagi, Schreuder, Sharpe, Thomas, Turnbull, Waggener.

Basic and applied subject matter in social sciences, management techniques and quantitative sciences for all curricula, and specific curricula in forest management and outdoor recreation are taught by the Management and Social Sciences Division.

BIOLOGICAL SCIENCES DIVISION (BS)

Chairperson

David R. M. Scott 101 Winkenwerder

Faculty

Agee, Bledsoe, Brubaker, Cole, Driver, Edmonds, Fritschen, Gara, Gessel, Grier, Leopold, Manuwal, Morison, Oliver, Scott, Stettler, Taber, Ugolini, van Klaveren, West, Witt, Zasoski.

Basic subjects in ecology, including plants, animals, climate, and soils for all curricula, and specific curricula in wildlife sciences and certain senior options in forest management are included in the teaching responsibility of the Biological Sciences Division.

PHYSICAL SCIENCES DIVISION (PS)

Chairperson

Bjorn Hrutfiord 332 Bloedel

Faculty

Allan, Bethel, Bryant, Burke, Carson, Greulich, Hathe-

way, Hrutfiord, Leney, McCarthy, McKean, Sarkanen, Schiess, Smith, Wooldridge.

Courses for which the Physical Sciences Division is responsible include those in wood utilization and properties, the organization of the wood-using industry, and principles of timber harvest for all curricula as well as specific programs of study in pulp and paper technology, wood and fiber science, and forest engineering.

UNDERGRADUATE PROGRAMS

In addition to the University's general admission requirements, students who plan to enter the College of Forest Resources should have completed Algebra III (intermediate), trigonometry, and at least one unit each of biological and physical science.

The college offers six undergraduate curricula. The first two years of study emphasize general preparation, followed by an upper-division professional program. Each curriculum contains a number of elective credits selected at the student's discretion. Students are encouraged to take a number of these credits outside the college to broaden their preparation. An honors program also is available in each curriculum to qualified students. Interested students may obtain information from the honors program adviser.

In addition to University regulations regarding requirements and grading, college regulations state that no required course may be taken on a satisfactory/not satisfactory or credit/no credit basis. Some classes include field trips, laboratory supplies, or material duplication at extra expense to the students. Grades and credits for such classes are contingent on these fees being paid.

The instructional program is administered by three college divisions: Management and Social Sciences (forest resources management and outdoor recreation), Biological Sciences (wildlife science and several upper-division options in forest resources management), and Physical Sciences (pulp and paper technology, wood and fiber science, and forest engineering).

Students intending to complete curricula in the Management and Social Sciences and Biological Sciences divisions are classified as premajors until they have completed 75 credits of required course work with a cumulative gradepoint average of at least 2.00. At this point, students may be admitted to a specific upper-division curriculum subject to completion of lower-division requirements. Students intending to complete curricula in the Physical Sciences Division should apply for admission to the specific curriculum as soon as they are admitted to the college.

Students interested in forest resources management or forest engineering should note that upper-level course work



may be taken only after completion of the required field camp at Pack Forest.

Students planning to enter the college from junior colleges or from other universities should check with their advisers to ensure their prior programs of study include the proper prerequisites.

Student advising is the joint responsibility of the College Advising Center, 116 Anderson, and the divisions. Student files are located in the advising center, and the curriculum adviser is available to assist with scheduling and questions.

Pack Forest Residential Field Classes

Students enrolled in the forest resources management and forest engineering curricula are required to attend the Pack Forest program during either Spring Quarter or Summer Quarter at the end of the sophomore year. This program is conducted as a field residential program at the Charles Lathrop Pack Demonstration Forest near LaGrande, sixty-five miles from Seattle. Classes taught include field measurement, surveying, and ecology. Students taking course work at Pack Forest are required to live at the field residential station, paying room and board charges in addition to regular tuition.

Students may apply for admission to the Pack Forest program approximately two months preceding the quarter they wish to attend. Admission is based on completion of lowerdivision course work and available space. Application forms and information are available from the curriculum adviser, 116 Anderson.

Courses of Study

In the descriptions of courses of study listed below, the division administering the program is indicated by initials after the curriculum title (MSS, BS, or PS). Explanations for footnotes are found at the end of the curricula listing.

Outdoor Recreation Curriculum (MSS)

Outdoor recreation is a restricted curriculum, requiring a special application procedure prior to beginning upperdivision courses. Interested students should obtain application forms no later than February 1 preceding their junior year. Application forms and information are available in the advising center. 116 Anderson.

LOWER-DIVISION REQUIREMENTS

Forest Resources—FOR M 100, Introduction to Forest Resources Management (5 credits); FOR B 210, Introductory Soils (3); FOR M 252, Introduction to Natural Resources Sociology (3). Mathematics¹—Q SCI 281, Elementary Statistical Methods (5), Q SCI 290, Introduction to Mathematics for Biologists (4), Q SCI 291, Analysis for Biologists (4). Physical Sciences—10 credits of the following: CHEM 101, 102, PHYS 114, 117, or PHYS 115, 118. Earth Science—GEOL 101, Physical Geology (5); ATM S 101, Survey of the Atmosphere (5). Social Science—ECON 200, Introduction to Economics (5); POL S 202, Introduction to American Politics (5). Humanities/Communication—SPCH 220, Introduction to Public Speaking (5); ENGL 181, Expository Writing (5). Biological Science—10 credits of the following: BIOL 101-102, General Biology, BOT 110, Plants in the Human Environment, or BOT 113,² Elementary Plant Classification, Engineering—ENGR 123, Graphical Analysis (1); ENGR 161, Plane Surveying (3). Electives (12).

UPPER-DIVISION CORE

Forest Resources—FOR M 350, Field Studies in Outdoor Recreation (3 credits), FOR M 351, Introduction to Outdoor Recreation (5); FOR B 325, Forest Ecology (5); FOR M 353, Interpreting the Environment (5), FOR M 354, Introduction to Recreation Area Management (3), FOR M 355, Resources Planning Processes (3), FOR M 459,³ Case Studies in Outdoor Recreation (5), FOR M 452, Sociology of Leisure and Outdoor Recreation (3), FOR M 450, Law Enforcement for Outdoor Recreation Professionals (2); WLF S 350, Survey of Wildlife Biology and Conservation (4); FOR B 322, Silvicultural Methods (3). Humanities—ENGR 331, Scientific and Technical Reporting (3); CMU 338, Public Relations (3).

PARK MANAGEMENT OPTION

Forest Resources—FOR B 333, Forest Protection (4 credits); FOR M 451, Outdoor Recreation Economics (3); ACCT 210, Introduction to Accounting (3); A ORG 440, Organization Theory (3); HRSYS 301, Personnel Systems and Industrial Relations (3); FOR M 370, Forest Policy, Law, and Planning (5). Environmental Health—one of the following: ENVH 440, Water and Waste Sanitation (4), or ENVH 442, Vector Control (3). Electives (18-19).

INTERPRETATION OPTION

Forest Resources—FOR M 453, Advanced Interpretation (5 credits). Education—EDC&I 482, Still Photography in Education (3). 20 credits from the following: HSTAA 412, The Westward Movement (1700-1850) (5); ANTH 417, North American Indians: Pacific Northwest (5); ZOOL 331, Natural History of Freshwater Invertebrates (5); ZOOL 330, Natural History of Marine Invertebrates (5); FOR B 435; Forest Entomology (3); WLF S 401, 411, Biology and Conservation of Birds, and Laboratory (3, 2), WLF S 404, 414, Biology and Conservation of Mammals, and Laboratory (3, 2). Electives (15).

PARK PLANNING OPTION

Forest Resources—FOR M 366, Quantitative Methods in Forest Resource Management (3), FOR M 455, Advanced Planning: Regional (5), FOR M 458, Advanced Planning: Site (5), FOR M 307, Environmental Impact Assessment and Regulation in Forest Resource Management (3), FOR M 463, Contemporary Problems in Forest Land Use (3), FOR M 250, Computer Programming (3), FOR M 451, Outdoor Recreation Economics (3); and one of the following: FOR B 430, Silvicultural Methods for Special Uses (3); WLF S 402, Human Culture and Wildlife Conservation (5); FOR B 311, Soils and Land Use (3), FOR B 329, Microclimatology (3), FOR B 300, Dendrology (4). Electives (13-15).

Forest Resource Management Curriculum (MSS)

LOWER-DIVISION REQUIREMENTS

Forest Resources—FOR M 100, Introduction to Forest Resources Management (5 credits), FOR M 252, Introduction to Natural Resources Sociology (3), FOR M 250, Computer Applications to Forestry Problems (3)⁴; FOR B 300, Dendrology (4). Mathematics¹—Q SCI 281, Elementary Statistical Methods (5), Q SCI 290, Introduction to Mathematics for Biologists (4), Q SCI 291, Analysis for Biologists (4). Humanities—ENGL 171, 172, College Writing⁵ (3, 3). Physical Science—CHEM 101, General Chemistry (5), CHEM 102, General and Organic Chemistry (5); PHYS 114, General Physics (4), PHYS 117, General Physics Laboratory (1). Earth Science—(5).⁶ Social Science—ECON 200, Introduction to Economics (5); electives⁷ (10). Biological Science—BIOL 101-102, General Biology (5-5). Electives (11).

UPPER-DIVISION REQUIREMENTS

Pack Forest Field Program—FOR M 320, Multiple Forest Uses (2 credits); FOR P 340, Forest Surveying and Drafting (4); FOR M 360, Field Studies in Forest Mensuration (3); FOR B 302, Practicum in Forest Soils, Plants, Diseases, and Insects (3), FOR B 320, Forest Community Ecology (3), FOR B 321, Silvics (3),⁸ FOR B 322, Silvicultural Methods (3), FOR B 329, Microclimatology (3), FOR B 310, Forest Soils (4); FOR M 362, Aerial Photos in Forestry (3), FOR M 365, Forest Economics (5), FOR M 361, Forest Measurements (4), FOR M 370, Forest Policy, Law, and Planning (5); FOR B 333, Forest Protection (4); FOR M 469, Forest Resources Management Case Studies (5). Professional option—(27-34). Electives (3-10).

FOREST LAND USE PLANNING OPTION (MSS)

Forest Resources—FOR M 355, Resource Planning Processes (3 credits), FOR M 307, Environmental Impact Assessment and Regulation in Forest Resource Management (3); FOR B 415, Applied Forest Hydrology (4), FOR B 311, Soils and Land Use (3); FOR M 463, Contemporary Problems in Forest Land Use (3), FOR M 366, Quantitative Methods in Forest Resource Management (3), FOR M 467, Economics of Forest Land Use (3), FOR M 482, Forest Land Use Case Studies (4). Political Science—POL S 465, Law and Public Policy (5), or 471, Administrative Processes (5), or 452, Political Processes and Public Opinion (5).

FOREST INDUSTRIES MANAGEMENT OPTION (MSS)

Forest Resources—FOR P 374, Wood Utilization (3 credits), FOR P 375, Wood Utilization Laboratory (2),

FOR P 400, Wood and Fiber Structure (5); FOR M 464, Economics of the Forest Products Industries (3); FOR P 479, Analysis of Wood Processing Facilities (3), FOR P 480, Wood Process Development and Design (3). Business Administration—FIN 350, Business Finance (4); Q SCI 376, Operations Research in Resource Utilization (3); MKTG 301, Marketing Concepts (4); HRSYS 301, Personnel Systems and Industrial Relations (3).

TIMBER MANAGEMENT OPTION (MSS)

Forest Resources—FOR P 341, Timber Harvesting (4 credits); Forest Protection Block (one course)—FOR M 430, Introduction to Wildland Fire Management (3) or FOR B 432, Introductory Forest Pathology (4), or FOR B 435, Forest Entomology (3); Forest Soils and Silviculture Block (two courses)—FOR B 422, Reproduction Methods in Silviculture (3), FOR B 415, Applied Forest Hydrology (4); FOR B 429, Intermediate Operations (3) or FOR M 417, Forest Soil Management (3), FOR M 466, Economics of Timber Production (3), FOR M 368, Forest Regulation (3); FOR P 304, Wood: Properties and Best Use (3); FOR M 468, Timber Resources Management Case Studies (5).

FOREST RECREATION OPTION (MSS)

Forest Resources—FOR M 351, Introduction to Outdoor Recreation (5 credits), FOR M 353, Interpreting the Environment (5), FOR M 354, Introduction to Management of Recreation Areas (3), FOR M 355, Resource Planning Processes (3), FOR M 451, Outdoor Recreation Economics (3), FOR M 452, Sociology of Leisure and Outdoor Recreation (3), FOR M 456, Wilderness Preservation and Management (3); FOR B 430, Silvicultural Methods for Special Uses (3), FOR B 311, Soils and Land Use (3); FOR M 488, Case Studies in Forest Recreation (5).

TIMBER HARVESTING OPTION (MSS)

Forest Resources—FOR P 341, Timber Harvesting (4 credits); Forest Soils Block (1 course)—FOR B 415, Applied Forest Hydrology (4); or FOR M 417, Forest Soil Management (3); FOR M 366, Quantitative Methods in Forest Resource Management (3), FOR M 368, Forest Regulation (3); FOR P 342, Forest Road Engineering (4); FOR M 307, Environmental Impact Assessment and Regulation in Forest Resource Management (3), FOR M 466, Economics of Timber Production (3), FOR M 448, Timber Harvesting Case Studies (5). Business Administration—BG&S 403, Commercial Law (5).

SILVICULTURE AND PROTECTION OPTION (BS)

Protection Block (two of three courses)—FOR M 430, Introduction to Wildland Fire Management (3 credits); FOR B 432, Introductory Forest Pathology (4), FOR B 435, 436, Forest Entomology and Laboratory (3, 2). Forest Soils Block—FOR M 417, Forest Soil Management (3), or FOR B 415, Applied Forest Hydrology (4). Silviculture Block (two of three courses)—FOR B 422, Reproduction



Methods in Silviculture (3), FOR B 429, Intermediate Operations in Silviculture (3), FOR B 427, Forest Genetics (3). Miscellaneous Block—FOR B 420, Forest Chemicals (3), or FOR B 326, Range and Wildlife Habitat (3); FOR P 341, Timber Harvesting (4); FOR M 468, Timber Resources Management Case Studies (5).

WILDLIFE CONSERVATION OPTION (BS)

Wildlife Science—WLF S 350, Survey of Wildlife Biology and Conservation (4 credits), WLF S 402, Human Culture and Wildlife Conservation (5), WLF S 401, 411, The Biology and Conservation of Birds, and Laboratory (3, 2); WLF S 404, 414, The Biology and Conservation of Mammals, and Laboratory (3, 2). Zoology—ZOOL 409, Sociobiology (3). Botany—BOT 113, Elementary Plant Classification (5). Forest Biology—FOR B 326, Range and Wildlife Habitat (3).

HYDROLOGY AND SOILS OPTION (BS)

Forest Resources—FOR B 440, Soil Physics (4 credits); FOR P 343, Introductory Soil Mechanics (3); FOR B 417, Environmental Biophysics (3), FOR B 415, Applied Forest Hydrology (4), FOR B 413, Soil Distribution and Classification (4); FOR M 417, Forest Soil Management (3); FOR P 344, Hydraulics for Forest Roads (3). Geology— GEOL 412, Fluvial Geomorphology (5). Engineering— CEWA 447, Physical Hydrology (3).

URBAN FORESTRY OPTION (BS)

Forest Resources—FOR B 420, Forest Chemicals (3 credits), FOR B 430, Silvicultural Methods for Special Uses (3); FOR M 307, Environmental Impact Assessment and Regulation in Forest Resource Management (3), FOR M 484, Urban Forestry Case Study (5). Botany—BOT 331, Ornamental Plants (3). Landscape Architecture—L ARC 341, Site Planning (3), L ARC 421, Landscape Horticulture (3), L ARC 463, Natural Processes as Planning and Design Determinants (3). Business Administration—A ORG 440, Organization Theory (3). Wildlife Science—WLF S 350. Survey of Wildlife Biology and Conservation (4).

STUDENT-SPECIFIC OPTION

Students desiring to pursue an option other than those established for the Forest Resources Management Curriculum should discuss their interests with members of the faculty. Upon sponsorship of two members of the faculty, the student shall submit to the associate dean a proposed program of study consisting of at least 30 credits of course work. Upon approval by the associate dean, a copy of the approved program is returned to the student and a copy placed in the student's file in the College Advising Center. This program is binding as a graduation requirement in lieu of one of the specified options. All other requirements of the curriculum, including the core requirements and senior case study, must be satisfied. Wildlife Science Curriculum (BS)

TEACHING AND RESEARCH FACULTY

Donald E. Bevan, Chairperson; Driver, Erickson, Gessel, Manuwal, Mathews, Salo, Scott, Taber, West, Whitney.

LOWER-DIVISION REQUIREMENTS

Biological sciences—BIOL 210, 211, 212, Introductory Biology (15 credits). Physical sciences—CHEM 140, General Chemistry (4); CHEM 150, 151, General Chemistry and Laboratory (4, 2); CHEM 231, 232, Organic Chemistry¹² (3, 3). Mathematics—Q SCI 290, Introduction to Mathematics for Biologists (4); Q SCI 291, 292, Analysis for Biologists (4, 4); Q SCI 381, Introduction to Probability and Statistics (5). Social sciences—ECON 200, Introduction to Economics (5); ECON 201, Introduction to Microeconomic Theory (5); social science electives⁷ (15); ENGL 271, 272, Advanced Expository Writing (5, 5). Earth sciences—GEOL 205, Introduction to Geological Sciences (5). Fisheries—FISH 340, Application of Digital Computers to Biological Problems (4). Electives (2).

UPPER-DIVISION REQUIREMENTS

Forest Resources—FOR B 310, Forest Soils (4), FOR B 325, Forest Ecology (5), FOR B 300, Dendrology (4), FOR B 329, Microclimatology (3). Quantitative Science-O SCI 456, Mathematical Models in Population Biology (4), Q SCI 457, Management of Exploited Animal Populations I (4), Q SCI 382, 383, Statistical Inference in Applied Research (5, 5). Resource husbandry (one course)—FOR B 322, Silvicultural Methods (3), or FOR B 326, Range and Wildlife Habitat (3) or FISH 451, Reproduction of Salmonid Fishes (3), or FISH 467, Fisheries Management (5). Fisheries-FISH 401, Icthyology (5). Social sciences-ECON 435, Natural Resource Utilization and Public Policy (5). Wildlife science—WLF S 350, Survey of Wildlife Biology and Conservation (4); WLF S 401, 411, The Biology and Conservation of Birds and Laboratory (3, 2), WLF S 402, Human Culture and Wildlife Conservation (5), WLF S 404, 414, The Biology and Conservation of Mammals and Laboratory (3, 2). Approved electives (23).

Pulp and Paper Technology Curriculum (PS)

LOWER-DIVISION REQUIREMENTS

Forest Resources—FOR P 101, Introduction to Wood and Paper (1 credit), FOR P 102, Introduction to Pulp and Paper Technology (3), FOR P 205, Pollution Problems in the Forest Industries (2). Mathematics—MATH 105, Elementary Functions (5), MATH 124, 125, 126, Calculus With Analytic Geometry (5, 5, 5), MATH 238, Elements of Differential Equations (3). Quantitative science—Q SCI 281, Elementary Statistical Methods (5). Physical sciences—CHEM 140, General Chemistry (4), CHEM 150, 151, General Chemistry and Laboratory (4, 2), CHEM 160, General Chemistry (4), CHEM 231, 232, Organic Chemistry (3, 3), CHEM 241⁹, Organic Chemistry Laboratory (3); PHYS 121, 122, 123, Mechanics (4), Electromagnetism and Oscillatory Motion (4), Waves (4). Social sciences—ECON 211, General Economics (3); ENGL 171, 172, College Writing (3, 3). Engineering—ENGR 141, Introductory FORTRAN Programming (4); ENGR 260, Thermodynamics (4). Electives (4).

UPPER-DIVISION REQUIREMENTS

Forest Resources—FOR B 323, 324, Forest Biology I, II (3, 3 credits); FOR P 400, Wood and Fiber Structure (5), FOR P 403, Fibrous Structure and Rheology I (3), FOR P 406, Wood Chemistry I (3), FOR P 407, Wood Chemistry I Laboratory (2), FOR P 408, Wood Chemistry II (3); FOR M 464, Economics of Forest Products Industries (3); FOR P 476, Pulping and Bleaching Technology (3), FOR P 477, Papermaking Technology (3), FOR P 478, Pulp and Paper Laboratory (2), FOR P 481, Pulp and Paper Unit Operation (3), FOR P 485, Undergraduate Research (1, 1, 1), FOR P 488, Polymer Chemistry (3). Physical sciences-CHEM 350, 351, Elementary Physical Chemistry (3, 3). Engineering-CH E 310, Material and Energy Balances (4), CH E 330, Transport Processes I (4), CH E 340, Transport Processes II (4), CH E 436, Chemical Engineering Laboratory I (3). Humanities and social sciences electives (27).

Wood and Fiber Curriculum (PS)

Science Option

LOWER-DIVISION REQUIREMENTS

Forest Resources—FOR P 101, Introduction to Wood and Paper (1 credit). Mathematics—MATH 105, Elementary Functions (5), MATH 124, 125, 126, Calculus With Analytical Geometry (15); Q SCI 281 or STAT 311, Elementary Statistical Methods (5). Physical sciences—CHEM 140, General Chemistry (4); CHEM 150, General Chemistry (4); CHEM 231, 232, Organic Chemistry (3, 3); PHYS 121, 122, 123,⁹ Mechanics (4), Electromagnetism and Oscillatory Motion (4), Waves (4). Biological sciences—BOT 110, Plants in the Human Environment (5). Social sciences—ECON 211, General Economics (3); ENGL 171, 172, College Writing (3, 3). Electives¹⁸ (24).

UPPER-DIVISION REQUIREMENTS

Forest Resources—FOR B 323, 324, Forest Biology I, II (3, 3 credits); FOR P 374, Wood Utilization (3), FOR P 400, Wood and Fiber Structure (5), FOR P 401, 402, Physics of Wood and Fiber Composites (4, 4), FOR P 403, Fibrous Structure and Rheology I (3), FOR P 406, Wood Chemistry I (3), FOR P 407, Wood Chemistry I Laboratory (2); FOR P 408, Wood Chemistry II (3); FOR M 464, Economics of the Forest Products Industries (3); FOR P 476, Pulping and Bleaching Technology (3), FOR P 477, Papermaking Technology (3), FOR P 478, Pulp and Paper Laboratory (2), FOR P 485, Undergraduate Research (1, 1, 1); FOR P 488, Polymer Chemistry (3). Electives¹⁸ (40).

Wood Products Option

LOWER-DIVISION REQUIREMENTS

Forest Resources—FOR P 101,¹⁰ Introduction to Wood and Paper (1 credit). Mathematics—Q SCI 290, Introduction to Mathematical Models in Biology (4); Q SCI 291, 292, Analysis for Biologists (4, 4), Q SCI 281, Elementary Statistical Methods (5). Physical sciences—CHEM 101, General Chemistry (5); CHEM 102, General and Organic Chemistry (5); PHYS 114, 115, General Physics (4, 4). Biological sciences—BOT 110,¹¹ Plants in the Human Environment (5). Social sciences—ECON 200,¹² Introduction to Economics (5); ENGL 171, 172, College Writing⁵ (3, 3). Social science electives (10). Electives¹³ (28).

UPPER-DIVISION REQUIREMENTS

Forest Resources—FOR B 323, 324, Forest Biology I, II (3, 3 credits); FOR P 374, Wood Utilization (3), FOR P 375, Wood Utilization Laboratory (2), FOR P 377, Materials Science in Forestry (4), FOR P 400, Wood and Fiber Structure (5), FOR P 401, The Physics of Wood and Fiber Composites (4), FOR P 406, Wood Chemistry I (3), FOR P 407, Wood Chemistry I Laboratory (2); FOR M 464, Economics of the Forest Products Industries (3); FOR P 470, Forest Products Protection (3), FOR P 472, Gluing Process Technology (3), FOR P 473, Plywood and Board Processes (4), FOR P 476, Pulping and Bleaching Technology (3) or FOR P 477, Papermaking Technology (3), FOR P 478, Pulp and Paper Technology Laboratory (2), FOR P 485, Undergraduate Research (3). Electives¹⁴ (30).

Forest Engineering Curriculum

LOWER-DIVISION REQUIREMENTS

Forest Resources—FOR M 100. Introduction to Forest Resources Management (5 credits); FOR B 310, Forest Soils (4), FOR B 300, Dendrology (4); FOR P 243, Mechanics in Forestry¹⁵ (3), FOR P 377, Materials Science in Forestry (4), FOR P 343, Introductory Soil Mechanics (3). Mathematics-Q SCI 290, Introduction to Mathematics for Biologists (4), O SCI 291, 292, Analysis for Biologists (4, 4), Q SCI 281, Elementary Statistical Methods (5). Humanities-ENGL 171, 172, College Writing⁵ (3, 3). Physical sciences-CHEM 101, General Chemistry (5); PHYS 114, 115, General Physics (4, 4), PHYS 117, 118, General Physics Laboratory (1, 1). Social sciences-ECON 211, General Economics (3). Biological sciences-BIOL 101-102, General Biology (5-5). Pack Forest Field Studies-FOR M 320, Multiple Forest Uses (2); FOR P 340, Surveying and Drafting (4); FOR M 360, Field Studies in Forest Mensuration (3); FOR B 302, Practicum in Forest Soils, Plants, Diseases, and Insects (3), FOR B 320, Forest Community Ecology (3). Engineering sciences-ENGR 161, Plane Surveying (3). Electives (6).



UPPER-DIVISION REQUIREMENTS

Forest Resources—FOR B 321, Silvics (3 credits), FOR B 322, Silviculture (3); FOR P 342, Forest Road Engineering (4), FOR P 344, Fluid Mechanics and Hydrology (3), FOR P 440, Construction (4); FOR M 370, Forest Policy, Law, and Planning (5), FOR M 365, Forest Economics (5), FOR M 362, Aerial Photos in Forestry (3); FOR P 341, Timber Harvesting (4); FOR M 361, Forest Measurements (4): FOR P 441, Forest Engineering (5); FOR P 443, Safety Practices in Forest Engineering (1), FOR P 442, Financial Analysis of Logging Equipment and Operations (4); FOR M 368, Forest Regulation (3); FOR P 445, Advanced Forest Engineering (3), FOR P 446, 447, 448, 449, Senior Forest Engineering Field Studies (2, 5, 5, 3). Mathematics-Q SCI 392, Techniques of Applied Mathematics in Biology I (3). Engineering-MEIE 411, Engineering Economy (3). Electives (14).

See Explanation of Requirements on page 48.

GRADUATE PROGRAMS

Graduate Program Adviser

Thomas R. Waggener 130 Anderson

Graduate programs offered in forest resources lead to degrees of Master of Forest Resources, Master of Science, and Doctor of Philosophy. Graduate students may center their graduate study in one of the college divisions and in the special fields of study and research within the division.

Students who prefer an interdisciplinary program of graduate study are encouraged to devise a program with the assistance of faculty in the appropriate specializations. Such programs are a long-standing tradition in the college.

Upon enrollment, the student is assigned a Graduate Program Committee, which is responsible for guidance in the early stages of the graduate program, followed by more formal committees as the student's program develops.

Graduate education is offered through the divisions of Management and Social Sciences, Biological Sciences, and Physical Sciences. The programs cover the following areas: Forest Industries Management, Quantitative Resource Management, Forest Resource Management, Forest Economics and Finance, Sociology and Leisure Studies, Land Use Planning and Resource Policy, Resource and Environmental Interpretation, Outdoor Recreation Management, Forest Resource Management/Biological, Forest Soils, Forest Genetics, Forest Entomology, Forest Pathology, Forest Ecology, Tree Physiology, Forest Hydrology and Meteorology, Wildlife Science, Ecosystem Analysis, Wood Science, Pulp and Paper Technology, Forest Engineering, and Wood Utilization and Technology. Other special programs can be developed in response to particular graduate needs.

In all areas of study, the college maintains a close working relationship with faculties in associated colleges and departments throughout the University, including service on graduate committees.

Admission

A student who intends to work toward an advanced degree must apply for admission to the Graduate School and must meet the requirements set forth by the Graduate School and the College of Forest Resources.

Basic requirements for admission to the Graduate School are a baccalaureate degree from an institution of recognized standing, high academic performance in the junior and senior years of college work, approval of the Dean of the Graduate School, and approval of the college in which the work is to be taken. For complete information, see the Graduate School section of this catalog.

In addition to requesting admission forms from the Graduate Admissions Office, an applicant should obtain admission and reference forms from the Dean of the College of Forest Resources. These forms contain supplementary information required from the applicant.

Master of Forest Resources Degree

The Master of Forest Resources degree is a professional degree offered for the student who desires to acquire a greater competence in a specific subject area of forest resources. Course work may be in forest resources and in appropriate natural and social sciences. Both thesis and nonthesis options are available.

Master of Science Degree

The Master of Science degree is a learned degree, often precursory to the Doctor of Philosophy degree. Its requirements include a minor of at least 9 credits in a field outside the major. Both thesis and nonthesis options are available. The nonthesis program requires at least 6 credits of research.

Doctor of Philosophy Degree

The Doctor of Philosophy degree may be preceded by baccalaureate education either in forest resources or in another discipline. The program comprises an appropriate selection of courses in forest resources and in the related natural and social sciences. The program requires passage of the General Examination in forest resources, the necessary research, and completion of the dissertation. A minimum of two years of residence at the University also is required. The time necessary to complete the degree requirements depends upon the thoroughness and applicability of prior course work. Reading proficiency may be required in one foreign language, subject to Graduate Program Committee recommendation. If required, the language examination should be passed within two years of the baccalaureate degree or within one year of the master's degree, whichever has preceded the doctoral work, and it must be passed before the General Examination is taken.

The General Examination, the form of which is determined by the Supervisory Committee and the prospective Candidate, centers on the specific areas of forest resources and of natural or social science in the student's major field.

Midcareer Education

A program has been established in the college for professionals in the field who, on a part- of full-time basis, take graduate work at midcareer to prepare themselves for new or broader responsibilities. Under this program, courses can be taught in a more flexible time arrangement to meet the constraints of participants and can be tailored to specific career needs. Professionals interested in midcareer graduate work should contact the graduate program adviser.

Scholarships and Financial Aid

Students interested in undergraduate and graduate scholarships, fellowships, assistantships, and awards available specifically to students in the College of Forest Resources may contact the Office of Student Financial Aid, 105 Schmitz, for information, which also may be obtained from the associate dean, 107 Anderson.

The Washington Pulp and Paper Foundation, Inc., provides scholarships for students preparing for careers in the pulp and paper industry. Awards are based upon professional promise and scholastic achievement. The foundation is supported by companies of the pulp and paper industry and by supplier companies.

INSTITUTE OF FOREST RESOURCES

Director

James S. Bethel 102A Anderson

Associate Director Ian G. Morison 107A Anderson

The Institute of Forest Resources is the research, continuing education, and information branch of the College of Forest Resources. Besides administering federally funded and state-supported programs in research, the institute coordinates cooperatively sponsored research and teaching programs with federal, state, and private agencies.

The employment of graduate and undergraduate students on grants and contracts is administered by the institute and its research divisions. Many students earn research and thesis credit toward advanced degrees by working on major forest resources problems, supported by grants or contracts.

Research programs within the institute are administered by three research divisions: Center for Forest Ecosystem Studies, Center for Resource Management Studies, and Center for International Forest Resources Studies.

Center for Forest Ecosystem Studies

Director

Dale W. Cole 204 Bloedel

Faculty

Bledsoe, Brubaker, Dawson, Driver, Edmonds, Fritschen, Gara, Gessel, Grier, Hatheway, Leopold, Manuwal, Morison, Oliver, Pickford, Schiess, Scott, Stettler, Taber, Ugolini, van Klaveren, Vogt, Witt, Zasoski.

The Center for Forest Ecosystem Studies has two major responsibilities within the College of Forest Resources. It provides administrative supervision for all lands of the college, including both the arboretum and forest properties (see Research Areas and Facilities). In addition, the center is responsible for the college research programs in the biological areas. The interests of the faculty working in the biological-based investigations are highly diverse, ranging from basic considerations of plant growth to the application of such information to the analysis of forest ecosystems.

Research projects within the center include both individual studies concerned with the many aspects of forest ecosystems and highly interdisciplinary programs such as Ecosystems Studies.

Center for Resource Management Studies

Director Gerard F. Schreuder

228 Anderson

Faculty

Allan, Bare, Bethel, Bradley, Bryant, Burke, Dowdle, Field, Gessel, Greulich, Hrutfiord, Jorgensen, Leney, Pickford, Rustagi, Sarkanen, Schreuder, Sharpe, Thomas, Turnbull, Waggener, Wooldridge.

This center presently conducts research in four different program areas: (1) land-use planning and decision making in forest management and forest industry; (2) public policies as they influence land use, resource management, outdoor recreation, and the forest industry; (3) goods and services and environmental protection in resource management, harvesting, and wood processing; (4) improving the yield on the utilization of forest resources. In general, research stresses the social, economic, and technological aspects of dealing with wildlands and the forest resource while being fully aware of the ecological and biological aspects.



Center for International Forest Resources Studies

Director

Kenneth J. Turnbull 107C Anderson

Faculty

Allan, Bethel, Bryant, Cole, Gara, Gessel, Greulich, Hatheway, Leney, Morison, Schreuder, Taber.

The people of Washington State long have had a profound involvement in the forest resources of other countries through an ever-increasing volume of commerce and intellectual and social interchange. The objective of this center is to develop and assist programs of study of forest resources in other lands and their products with respect to their biology management, economics, manufacture, legislation, and administration. For example, specific programs now active include studies of tropical forest ecosystems in Latin America and Thailand, analysis of alternatives in the utilization of tropical forest in Honduras, solution of problems in forest utilization in Thailand, foreign log supply and the domestic market, national parks in Central America, and control of insect pests of mahogany. When possible, the topics of study are selected not only to foster the interests of individuals and groups in this state but also to promote the national interest and to aid the scientific community at large.

This center also provides academic support to studies of forestry in other lands by both domestic and foreign students.

Center for Quantitative Science in Forestry, Fisheries, and Wildlife

Acting Director

Douglas G. Chapman

Faculty

Bare, Bevan, Bledsoe, Chapman, Fletcher, Gallucci, Greulich, Hatheway, Mathews, Rustagi, Schreuder, Swartzman, Turnbull.

The Center for Quantitative Science in Forestry, Fisheries, and Wildlife is an intercollege academic unit sponsored by the College of Forest Resources and the College of Fisheries. The center offers a broad program in applied mathematics and in mathematical services directed principally to the two resource colleges, as well as other life science departments of the University. The applied mathematics program of the Center for Quantitative Science is concerned with quantitative descriptions of the management of both aquatic and terrestrial ecosystems. The center's program consists of six areas of course offerings. These areas include computer programming with particular emphasis on problems of the management of living resources; quantitative ecology, including population, community, and systems ecology; physical processes in biological systems, emphasizing mass and energy transport in ecosystems; operations research with particular focus on the utilization of renewable resources; applied statistics, with emphasis on statistical inference and experimental design for the biological sciences; and applied analysis consisting of differential and integral calculus applied to the life sciences. Courses in each of the six areas are interrelated in a way that meets a wide range of student interests and needs.

The faculty of the center participates in the research activities of several academic units of the University. These include, in addition to the two resource colleges, the College of Engineering and the College of Arts and Sciences, including the departments of Economics, Geography, and Oceanography, and the graduate schools of Business Administration and Public Affairs.

Both the teaching and the research programs of the center are designed to bring together living systems, mathematics, and the computer for purposes of description and management. Particular emphasis is placed upon the use of the computer for quantitative descriptions of both terrestrial and aquatic ecosystems and resource management. Computerization makes possible a study of the impact of exploratory management policies on simulated resource systems embedded in backgrounds of interrelated physical, biological, and economic activities, and under numerous institutional constraints. Computer-based models have been successfully employed in the management of forest stands, control of insect pests, management of fish and aquatic mammal stocks, and in the descriptions of complex ecosystems.

College Facilities

The college occupies a complex of three buildings: Alfred H. Anderson Hall, the Hugo Winkenwerder Forest Sciences Laboratory, and Julius H. Bloedel Hall. They provide the college with excellent areas and equipment for scientific laboratories, classrooms, seminar rooms, special collections, and administrative offices.

The library, a branch of the University's Suzzallo Library, houses more than twenty-six thousand bound volumes and thirty-three thousand pamphlets, reports, and monographs. It also has an excellent collection of approximately twentyfive hundred periodicals and many indexes to current literature in forestry and supporting sciences. Under the nationwide Farmington Plan, sponsored by the Special Library Association, the forest resources library has assumed responsibility for collecting foreign material published in the fields of forestry and pulp and paper technology, providing an unusual opportunity for academic research.

The herbarium supplements forest resources students fieldwork in dendrology. Containing representative plant material from all parts of the United States, the collection includes dried, mounted specimens of shrubs, hardwood trees, and conifers. Fruit specimens and a complete cone collection of American conifers are maintained apart from the mounted collection. Another herbarium complete in range plans is maintained by the Department of Botany and is available for use by forest resources students.

Research Areas and Facilities

Designed for both graduate and undergraduate use, the laboratory facilities of the college include an extensive array of modern equipment for research. The many available research tools include optical equipment, electronic instrumentation for a wide variety of uses, gas chromatographs, spectrophotometers, physical test equipment, and an electron microscopy facility. The college computing facilities include a NOVA computer and a remote input-output terminal for the main University CDC computer. Specific laboratories are designed to study soil chemistry and soil physics, hydrology, polymer chemistry, meteorology, tree physiology, genetics, wood and extractives chemistry, physics of fibrous composites, applied mechanics, wood process technology, pulp and paper technology, pathology, entomology, and recreation.

The college field facilities include four major forested areas covering nearly ten thousand acres, an arboretum, two reserves, and three cooperative research centers and stations. These lands offer a wide variety of terrestrial and aquatic characteristics favorable to the full range of scientific investigations. These field units provide a general natural science laboratory for the many disciplines in the college specifically related to, or concerned with, the research and teaching of natural resources behavioral patterns and management.

The Charles Lathrop Pack Demonstration Forest, a tract of about three thousand acres located at La Grande, Washington, sixty-five miles from the University, consists of highly developed field research facilities and teaching and living accommodations in an excellent terrestrial ecology area.

The Lee Memorial Forest, a 158-acre property at Maltby in nearby Snohomish County, is located about twenty-two miles from the University. It provides for exceptionally valuable studies and demonstrations of forestry practices applicable in western Washington.

The Gordon D. Marckworth Experimental Forest is a 6,900-acre area managed jointly by the State Department of Natural Resources and by the University. Located about thirty miles from campus and offering a wide variety of forest soil and water conditions, the forest is an ideal site for study and research. Many ponds, beaver dams, streams, and swamps make excellent study areas for all types of rec-

reation use, as well as for the operation of programs in ecological and management phases related to the forest resource.

The Allan H. Thompson Research Center in the Cedar River watershed is maintained by the college in cooperation with the water department of Seattle for studies in forest hydrology and mineral cycling in the forest ecosystem. This area serves as a principal research site for the Coniferous Forest Biome study. Other research stations in this program are established at Chester Morse Lake and in the Findley Lake watershed.

The Washington Park Arboretum, a 120-acre natural setting located within Washington Park, is only a ten-minute walk from the University campus. Through a long-term lease with Seattle, this property has been dedicated to the University for arboretum purposes. The diversity of soils and topography of the arboretum, together with the mild climate of the Puget Sound, has assisted in the successful propagation of more than five thousand species, including one of the best collections of woody plants. This area has been managed as an arboretum since 1934 by the college, and many of the specimens are now fully mature, excellent for a number of academic and research programs centered at the University, including studies in dendrology, ecology, and landscape architecture. The botanical collection at the arboretum also serves an important public education function of the University.

The Bloedel Reserve is a 200-acre property on Bainbridge Island that is currently under study and development as part of an arboretum complex broadening the offerings of the urban-oriented Washington Park Arboretum.

Explanation of Requirements

1. MATH 105 for Q SCI 290, MATH 124 for Q SCI 291, or equivalent mathematics courses may be substituted.

2. BOT 110, 113 must be taken by interpretation majors.

3. Internship participants substitute FOR M 357, 457.

4. May substitute ENGR 141, Q METH 200, MATH 114, FOR M 470, or equivalent course.

5. Or from ENGL 111, 121, 122 or ENGR 130, 331.

6. From GEOL 101, 205, 310 or ATM S 101, 201, 301.

7. From social science section of College of Arts and Science distribution.

- 8. Prerequisite to silviculture.
- 9. Or PHYS 114, 115, 116 with adviser's approval.

10. A minimum of 27 credits must be taken in the humanities or social sciences, or both, as well as 18 credits of approved sciences and engineering electives, of which 6 must be in laboratories.

11. Or BIOL 101-102 or 210.

12. ECON 201 may be substituted by a transfer student.

13. A minimum of 16 credits from the following: physical sciences, mathematics, earth sciences, computer programming. M E 303, ACCTG 210, 220, 230.

14. A minimum of 30 credits from approved list.

15. Or ENGR 180.


INTERDISCIPLINARY GRADUATE DEGREE PROGRAMS

To assist students and faculty who have interests not well matched to the University's departmental structure, the Graduate School establishes interdisciplinary groups of faculty. Certain of these groups, having reached a stage of sufficient maturity, are authorized to offer programs leading to advanced degrees. Students may apply for admission to study in one of these groups in the same manner as applying to a department. Brief descriptions of the degree-offering groups and their programs are given in the following:

APPLIED MATHEMATICS

408 Guggenheim

Faculty

William O. Criminale, Jr., Chairperson; Baker, Brownell, Davidson, Faaland, Finlayson, Goldstein, Ishimaru, Kevorkian, Klee, Pearson, Rockafellar, Sarason, Vagners, Westwater, Winter.

The Applied Mathematics Group provides an independent interdisciplinary graduate degree program involving training in mathematics as well as significant study in at least one outside field, and is vested with the sole authority to offer a degree of Doctor of Philosophy or Master of Science in Applied Mathematics. Graduate work in Applied Mathematics leading to M.S. and Ph.D. degrees encompasses (1) broad training in those mathematical techniques that have been found generally useful in applications, (2) indepth exposure to at least one field of application, and (3) an opportunity to explore certain specialized aspects of applied mathematics.

Admission

Candidates for admission should hold an undergraduate degree in the physical, earth, or life sciences; in engineering; in economics, management, or a behavioral science with a strong background in mathematics; or in mathematics with significant experience or study in at least one other field. Grade records and three letters of recommendation are requested for each person seeking admission to graduate study in applied mathematics. The Graduate Record Examination is suggested, but is not required. Knowledge of a foreign language is strongly encouraged.

Programs of Study

At present, the principal areas of study in applied mathematics include applied linear algebra, real variables and operator theory, ordinary differential equations, partial differential equations, complex variables, special functions and approximations, numerical analysis, control and estimation theory, probability and statistics, optimization theory and mathematical programming, combinatories, and perturbation and approximation techniques. An extensive range of appropriate outside fields has been identified, including all branches of engineering, the physical sciences, the biological sciences, computer science, economics and management science, and certain areas of medical science. Nontraditional fields of application may be approved by the Applied Mathematics Group where appropriate.

Master of Science Degree

In addition to the minimum formal requirements of the Graduate School, the following requirements must be met:

Applied Mathematics: A total of at least 18 credits chosen from the current approved course list. Of these, there must

be at least 3 credits in each of three of the twelve areas listed under the Ph.D. breadth requirements. At most, 3 credits may be in a 400-level course, and only then if a grade of at least 3.0 is obtained.

Applications field requirement: A total of at least 9 credits at the 400 and 500 level in a field of application (see definition of such fields as given under Ph.D. requirement). At most, 3 credits below the 500 level are usually accepted, and only then if a grade of 3.0 or better is obtained.

Additional courses, or thesis: 9 additional credits to be chosen by the student, subject to approval of the group. These may be fulfilled by the preparation of a thesis; otherwise, additional course work is required. All students must have completed a minimum of 3 credits in AMATH 501 (Applied Mathematics Seminar).

Computational skills: The student is expected to have had, or to acquire, some experience with high-speed computation.

Doctor of Philosophy Degree

Admission to the Graduate School does not imply admission to the Ph.D. program. A decision on admission to the Ph.D. program is contingent upon passing a qualifying examination administered by the Applied Mathematics Group. Once admission has been obtained, the Supervisory Committee chairperson, in consultation with the student, recommends at least four faculty members to serve as the Supervisory Committee for the student's doctoral program. In addition, a graduate faculty representative is appointed. A minimum of three members (including the Supervisory Committee chairperson) must belong to the Applied Mathematics Group, and at least one member of the Supervisory Committee must be in the field of application chosen by the student. In every case, the final committee must be approved by the group chairperson and appointed by the Dean of the Graduate School.

The individual Supervisory Committee, so constituted, approves the student's course of study and sets the General Examination covering areas deemed appropriate. In approving a course of study and in setting examinations, the Supervisory Committee may modify the detailed requirements listed below as may be appropriate for unusual or special cases, while maintaining the concepts of breadth, depth, and outside field. The reading committee for the dissertation is recommended from the Supervisory Committee and submitted to the Dean of the Graduate School for appointment.

A reading knowledge of one appropriate foreign language must be demonstrated to the satisfaction of the Supervisory Committee.

In addition to a satisfactory dissertation, to be approved according to the standard procedures of the Graduate School, the student will have completed work to such a degree that adequately ensures:

(a) Applied mathematics breadth: A total of at least 18 regular graded credits in six areas chosen from the following twelve fields must be satisfied: (1) applied linear algebra, (2) combinatorics, (3) real variables and operator theory, (4) ordinary differential equations, (5) partial differential equations, (6) complex variables, (7) special functions and approximations, (8) numerical analysis, (9) control and estimation theory, (10) probability and statistics, (11) optimization theory and mathematical programming, and (12) perturbation and approximation techniques. (b) Applications field requirement: a knowledge (essentially equivalent to 18 credits at the 400 and 500 level or above) of a field that uses mathematical tools to a significant extent and at a reasonable level of sophistication. This field should be outside the area of mathematical technique per se and must meet the approval of the Supervisory Committee:

Additional courses: All students must satisfactorily complete a minimum of 6 credits in AMATH 501 (Applied Mathematics Seminar).

Computational skills: The student is expected to have had, or to acquire, some experience with high-speed computation.

The current group course list, from which the degree requirements may be met, is available from the applied mathematics graduate program adviser.

For minimum Graduate School requirements, see the Graduate School section of this catalog.

BIOLOGY TEACHING

212 Johnson

Faculty

Ingrith Deyrup-Olsen, Chairperson; Donald S. Farner, Associate Chairperson; Douglas (Microbiology and Immunology), Gordon (Biochemistry), Halperin (Botany), Kohn (Zoology), Meeuse (Botany), Nester (Microbiology and Immunology), Olstad (Education), Stettler (Forest Resources). Ingrith Deyrup-Olsen, graduate program adviser.

Master of Arts for Teachers Degree

The University of Washington offers an interdisciplinary program leading to the degree of Master of Arts for Teachers in the field of biological sciences. Designed for biology teachers in secondary schools and community colleges, the program emphasizes the broadening of the student's understanding of the various fields of biological science and the providing of opportunities for independent study, with the primary goal being the improvement of the student's effectiveness as a teacher.



The program offers training in the major areas of biological science and, in advanced courses and seminars, in science teaching methods and curriculum design. Each student is asked to perform an in-depth study of a biological problem in the context of its relevance to the teaching of biological science. Guidance in this work is provided by a sponsoring professor and an advisory committee drawn from the range of departments and colleges throughout the University concerned with biological science and with education.

Admission to the program may be granted to teachers with provisional or permanent certification who meet the requirements of the Graduate School as outlined in the Graduate School section of this catalog.

Specific requirements for the M.A.T. degree in the field of biological science include a minimum of 36 credits in course work distributed as follows: 27-30 credits in courses in biological science and science education, including at least one course in each of the fields of biochemistry, botany, genetics, microbiology and immunology, and zoology. A minimum of 9-12 of these credits must be at or above the 500 level. In project work, 6-9 credits are required. These may take the form of laboratory or field study.

Award of the degree is recommended on successful completion of a written report on the project work and on passage of a general examination in the fields of the candidate's specific interests and course work.

Additional information about the program may be obtained from the graduate program adviser.

BIOMATHEMATICS

F664 Health Sciences

Faculty

Richard A. Kronmal, Chairperson; Bassingthwaighte (Center for Bioengineering), Bell (Biostatistics), Bledsoe (Fisheries), Breslow (Biostatistics), Chapman (Fisheries), Davis (Biostatistics), DeRouen (Biostatistics), Diehr (Biostatistics), Farewell (Biostatistics), Feigl (Biostatistics), Fisher (Biostatistics), Fletcher (Fisheries), Gallucci (Fisheries), Goldstein (Mathematics), Hatheway (Forest Resources), Hewitt (Mathematics), Hutchinson (Bioengineering), Johnson (Bioengineering), King (Finance, Business Economics, and Quantitative Methods), Martin (Biostatistics), Martin (Electrical Engineering), Mathews (Fisheries), Perlman (Statistics), Perrin (Health Services), Peterson (Biostatistics), Polissar (Biostatistics), Prentice (Biostatistics), Powers (Biostatistics), Pyke (Mathematics), Schoener (Zoology), Shorack (Mathematics), Swartzman (Fisheries), Thompson (Biostatistics), Turnbull (Forest Resources), van Belle (Biostatistics), Wahl (Biostatistics), Ward (Epidemiology). Richard A. Kronmal, graduate program adviser.

Biology and medicine are undergoing major changes in their development as quantitative sciences. As rapid 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 rapidly being woven into the fabric of the life sciences. The recent emergence and rapid growth of interest in mathematical biology provide exciting new opportunities in research and teaching. The aim of this program is to stimulate interest in, and to produce researchers for, this interdisciplinary area.

Many universities have instituted programs relating mathematics and/or statistics to one particular biological field. The aim of the program at the University is to give students the opportunity to bring together one or more branches of mathematics with selected fields of biology, medicine, or health services. This is done by means of prescribed pathways as well as individual programs.

Admission

Students may enter the program from an undergraduate major in mathematics, statistics, or a biological field. Ideally, an applicant should have 30 or more quarter credits in mathematics and statistics (to include a year of advanced calculus, one course in linear algebra, and one course in probability theory), and 15 or more quarter credits in a biological field. Excellent students with some deficiencies in this preparation may be admitted and allowed to make up these deficiencies during the first year of their programs.

The number of students admitted to the biomathematics program is limited, and selection is made by a faculty admissions committee. Review of applications begins in February for admission to Autumn Quarter. Applications are accepted for other quarters as well. The earlier an application is submitted, the greater the possibility of admission.

In addition to fulfilling graduate admissions requirements, an applicant must submit three letters of recommendation from persons competent to evaluate the applicant's abilities, a narrative statement regarding the applicant's purpose and interest in entering the program, and an official Graduate Record Examination score report (only verbal and quantitative sections are required).

Master of Science Degree

The Master of Science degree program is designed for the Biostatistics Pathway and includes two options: Health Sciences Biology, and Quantitative Ecology and Resource Management.

Only in exceptional situations is this degree offered in the Independent Program pathway.

Degree requirements:

MATH 304 305 (3 3) or STAT 511 (5) Brobability	Creats
WATH 574, 575 (5, 5) OF STAT 511 (5), Probability	2 OL 0
STAT 472, 473 (3, 3) or STAT 512 (5), Statistical Inference	5 or 6
STAT 484, Distribution Free Inference, or	
BIOST 520, Nonparametric Methods	3
STAT 485, Analysis of Variance	3
BIOST 511, 512, 513 (4, 4, 4), Medical Biometry I, II, III or	
Q SCI 382, 383 (5, 5), Statistical Inference	
in Applied Research	10 or 12

Two appropriate electives from selected courses in biostatistics, health services, quantitative methods, or quantitative science.

6 or more credits of approved electives in biology or health services appropriate to a student's particular background. At least 9 of the total course credits (not to include thesis credits) must be for work in courses numbered 500 or above. Competence in computer programming must be demonstrated. A thesis also is required, as well as a passing performance on the first-year examination. This examination is offered after a student's first year and, if a student does not pass at this time, he or she has the option of continuing in the program and retaking the examination the next year.

Doctor of Philosophy Degree

Students may pursue the Doctor of Philosophy degree by following either the Biostatistics or Independent Program pathway. Within the Biostatistics pathway there are two optional areas of emphasis. Health Sciences Biology develops the theory and application of statistics regarding phenomena associated with the health sciences. The second option, Quantitative Ecology and Resource Management, applies statistics to problems in ecology and resource management; students take appropriate supplementary course work in fisheries, forest resources, and zoology.

Students who seek the Ph.D. degree in the Independent Program pathway wish to emphasize an area of biomathematics other than fundamental statistical approaches to ecology or health; frequently the topic deals with applied mathematics and its use in mathematical biology. Applied mathematics areas include stochastic processes, differential equations, time series, numerical analysis, control theory, and decision theory. Mathematical biology areas include population genetics, population dynamics, automata theory, biophysics, optimal foraging theory, ecosystem simulation, bioengineering, and biochemical kinetics.

DEGREE REQUIREMENTS (BIOSTATISTICS PATHWAY)

MATH 394, 395 (3, 3) or STAT 511 (5), Probability	or 6 or 6 3 3
Analysis or MATH 427, 428 (3, 3), Topics in Applied Analysis 6 and MATH 527, Elements of Real Variables for Scientists	or 9 3

BIOST 511, 512, 513 (4, 4, 4), Medical Biometry I, II, III or O SCI 382, 383 (5, 5). Statistical Inference in Applied Research . . 10 or 12 MATH 438 (3), Principles of Differential Equations, or Equivalent, or Q SCI 392, 393 (3, 3), Techniques of Applied Mathematics in Biology I, II (3, 3) 4 or 6 STAT 581, 582, 583 (3, 3, 3), Advanced Theory of Statistical Inference 9 · · · · · · · · · · **BIOST 571, Applied Regression Analysis** 3 **BIOST 572, Multivariate Statistical Methods** 3 BIOST 573, Statistical Methods for Categorical Data 3

2 elective courses from the following:

BIOST 524, Design of Medical Studies	. 3
BMATH 554, Stochastic Processes in the Life Sciences	3
BIOST 574, Statistical Computing	3
BIOST 575, Population Models	3
BIOST 576, Statistical Methods for Survival Data	3
BIOST 578, Special Topics in Advanced Biostatistics	3
STAT 491, 492 (3, 3), Introduction to Stochastic Processes	6
Q SCI 480, Sampling Theory for Biologists	3'
Q SCI 486, Experimental Design	3
9 credits at 1 per quarter of BIOST 580, Seminar in Biostatistics or	9
Three credits of either of the following	
BIOST 590, Biostatistical Consulting	3 3 36

science or ecology related areas.

Three appropriate electives from selected courses in the life sciences, health services, or quantitative science.

ADDITIONAL REQUIREMENTS

(1) Demonstration of competence in computer programming. (2) Research experience. (3) Examinations. All students must take and pass a first- and second-year examination. Students take the first-year examination following their first year. Those who fail the examination after one taking have to retake it after the second year and receive a passing score as partial fulfillment of the Ph.D. examination requirement. Similarly, students take the second-year examination after their second year. Students who fail this examination after one taking are required to take it after their third year and receive a passing score to fulfill group examination requirements. After passing both the first- and second-year examinations, a student takes a separate biology examination, which may be oral or written. This examination covers the knowledge of a student's biological specialty and some selected topics in mathematical and applied statistics. The General Examination is an oral examination that covers a student's proposed thesis topic, and it may or may not include the biology examination. Upon completion of the General Examination, most of a student's time is devoted to his or her dissertation. (4) Dissertation.

Candina

Credits

DEGREE REQUIREMENTS	
(INDEPENDENT PROGRAM PATHWAY)	
	Credits
MATH 394, 395, 396, (3, 3, 3), or STAT 511 (5), Probability	5 or 9
MATH 424, 425, 426, (3, 3, 3), Fundamental Concepts of	
Analysis, or MATH 427, 428, 429, (3, 3, 3), Topics in	
Applied Analysis	9
BIOST 511, 512, 513 (4, 4, 4), Medical Biometry I, II, III or	
O SCI 382, 383 (5, 5). Statistical Inference	
in Applied Research	10 or 12
9 credits of biology consisting of courses that have been	
approved by a student's committee.	
approved by a stadem o committee.	
BMATH 800, Doctoral Dissertation	36

ADDITIONAL REQUIREMENTS

(1) Demonstration of competence in computer programming. (2) Research experience. (3) Examinations. Following the first year of course work, students take the first-year examination. A student may take the examination a second time. Upon completing this examination, a student forms a Supervisory Committee and submits a proposed Independent Program. This must be approved by the biomathematics faculty. As required of other Ph.D. students, students in this pathway are required to pass a second-year examination that is typically constructed by the student's Supervisory Committee chairperson and other faculty members. In addition, a student takes a separate biology examination, which may be oral or written.

Below is a sample program for the Independent Program Pathway, with a concentration on Applied Mathematics— Differential Equations. Any requirements under numbers 1-3 may be satisfied by course work covered prior to enrollment in the Biomathematics Group program. Other Ph.D. requirements fulfilled by previous study may be waived with permission from the Chairperson of the group.

	Credits
MATH 394, 395, 396, (3, 3, 3), or STAT 511 (5), Probability	5 or 9
STAT 472, 473 (3, 3), Statistical Inference	6
BIOST 511, 512, 513 (4, 4, 4), Medical Biometry I, II, III or	
Q SCI 382, 383 (5, 5), Statistical Inference	
in Applied Research	0 or 12
MATH 438, (3), Elements of Differential Equations, or	
Q SCI 392, 393 (3, 3), Techniques of Applied	
Mathematics	3 or 6
MATH 427, 428, 429 (3, 3, 3), Topics in Applied Analysis, or	
A A 587, 588, 589 (3, 3, 3), Techniques of Applied	
Analysis	9
STAT 491, 492 (3, 3), Introduction to Stochastic Processes	6
Seven electives from the following courses:	
A A 562, 563, 564 (3, 3, 3), Methods of Partial Differential	
Equations I, II, III	9

	У
MATH 464, 465, 466 (3, 3, 3), Numerical Analysis I, II, III	9
MATH 538, 539 (3, 3), Nonlinear Ordinary Differential	
Equations	6
MATH 574, 575, 576 (3, 3, 3), Advanced Partial Differential	
Equations	9
At least 9 credits of appropriate electives in biology that have been	ap-
proved by a student's committee.	

Other electives that may be selected from various courses in computer science, bioengineering, electrical engineering,

fisheries, pathobiology, quantitative science, or mathematics.

The additional requirements shown above.

COMPARATIVE LITERATURE

B531 Padelford

Faculty

Ernst H. Behler, Chairperson; Altieri (English and Comparative Literature), Ammerlahn (Germanics and Comparative Literature), Andrews (Near Eastern Languages and Literature, and Comparative Literature), D. Behler (Germanics and Comparative Literature), Brandauer (Asian Languages and Literature), Carpenter (Slavic Languages and Literature, and Comparative Literature). Christofides (Romance Languages and Literature, Comparative Literature, and Art History), Ellrich (Romance Languages and Literature, and Comparative Literature), Gerstenberger (English), Grummel (Classics and Comparative Literature), Harmon (Classics and Comparative Literature), Hruby (Germanics and Comparative Literature), L. Jones (Romance Languages and Literature, and Comparative Literature), D. Kapetanic (Slavic Languages and Literature), Konick (Slavic Languages and Literature, Comparative Literature, and International Studies), Kramer (Slavic Languages and Literature, Comparative Literature, and International Studies), J. Leiner (Romance Languages and Literature, and Comparative Literature), W. Leiner (Comparative Literature), Loraine (Near Eastern Languages and Literature, and Comparative Literature), MacKay (Classics, Near Eastern Languages and Literature, and Comparative Literature), McKinnon (Asian Languages and Literature, Comparative Literature, and East Asian Studies), McLean (Germanics and Comparative Literature), Penuelas (Romance Languages and Literature), Reinert (English and Comparative Literature), Rossel (Scandinavian Languages and Literature, and Comparative Literature), Sehmsdorf (Scandinavian Languages and Literature, and Comparative Literature), Steene (Scandinavian Languages and Literature, and Comparative Literature), Vaughan (English and Comparative Literature), Wang (Asian Languages and Literature, and Comparative Literature), Webb (Comparative Religion and Comparative Literature), Willeford (English and Comparative Literature), Yarbro-Bejarano (Romance Languages and Literature, and Comparative Literature), Ziadeh (Near Eastern Languages and Literature). Otto Reinert, graduate program adviser.

The graduate program in comparative literature leading to the Master of Arts or Doctor of Philosophy degree is administered by an interdisciplinary Comparative Literature Group of the Graduate School.

The comparative literature program is devoted to the study of literature that transcends the confines of national literature and explores the relationships existing among several literatures. In addition, the program is concerned with the relationship of literature to the arts and fields of knowledge, such as philosophy, religion, and political thought. Typical areas of inquiry include literary traditions and periods, motifs, and genres; patterns of influence and reception of literary works among national cultures; and the general principles of literary theory and criticism.

On receiving the Master of Arts or Doctor of Philosophy degree, the graduate is qualified for teaching and research in comparative and world literature and in the history of literary genres, as well as in the language and literature of his or her specialization.

Master of Arts Degree

Admission Requirements: Bachelor of Arts degree in comparative literature, English, or any foreign literature, or equivalent background. Advanced competence in one foreign language.

Graduation Requirements: 40 quarter credits at the 400 and 500 level, of which at least 25 must be in 500-level courses; with permission, a maximum of 10 credits may be at the 600 level. Of the required work, three courses must be taken in comparative literature, including C LIT 510. The remaining credits must include study in two or more literatures, with at least three courses being taken in each of two literatures. Advanced competence in one foreign language must be demonstrated on entering the program; basic reading knowledge of a second foreign language must be acquired before examinations are scheduled. A comprehensive written examination must be taken after completion of course work. With permission, a thesis may be presented for 10 of the 40 credits.

Doctor of Philosophy Degree

Admission Requirements: Master of Arts degree in comparative literature, English, or any foreign literature, or equivalent background. Advanced competence in two foreign languages and a basic reading knowledge of a third.

Graduation Requirements: A minimum of 90 postbaccalaureate degree credits at the 400 and 500 level, of which at least half in each section of the student's program must be in 500-level courses; with permission, a maximum of 15 credits may be at the 600 level. Of these total credits, the program must comprise: (1) at least 30 credits in comparative literature (including 510; one course among 513, 514, 515; and one among 570, 571, 572, 573); (2) at least 30 credits in the literature of major interest to the student; (3) at least 20 credits in the student's minor field (or, if more than one minor field is chosen, at least 15 credits in each); and (4) 10 elective credits selected from any area of the student's choice. With permission, one of two minor fields may be history, philosophy, art, or other subjects not covered by the departments participating in the comparative literature program. Advanced competence in two foreign languages must be demonstrated on entering the program; basic reading knowledge of a third foreign language must be acquired before the General Examination. Written and oral General Examination, dissertation, and Final Examination complete the Ph.D. degree requirements.

During the period of study, students working for advanced degrees in comparative literature are eligible for teaching assistantships in the language of their major literature (i.e., Asian, Classics, English, Germanics, Near Eastern, Romance, Scandinavian, or Slavic).

Additional information regarding the comparative literature program may be obtained from the Comparative Literature office.

HEALTH SERVICES ADMINISTRATION AND PLANNING

F361 Health Sciences

Faculty

William L. Dowling, Chairperson; Amoss (Architecture and Urban Planning), A. Bergman (Health Services), Blackman (Health Services), French (Business Administration), Gross (Sociology), Horn (Nursing), LoGerfo (Health Services), Lyden (Public Affairs), MacStravic (Health Services), McCaffree (Economics), Miller (Urban Planning), Morrill (Geography), Page (Finance, Business Economics, and Quantitative Methods), Patti (Social Work), Phillips (Family Medicine), W. Richardson (Health Services), Riedel (Health Services), Rosenzweig (Management and Organization), Saxberg (Management and Organization), Schneider (Urban Planning), Shortell (Health Services), S. Williams (Health Services), W. Williams (Public Affairs). William L. Dowling and Stephen J. Williams, graduate program advisers.

Master of Health Administration Degree

A two-year program of studies leading to the degree of Master of Health Administration is offered by the faculty in the interdisciplinary Health Services Administration and Planning Group of the Graduate School. Administrative offices are located in the Department of Health Services, School of Public Health and Community Medicine. The course of study is designed to provide preparation for careers in management, planning, policy analysis, and similar roles in ambulatory-care organizations, hospitals, longterm-care facilities, mental-health-care organizations, government agencies, planning agencies, and other organizational settings in the health field. The curriculum is designed to be highly interdisciplinary, with a faculty drawn from several academic units within the University.

Admission Requirements: Admissibility to the Graduate School, including a baccalaureate degree from an accredited college or university with at least a 3.00 gradepoint average for the last two years of undergraduate work; successful performance on either the Graduate Record Ex-



amination or the Graduate Management Admissions Test; a narrative statement regarding the applicant's objectives; three letters of reference; and, for applicants who pass initial screening, interviews by members of the program faculty or their designees are generally required. Relevant health field experience is preferred. In general, applications are accepted only for Autumn Quarter of each year.

Graduation Requirements: Degree requirements include three quarters of study with emphasis on multidisciplinary basic disciplines and methods courses following distribution requirements established by the program; introductory health services courses; a summer internship at an institution, agency, or program appropriate to the applicant's program of study; and an additional three quarters of health services core courses, specialization courses, and electives. In addition, as part of the graduation requirement, secondyear students undertake a field analysis or research report. The project is supervised by the faculty, and academic credit is awarded.

Additional information and application materials may be obtained from the graduate program adviser.

MARINE AFFAIRS

102 Clifford Apartments

Faculty

Warren S. Wooster, Acting Chairperson; Adee (Ocean Engineering and Mechanical Engineering), Bevan (Fisheries), Burke (Law and Marine Studies), Crutchfield (Economics, Public Affairs, Environmental Studies, and Marine Studies). Fleagle (Atmospheric Sciences), D. Fleming (Geography and Marine Studies), R. Fleming (Oceanography and Marine Studies), Goodwin (Division of Marine Resources), Hershman (Law and Marine Studies), R. Johnson (Law), Lee (Environmental Studies and Political Science), McManus (Oceanography), Miles (Public Affairs, Political Science, and Marine Studies), Murphy (Division of Marine Resources, Oceanography, Mechanical Engineering, and Ocean Engineering), Vesper (Business Adminstration, Mechanical Engineering, and Marine Studies), Wenk (Engineering, Public Affairs, and Social Management of Technology). Marc J. Hershman, graduate program adviser.

An interdisciplinary program of study leading to the Master of Marine Affairs (M.M.A) degree is offered under the auspices of the Marine Affairs Group. The Marine Affairs Group comprises graduate faculty members associated with the Institute for Marine Studies through joint, adjunct, or affiliate appointments with appropriate academic units. The program of study includes course offerings from the Institute for Marine Studies, business administration, economics, engineering, fisheries, law, oceanography, political science, and public affairs.

Programs are designed to meet the individual needs of graduate students with varied academic backgrounds and

different levels of education and types of experience. The objective is to prepare students for professional careers in policy-making and management organizations and for teaching and research. Emphasis is placed upon breadth, and all students are expected to gain familiarity with pertinent aspects of the social, technological, and environmental sciences. In addition, each student is expected to build upon his or her specialty and to develop professional and scholarly proficiency in one aspect of marine studies.

The M.M.A. degree program requires two academic years for students who have recently received a baccalaureate degree. The first year is largely devoted to achieving a general comprehensive understanding of the field of marine affairs and to developing analytic skills. The second year provides the opportunity to take advanced courses and seminars and to develop special competence in one of the three areas of specialization: coastal zone management, marine resource management, and marine policy. Under the guidance of a faculty supervisory committee a research project reported in a thesis should be completed during the second year.

Core curriculum requirements include a basic marine affairs introductory course and required courses in ocean science, economics, law, political science/public affairs, and policy analysis/planning. Proficiency in written communication and familiarity with statistical techniques are required. There is no foreign-language requirement; however, students with a background in one or more foreign languages may be encouraged to plan programs of study and research that focus upon an appropriate foreign area.

Students entering the program with substantial and pertinent prior graduate study or professional experience may be able to meet the requirements in twelve months of continuous study.

For students with a degree in law, there is an LL.M. degree program administered by the School of Law that is closely affiliated with the M.M.A. program.

Admission

Admission requirements include a baccalaureate degree, application to the Graduate School, supplementary information form to the Marine Affairs Group, Graduate Record Examinations scores (verbal and quantitative required, others optional), a letter outlining career objectives, and three letter of recommendation. Application deadline for Autumn Quarter is March 1.

Course sequences normally begin during Autumn Quarter, and students are strongly encouraged to begin their study at that time. However, under some circumstances students may be admitted during Winter or Spring quarters.

Additional information on the M.M.A. degree program may be obtained from the graduate program adviser.

PHYSIOLOGY-PSYCHOLOGY

333A Guthrie

Faculty

Moncrieff H. Smith, Jr., Group Chairperson. *Psychology*—Lee Roy Beach, Chairperson; Kenney, Makous, Rose, Simpson, M. Smith, Woods. *Physiology and Biophysics*—Harry D. Patton, Chairperson; Fetz, Luschei, Miller, O. Smith, Towe. Moncrieff H. Smith, Jr., graduate program adviser.

This interdisciplinary program administered by the Physiology-Psychology Group of the Graduate School has been designed to meet a need for intensive training in the overlapping area of the behavioral and the physiological sciences. Currently, physiology and other departments of medical schools are appointing psychologists to carry on certain types of physiological research and to teach medical students. Psychology departments long have felt the need for individuals more highly conversant with physiological techniques and concepts than is usual for persons with a Ph.D. degree in psychology. Further, because physiological psychology is a fruitful research field, numerous research institutes are seeking persons trained in both disciplines.

Individuals could obtain a Ph.D. degree in each subject. In practice, this is rarely feasible, with the result that individuals in physiological psychology and in behavioral neurophysiology usually are less than adequately trained in one or the other of the parent disciplines. Therefore, it is the aim of the faculty in psychology and the faculty in physiology to work jointly to offer graduate students intensive training in the large area of overlap between the disciplines.

The program of each student is supervised by a committee of four faculty members. Each student is expected to do laboratory work in both areas in order to become familiar with current research techniques in the respective departments. Although no formal master's degree program is provided, each student is expected to do independent research in either one discipline or the other prior to undertaking a doctoral research program.

Each student spends approximately a year in basic course work in each discipline. At the conclusion of these two years of study, the student's training consists of advanced seminars in either area and doctoral research.

Because physiological psychology and neurophysiology are strongly developed at the University of Washington, the graduate student finds the latest in instrumentation and research techniques in both fields.

In addition to the facilities of both the physiology and psychology departments, students have the opportunity of working with laboratory primates at the Regional Primate Center. The center has facilities for a wide variety of behavioral and physiological studies of a number of primate species. Because primates offer unique advantages for both the behavioral and the physiological work, the center is a valuable adjunct to the resources of the training program.

RADIOLOGICAL SCIENCES

D213 Health Sciences

Faculty

Kenneth L. Jackson, Chairperson; Christensen (Environmental Health), Fairhall (Chemistry), Figley (Radiology), Geraci (Environmental Health), Gordon (Biochemistry), Lee (Epidemiology), Nelp (Radiology), Robkin (Nuclear Engineering), Roman (Genetics), Schell (Fisheries), Seymour (Fisheries), Stoebe (Metallurgical Engineering), Wolf (Pathology), Wootton (Radiology). Kenneth L. Jackson, graduate program adviser.

Master of Science in Radiological Sciences Degree

The program leading to the degree of Master of Science in Radiological Sciences is offered by the Radiological Sciences Group of the Graduate School. Study for this degree is open to students with baccalaureate degrees in a physical or biological science or in engineering, depending on the option selected. Several curriculum options are offered to satisfy different requirements and interests of biological scientists, physical scientists, or engineers. The various options described below prepare students for careers in health physics, radiological health, radiological physics, radiation biology, or hospital physics.

Thesis topics include studies in radiation biology, radioecology, nuclear medicine, radiochemistry, radiation physics, or nuclear engineering. The first three options also are offered at the Joint Center for Graduate Study in Richland, making available for thesis research the extensive government laboratories there.

A student with a deficiency in one area of the prerequisites may be accepted for the program, provided he or she removes the deficiency during the first year of graduate study. Credit toward the degree is not ordinarily granted for a course used to remove a deficiency.

PHYSICAL SCIENCE OPTION

Prerequisites for this option include a baccalaureate degree in a physical science or in engineering, and a year of general biology at the college level.

Courses		(Cre	dits
FISH 473, Aquatic Radioecology II				3
PHYS 431, 433, Modern Physics Laboratory		•		3,3
NUC E 484, Introduction to Nuclear Engineering				4
NUC E 485, Nuclear Instruments				3
or CHEM 410, Radiochemical Techniques and Radioactivity	1			
Measurements				3
NUC E 477, Introduction to Radioactive Tracer Techniques				3



RADGY 505, 506, Radiological Physics	3,3
RAD S 501, 502, Biological Effects of Ionizing Radiation	2,2
RAD S 503, 504, Laboratory in Radiation Biology	1,1
RAD S 507, Radiation Hazards Analysis and Control	· 1
RAD S 520, Radiological Sciences Seminar	2
RAD S 700, Master's Thesis	- 9

BIOLOGICAL SCIENCE OPTION

Prerequisites for this option include a baccalaureate degree in biological science, courses in mathematics through differential and integral calculus and statistics, and chemistry through quantitative analysis and organic chemistry.

Courses	Credits
500-level course in a biological science	. 3
FISH 473, Aquatic Radioecology Physics	3,3
CHEM 350, 351, Elementary Physical Chemistry	. 3
CHEM 410, Radiochemical Techniques and	3,3
Radioactivity Measurements	
PHYS 221, Quantum Physics	. 3
PHYS 327, Introduction to Nuclear Physics	. 3
RADGY 505, 506, Radiological Physics	. 3
RAD S 501, 502, Biological Effects of Ionizing Radiation	. 2,2
RAD S 503, 504, Laboratory in Radiation Biology	. I,1
RAD S 507, Radiation Hazards Analysis and Control	. 1
RAD S 520, Radiological Sciences Seminar	. 2
RAD S 700, Master's Thesis	. 9

ENVIRONMENTAL SCIENCE OPTION

An applicant with a baccalaureate degree in a physical science or engineering and a year of general biology at the college level generally is prepared to pursue this curriculum.

Courses	redits
CEWA 434, Ecological Effects of Waste Water	. 4
or FISH 473, Aquatic Radioecology II	3
CEWA 461, Air Pollution Dynamics and Control	3
NUC E 484, Introduction to Nuclear Engineering	4
NUC E 485, Nuclear Instruments	3
NUC E 486, Nuclear Power Plants	3
CHEM 410, Radiochemical Techniques and	
Radioactivity Measurements	3
RADGY 505, 506, Radiological Physics	3,3
RAD S 501, 502, Biological Effects of Ionizing Radiation	2,2
RAD S 503, 504, Laboratory in Radiation Biology	1,1
RAD S 520, Radiological Sciences Seminar	2
RAD S 700, Master's Thesis	9

MEDICAL RADIATION PHYSICS OPTION

Prerequisites for this option include a baccalaureate degree in a physical science or engineering.

Courses	Credits
CONJ 317-318, Introductory Anatomy and Physiology	6-6
NUC E 485, Nuclear Instruments	1
RAD S 501, 502, Biological Effects of Ionizing	3
Radiation	
RADGY 505, 506, Radiological Physics	2,2
RAD S 520, Radiological Sciences Seminar	3,3
RAD S 507, Radiation Hazards Analysis and Control	2
RAD S 600, Independent Study or Research (Hospital	
Physics Board Certification Related Experience)	3
RAD S 700, Master's Thesis	9

SOCIAL WELFARE

204 Eagleson

Faculty

Scott Briar, Chairperson; Austin (Social Work), Berleman (Social Work), Dear (Social Work), Dowling (Public Health), Hooyman (Social Work), Gottlieb (Social Work), Hutchins (Social Work), Jaffee (Social Work), Levy (Social Work), Nash (Social Work), Page (Business Adminis tration), Patti (Social Work), Resnick (Social Work), Richey (Social Work), Robinson (Psychology), Schinke (Social Work), Smith (Law), Thompson (Biostatistics), Valdez (Social Work), Weatherley (Social Work), Weiss (Sociology), Williams (Public Affairs).

The social welfare doctoral program is administered by the interdisciplinary Social Welfare Group, appointed by the Graduate School and representing the disciplines of law, psychology, public affairs, social work, and sociology.

The doctoral program in social welfare prepares students to contribute to the field of social welfare and the profession of social work through research, teaching, policy analyses, and program development. The program builds on the premise that the field of social welfare must be scientifically based, continually responsive to service and practice needs, and knowledgeable about developments in related fields and disciplines.

Each student's program is individually designed with an emphasis on interdisciplinary study. In the basic core of required courses, as well as others specially selected, students have ample opportunity to pursue their particular interest.

During the first two years, the student is expected to define and develop the specialized area that will be the focus of the subsequent dissertation research. The area selected most have clear significance for the development of practice, programs, or policies in social work and social welfare. A variety of specialized areas of study are possible within the program, ranging, for example, from studies of child welfare policy, services for women, services to the aged, or income maintenance programs, to the effectiveness of social work practice with individuals and families.

Admission

Applicants should have a master's degree in social work or comparable preparation in a closely related field. The applicants selected for admission are those whose scholastic achievements, previous experience, and aptitude for social welfare research and scholarship 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 work and social welfare as well as the affirmative action goals of the University.

Graduation Requirements

Successful completion of a set of core courses required of all students and additional courses recommended by the student's Supervisory Committee that emphasize the interdisciplinary and individualized character of each student's program. Courses may be taken in such fields as economics, law, psychology, public affairs, public health, social work, and sociology. Successful completion of the General Examination for advancement to candidacy. Preparation of a dissertation acceptable to the Supervisory Committee. Successful completion of the Final Examination, the defense of the dissertation.

Students enroll in the following social work courses: SOCWL 552, History of Poverty and Inequality: The Anglo-American Experience (1485-1900) (3 credits); 553, Seminar in Contemporary Social Welfare Policy (3); 580, Introduction to Advanced Research Methods and Design (3); 598-599, Research Problems and Priorities in Social Work and Social Welfare (3-3); 600, Independent Study or Research (*); 800, Doctoral Dissertation (*).

INTERSCHOOL OR INTERCOLLEGE PROGRAMS

BIOENGINEERING

328 Aerospace Engineering and Research Laboratory Building Harris Hydraulics Laboratory

Faculty

Lee L. Huntsman, Acting Director; Allan S. Hoffman, Thomas E. Hutchinson, Assistant Directors; Baker, Bassingthwaighte, Carter, Foster, Halbert, Holloway, Horbett, Huntsman, Johnson, Lee, MacKenzie, Pearlman, Pollack, Ratner, Rushmer, Spelman, Verdugo.

Adjunct Faculty

Auth, Bruckner, Forster, Guy, Martin, Warren.

Affiliate Faculty

Tam.

Bioengineering provides a comprehensive multidisciplinary program of research and education. The concepts and techniques of engineering are applied to problems of biology and medicine through collaboration among the many disciplines of engineering and health sciences.

Undergraduate Programs

Programs of study for engineering students are individually tailored to career objectives and may be accomplished by either of two pathways: (1) adherence to a traditional engineering department program using electives to cover bioengineering and health sciences courses; (2) adherence to a Bachelor of Science in Engineering degree program providing wider latitude in course requirements as approved by the Interdisciplinary Engineering Studies Group and the student's advisory committee.

Graduate Study

In consultation with departmental and bioengineering advisers, graduate students may develop programs conforming to their career objectives. This may be done by enrolling in one of the traditional departments or by formulating an individualized Master of Science in Engineering program under the auspices of the Inter-Engineering Group of the College of Engineering or an individual Ph.D. degree program under the auspices of the Graduate School. Courses and thesis topics, oriented toward the application of engineering technology to problems of biology and medicine, are available. Most programs emphasize combining advanced engineering principles and techniques with substantial biological and health sciences studies. Current collaborative projects involve most departments of engineering and many health sciences divisions. Major areas of current research include bioinstrumentation, biomaterials, biomathematics, biomechanics, computer applications, fertility studies, health-care delivery systems, laser applications, microanalysis of subcellular structures, microcirculatory transport, muscle, orthopaedic engineering, and ultrasonic instrumentation.

COMPUTER SCIENCE

112 Sieg

Computer science is the study of information and algorithms within the context of real and abstract computing devices. Computer scientists are interested in: the representation and storage of information; algorithms to access, display, edit, and transform information; programming and mathematical languages to express algorithms; and hardware and software processors to execute algorithms. These concerns lead both to theoretical investigations of computers, algorithms, and data and to practical developments in computer technology and applications.

The objective of computer science education is to develop professionally competent and broadly educated computer scientists. Undergraduate education is designed to prepare students for professional careers or graduate studies; especially important is a foundation that will not become obsolete as technology advances and changes.

The computer field has a broad base of industrial and governmental computer users, providing many of the jobs suitable for the Bachelor of Science graduate. Typical jobs are systems analyst, systems programmer, technical salesperson, and hardware or software specialist. Above this base is a pyramid of producers and developers of computer systems, as well as teachers and researchers. Graduate education is appropriate for many of the jobs at these higher levels.

Faculty

Robert W. Ritchie, Chairperson; Almes, Baer, Dekker, Fischer, Golde, Kehl, Ladner, Lazowska, Noe, Ruzzo, Shaw, Tanimoto.

Adjunct, Research, and Lecturer Appointments

Adolphson, Garthwaite, Gillespie, Holden, D. L. Johnson, Klee, Meditch, Moritz, Rockafellar, Sobolewski, Zick.

Undergraduate Program

Bachelor of Science Degree

Although the Department of Computer Science operates administratively within the College of Arts and Sciences, it offers Bachelor of Science degrees through both that college and the College of Engineering. A student typically enters the program during the sophomore year or at the beginning of the junior year. The required computer science curriculum consists of four components:

GENERAL EDUCATION COMPONENT (93 CREDITS)

A student may satisfy this component by completing 93 credits of approved general education courses. For example, a student in the College of Arts and Sciences may satisfy this component by study in the following areas:

Proficiency requirement: MATH 124, 125, 126: 15 credits.

Humanities from the college distribution list: 20 credits. Social sciences from the college distribution list: 20 credits. Free electives: 38 credits. A student in the College of Engineering may satisfy this component by studying in the following areas:

MATH 124, 125, 126: 15 credits. Humanities and social sciences from the college distribution list: 30 credits with at least 10 in each. Functional techniques (excludes computational): 10 credits. Free electives: 38 credits.

PREPARATORY COMPONENT (32 CREDITS)

MATH 205, 238. PHYS 121, 122, 123. ENGR 251. 10 credits of natural sciences, business, or engineering.

COMPUTER SCIENCE CORE COMPONENT (42 CREDITS)

C SCI 201, 241, 321, 322, 326, 341, 378, 470, MATH 464, and 6 credits of C SCI 498.

COMPUTER SCIENCE ELECTIVE COMPONENT (13 CREDITS)

A student may satisfy this requirement by taking additional courses on the approved computer science electives list or by taking graduate courses in computer science.

Four-Year Program

Printed below is a sample curriculum for a student who starts a computer science major during the sophomore year. The number in parentheses indicates the number of credits; G, P, and C denote courses from the general education, preparatory, and computer science elective components, respectively.

FRESHMAN YEAR

Autumn Quarter: MATH 124 (5), G/P (10). Winter Quarter: MATH 125 (5), PHYS 121 (4), C SCI 201 (5), G/P (1). Spring Quarter: MATH 126 (5), PHYS 122 (4), G/P (6).

SOPHOMORE YEAR

Autumn Quarter: MATH 205 (3), PHYS 123 (4), C SCI 241 (3), G/P (5). Winter Quarter: MATH 238 (3), ENGR 251 (4), G/P (8). Spring Quarter: G/P (15).

JUNIOR YEAR

Autumn Quarter: C SCI 321 (3), C SCI 378 (5), MATH 464 (3), G/P/C (4). Winter Quarter: C SCI 322 (3), C SCI 341 (5), G/P/C (7). Spring Quarter: C SCI 326 (5), G/P/C (10).

'SENIOR, YEAR

Autumn Quarter: C SCI 470 (4), G/C (11). Winter Quarter: C SCI 498 (3), G/C (12). Spring Quarter: C SCI 498 (3), G/C (12).

Admission Requirements: Each applicant must: have been admitted to the University or have completed an application



to the University through the Office of Admissions; have earned at least 30 quarter credits applicable toward graduation; have achieved an overall University grade-point average of at least 2.50; have completed the following courses or equivalent-MATH 124, 125, PHYS 121, and C SCI 201. Selection of applicants is made primarily on the basis of scholastic achievement and potential. Other selection criteria, such as relevant work experience and grades in computer science preparatory courses or in mathematics, science, and engineering courses, also may be considered. Women and minorities are encouraged to apply. For more information, the computer science undergraduate adviser or the colleges of Arts and Sciences or Engineering advising centers should be consulted. Departmental application forms are available at the Computer Science office, 114 Sieg.

Completed applications must be received by the department by: April 15 for Autumn Quarter, October 15 for Winter Quarter, January 15 for Spring Quarter. Transcripts from *all* applicants are also needed by the above dates. University of Washington students must arrange for their latest transcripts to be sent from the Office of Admissions and Records.

Graduate Program

Graduate Program Adviser

David B. Dekker 112 Sieg

Master of Science Degree

Two options leading to the Master of Science degree in computer science are offered. Individual programs should be designed to provide considerable breadth of knowledge, as well as depth in some area of specialization. The program usually can be completed in one to two years. In addition to the degree requirements outlined in the Graduate School section of this catalog, the student must satisfy the following requirements:

1. Nonthesis Option—Completion of 40 credits of course work with at least one-half of the credits in courses numbered 500 or above is required. At least 30 credits must be in courses chosen from the computer science course list. The remaining course work should be in one or more supporting fields (e.g., engineering, mathematics, natural sciences, business administration, linguistics, philosophy, psychology, or medicine). The candidate must satisfactorily pass a written examination on the computer science core curriculum (currently based on the courses C SCI 470, 501, 505, 508, 531, and 551, and MATH 464), and submit a written report acceptable to the student's faculty adviser. An example of such a report would be one on a computer science project in which the student had participated.

2. Thesis Option—Completion of 31 credits, of which at least one-half must be in courses numbered 500 or above, is required. At least 24 credits must be in courses chosen from

the computer science course list. The remaining course work should be in one or more supporting fields (e.g., engineering, mathematics, natural sciences, business administration, linguistics, philosophy, psychology, or medicine). The candidate must prepare a thesis acceptable to a computer science supervisory committee and must satisfactorily pass an oral examination on the thesis work. Students must register for at least 9 credits of C SCI 700 in addition to the 31 credits of course work.

Doctor of Philosophy Degree

(1) The student must satisfactorily pass a Ph.D. degree qualifying examination administered by Computer Science. The examination generally is taken after completion of four quarters of graduate study and covers breadth of knowledge in computer science, which can be obtained from the basic computer science courses. A detailed prospectus is issued well in advance of the examination. (2) The student must also satisfactorily pass the General Examination specified in the Graduate School section of this catalog. In this examination, the student must demonstrate depth of knowledge in a number of special areas acceptable to the Supervisory Committee. (3) Approximately 60 credits of course work must be completed, of which at least 40 credits are to be in courses numbered 500 or above and approximately 45 credits should be in courses chosen from the computer science course list. Course work taken for the Master of Science degree is applicable to the Doctor of Philosophy degree. (4) The Candidate must prepare a dissertation acceptable to the Supervisory Committee. Students must register for at least 27 credits of C SCI 800, Doctoral Dissertation.

Admission to the Computer Science Graduate Program

1. To be admitted to the graduate program in computer science, a student must satisfy the admissions criteria outlined in the Graduate School section of this catalog. In addition to the Application for Admission to the Graduate School, the student must make a separate application to Computer Science showing background that includes: (a) a knowledge of computer organization and computer programming; (b) advanced undergraduate preparation in the mathematical, natural, or engineering sciences (this preparation does not imply a major in these fields).

2. Three letters of recommendation are required with the application and should be sent directly to the department by the recommender.

3. It is recommended that applicants take the Graduate Record Examination. Graduate Record Examination results are not required, but may be helpful to the student in competing for available openings in the program.

4. Official transcripts (two copies) should be sent directly to the Graduate Admissions Office and not to the department.

5. Applications for admission to the program should be submitted by these deadlines: July 1 for Autumn Quarter, November 1 for Winter Quarter, February 1 for Spring Quarter, and May 15 for Summer Quarter.

6. Students applying for assistantships starting in Autumn Quarter should have all applications to the University and the department completed by *February 1*.

Computer science and the separate assistantship application forms may be obtained directly from the University of Washington, Department of Computer Science, 114 Sieg, FR-35, Seattle, Washington 98195. Applications from women and minorities are encouraged.

MARINE STUDIES

102 Clifford Apartments

Faculty

Warren S. Wooster, Acting Director; Burke, Crutchfield, D. K. Fleming, R. H. Fleming, Hershman, Miles, Stokes, Vesper.

Adjunct Faculty

Adee, Bevan, Fleagle, R. W. Johnson, Lee, McManus, Murphy, Wenk.

Affiliate Faculty

Alverson, D. R. Johnson, Marasco, McCulloh, Opheim.

Research Faculty

Brewer, Duxbury, Fluharty, Gibbs, Kaczynski, Miller.

The Institute for Marine Studies is an academic and research unit established in September, 1972, for multidisciplinary studies and research of problems and conflicts arising from increased use of the world's oceans and coastal areas and the increased exploitation of marine resources. The institute's focus is the study of "marine affairs," which refers to the use, management, and policy affecting the living and nonliving resources found in the oceans, estuaries, large inland bodies of water and associated shorelands and wetlands, and the aquatic environment associated with those resources. Emphasis is on the development and evaluation of alternative solutions to policy and management issues at the local, national, and international levels.

The problems of conflicting ocean and coastal use that are examined must be addressed from different disciplinary perspectives and with reference to different sets of goals and objectives. Typically, this policy research requires teams of faculty members and students, each person contributing special knowledge and talents. Objectives of this research are to improve government and industry decision making, to improve the rationality of ocean use, and to minimize conflicts. Research projects undertaken by students usually stem from the interests and public service activities of the institute faculty. The work that a student does might well have a significant, measurable impact on the evolution of United States and international marine policies.

Major sponsors of the research work of the institute include the National Sea-Grant Program of the National Oceanic and Atmospheric Administration, the National Marine Fisheries Service, and the Rockefeller Foundation. In addition, international organizations, federal and state agencies, private foundations, and individual companies have assisted and continue to assist the institute in its research.

Members of the faculty of the Institute for Marine Studies offer through the Graduate School an interdisciplinary Master of Marine Affairs degree program for students seeking careers in ocean management. Information on the degree program appears in the Interdisciplinary Graduate Degree Programs section of this catalog. Additional information on the institute and the degree program may be obtained from the graduate program adviser.

QUANTITATIVE SCIENCE

Faculty

Bare, Bevan, Bledsoe, Chapman, Clark, Conquest, Dowdle, Fletcher, Gales, Gallucci, Greulich, Hatheway, Hertzberg, Mathews, Rustagi, Schreuder, Swartzman, Turnbull.

Adjunct Faculty

Mar, Newell.

Affiliate Faculty

Eberhardt, Estes, Tillman.

Research Staff

Clark, Lindsay, Mesmer, Mobrand, Somerton.

The Center for Quantitative Science in Forestry, Fisheries, and Wildlife is an intercollege academic unit sponsored by the College of Forest Resources and the College of Fisheries. The center offers a broad program in applied mathematics and statistical services directed principally to the two resource colleges and to other life science departments of the University. The center's applied mathematics program is concerned with quantitative descriptions of the management of both aquatic and terrestrial ecosystems.

The applied mathematics program of the center consists of six areas of course offerings: (1) computer programming, with particular emphasis on problems of the management of living resources; (2) quantitative ecology, including population, community, and systems ecology; (3) physical processes in biological systems, emphasizing mass and energy transport in ecosystems; (4) operations research, with particular focus on the utilization of renewable resources;



(5) applied statistics, with emphasis on statistical inference and experimental design for the biological sciences; and (6) applied analysis, consisting of differential and integral calculus applied to the life sciences. Courses in each of the six areas are interrelated in a way that meets a wide range of student interests and needs.

The faculty participates in the research activities of several academic units of the University. In addition to the two resource colleges, these include the Biomathematics Program, the College of Engineering, the College of Arts and Sciences, the departments of Economics, Geography, and Oceanography, and the graduate schools of Business Administration and Public Affairs.

Both the teaching and the research programs of the Center for Quantitative Science are designed to bring together living systems, mathematics, and the computer for purposes of description and management. Particular emphasis is placed on the use of the computer for quantitative descriptions of both terrestrial and aquatic ecosystems and resource management. Computerization makes possible study of the impact of exploratory management policies on simulated resource systems embedded in backgrounds of interrelated physical, biological, and economic activities and under numerous institutional constraints. Computerbased models have been successfully employed in the descriptions of complex ecosystems and in the management of forest stands, the control of insect pests, and the management of fish and aquatic mammal stocks.

SOCIAL MANAGEMENT OF TECHNOLOGY

314 Guggenheim

Faculty

Barry Hyman, Director; Bereano, Douthwaite, Wenk, Zerbe.

Adjunct Faculty

Bodoia, Fleagle, Gale, Lauritzen, Lopez, Rushmer, Storch.

Affiliate Faculty

Sine, Watson.

Advisory Faculty

Crutchfield, Fleagle, Garlid, Lyden, Richardson.

Because of the pervasive impact of technology on society, we must develop means for guiding technological change to benefit mankind more effectively and to minimize undesirable side effects. Social management of technology is concerned with examining how technological change is affected by political, economic, legal, technical, and cultural factors. It seeks to assess those societal goals that are met by technology, the processes by which public policy modifies technology in response to social needs, and the roles that public and private institutions play in bringing about technological change. Specific technological areas studied include, but are not restricted to, biomedical, energy, health care, communication, transportation, marine activities, and municipal services.

The problems involved in analyzing and managing technological systems have created a demand for new professional skills that the Program in Social Management of Technology (SMT) aims to satisfy in two ways: (1) by complementing an individual's primary skills with a deeper perspective, so that the professional, such as an engineer, can work effectively with matters involving public policy on technological issues, and (2) by providing preparation for specialization in technology-intensive public policy per se, drawing upon disciplinary training but with a primary interest in technological policy analysis. Such endeavors require a knowledge not only of scientific and engineering principles but also of social sciences and law for comprehension of processes and institutions that implement technology, of the humanities that give expression to our society's value preferences, and of associated techniques of analysis that facilitate generation of options and identification of potential consequences.

This program is involved in the real-world settings where technology is generated. Through its teaching, research, and public service activities, SMT contributes to examination of technology policy issues at local, state, national, and international levels. SMT is also committed to a group practice of scholarship by faculty and students as an essential mechanism for synthesizing the contributions of various disciplines.

The SMT program is an interdisciplinary effort. It supplements a full-time core faculty, all of whom have joint appointments elsewhere on the campus, with a part-time faculty with appointments in such disciplines as business administration, engineering, physical and social sciences, economics, medicine, and public administration. The program contributes to strengthening the technology policy dimension of the other professional schools, of the social sciences, and of the institutes for Marine Studies and Environmental Studies.

The program is administered through a committee of deans representing the College of Arts and Sciences, the School and Graduate School of Business Administration, the Graduate School of Public Affairs, the Graduate School, and the College of Engineering, with the Dean of the latter serving as chairperson.

Undergraduate Studies

Students in engineering whose interests embrace social management of technology can design an individualized program leading to either a Bachelor of Science or a Bachelor of Science in Engineering degree. Students in the College of Arts and Sciences can pursue their interests in this field through an individualized program leading to a Bachelor of Arts or Bachelor of Science degree in General Studies.

In addition, students enrolled in any school or college of the University may select courses from, or may minor in, this program to enrich their general appreciation of the technology and policy aspects of their major field.

Graduate Studies

Graduate students specializing in social management of technology come from a wide variety of educational backgrounds. Course offerings are designed for students who want (1) to deal with policy, institutional, and decisionmaking processes in social management of technology; (2) to study social, economic, and environmental impacts of technology; (3) to broaden their perspectives of the role of technology in modern society; or (4) to become specialists in a particular technology-related policy field.

Graduate students may formulate their individual programs in several ways, but all programs require student enrollment in a degree-granting unit of the University. Students may (1) employ studies in the social management of technology area to augment a major elsewhere in the University; (2) select science and technology policy as one of the degree options for the Master of Public Administration degree in the Graduate School of Public Affairs; (3) utilize the flexibility of established master's and doctoral programs in the College of Engineering (e.g., the Inter-Engineering Group) to develop programs of study that cross departmental or college lines; (4) make special arrangements with departments in which SMT faculty hold joint appointments; (5) qualify for the special individual Doctor of Philosophy degree program in the Graduate School under Social Management of Technology supervision.

An active SMT research program provides opportunities for financial support for graduate students. Internships with industry and government also are available.

WILDLIFE SCIENCE

Wildlife Science Committee

Donald E. Bevan, Chairperson; Driver, Gessel, Mathews, Salo, Scott, Taber, Whitney.

Teaching and Research Faculty

Erickson, Manuwal, Taber, West.

The colleges of Fisheries and Forest Resources, through the Wildlife Science Committee, jointly administer an undergraduate degree program in wildlife science. This interdisciplinary program requires training in biological and quantitative science as well as work in fisheries and forest resources. A student seeking a degree in wildlife science applies for admission to either one of the sponsoring colleges. The student who obtains a Bachelor of Science degree with a major in wildlife science to be able to apply his training to management of wildlife resources and the related environment, or he may proceed to prepare for advanced management or to fill a research position. An undergraduate interested in this field may alternatively major in one of the other curricula of the chosen college and select an elective concentration in wildlife science. Additional information may be obtained from a wildlife science adviser in either college or from a member of the faculty.

Dean

George Schatzki 336 Condon

Associate Dean

Richard O. Kummert 414 Condon

Assistant Dean

Joseph J. Gallucci, Jr. 306 Condon

Faculty

Andersen, Aronson, Burke, Chisum, Corker, Cosway, Cross, Fletcher, Gallagher, Harsch (emeritus), Haley, Hardisty, Henderson, Hjorth, Hume, Hunt, Huston, Johnson, Junker, Kummert, Loh, Lyness, Meisenholder, Morris, Peck, Price, Prosterman, Rieke, Roddis, Rodgers, Rombauer, Schatzki, Shattuck (emeritus), C. Z. Smith, Stoebuck, Taylor (emeritus), Trautman, Tunks, Whitman.

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 or other common-law countries. Additional information about the school is contained in the current University bulletin School of Law.

School Facilities and Services

The School of Law is housed in Condon Hall, a new building adjacent to the University's main campus. It is equipped with classroom, library, student, and office facilities.

The School of Law library contains some 280,000 bound volumes and 24,000 microform equivalent volumes. It includes decisions of all English and American courts of last resort, in addition to an excellent collection of Japanese and other Asian law material.

Student Services and Activities

The school offers many student services and cocurricular activities, including the Student Bar Association, affiliated with the American Bar Association; a chapter of the National Lawyers Guild; a program of legal services to prisoners of the state reformatories at Monroe and Purdy; an extensive moot court program; a nationally recognized law review; chapters of the Order of the Coif and three national law school fraternities; an active Minority Law Student Association and Law Women's Caucus; opportunity for limited practice before the Washington courts for those students who have completed two of the three years of law school; and a legal-aid program.

The school has limited financial aid available, principally for second- and third-year students, which is usually dispensed on the basis of need.

A school-maintained placement service assists students in finding legal positions upon their graduation, in finding law-related summer jobs, and in gualifying for legal internships under the Washington court rules.

Programs of Study

Juris Doctor Degree

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 in most law schools of 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 are Contracts, Torts, Property, Civil Procedure, Criminal Law, Administrative Law, and Basic Legal Skills.

Except for a required course in professional responsibility, courses in the second and third years are elective. A student may, therefore, choose a program designed to suit his or her interests and needs. In addition, LAW 600 (Independent Study or Research) and LAW B 532 (Research and Writing) are available to students interested in pursuing individual projects. Seminars are also offered. They are built on the belief that an opportunity for sustained research, analysis, and writing at an advanced level is an important part of preparation for the contemporary legal profession. The intended product of the seminar is a high-quality paper.

Postgraduate Degrees in Law

Applicants for admission to the postgraduate programs in law must meet the requirements of the faculty in law as well as the requirements of the University's Graduate School. Thus, prospective applicants should familiarize themselves with the general policies, procedures, and regulations of the Graduate School. Statements about admission, scholarship, residence, continuous enrollment, general master's and doctoral degree requirements, and other pertinent information may be found in the Graduate School section of this catalog or in the Graduate School bulletin, entitled Graduate Study and Research.

Admission applications may be obtained by writing: University of Washington, Graduate Studies in Law, 618 Condon, JB-20, Seattle, Washington 98105.

Master of Laws Degree

Admission to the Master of Laws (LL.M.) degree programs, with specialization in Asian law or in law and marine affairs, is limited to applicants who have received a first professional degree (LL.B. or J.D.) and who have a record of superior academic achievement. In the case of the Asian law emphasis, the applicant must be admitted to practice and must be competent in English and either Japanese, Korean, or Chinese. Both programs contemplate one year in residence, at least 26 (40 in the case of law and marine affairs) credits, and an acceptable major research undertaking.

Doctor of Philosophy Degree

Admission to the Ph.D. degree program in Asian law is limited to exceptional scholar-lawyers who are bilingual (English and either Chinese, Japanese, or Korean). The core of the program is a major creative research project using Asian language sources as well as English language sources. At least two, and usually three, years in residence are necessary in order to accomplish the work that must be done to pass the General Examination that precedes candidacy for the doctoral degree. An acceptable dissertation must thereafter be submitted to complete the degree requirements. The Candidate may spend a year abroad while working on the dissertation, but must be in residence during the quarter in which the degree is to be received.

Summer Quarter

The School of Law offers courses during Summer Quarter for its own students and for students from other law schools who have completed at least one year of law study, as well as a few courses for nonlaw students. Summer Quarter courses also are available on a nonmatriculated basis for practicing lawyers who desire structured instruction in areas of expanding significance.

Admission

When Students May Enter

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.

Applicants to the First-Year Class

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 material for both appears in the Law School Admission Bulletin and LSAT Study Guide. To avoid paying a late registration fee and to ensure being registered, candidates in the United States must postmark their LSAT registrations no later than thirty days before a test date and register directly with the Educational Testing Service. The School of Law recommends taking the LSAT as early as April of the junior year and requires applicants to take the test no later than the December administration immediately prior to the application deadline.

No specific prelaw course is required or recommended, and the School of Law subscribes to the remarks set forth on prelaw preparation in the *Prelaw Handbook—Annual Official Guide to ABA-Approved Law Schools*. Personal interviews are neither required nor encouraged. Applications for admission to the next entering class must be postmarked or delivered by February 1. To be assured of consideration for admission, an applicant must cause complete credentials,

SCHOOL OF LAW



including the LSDAS report, to be filed in the School of Law by March 1.

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 nondegree candidate.

Applicants should request application forms and instructions from the admissions officer in time to permit filing of the application by July 15. To be assured of consideration, the applicant must complete his or her application file by August 1.

Students are accepted only to the extent that vacancies ex-

ist. Selection of the applicants is based on evidence either (1) that the candidate can produce acceptable work at this law school and that only by transferring to this law school will the candidate alleviate serious hardship, or (2) that the candidate can produce above-average work at this law school. Minority transfer applicants are considered under criteria applicable to first-year admissions.

Students working on law degrees to be conferred by the University have priority over nondegree candidates in the selection of courses. This policy is in accordance with the general University policy on the registration of nonmatriculated students.

Inquiries

A more complete 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 the University of Washington, School of Law, Admissions Officer, JB-20, Seattle, Washington 98105.





LIBRARIANSHIP

Director

Peter Hiatt 133 Suzzallo

Faculty

Ahlers (emeritus), Bates, Benne, Bevis (emeritus), Chisholm, Gallagher, Hiatt, Lieberman (emeritus), Mignon, Milczewski (emeritus), Nelson, Page, Shaw, Skelley, Soper, Turner (emeritus), Zweizig. Peter Hiatt, graduate program adviser.

The School of Librarianship offers two master's degree programs, leading to the Master of Librarianship or the Master of Law Librarianship degrees. Both programs were completely revised in 1979 to empower graduates to meet the rapidly changing information needs of individuals and society in the close of this century.

Philosophy

For centuries, libraries have been given responsibility for the identification and preservation of the most useful in the record of human experience. Increasingly, libraries and information centers have broadened their resources to include all forms of recorded information and, in recent decades, human resources as well. But the role of library/information agencies has taken on new dimensions in the past decade—dimensions that predict very different and increasingly important roles for libraries in the last quarter of this century. The problem faced by libraries today is not so much preserving information as it is dealing with an exponential increase in the volume of the human record. This information glut and rapidly increasing social and technological change demand a new role for librarians and for libraries. A librarian deals with ideas and in the ways those ideas are made accessible and useful to people. The library's role is to provide access to the human records of the past—factual, imaginative, scientific, and humanistic. This means organizing the human record so that access can be made to it from a myriad of directions allowing not only the facts, but also the wisdom in the record, to be retrieved. Increasingly, it means packaging and presenting the human record to allow easy access for people previously excluded by lack of education, lack of language facility, ethnic or cultural backgrounds, age, physical or mental handicaps, and apathy. It means effective networks, linking all collections in the region, state, nation, and the world.

Librarians and information specialists are needed to lead the changes necessary to see that society receives the kinds of library information services it needs in the close of this century, whether the introduction of the preschool child to the wonder of history's imaginative creations, the researcher creating knowledge, the student in the midst of the learning process, the retired adult exploring new interests and coping with new problems, indeed, the whole range of human and societal needs. The program of the School of Librarianship is designed to produce professionals who can lead such change.

The School

Established in 1911, the School of Librarianship is the oldest library school west of the Mississippi River. It has been accredited by the American Library Association since 1926 and is the only accredited library school program in the Pacific Northwest. Degrees granted are the Master of Librarianship and the Master of Law Librarianship. In October, 1979, the school became the second library school in the United States to lengthen and diversify its Master of Librarianship program by offering a two-year course of study. At the same time, an augmented program of professional continuing education was developed to help practitioners keep abreast of new ideas and changes in professional practice.

The goals of the school are: (1) to prepare candidates for professional careers and leadership roles in the field of librarianship; (2) to conduct systematic study and research on problems, concerns, and policies in librarianship; (3) to provide leadership in encouraging cooperative ventures in the application of innovation and advances within the profession; (4) to plan with professional associations, institutions, and related disciplines in designing programs of instruction and research leading to improved library and information services; and (5) to act in cooperation with other state institutions and agencies and other units within the University concerned with education for library practice in developing programs for library education at various levels.

Facilities

Headquarters for approximately one hundred sixty librarianship students, twelve faculty members, and six nonteaching staff members are located on two floors in the south wing of Henry Suzzallo Library. Facilities include a reception area, faculty offices, a student lounge, and two classrooms. The William E. Henry collection of rare books is housed in the school.

The school has three computer terminals with the capability of accessing 120 special data bases.

Curriculum

A completely redesigned curriculum, offered for the first time Autumn Quarter 1979, incorporates an increased number of courses, major changes in content and sequencing, and new teaching approaches.

The curriculum gives greater emphasis to the needs of library users, as contrasted with the traditional institutioncentered approach. The foundation courses, LIBR 500 (Society, Users and Libraries), and LIBR 501 (Bibliographic Control), provide the theoretical base for further study. Advanced and skill courses are organized around five areas of concentration: managerial tools; organization of resources; information resources and retrieval; design and provision of information services; and environments of information service.

LIBR 590 (Directed Field Work) is one of the most popular options available to librarianship students. A faculty coordinator matches students with libraries throughout the United States. Each student participating works full time for six weeks carrying the equivalent responsibilities of a new professional staff member. After six weeks, both the student and the supervising librarian prepare written evaluations that provide the basis for the student's grade. While required for students earning the Master of Law Librarianship degree, fieldwork is optional for those seeking the Master of Librarianship degree. Students make their own arrangements for travel and living expenses.

Students are encouraged to complement their library courses with the wealth of course offerings outside the school in related fields, such as business, communications, computer science, education, and public administration. Careful faculty advising ensures that the courses selected serve the student's chosen career path.

Master of Librarianship Degree

This two-year program is designed to prepare information professionals to work in a variety of environments, including academic, public, school, and special libraries, other information agencies, and free-lancing. A student typically begins the program in late September with the required foundation courses and completes six quarters of academic work in June of the second year. A total of 63 credits of graduate work are required for the degree, of which twothirds (42 credits) must be taken within the school. Librarianship is generally a nonthesis program.

Degree requirements are detailed as follows:

· · · · · · · · · · · · · · · · · · ·	redits
Two foundation courses (LIBR 500 and 501), 6 credits each (of- fered Autumn Quarter only)	12
One course from each of five areas of concentration, 3 credits each: (1) Managerial Tools (LIBR 510, 511, 512, 599); (2) Or- ganization of Resources (LIBR 520, 522, 523, 525, 526, 528); (3) Information Resources and Retrieval (LIBR 540, 541, 542, 543, 545, 546, 547, 549, 550, 551, 553, 557, 558); (4) Design and Provision of Information Services (560, 561, 562, 563, 567, 568, 569, 570, 571, 572, 577); (5) Environments of Information Service (581, 583, 588, others to be added)	15
Individual selection of courses in librarianship and in other depart- ments, with the approval of a faculty adviser. A maximum of 21 credits may be taken in other departments on campus Total	<u>36</u> 63

Master of Law Librarianship Degree

The Master of Law Librarianship program is designed to prepare lawyers to serve as law librarians in courts, federal and state units of government, law firms, associations of legal practitioners, and schools of law.

For this program, the basic professional curriculum in librarianship is augmented by courses that deal specifically with law librarianship. Courses required for the Master of Law Librarianship degree include: LIBR 500 and 501, 557, 558, 577, 590, and one course each in Organization of Resources and Environments of Information Service, for a total of 33 credits. Elective courses (12 credits) are chosen with the assistance of an academic adviser. A total of 45 credits is required for the degree, which can be completed in four quarters, beginning with the Autumn Quarter and concluding with the following Summer Quarter. An applicant for admission to this program must hold a degree from an accredited American law school or from a law school in one of the common-law countries. All other requirements for admisson are identical to those for the Master of Librarianship program; the same application forms and procedures are used.

Admission Requirements

The primary criterion for admisson is the applicant's apparent ability to progress satisfactorily in a graduate degree program. The following are examined as evidence: (1) application for admission; (2) a baccalaureate degree from a college or university of recognized rank, and evidence in the college record of above-average scholastic ability, usually shown by graduation with a 3.00 minimum grade-point average for the junior/senior years; (3) an official score from the Graduate Record Examination, general aptitude section only, taken within five years of the year of expected enrollment; (4) three letters of reference; (5) a statement of educational and personal objectives; and (6) an interview, when possible. In addition, an applicant from a non-English-speaking country must demonstrate a satisfactory command of English by submitting a recent score from the Test of English as a Foreign Language examination.

While not required, it is recommended that applicants have completed some formal study of a modern foreign language. Familiarity with computer programming, statistics, or college algebra is helpful in some areas of librarianship.

The University offers intensive courses in English as a second language. These are available to international applicants during the Summer Quarter prior to entering the School of Librarianship.

Completed applications for admission must be received by April 1. International students, however, are advised to complete their applications by February 1. Decisions regarding transfer of credits earned at other schools are made when the student meets with an adviser during the first quarter after enrollment. Applicants must be admitted into the program by both the Graduate School and the School of Librarianship.

Application forms may be obtained by writing or telephoning the University of Washington, School of Librarianship, 133 Suzzallo Library, FM-30, Seattle, Washington 98195; (206) 543-1794.

Financial Aid

The School of Librarianship application for financial aid must be completed by students who want to be considered for any scholarships, research assistantships, or student assistant positions within the school. The amount of available assistance varies from year to year; however, the school regularly awards a multiethnic scholarship to a minority student who has been admitted to the program. The application form may be requested from the school.



A resident of Alaska, New Mexico, or Oregon may be eligible for assistance through the WICHE Professional Student Exchange Program. Because these states do not offer professional library programs, the difference between instate and out-of-state tuition is paid for qualified applicants. Funding is limited, however, and early application is advised. Requests should be directed to the WICHE Certifying Officer in the home state.

Information about national and state scholarships may be obtained from American Library Association, Library Education Division, 50 East Huron Street, Chicago, Illinois 60611, or through contact with a state library.

Placement

The University's Placement Center works closely with the School of Librarianship in assisting graduates. Prior to graduation, a counselor helps with résumé preparation, gives advice on job-hunting techniques, and assists students in developing placement files.

In recent years, students with mobility regarding place of employment and flexibility in type of position have had the greatest success in finding professional positions. Those offering special backgrounds, such as undergraduate degrees in business or the sciences, have an edge in the job market.

Recent information concerning placement and salaries for graduates of accredited library schools appears annually in the July issue of *Library Journal*.

Continuing Education

The School of Librarianship is deeply committed to providing a variety of options for librarians interested in updating their skills and keeping abreast of new ideas and the latest in research.

The Professional Development Studies Program has five admission spaces set aside by the school each year for librarians who wish to pursue formal continuing education. This nondegree program is designed to serve those who have graduated from an ALA-accredited library program and whose career objectives can best be met through additional course work at this university.

Interested persons must apply to both the Graduate School and the School of Librarianship. Applications are accepted throughout the year.

Some credit courses, noncredit workshops, and institutes are held during the summer months on topics of particular interest to practicing librarians. Each lasts from a few days to a week or more. Scheduling and publicity are handled through the Office of Conferences and Institutes, DW-50, Seattle, Washington 98195. Full details are usually available each spring.

A limited number of credit courses is offered each summer.

Information about summer school classes may be obtained by writing the School of Librarianship after March 15.

Colloquia are held throughout the year on topics of general interest to librarians, students, and others. Any interested person may attend. Information regarding topics and scheduling may be obtained by contacting the Colloquia Chairperson, School of Librarianship.

The Career Development and Assessment Center for Librarians project, supported by a Kellogg Foundation grant of \$315,316, was established on the campus on July 1, 1979, with the primary goal of providing women librarians equal opportunity for appointment to managerial responsibility. Cosponsored by the School of Librarianship and the Washington State Library, the model project will be supported by the foundation through June, 1982.

Each individual will participate in two full days of testing and group participation, resulting in confidential written analysis of strengths and weaknesses and developmental needs.

During 1980, librarians from Washington State will be able to participate, and both men and women will be eligible for assessments. In 1981/82, the territory served will expand to include Washington, Oregon, Montana, Idaho, Alaska, British Columbia, and Alberta.

MEDICINE

The school currently admits one hundred seventy-five students to its first-year class and has a total enrollment of seven hundred. The full-time faculty numbers more than a thousand members. The affiliated University residency training network enrolls six hundred house officers. Enrollment in the graduate programs in the basic sciences exceeds two hundred, and there are approximately four hundred postdoctoral fellows in various advanced training programs. The school has baccalaureate and graduate programs in occupational therapy, physical therapy, and laboratory technology, and also participates in training a broad spectrum of other allied health professionals.

Curriculum

The curriculum is divided into two major divisions, the basic curriculum, which must be completed by all students who are candidates for the Doctor of Medicine degree, and the pathway curricula, which provide an opportunity for students to complete their degree requirements by taking courses in one of three prescribed pathways. Attainment of the M.D. degree is based upon credits earned.

Basic Curriculum

The basic curriculum has two parallel programs: the Lecture-Discussion Program and the Self-Paced Curriculum Program. Each covers the basic information prerequisite to the clerkship rotations in the University-affiliated hospitals. The major difference between the two programs is the method of study. In the Self-Paced Curriculum Program, the student proceeds at his own pace. The basic curriculum is designed to occupy six quarters; the lecture-discussion students usually complete it in Spring Quarter of the second year of medical school. The Self-Paced Curriculum Program allows the student to learn independently and to inte-

Dean

Robert L. Van Citters A300 Health Sciences

Associate Deans

Benjamin H. Belknap John D. Chase Jack M. Docter E. Harold Laws John N. Lein T. J. Phillips

Assistant Deans

Zenaido Camacho John D. Loeser Werner E. Samson Richard K. Tompkins Loren C. Winterscheid

The School of Medicine was established in 1946 and is the only medical school directly serving the states of Washington, Alaska, Montana, and Idaho. Located in the Warren G. Magnuson Health Sciences Building, the school operates a decentralized program of medical education (WAMI) via a network of teaching affiliates throughout the Pacific Northwest.

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 Hospital, Harborview Medical Center, Children's Orthopedic Hospital and Medical Center, Veterans Administration Hospital, and United States Public Health Service Hospital, as well as at ninety-seven other clinical affiliates in the WAMI states. grate medical school activities with other degree programs or special interests.

The pathway curricula usually occupy an additional two years, so most medical students receive their Doctor of Medicine degree in four years. Exceptional students may accelerate to graduate in three years; students with academic difficulties may require more time. Students pursuing conjoint degree programs usually require more than four years to complete the work for the degree. The curricula are designed to permit flexibility and individualized learning experiences.

The Lecture-Discussion Program in the medical sciences occupies the first six quarters. There are three general phases: pre-organ systems courses, organ systems, and introduction to clinical medicine, the last running parallel to the other two phases. Clinical medicine begins in the first quarter and steadily assumes increasing prominence until the sixth quarter, when nearly half of the curriculum offerings are in this area. The first phase is designed to provide the background required for the organ systems courses and an insight into some of the many different aspects of the world of medicine. Among these experiences is an elective opportunity to spend one morning a week with a practicing physician at work in his office or clinic. The third, fourth, fifth, and sixth quarters are concerned with teaching the anatomical, physiological, and biochemical properties of the several organ systems of man. Emphasis is placed upon correlating these properties with clinical methods of data collection and upon derangements of function of these systems that illustrate the application of basic scientific principles to clinical medicine. During the introduction to clinical medicine, students are taught on the wards and at the bedside, their clinical skills being developed so they may be launched into their pathway programs with a fundamental knowledge of clinical medicine.

Students are expected to proceed through the basic curriculum during their first six quarters in the School of Medicine. The academic demands of the basic curriculum are scaled so that most students will be able to take elective courses in addition to the basic curriculum. Electives may be used to make up educational deficiencies, to broaden the student's background, or to begin the fulfillment of pathway requirements. No student is expected to undertake work in excess of 24 credits per quarter. Assumption of an academic load in excess of 24 credits requires special permission from the student's adviser and the associate dean for academic affairs. A student may decide to embark upon a specific pathway at any time, but is required to make a decision by the fifth quarter.

FIRST QUARTER (AUTUMN)

en e	Introduction to medicine and curriculum orientation
HUBIO 510P	Anatomy (Microscopic)
HUBIO 511P	Anatomy (Gross)
HUBIO 512P	Mechanisms in Cell Physiology
HUBIO 513P	Introduction to Clinical Medicine

HUBIO 514P Molecular and Cellular Biology I HUBIO 515P The Ages of Man

SECOND QUARTER (WINTER)

HUBIO 520P	Cell and Tissue Response to Injury
HUBIO 521P	Natural History of Infectious Diseases and
	Chemotherapy
HUBIO 522P	Introduction to Clinical Medicine
HUBIO 523P	System of Human Behavior I
HUBIO 524P	Molecular and Cellular Biology II

THIRD QUARTER (SPRING)

HUBIO 530P	Epidemiology
HUBIO 531P	Head, Neck, Ear, Nose, and Throat
HUBIO 532P	Nervous System
HUBIO 534P	Endocrine System
HUBIO 535P	Introduction to Clinical Medicine

FOURTH QUARTER (AUTUMN)

HUBIO 540P	Cardiovascular Respiratory System
HUBIO 541P	Gastro-Intestinal System
HUBIO 542P	Introduction to Clinical Medicine
HUBIO 543P	Principles of Pharmacology I

FIFTH QUARTER (WINTER)

HUBIO 550P	Introduction to Clinical Medicine
HUBIO 551P	Skin System
HUBIO 552P	Reproductive Biology
HUBIO 553P	Musculoskeletal System
HUBIO 554P	Genetics
HUBIO 555P	Medicine, Health, and Society

SIXTH QUARTER (SPRING)

HUBIO 560P	Introduction to Clinical Medicine
HUBIO 561P	Hematology
HUBIO 562P	Urinary System
HUBIO 563P	System of Human Behavior II
HUBIO 564P	Principles of Pharmacology II

Pathway Curricula

Three pathways are currently defined. Their general descriptions:

Family Physician Pathway: Physicians are trained to fulfill a role in our health-care system that is in great demand and in short supply. These physicians assume responsibility for the overall health care of individuals of all ages. They are capable of making initial diagnoses and treating many illnesses. Their knowledge allows them to make decisions regarding the need for more specialized consultation and care. They are capable of resuming the care of patients who are treated for a time by specialists. These physicians are particularly skilled in utilizing all of the health service resources of their community and region in the care of their patients. Their training emphasizes experience in ambulatory clinics and situations in which diagnostic and treatment facilities are used in caring for patients who need not be hospitalized. They learn to work with specialists in internal medicine, surgery, and psychiatry, and with public health nurses, social workers, diagnostic technicians, and other members of the health-care team. Through coordinated teaching they follow patients through acute illness and into convalescence, so that the full impact of illness on the patient, the family, and the community can be appreciated.

Clinical Specialist Pathway: In modern medical practice, sophisticated application of scientific knowledge is of great importance in the diagnosis and treatment of many diseases. The specialties of internal medicine, pediatrics, and surgery have become highly diversified. The Clinical Specialist Pathway provides the fundamental education for students who will develop into specialists in either internal medicine, pediatrics, or surgery. Emphasis is placed upon hospital experience and upon the knowledge of basic sciences essential to the rational application of scientific knowledge to clinical problems. Opportunities are provided for prolonged follow-up treatment of patients with chronic disease.

Medical Scientist Pathway: This pathway is designed to allow students who are highly motivated toward developing themselves as research investigators in medicine an opportunity to pursue simultaneously their education in the areas of scientific investigations and clinical medicine. The program allows time for a detailed development of knowledge in one of the basic sciences and a sound education in medicine. Because of the course demands and the need for prolonged periods of research training, five years are required to complete this course of study. The granting of a combined degree is under consideration. A Doctor of Philosophy or Master of Science degree from a basic science department may be obtained under existing rules of the Graduate School, but special arrangements must be made in each case.

In general, each pathway has certain absolute requirements, makes available an opportunity for the selection of courses from a defined list, and offers completely free elective choices. The Doctor of Medicine degree may be granted after satisfaction of basic curriculum and pathway requirements.

The curriculum of the School of Medicine is predicated on the assumption that all graduates will continue their training through several postdoctoral years of internship and residency. It is believed that the curriculum provides a maximum opportunity for the student to prepare to make a career choice and to develop his or her own education to permit the fulfillment of a chosen career.

WAMI Program

(Decentralized Medical Education)

The WAMI Program was initiated in 1971 as an experiment in decentralized medical education to provide a broader range of educational opportunities for students. It is an inte-



gral part of the undergraduate medical curriculum and is a fully accredited program of the School of Medicine. The WAMI Program is named for the four states (Washington, Alaska, Montana, and Idaho) that share resources and responsibilities in the regional program. Funds appropriated to the WAMI Program by Alaska, Montana, and Idaho legislatures ensure each state of positions in the freshman medical class each year for its students.

University Phase

In the University Phase of the WAMI Program, approximately forty percent of the students admitted to the University's School of Medicine receive the first year of their medical school training at Washington State University, University of Alaska, Montana State University, or the University of Idaho. While in one of these institutions, they enroll in basic science courses taught by the science faculty and are provided supplemental resources from this university's School of Medicine faculty. Preceptorships with community physicians are also offered first-year students at the WAMI-participating universities. These students join their classmates at the University's campus in Seattle for the second year of medical studies.

Clinical Phase

At the conclusion of the second year, students enter the elective portion of their training, which is predominantly clinical, and select a pathway of study. As part of the clinical training, they may choose among clerkships at the University of Washington, at its affiliated hospitals, or at seventeen Community Clinical Units located in the four-state region. At these sites, physicians in private practice serve as School of Medicine clinical faculty members to provide supervised clinical training in five specialties: family medicine, obstetrics and gynecology, psychiatry, pediatrics, and internal medicine. The WAMI Community Clinical Units are also used for a portion of the residency training in the respective disciplines. Training experiences at the WAMI Community Clinical Units include outpatient contact at local physicians' private offices, hospital rounds, follow-through inpatient care, emergency room duty, service at local community special clinics, lectures, and didactic and participatory discussions. Clerkships in family medicine are offered at Pocatello, Idaho; Anchorage and Ketchikan, Alaska; Whitefish-Kalispell, Montana; and Anacortes, Spokane, and Omak, Washington. Clerkships in obstetrics and gynecology are offered at Spokane, Washington; Anchorage, Alaska; and Boise, Idaho. Psychiatric clerkships are offered at Anchorage. Pediatrics clerkships are available in Pocatello; Great Falls, Montana; and Spokane. Clerkships in internal medicine are offered at Billings and Missoula, Montana, and Wenatchee, Washington.

By capitalizing on the resources of neighboring state universities, the clinical expertise of community practitioners, and the medical center, the WAMI Program has been able to expand medical school admissions for students from all four states, to expand clinical training opportunities in the primary-care disciplines, and to expand continuing medical education programs offered health professionals in their local communities.

Admission*

Requirements for Entrance

The New Medical College Admission Test is required and must be taken by autumn of the year preceding the proposed date of enrollment. All MCAT tests prior to April, 1977, do not meet the requirement and cannot be substituted. Minimum science course requirements are: biology (8 semester/12 quarter credits); chemistry (12 semester/18) quarter credits), including one year of organic chemistry (all lectures and laboratories within a sequence; and physics (8 sémester/12 quarter credits). These courses should be completed by time of application if possible; all must be completed prior to anticipated medical school matriculation. Proficiency also is required in English and basic mathematics. Candidates are considered regardless of major; all must demonstrate substantial academic ability in major fields and required science courses. A minimum of three years of college is required; however, ninety-nine to one hundred percent of entrants in recent years have had baccalaureate degrees. A broad background in biological science and the humanities; a knowledge of, and exposure to, the needs of individuals and society; and an awareness of health-care delivery systems are desirable.

Candidates are urged to discuss undergraduate credentials and curriculum with premedical advisers at their undergraduate institutions.

New Medical College Admission Test

Applicants to the class entering in the autumn of 1978 and subsequent classes must provide the scores received on the New MCAT. Arrangements for this test may be made with the premedical adviser at the institution where premedical training is being taken. The New MCAT customarily is given in the spring and autumn of each year. As noted, the New MCAT must be taken by autumn of the year preceding the proposed date of enrollment. Additional information on the administration of this test may be obtained by writing to the American College Testing Program, Post Office Box 618, Iowa City, Iowa 52240, or telephoning (319) 356-3833. Early application for testing is advised. The deadline for registration is generally a month prior to the actual test date.

Variations in the type and amount of course work completed by the time of testing are considered in evaluation of MCAT results, particularly where retesting has been employed. All candidates are referred specifically to the section of the Association of American Medical Colleges' (AAMC) *Medical School Admission Requirements* relating to the New Medical College Admission Test.

* These procedures and policies are subject to change. Information regarding changes is available at the School of Medicine Admissions.Office.

Application Process

The University is a participant in the American Medical College Application Service (AMCAS) Program. Applications may be obtained from AMCAS offices, 1776 Massachusetts Avenue Northwest, Suite 301, Washington, D.C. 20036. Because the admissions committee begins examining applications a year ahead of the time of entrance, early application is advisable. Deadline for receipt of application by AMCAS is November 15.

Candidates generally given serious consideration are persons who are legal residents of Washington, Alaska, Montana, and Idaho and, regardless of residence, M.D.-Ph.D. program candidates and Black Americans, American Indians, and Chicanos. Those considering application as nonresidents apart from the groups outlined above should be aware that no such individuals gained admission to the last five entering classes. Applications from those who have failed to meet minimum standards in another medical school or a dental school cannot be considered.

The AMCAS application and supplemental material are required before an application is reviewed. Legal residents of Washington, Alaska, Montana, and Idaho, and Black Americans, American Indians, and Chicanos should automatically submit the required supplemental material except for the application fee. All other applicants, including nonresidents designating themselves as candidates for the combined M.D.-Ph.D. program, are asked not to submit any of the supplemental material until specifically requested.

The required supplemental materials are: a three-hundredword autobiography (personal comments section of the AMCAS application may be used); a premedical committee evaluation (letters from three science [biology, chemistry, physics, mathematics] and two nonscience collegiate instructors may be substituted); a \$10.00 nonresident fee, which should not be sent until specifically requested and may be waived for economic reasons (residents of Washington, Alaska, Montana, and Idaho do not pay this fee). Legal residence certification by the appropriate state certifying officer is required for Alaska, Montana, and Idaho applicants.

Letters of recommendation should evaluate critically the candidate's academic ability, strengths, weaknesses, motivation for medicine, maturity, difficulty of course work attempted, and special attributes and assets.

In addition to the transcripts filed with AMCAS at the time that application is submitted, supplementary transcripts should be filed directly with the school's Office of Admissions as soon as available. If the course of study as outlined in the AMCAS application changes, it is requested that this office be notified of these changes in writing, preferably using the format on the AMCAS application.

Interviews are by invitation only and are granted, after careful review of completed applications, to those candi-

SCHOOL OF MEDICINE



dates considered potentially competitive for the positions available.

Attempts are made to issue notices of acceptance about the middle of each month, starting in December. Successful applicants should respond in writing to the notice of acceptance within two weeks. Prior to matriculation, the comptroller's office will require a \$50 deposit from those expected to enter. This deposit is applied to the first quarter's tuition.

The WAMI Program of decentralized medical education is discussed earlier in this catalog. All students enrolled in the School of Medicine may, as part of the WAMI Program, receive a portion of training at sites away from the University campus. Those who enter as residents of Alaska, Montana, and Idaho are expected to spend their first year at the university site in their particular states. Offers of acceptance, therefore, are conditioned upon agreement to participate in WAMI operations. Questions about this program should be directed to the University of Washington; School of Medicine; WAMI Office; A300 Health Sciences, SC-64; Seattle, Washington 98195.

Inquiries, address changes, or other information regarding the application should be transmitted in writing, rather than made by telephone or in person, and directed to the University of Washington; School of Medicine; Office of the Dean, SC-64; Committee on Admissions; Seattle, Washington 98195.

Residence Classification

Upon review of an application, the Committee on Admissions may request proof of legal residence for Washington candidates and will require proof of legal residence for Alaska, Montana, or Idaho candidates. Determination of state of legal residence is not made by the School of Medicine.

The University's Residence Classification Office handles determinations of *Washington residency* for University purposes. Application for such a determination can be obtained by writing: University of Washington; Residence Classification Office; 320 Schmitz, PC-30; Seattle, Washington 98195.

Certification of Alaska, Montana, and Idaho residency for University purposes is made by each state's WAMI certifying officer. Alaska applicants should contact University of Alaska; Dr. James R. Crook; WAMI Residency Committee, WAMI Medical Education Program; Fairbanks, Alaska 99701. Idaho applicants should contact University of Idaho; Judy McNevin, Associate Director of Admissions; Moscow, Idaho 83843. Montana applicants should contact Ms. Leoti J. Waite, Certifying Officer for the WAMI Program, 33 South Last Chance Gulch, Helena, Montana 59601. Please note that these certifying offices do not have access to the AMCAS application. Candidates must supply data on residency directly to the certifying offices. Medical Scientist Training Program (M.D.-Ph.D. Program)

A limited number of highly qualified candidates wishing to pursue both the M.D. and Ph.D. degrees have been considered annually. The program is designed particularly for those students who plan a career in academic medicine with a strong interest in research. Upon completion of training in the program, which normally lasts six years, medical scientist trainees are expected to engage in biomedical research or teaching for a period equal to the period of support.

Medical scientist trainees must be accepted by the medical school for the M.D. degree and by a department of the Graduate School for the Ph.D. degree. They 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 science exposure. Among participating graduate departments and interdepartmental disciplines are Biochemistry, Bioengineering, Biological Structure, Biomathematics, Biostatistics, Epidemiology, Genetics, Microbiology and Immunology, Pathobiology, Pathology, Pharmacology, Physiology and Biophysics, and Physiology-Psychology.

Applicants should correspond directly with the University of Washington Director of the Medical Scientist Training Program; C413 Health Sciences, SM-30; Seattle, Washington 98195, as well as proceeding with regular School of Medicine application indicating clearly on the personal comments section of the AMCAS application or by letter to the School of Medicine Admissions Committee that the applicant wishes to be considered a candidate for the M.D.-Ph.D. program.

Selection Factors

Candidates are considered comparatively on the basis of academic performance, medical aptitude, motivation, maturity, and demonstrated humanitarian qualities. Extenuating background circumstances are considered as they relate to these selection factors.

The School of Medicine does not discriminate on the basis of race, creed, national origin, sex, or age. The School of Medicine is an integral part of a university with strong institutional commitments toward the end of providing higher education to qualified applicants from all backgrounds.

Transfer Students

Washington State residents who are attending two-year medical schools in the United States, foreign medical schools, or United States medical schools are eligible to apply for transfer for clinical training into the third-year class only. Students interested in transferring from other medical schools should direct their inquiries to the admissions office of the School of Medicine for the latest information.

Medical School Admission Requirements, United States and Canada

This annual publication of the Association of American Medical Colleges includes not only a statement on each United States and Canadian medical school, but also information dealing with a variety of subjects with which all individuals considering medical school application should become familiar. It is recommended that all applicants refer to it and, if possible, obtain a personal copy. Premedical advisers should have a copy of the current edition of this publication. It is available, at a nominal charge, from: Association of American Medical Colleges; 1 Dupont Circle Northwest, Suite 200; Washington, D.C. 20036. Attention: Membership and Subscriptions.

Frequently requested addresses and telephone numbers: University of Washington; Office of Residence Classification; 320 Schmitz, PC-30; 1400 Northeast Campus Parkway; Seattle, Washington 98195; telephone: (206) 543-4188.

University of Washington; Premedical Advisory Service; B10 Padelford, GN-10; Seattle, Washington 98195; telephone: (206) 543-2550.

University of Washington; Medical Scientist Training Program; C413 Health Sciences, SM-30; Seattle, Washington 98195; telephone (206) 543-7902.

University of Washington; School of Medicine; Committee on Admissions; Office of the Dean, SC-64; Seattle, Washington 98195; telephone (206) 543-7212.

Financial Information

Fees and Other Charges

All fees and extra service charges are payable in United States 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 presently is \$343 per quarter. Nonresident tuition presently is \$1,253 per quarter. The average annual cost for books, supplies, equipment, and examination fees for medical students is \$600.

Financial Assistance

All financial aid is based on the demonstrated need of the student. All applicants for aid from the school must submit data for an analysis of need by the College Scholarship Service. This requires a full disclosure of resources available to the student from individual and family sources. The National Direct Student Loan Program, the Washington Guaranteed Student Loan Program, the Health Education Assistance Loan Program, and the Health Professions Student Loan Program are the primary sources of aid.

Financial aid information is distributed to all accepted applicants. Application forms for financial aid may be obtained from the Office of Student Financial Aid, School of Medicine. In case of emergency or special need, an application for financial assistance may be made at any time.

Outside employment is discouraged, and a number of grants and loans are awarded with the stipulation that the student not engage in remunerative employment without consent of the Financial Aid Committee.

Research and Training Grants

Each year, grants from various public and private sources are received by individual faculty members and by the School of Medicine to support medical research and training in teaching and research. Training programs, supported largely by the National Institutes of Health, provide training in teaching and research to individuals at the undergraduate, graduate, and postdoctoral levels. The programs have limited availability to undergraduate students.

Traineeships

A traineeship is an academic award of honor based upon scholastic achievement, designed to aid and encourage the student in studies or research. In cases in which the trainee collaborates with a faculty member, the trainee is expected to take the lead as principal investigator. The trainee is allowed freedom of publication of the project's results as a condition of the grant. The trainee is expected to devote full time and energy to the project and may not be otherwise gainfully employed during the period of traineeship. Ordinarily, the traineeships cover the three months of a free quarter, often the summer.

Assistantships

A number of positions with individual faculty members are usually available to medical students during the summer months. Most of these positions involve laboratory work on research projects.

Student Evaluation and Promotion

Receipt of the Doctor of Medicine degree is contingent upon the satisfactory completion of academic and noncognitive or samaritan requirements. The latter includes the acguisition of behavior patterns and attitudes consistent with the oath that all physicians take at the time of graduation. As such, student evaluation is based upon the faculty's observations of the student's behavior and conduct, as well as upon written papers and examinations. Periodic review of student progress is made by a faculty committee, and students are informed of their deficiencies and the remedial requirements 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 committees of the school, and/or fails to develop attitudes and behavior patterns appropriate to a career in medicine. Opportunities to make-up unsatisfactory work are allowed at the discretion of the Dean, the executive committee of the School of Medicine, or the academic



affairs committee of the School of Medicine. Once the dismissal has occurred, readmission requires the approval of the academic affairs committee. Readmission after dismissal will not be considered unless there is substantial evidence that the problems causing dismissal have been resolved. All students are required to pass Parts I and II of the National Board Examinations and University of Washington examinations, including year-end comprehensive examinations, before receiving the Doctor of Medicine degree.

Honors

A charter as Alpha of Washington was granted to the School of Medicine in 1950 by Alpha Omega Alpha, the honorary medical fraternity. Members are elected by the membership of Alpha Omega Alpha on the basis of high scholarship and good moral character.

Medical Thesis Program

The medical thesis program of the School of Medicine is voluntary, and participation is initiated by the student. Often a student will become especially interested in some particular field in medicine. This interest will create a desire to learn more about the field or to do special work in it. The thesis program is a means of fulfilling that desire. A prize may be awarded for the best thesis submitted each year, and certain departments have available prizes for the best thesis written under that department's supervision. The preparation of a satisfactory thesis may carry with it honors in the department. Additional information concerning the thesis program can be obtained from the chairperson of the Medical Thesis Committee or from the Office of the Dean.

Graduation With Honor

A degree of Doctor of Medicine with honor may be awarded to students with high achievement who, in addition, have demonstrated initiative and success in clinical and scholarly pursuits related to medicine. Evidence of such scholarly achievement may be represented by a thesis of acceptable quality, by a paper accepted for publication in a recognized scientific journal, or by a scholarly analysis of a clinical subject comparable to review papers and case reports.

Academic Programs

Doctor of Medicine Degree

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 basic and pathway curriculum; (3) have fulfilled all special requirements; and (4) have discharged all indebtedness to the University.

Bachelor of Science Degree

Programs leading to a baccalaureate degree with a major in microbiology are offered through the College of Arts and Sciences. The programs are described in the College of Arts and Sciences section of this catalog.

Bachelor of Science in Medical Technology Degree

The medical technology curriculum is designed to train young men and women to be professional employees in hospital, clinic, public health, and medical research laboratories. The prescribed preparatory program consists of two years of University study in which an emphasis is placed upon courses in chemistry and biology. This is followed by a two-year period of full-time instruction and training in medical technology. Information concerning the curriculum and admission to the program in medical technology appears under Laboratory Medicine in this catalog.

Bachelor of Science in Physical Therapy Degree

A curriculum in physical therapy is offered by the Department of Rehabilitation Medicine in the School of Medicine. It provides professional training in the basic sciences and in the clinical use of accepted physical therapy modalities and procedures. Information concerning admission to physical therapy appears under Rehabilitation Medicine in this catalog.

Bachelor of Science in Occupational Therapy Degree

A curriculum in occupational therapy is offered by the Department of Rehabilitation Medicine in the School of Medicine. It provides professional training in the basic sciences and in the clinical use of occupational therapy. Information concerning admission to occupational therapy appears under Rehabilitation Medicine in this catalog.

Bachelor of Science Degree

A curriculum in prosthetics and orthotics leading to the degree of Bachelor of Science is offered by the Department of Rehabilitation Medicine in the School of Medicine. It 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 appears under Rehabilitation Medicine in this catalog.

Master of Science and Doctor of Philosophy Degrees

Work leading to master's and doctoral degrees is offered, in accordance with the requirements of the Graduate School, in the departments of Biochemistry, Biological Structure, Microbiology and Immunology, Pathology, Pharmacology, and Physiology and Biophysics. Master's degree programs are offered by the departments of Biomedical History, Rehabilitation Medicine, and Laboratory Medicine.

Students who work toward these degrees concurrently with the M.D. degree pursue the Medical Scientist Pathway.

In order to expedite the training of physicians who wish to specialize in public health or community medicine, the school has made available a program that leads simultaneously to the degrees of Doctor of Medicine and Master of Public Health. The program requires the addition of a fifth year to the medical education process. The quarters of the fifth year may be taken sequentially or interspersed with medical training in a variable pattern, subject to appropriate academic approval. Students may pursue either the Clinical Specialist Pathway or the Family Physician Pathway. Students can elect concentration in any of four departments of the School of Public Health and Community Medicine: Biostatistics, Environmental Health, Epidemiology, or Health Services.

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. Specific requirements for admission to work for advanced degrees appear in the Graduate School section of this catalog.

Medical Accreditation and Licensure

The University of Washington School of Medicine is a fully accredited institution, having received approval from the Liaison Committee on Medical Education representing the Association of American Medical Colleges and the American Medical Association.

Admission to the practice of medicine in any state is conditional upon meeting the requirements of that state's board of examiners. Admission to practice in the state of Washington is dependent upon the candidate's having an M.D. degree, completing internship, and passing the basic science and licensing examinations. Completion of the basic science requirements may be arranged through reciprocity with the National Board of Medical Examinations and with certain specified states.

Additional information about licensure requirements may be obtained from the Washington State Division of Professional Licensing, Post Office Box 649, Dept. 71175, Olympia, Washington 98504.

Postgraduate Medical Education

Internships and Residencies

First-year postgraduate clinical training programs are available at University affiliated hospitals: University Hospital, Harborview Medical Center, Veterans Administration Hospital, United States Public Health Service Hospital, Children's Orthopedic Hospital and Medical Center, Providence Hospital, Swedish Hospital, and Group Health Cooperative of Puget Sound. All clinical departments participate in the training program for first-year trainees in one or more of these institutions. First-year training programs are available in the clinical fields of anesthesiology, family medicine, general surgery, laboratory medicine, medicine, neurology, neurological surgery, obstetrics and gynecology, ophthalmology, orthopaedic surgery, pathology, pediatrics, psychiatry and behavioral sciences, radiation therapy, radiology, rehabilitation medicine, and urology. The residency programs vary in duration from three to five years and are integrated, providing for rotation through several of the University-affiliated hospitals during this period of training.

Postdoctoral Fellowships and Traineeships

Postdoctoral fellowships and traineeships are available in all departments. They are designed to provide additional research and teaching experience for the advanced students who already have obtained their Ph.D. or M.D. degree.

CONTINUING MEDICAL EDUCATION

Director

John N. Lein (206) 543-1050

The Division of Continuing Medical Education offers a variety of programs for physicians and health professionals at the School of Medicine and in Pacific Northwest and Alaska communities.

Programs at the School of Medicine include short courses and conferences, year-long review courses, workshops, visiting professorships, preceptorships, and teleconferences. Programs in the communities include an annual circuit course, which visits twenty-three communities throughout Washington, Alaska, Montana, and Idaho, and guest lecturers and programs as requested by communities throughout the region.

All physicians are invited to participate in continuing medical education programs and in the regular hospital rounds and conferences scheduled at the University Hospital or its affiliated hospital clinics.

All programs sponsored by the Division of Continuing Medical Education are applicable to physician relicensure requirements of the Washington Board of Medical Examiners, Category I of the Physician's Recognition Award of the American Medical Association, and the Liaison Committee for Continuing Medical Education. Prescribed credit from the American Academy of Family Practice is requested for all applicable programs.

A quarterly catalog is published, and descriptive brochures for short courses and conferences are published eight to ten weeks in advance of each program. Information concerning Continuing Medical Education programs may be obtained from: University of Washington; School of Medicine; Division of Continuing Medical Education; E303 Health Sciences Building, SC-50; Seattle, Washington 98195; telephone: (206) 543-1050. Information concerning hospital rounds should be requested from the various responsible departments.

SCHOOL OF MEDICINE



ANESTHESIOLOGY

BB1459 Health Sciences

Faculty

Thomas F. Hornbein, Chairperson; Amory, Barsa, Bashein, Batra, Benedetti, Bonica, Buckley, Buffington, Butler, Charlton, Cheney, Colley, Eng, Fink, Fruend, Hargrove, W. Kennedy, Lamb, Lillie, Murphy, Orr, E. Pavlin, J. Pavlin, Ralston, Ready, Sivarajan, Tyler, Ward.

The Department of Anesthesiology has responsibilities for the teaching of medical students during their years of undergraduate training. During the second year, faculty who also have joint appointments in physiology and pharmacology participate in the teaching of students in these areas. During the clinical years, students are taught basic principles of anesthesiology, including artificial respiration and resuscitation through clinical clerkships. In addition, the department has an active training program for interns and residents in anesthesiology and affords experience in anesthesiology to dental interns and residents in surgery and obstetrics.

ANIMAL MEDICINE

T142 Health Sciences

Faculty

G. L. Van Hoosier, Jr., Chairperson; Cotton, Dennis, Di-Giacomo, Miller, Rausch, Wardrop.

Animal Medicine provides education and research opportunities in laboratory animal and comparative medicine, in cooperation with other campus units and the College of Veterinary Medicine at Washington State University. Current educational programs include scheduled courses in principles and techniques of animal experimentation, wildlife diseases, and zoonotic disease; predoctoral and postdoctoral training in laboratory animal and special animal medicine for veterinary students; M.S. and Ph.D. degree programs in relevant areas of veterinary science. Areas of current research include bacteriological and viral diseases of laboratory animals, parasitic diseases, and animal models of human disease conditions.

BIOCHEMISTRY

J405 Health Sciences

Faculty

Earl W. Davie, Chairperson; Agabian, Bornstein, Davie, Fischer, Gordon, Hauschka, Herriott, Jensen, Morris, Neurath, Palmiter, Parson, Shapiro, Teller, Wade, Walsh, Young. Biochemistry is the branch of the biological sciences in which the chemistry of life processes is studied.

Academic Programs

There is no curriculum that leads to an undergraduate degree in biochemistry, but students who seek a Bachelor of Science degree in the field of biology (molecular and cell) enroll in biochemistry courses. The department offers the Doctor of Philosophy degree program in biochemistry.

Admission Requirements

An undergraduate degree in chemistry, physics, or biology. Overall grade-point average of 3.00 or higher, or equivalent, in the following required courses: calculus, general biology, general physics, organic chemistry, physical chemistry. Deficiencies may be remedied during the first year of graduate study. Graduate School requirements, which appear in the Graduate School section of this catalog, should be consulted.

Graduation Requirements

In exceptional circumstances, students not continuing in the Doctor of Philosophy degree program are able to receive a Master of Science degree by completing a minimum of 36 quarter credits. One-half are in courses numbered 500 or above with a minimum of 9 thesis credits. Nonresearch course credits must be completed within the first year.

Doctor of Philosophy Degree: A minimum of three academic years of study; dissertation; teaching experience as a teaching assistant or predoctoral teaching associate. An adviser may be consulted for additional information. See Graduate School requirements, which appear in the Graduate School section of this catalog.

BIOENGINEERING

Harris Hydraulics Laboratory

328 Aerospace Engineering and Research Laboratory

Faculty

Lee L. Huntsman, Acting Director; Allan S. Hoffman, Thomas E. Hutchinson, Assistant Directors; Baker, Bassingthwaighte, Carter, Foster, Halbert, Holloway, Horbett, Huntsman, Johnson, Lee, MacKenzie, Pearlman, Pollack, Ratner, Rushner, Spelman, Verdugo.

Adjunct Faculty

Auth, Bruckner, Forster, Guy, Martin, Warren.

Affiliate Faculty

`Tam.

The Center for Bioengineering provides a multidisciplinary program of collaborative research' and training designed to accelerate the application of new engineering technologies to clinical practice and research. Major areas of current research involvement include bioinstrumentation, biomaterials, biomathematics, biomechanics, computer applications, fertility studies, health-care delivery systems, laser application, microanalysis of subcellular structures, microcirculatory transport, muscle, orthopaedic engineering, and ultrasonic instrumentation.

Faculty and students in the health sciences may engage in studies of mutual interest with faculty and students in the College of Engineering. Programs offered in the College of Engineering can lead to the interdepartmental undergraduate B.S.E. and graduate M.S.E. degrees, and in both the College of Engineering and the School of Medicine a special individual Ph.D. program can be formulated. Information on bioengineering also appears in the Interschool or Intercollege Programs section of this catalog.

BIOLOGICAL STRUCTURE

G511 Health Sciences

Faculty

E. M. Eddy, Acting Chairperson, Adman, Baskin, Bolender, Blandau, Broderson, Gaddum-Rosse, Gehrig, Graney, Hampton, Holbrook, Jensen, Kashiwa, Klimpel, Koehler, Landau, Lasher, Luft, Merchant, Nameroff, Odland, Prothero, Roosen-Runge, Rosse, Stebbins, Sundsten, Szubinska-Luft, Tamarin, Watenpaugh, Westrum. James K. Koehler, graduate program adviser.

In the Department of Biological Structure, courses are offered that comprise all levels of structural organization of the body, from the molecular to the gross.

The traditional major fields of anatomy are represented in the department: gross anatomy and neuroanatomy, growth and development, cell biology and histology.

In addition to courses for students in medicine, dentistry, dental hygiene, nursing, physical therapy, and occupational therapy, a graduate program is offered to provide the background necessary for pursuing a professional career in a variety of fields relating to the morphological sciences (e.g., neuroanatomy and cell biology). Students who intend to work toward the degrees of Master of Science or Doctor of Philosophy must meet the requirements of the Graduate School as outlined in the Graduate School section of this catalog.

Continuous Course

Gross Anatomical Dissection: Physicians who desire additional individual experience in the dissection of the entire cadaver or parts thereof may make arrangements through the Division of Continuing Medical Education and the Department of Biological Structure. Laboratory space and anatomical material may be provided, without staff participation. The fees are proportionate to the amount of gross material supplied.

BIOMEDICAL HISTORY

A204 Health Sciences

Faculty

Charles W. Bodemer, Chairperson; Dworkin, Gottdenker, McCormick, Odegaard, Whorton. James C. Whorton, graduate program adviser.

The history of medicine and biology represents an integral part of the history of Western civilization. Study of the history of biomedical sciences provides simultaneously a greater understanding of their relation to the social, economic, philosophic, and religious factors influencing, and influenced by, them at different times and places during their development. The biomedical sciences lend another dimension to history valuable to the scientist and nonscientist alike, and the associated legal and ethical issues are of critical importance.

Master of Arts Degree

The Department of Biomedical History offers a program of studies leading to the Master of Arts degree. Specific requirements for this degree may be obtained by contacting the department.

The department's courses and research sponsorship in the history of medicine and biology and biomedical ethics, and medicolegal affairs, are available to undergraduates, medical students, graduate students, and postdoctoral fellows. Approximately fifteen hundred rare books relevant to the development of the modern medical sciences provide a valuable adjunct to the teaching program.

FAMILY MEDICINE

C408 Health Sciences

Faculty

J. P. Geyman, Chairperson; Beck, Berg, Bergman, Coggan, Deisher, English, Gordon, Leversee, Lincoln, T. J. Phillips, W. R. Phillips, Rosenblatt, Schneeweiss, Smilkstein, Smith, Taylor, Williamson.

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, elective courses open to all



medical students, and responsibility for developing and administering the Family Physician Pathway curriculum. A graduate residency program in family practice provides training consistent with the standards of the American Board of Family Practice, the American Academy of Family Physicians, and the Council on Medical Education of the American Medical Association. Active teaching affiliations are maintained throughout the WAMI region at both undergraduate and graduate levels. A clinical clerkship is offered in eight community practices in the WAMI states, and a residency-based clerkship is offered within a network of nine affiliated family medicine residency programs.

LABORATORY MEDICINE

AA210 University Hospital

Faculty

Paul E. Strandjord, Chairperson; Behrens, Benjamin, Chatrian, Clausen, Clayson, Corey, Coyle, Delaney, Dennis, Detter, Fine, Gavin, Gilliland, Hamernyik, Hamlin, Hutchinson, Kadin, Kaplan, Kenny, Labbe, Larson, Le-Crone, Lettich, McGonagle, Opheim, Peterson, Petra, Pierce, Plorde, Raisys, Schiller, Schmer, Schoenknecht, Smith, Szabo, Tompkins, Wilkus.

The Department of Laboratory Medicine includes divisions of clinical chemistry, hematology, microbiology, coagulation, immunology, genetics, virology, computer technology, and electroencephalography and neurophysiology. In addition to courses for medical students, the department offers a curriculum leading to the Bachelor of Science in Medical Technology degree.

Bachelor of Science in Medical Technology Degree

The medical technology program is a four-year college program, supervised by the College of Arts and Sciences in the freshman and sophomore years (preprofessional, 90 credits) and by the Department of Laboratory Medicine in the junior and senior years (professional, 105 credits).

Admission Requirements: The professional curriculum consists of seven consecutive quarters of study that must be taken at the School of Medicine. Prerequisite requirements may be satisfied at the University or at other accredited colleges and universities. Completion of 90 quarter credits, or achievement of junior standing, must be attained and must include the following preprofessional courses: one year of general chemistry, quantitative analysis, 12 credits of organic chemistry, college algebra, and 15 credits of biological science. Admission to the professional program is competitive and requires submission of an application to the Department of Laboratory Medicine by April 15 of the year the applicant plans to enroll. The Allied Health Professions Admission Test is required, and the scores from the test must be available by the April 15 deadline for application to the program. A grade-point average of 2.00, both cumulative and in required courses, is necessary for admission consideration.

Graduation Requirements: MICRO 441, 442, 443, 444; PATH 410; BIOC 405, 406, 426; LAB M 321, 322, 418, 419, 420, 421, 422, 423, 424, 425, 426, and 427. A 2.00 grade-point average in the required courses, as well as an overall cumulative average of 2.00, is necessary for graduation. The medical technology curriculum is accredited by the Committee on Allied Health Education and Accreditation. Graduates are eligible and are encouraged to take an appropriate examination to become certified medical technologists.

Master of Science in Laboratory Medicine Degree

Admission Requirements: The Master of Science degree program is designed for students who have earned undergraduate degrees from accredited colleges in medical technology, microbiology, chemistry, or related fields and have received a minimum of 3.00 grade-point average in the junior and senior years. The applicant must also be certified as a medical technologist or as a specialist in a particular field of medical technology by one of the national or governmental certifying bodies and should have taken the verbal and quantitative parts of the Graduate Record Examination. Three letters of recommendation and a two-tothree-hundred-word statement of the applicant's educational and professional objectives should be sent to the graduate program adviser. Admission to the program is competitive, because the University enrollment is limited; the most highly qualified applicants are selected for admission by a departmental admissions committee.

The master's degree program requires two years of study for most students. Much of the first year is taken up with core courses relevant to the laboratory medicine specialty, including courses in statistics and management. Courses in education are recommended for those contemplating a career in teaching. Much of the second year is occupied by seminar courses and work on a thesis.

Students interested in applying for admission should write to the graduate program adviser, Department of Laboratory Medicine, SB-10, for more detailed information.

Graduation Requirements: At least 36 approved credits with 18 in courses at the 500 level or above; 18 in courses at the 400 level or above (or at the 300 level in outside departments) taken for numerical grade; 9 credits in thesis research for a thesis that is acceptable to the department. There is no foreign-language requirement.

MEDICINE

RR512 University Hospital

Faculty

Seymour J. Klebanoff, Acting Chairperson; Aagaard,

Adamson, Ahmad, Albers, Albert, Altman, D. Appelbaum, F. Appelbaum, Arend, Atkinson, Banaji, Baylink, Beasley, Beeson, Belcher, Belknap, Bensinger, Bierman, Bird, Blackmon, Blagg, Blair, Bleyer, Bornstein, Bremner, Brice, Bruce, Brunzell, Bryant, Buchanan, Buckner, Burnell, Burstein, Butler, Byers, Caldwell, Camerman, Carmerman, Chait, Chase, Cheever, C. Chen, M. Chen, Chesnut, Cheung, A. Clark, H. Clark, Clift, Cobb, Cole, Collins, Cook, Copass, Corey, G. Counts, R. Counts, Crill, Critchlow, Cullen, Culver, Cummins, Curtis, Cutler, Cowan, Dale, Davidson, Deeg, deHaen, Dennis, Dodge, Dohner, Doney, Dorsa, Eiriksson, Eisenberg, Eisenman, Eliel, Emlen, Ensinck, F. Evans, J. Evans, Falkow, Farquhar, Farrell, Farrow, Farwell, Featherstone, Fefer, Fialkow, Figley, Fihn, Finch, Fleet, Franz, Fretwell, Fritz, Fujimoto, C. Furlong, F. Furlong, Gartler, Giblett, Gilbert, Gilliland, Glomset, Gloster, Goodell, Goodner, Gotshall, Gould, B. Green, W. Green, Greenberg, Greene, Griep, Grootes-Reuvencamp, Gruber, Haakenstad, Habernicht, Hall, Halter, Hamilton, Hammarsten, Hammermeister, Hammond, Handsfield, Hansen, Harder, Harker, Harlan, Harmon, Harris, Hazzard, J. Heller, T. Heller, M. Henderson, W. Henderson, Hildebrandt, Hillman, Hirschmann, Hlastala, Holbrook, Hollander, Holmes, Hook, Hossack, Howard, Hudson, Huebers, Huseby, Inui, Ivey, Jiminez, Johnson, Jong, Jorg, Kaplan, J. Kennedy, M. Kennedy, King, B. Kirby, W. Kirby, Klebanoff, Knapp, Knopp, Koe, Koerker, Koespell, Kraning, Kudchodkar, Kushwaha, Kusumi, Lakshminarayan, E. Larson, S. Larson, Lee, Leonard, Ley, Lindner, Ling, Linial, Lipsky, Little, Liu, LoGerfo, Mannik, Marini, Martin, Mastropaolo, Mathews, McArthur, McDonald, McGuffin, McRae, Metz, Meyers, Michelson, Miller, Milner, Milstein, Monsen, Motulsky, Moy, Najfeld, Nardella, Neiman, Nelp, Nilson, Nute, Odland, Ogilvie, Olerud, Omenn, Oram, Overman, Pachl, Palmer, Paquette, Parrish, Paulsen, A. Pearlman, R. Pearlman, Pecoraro, Pehlke, Perkins, Peterson, Pfeifer, Pierson, Pippard, Plorde, Polin, Pollock, Pope, Porte, Preston, Price, Pro, Protell, Putsch, Puzas, Rattazzi, Razevska, Rearick, Reddy, Richmond, Ritchie, Robb, H. T. Robertson, R. P. Robertson, Rockey, Rogers, Rosen, Rowell, Rubin, Rudd, Saunders, Sawyer, Sayers, Schibli, Schoene, Schuffler, K. Schwartz, R. Schwartz, Schwindt, Scribner, Shanahan, Shannon, M. Shaw, W. Shaw, Shen, Sherrard, Silverstein, Simkin, Singer, Siscovick, Slichter, A. Smith, H. W. Smith, Sobolewski, Sparkman, Spence, Springmeyer, Stahl, G. Stamatoyannoupoulos, T. Stamatoyannoupoulos, Stamm, Starkebaum. O. Stein, Y. Stein, Steinberg, Stevens, D. Stewart, J. Stewart. P. Stewart, Storb, Strand, Subbaiah, K. Sullivan, M. Sullivan, Sumi, Surawicz, Swanson, Syrotuck, Taborsky, Tenckhoff, Tennican, Thomas, Thompson, Tigelaar, Tompkins, Torok-Storb, Trobaugh, Tsoi, Turck, Tyler, VanArsdel, Van Citters, Vestal, Volwiler, Wallace, Warnick, Warren, D. Weaver, J. Weaver, Weiden, Werner, Whitten, Wilensky, Wilkus, Williams, Willson, Wisner, Witherspoon, F. Wood, R. Wood, Woods, Wright, Young.

Active programs in teaching, research, and patient care are

carried on at the University Hospital, Veterans Administration Hospital, Harborview Medical Center, United States Public Health Service Hospital, and the Fred Hutchinson Cancer Research Center. Major affiliations for clinical teaching also exist with Providence Hospital and Swedish Hospital. There are many additional affiliations with community hospitals in Seattle, the state of Washington, and the WAMI region. Medical students, interns, medical residents, and postdoctoral research fellows rotate through these various hospitals and participate in the learning experiences offered at each.

MICROBIOLOGY AND IMMUNOLOGY

G305 Health Sciences

Faculty

John C. Sherris, Chairperson; Barnes, Bicknell, Champoux, Clagett, Corey, Coyle, Cramer, Crosa, Douglas, Evans, Falkow, Gilliland, Groman, Hakomori, I. Hellstrom, K. E. Hellstrom, Henney, Holmes, Kenny, Kiehn, Klebanoff, Lara, Laxson, Linial, Mannik, Memmer, Minshew, Nester, Newman, Nowinski, O'Connor, Parkhurst, Plorde, S. Pollack, Rohrschneider, Schoenknecht, Staley, Stanton, U. Storb, Tompkins, H. Whiteley, Wright. E. Nester, graduate program adviser.

The Department of Microbiology and Immunology is concerned with two branches of natural science. Microbiology deals with microscopic organisms, including bacteria, viruses, fungi, protozoa, and algae, and is concerned with the nature and properties of these organisms and their effects on man and the environment. Immunology deals with specific and nonspecific resistance to tissue injury by foreign or autochthonous substances. The mechanisms of resistance involve primarily the activities of leukocytes and antibodies, including those involved with the specific immune response.

Undergraduate Programs

In addition to courses for health sciences professionals, the Department of Microbiology and Immunology offers programs in microbiology that lead to a baccalaureate degree in the College of Arts and Sciences (see College of Arts and Sciences section of this catalog).

Graduate Programs

Master of Science Degree

Admission Requirements: Students interested in applying for admission should write the Department of Microbiology and Immunology for current, more detailed information. A minimum of a 3.00 grade-point average in the junior and senior years and approval by the faculty of microbiology and immunology. An undergraduate major in microbiology or immunology is not required. For the nonthesis medical microbiology option, two years of acceptable work experience in a medical or public health laboratory are required.


Verbal and quantitative parts of the Graduate Record Examination must be taken by applicants. An advanced Graduate Record Examination in either biology or chemistry is useful but not required. Three letters of recommendation are required, as is a two-to-three-hundred-word statement of the applicant's educational and professional objectives.

Graduation Requirements: With Thesis—Includes course work and preparation of a thesis based on laboratory research. Without Thesis—Includes course work and an individually supervised laboratory project resulting in a report. There is no foreign-language requirement.

Doctor of Philosophy Degree

Admission Requirements: Same as for Master of Science degree.

Graduation Requirements: Microbiology option—One course in three areas must be taken from among the general areas of virology, microbial physiology, advanced general microbiology, and immunology. For the first year, the research experience of students normally consists of research in three different laboratories, one per quarter. Laboratory courses in immunology and electron microscopy may substitute for one quarter of this experience. Research. Laboratory teaching experience. General Examination, dissertation, and Final Examination. There is no foreign-language requirement. Immunology option—Same as microbiology option, except for specific additional course requirements.

Combined Doctor of Medicine-Doctor of Philosophy Degree

This degree is offered in cooperation with the School of Medicine. Information about, and application blanks for, the Medical Scientist Training Program may be obtained by writing to: University of Washington; Office of the Dean; School of Medicine; A300 Health Sciences, SC-64; Seattle, Washington 98195.

NEUROLOGICAL SURGERY

RR744 University Hospital

Faculty

Arthur A. Ward, Jr., Chairperson; Calvin, Chatrian, De-Vito, Dikmen, Dodrill, Farwell, Fraser, Harris, Howe, Kelly, Levy, Lockard, Loeser, G. Ojemann, L. Ojemann, Schwartzkroin, Temkin, Westrum, Wilensky, Wyler.

The Department of Neurological Surgery is concerned with 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 University Hospital and Harborview Medical Center, including the Epilepsy Center at Harborview. The department also has several course offerings correlating research and clinical problems of the nervous system, including the neuroscience research seminar, 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 Hospital and at the Epilepsy Center at Harborview. Investigations are under way at these institutions in many areas of neurophysiology, in behavioral research in man and primates, and in light and electron microscopic examination of the anatomy of the nervous system. Particular research interests encompass the basic aspects of animal models of such disease processes as epilepsy, including confirmation from human material, and the mechanisms and pathways of pain.

In addition to the undergraduate instruction, a fully certified residency program in neurological surgery is available for selected postgraduate physicians. The six-year program emphasizes preparation for a career in academic neurosurgery.

OBSTETRICS AND GYNECOLOGY

BB607 Health Sciences

Faculty

Morton A. Stenchever, Chairperson; Benedetti, Bremner, Briggs, Brown, J. Conrad, S. Conrad, DeJong, Eschenbach, Figge, Gellert, Guzinski, Irby, Karp, Lein, LoBue, Luthy, Moore, Peterson, Petra, Prince, Shy, Smith, Spadoni, Steiner, Tamimi, Vontver.

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.

OPHTHALMOLOGY

RR801 University Hospital

Faculty

Robert E. Kalina, Chairperson; Bensinger, Bunt, Chin, Hendrickson, Kinyoun, Rodieck, Saari, Sarthy.

The Department of Ophthalmology is responsible for the instructional and research programs in diseases of the eye and its adnexae as well as the visual system.

Medical student instruction is provided at all levels, including multiple electives in the clinical years. Graduate physicians are provided with three or four years of residency training at the affiliated hospitals. Patient care is provided under the supervision of full- and part-time faculty physicians at University Hospital, Harborview Medical Center, United States Public Health Service Hospital, Veterans Administration Hospital, and Children's Orthopedic Hospital and Medical Center.

Clinical research programs relate to blinding eye diseases. Laboratory research encompasses neurophysiology of vision, morphology of the retina and visual system, and biochemistry of ocular tissues. Postdoctoral training is offered in all these disciplines, and predoctoral training is offered in morphology.

ORTHOPAEDICS

BB1043 University Hospital

Faculty .

Victor H. Frankel, Chairperson; Bach, Bramwell, Greenlee, Hansen, Henderson, Hunter, King, Lippert, Matsen, Spengler, Staheli, Wyss.

In addition to providing instruction for medical students, the Department of Orthopaedics participates in the teaching program of students in the School of Nursing, the School of Dentistry, and the Department of Rehabilitation Medicine. A fully approved residency with opportunities to carry out fundamental research is offered. 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. Sports Medicine is a division of the Department of Orthopaedics.

OTOLARYNGOLOGY

BB1165 University Hospital

Faculty

Charles W. Cummings, Chairperson; Clopton, Dobie. Donaldson, Duckert, Lonsbury-Martin, Martin, Miller, Pfingst, Rees, Snyder, Sutton, Weymuller, Yue.

The Department of Otolaryngology undertakes the teaching of the principles and the practical aspects of the diagnosis and treatment of diseases of the ear, nose, throat, and larynx to first-, second-, third-, and fourth-year medical students. The department assumes responsibility for the organization and supervision of a residency training program and provides consultation and instruction to interns and members of the residency training program at the University.

PATHOLOGY

C506 Health Sciences

Faculty

Earl P. Benditt, Chairperson; Alvord, Barker, Beckwith, Beegle, Benjamin, Byers, Camacho, Chen, Ek, Giddens, Hellström, Huang, Kadin, Lee, Loeb, Martin, Mottet, Mishimura, Norris, Norwood, Page, Reay, Reichenback, Ross, Sale, Schwartz, Shaw, Shulman, Spence, Striker, Sumi, Thorning, Van Hoosier, Vracko, Wright, Wolf. Stephen Schwartz, graduate program adviser.

Pathology is both a basic biological science and a specialty of medicine. As a basic science, it deals with the natural history and mechanisms of initiation and expression of disease processes. In its broadest sense, the study of disease encompasses the entire animal and plant kingdoms. The interests of the department focus on diseases of vertebrates, especially of man. The principal aim of the pathologist is to understand disease manifestations and processes in whatever terms are required. Therefore, the techniques of the pathologist range from those of the physicist and physical chemist through those of the physiologist to the realm of the epidemiologist. Present emphasis in the department is on cellular and molecular pathology, environmental pathology, analysis of disease by light and electron microscopy, histochemistry and cytochemistry, analytical biochemistry, cell and organ culture, and immunology.

Courses are offered for undergraduate students, as well as for medical students, dental students, students of medical technology, and other allied health sciences professions. A program leading to a Doctor of Philosophy degree in the field of experimental pathology is offered for both predoctoral students and those with degrees in medicine, dentistry, or veterinary medicine.

Central teaching and research facilities are located in the Health Sciences Center and University Hospital. Closely associated are the personnel and facilities of Harborview Medical Center, Veterans Administration Hospital, United States Public Health Service Hospital, Children's Orthopedic Hospital and Medical Center, and Swedish Hospital.

Research programs in the department include studies of the basic pathological process involved in arteriosclerosis, cancer, and inflammation (including allergic diseases), congenital defects, and of the injurious effects of various drugs, toxins, foods, and other things derived from the environment. Diseases of certain systems, including organs such as the brain, heart, blood vessels, kidneys, lungs, liver, and skin, are studied with appropriate specialists in these areas. The approach to the study of these basic disease entities and specific systemic diseases utilizes the concepts and techniques of modern biological and physical disease. The combination of modern morphologic techniques with chemical and functional studies is emphasized throughout.



Graduate Programs

Master of Science and Doctor of Philosophy Degrees

Programs in the field of experimental pathology that lead to the Master of Science or Doctor of Philosophy degrees are offered through the Graduate School. Graduates of the program are qualified for research and academic appointments in medical, dental, or veterinary schools, as well as in experimental pathology in government laboratories and private industry.

Postdoctoral Programs

Postdoctoral traineeships in experimental pathology include specialized programs in renal pathology, electron microscopy, immunopathology, tumor biology, genetic pathology, connective tissue and vascular disorders, inflammation, and teratology and environmental pathology, and neuropathology. Stephen Schwartz is program director.

Residency Training Program

The department supervises an internship and residency training program in anatomic pathology and, jointly with the Department of Laboratory Medicine, in clinical pathology for qualified medical doctors. Persons who complete the residency program are eligible for certification by the American Board of Pathology. Edward A. Barker is program director.

PEDIATRICS

RR314 Health Sciences

Faculty

Beverly Morgan, Chairperson; Beck, Beckwith, Benjamin, Bennett, Bergman, Bernstein, Bleyer, Blumhagen, Chen, Clarren, Cohen, Connell, Corey, Davis, Deisher, Doan, Emanuel, Fantel, Farrow, Farwell, Gladstone, Graham, Griffith, Guntheroth, Guthrie, Hall, Hayden, Hodson, Holm, Holterman, Johnson, Kawabori, Kelley, Kessler, Koup, Labbe, Lamson, Lemire, Lum, Mackler, McLaughlin, Milstein, Mirkes, Morgan, Murphy, Novack, Ochs, Okamoto, Orr, Osborne, Pagon, Pendergrass, Pious, Quan, Reichler, Rice, Robertson, Robinson, Rothenberg, Ruvalcaba, Sanders, Schaller, Scott, Sells, Shepard, Shurtlef, A. Smith, D. Smith, E. K. Smith, N. Smith, Standaert, Stevenson, Sulzbacher, Sybert, Telzrow. Truog. Tyler, Wedgwood, Wilson, Woodrum, Wragg.

Pediatrics involves the study of the physical and behavioral development of man, in health and disease, from conception to maturity.

Instruction is provided through conjoint courses, lectures, conferences, clerkships, and electives. Faculty members participate in teaching the basic curriculum and offer twenty-four electives, including PEDS 665P (Pediatric General Clerkship), which almost all medical students take. A residency program is offered with a wide variety of electives in addition to traditional hospital inpatient and clinic experience and a new primary care/general pediatric track. Postdoctoral training is available in virtually every subspecialty area of pediatrics. The major teaching hospitals are Children's Orthopedic Hospital and Medical Center, University Hospital, and Harborview Medical Center.

PHARMACOLOGY

E401 Health Sciences

Faculty

Edwin G. Krebs, Chairperson; Aagaard, Beavo, Bowden, Camerman, Catterall, Carino, Davis, Halpern, Hinds, Horita, Juchau, Loomis, McKnight, Namkung, Nathanson, Storm, Vincenzi, Watson, Mont R. Juchau, graduate program adviser.

Pharmacology is the science that deals with the nature of the interactions between drugs and the biological system, and with the application of these drugs to the treatment of disease. Courses in this field are given for medical, dental, pharmacy, nursing, and graduate students.

Graduate Programs

Master of Science and Doctor of Philosophy Degrees

Admission Requirement: A baccalaureate degree with a major in any of the sciences, such as biochemistry, chemistry, pharmacy, physics, physiology, psychology, or zoology.

Graduation Requirements: Master of Science degree— PHCOL 511, 512, and two 500-level pharmacology courses. Demonstration of competence in pharmacology and a related discipline such as biochemistry or physiology, and a thesis. A foreign language is not required. Doctor of Philosophy degree—PHCOL 511, 512, and six 500-level pharmacology courses. Passing a comprehensive examination covering general pharmacology and the allied disciplines of physiology and biochemistry. General Examination, dissertation, and Final Examination. A foreign language is not required.

PHYSIOLOGY AND BIOPHYSICS

G412 Health Sciences

Faculty

Harry D. Patton, Chairperson; Anderson, Almers, Berger, Binder, Brengelmann, Conrad, Crill, Detwiler, Feigl, Fetz, Fuchs, Gale, Gordon, Harris, Hildebrandt, Hille, Hlastala, Hornbein, Ito, Kaneko, Kehl, Kennedy, Kerrick, Koerker, Landau, Luschei, Martin, McGuire, Miller, Rowell, Scher, Schwindt, Shaw, Smith, Stahl, Steiner, Stirling, Taylor, Teller, Towe, Van Citters, Wiederhielm, Young. Thelma T. Kennedy, graduate program adviser.

Physiology deals with the processes, activities, and phenomena incidental to, and characteristic of, life and living organisms. Based upon zoology, physics, chemistry, and mathematics, physiology interlocks closely with the other basic medical sciences—biological structure, biochemistry, pharmacology, and pathology—and with psychology. 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.

Biophysics emphasizes the physical aspects of organs and control systems studied by the instruments and methods of thinking used by physicists.

Graduate Programs

Admission

The department considers applications with baccalaureate degrees in biology, zoology, psychology, chemistry, physics, or engineering, or with M.D. degrees. Applicants must meet the requirements of the Graduate School.

Programs of Study

A program of study leading to the Doctor of Physiology degree is offered. (In special instances, a program leading to the Master of Science is available, requiring five quarters of course work and a thesis.) Several specializations within the broad field of physiology are recognized, and the requirements and curricula vary somewhat for each. Areas of specialization cover the functions of cell membrane, the nervous system, the renal and gastrointestinal systems, muscle, circulation, respiration, and the endocrines. For students who desire a program equally divided between physiology and psychology, an interdisciplinary Ph.D. degree program is administered by the Physiology-Psychology Group of the Graduate School (see Interdisciplinary Graduate Degree Programs section of this catalog).

PSYCHIATRY AND BEHAVIORAL SCIENCES

BB1644 Health Sciences

Faculty

C. Eisdorfer, Chairperson; Anderson, Armstrong, Attneave, Avery, Backus, Barnes, Barr, Becker, Beiser, Beitman, Bokan, Bowden, Brinkley, Buffington, Burke, Carlin, Carr, Chaney, Chapman, Chiles, Cohen, Combs, Conner, Cox, Crnic, Croake, Dagadakis, Daggett, Darby, Dietze, Doerr, Dudley, Dunner, Dworkin, Fay, Fellner, Fiore, Gentry, Gerber, Goldenberg, Hampson, Herman, Hernandez, Holmes, Horita, Humphreys, Hunt, Hyde, James, Johnson, Kaplan, Katon, Kleinman, Kogan, Kraus, Landesman-Dwyer, Larsen, Little, Livingstone, Loebel, Maiuro, D. Martin, J. Martin, Mason, Masuda, Maxim, McCauley, Meltzoff, Mendez, Okimoto, O'Leary, Olson, Paige, Plattner, Preston, Printz, Prinz, Pro, Ragozin, Raskind, Reichert, Reichler, Reifler, Ries, Ripley, Robinson, Roszell, Rothenberg, Scher, Schwartz, Shapiro, Smith, Stauss, Stewart-Larson, Streissguth, Strother, Sulzbacher, Taylor, Townes, Trupin, Varley, Veith, Verhulst, Vitaliano, Walker, Ward, Wenet, Wilkie, Williams, Wilson, Womack, Wright.

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 holistic approach is emphasized, which incorporates intrapersonal, interpersonal, and sociocultural factors. Intrapersonal factors include emotion, perception, cognition, psychodynamics, neurochemistry, neuroanatomy, neurophysiology, and the developmental and aging processes. Interpersonal factors focus upon duadic, 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.

Undergraduate Programs

A variety of courses in the behavioral sciences and psychiatry are available to students during their undergraduate years. Included among these are psychosocial growth and development, aging and adult development, preventive methods for mental health, cross-cultural mental health, and clinical psychiatry.

Graduate Programs

The medical school curriculum is divided into a core (basic) curriculum and an elective 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, and psychopathology, as well as the development of interviewing skills and assessment techniques within the core curriculum. Its elective program includes a variety of clinical experiences and advanced didactics and seminars designed to further the knowledge and skills developed during 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.

Clinical Psychology Internship Program

A one-year clinical psychology internship approved by the American Psychological Association is offered as an interdepartmental program. This internship is open to candidates for the doctorate in clinical psychology from graduate programs approved by the American Psychological Association. Postdoctoral fellows with equivalent training who have not completed predoctoral internships can also be ac-

SCHOOL OF MEDICINE



cepted. The training entails supervised experience in psychological assessment, treatment, and clinical research within a wide variety of clinical and community settings.

Courses for Graduate Students in Allied Health Programs

In addition to the medical school curriculum and the psychology internship, a wide variety of courses are available for students in other allied health programs. Among these are included: problems and dynamics of families and small groups, behavioral medicine, community psychiatry, and clinical psychiatry.

Residency Program

The department offers a three-year psychiatric residency training program for those who have completed internships, and a four-year program, including the mini-internship, for recent recipients of the M.D. degree. Graduates of both programs are eligible for ABPN certification. Residents in the program must have the equivalent of an M.D. degree received from an accredited medical school. The program is eclectic in its philosophy, with a faculty of mental-health professionals whose expertise spans psychoanalytic through biochemical interpretations of behavior. The program prepares the resident for either the general practice of psychiatry of the pursuit of subspecialty interests. Residents interested in child psychiatry are eligible to apply for training in that subdiscipline after two years of general psychiatric training. Training fellowships in child psychiatry and community psychiatry are available.

RADIATION ONCOLOGY

NN110 University Hospital

Faculty

Thomas W. Griffin, Chairperson; Eenmaa, Groudine, Kurtz, Laramore, Rasey, Russell, Tong, Wootton.

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 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.

RADIOLOGY

RR215 University Hospital

Faculty

John W. Loop, Chairperson; Allan, Allen, Bolender, Chestnut, Chikos, Cromwell, Figley, Graham, Harley,

Hirsch, Mack, Morishima, Nelp, Phillips, Ricketts, Rohrmann, Rudd.

Diagnostic radiology is the branch of clinical medicine that applies electromagnetic and nuclear radiations to the detection of disease. In diagnostic radiology, the differential absorption of penetrating radiation is detected by fluorescent crystals (fluoroscopy) or by photographic emulsions (radiography). The majority of important diseases have some radiologic expression. The diagnostic radiologist is, in effect, a general pathologist with special methods for nondestructive internal examination.

The radiations emanating from disintegrating radioactive isotopes can be measured in quantity and energy and can be plotted spatially in living tissues as well as in samples of body fluids. Nuclear medicine is that branch of radiology that concerns itself with isotopes in organs and metabolic systems for diagnosis and treatment.

The Department of Radiology is represented by senior staff with extensive practical experience. Instruction is provided for medical students, residents, and other physicians. Certain courses are open to graduate students. The staff and its teaching and research activities are represented in each of the hospitals affiliated with the University.

REHABILITATION MEDICINE

CC814 University Hospital

Faculty

Justus F. Lehmann, Chairperson; Anderson, Andrews, Becker, Berni, Brockway, Buekelman, Carman, Chitnis, Chou, Delateur, Dikman, DeLisa, Dralle, Dundore, Fordyce, Fowler, Freal, Gordon, Guy, Hager, Halar, Hertling, Jamero, Kanny, Kessler, Klein, Kraft, Kunkel, McGee, McMillan, Moore, Okamoto, O'Shaughnessy, Peterson, Simons, Steger, Stolov, Trotter, Warren, Williamson-Kirkland, Woolf, Yorkston.

The Department of Rehabilitation Medicine provides instruction for medical students, interns, and residents 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 encounteres 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: Bachelor of Science in Occupational Therapy, Master of Occupational Therapy, Bachelor of Science in Physical Therapy, Master of Physical Therapy, Bachelor of Science in the field of prosthetics and orthotics, and a Master of Science for residents in physical medicine and rehabilitation who wish to enter the academic field.

Occupational Therapy

Head

Brenda H. Moore BB869 University Hospital

Occupational therapy is one of the vital health-care disciplines that provides service to those individuals whose abilities are impaired by developmental deficits, aging, poverty, cultural differences, physical injury or illness, or psychologic and social disability. Occupational therapy skills include evaluation and treatment of problems interfering with functional performance. Services may consist of self-care, homemaking, sensorimotor activities, fabrication and application of orthotic devices or adaptive equipment, functional therapeutic activities, and prevocational evaluation and training.

The program in occupational therapy leading to a Bachelor of Science degree awarded by the School of Medicine is approved by the American Occupational Therapy Association and the Council on Medical Education of the American Medical Association, Graduates are eligible to become registered occupational therapists by passing the registered certification examination for occupational therapists.

Bachelor of Science in Occupational Therapy Degree

Admission Requirements: Students are admitted to the professional program at the junior level. Preprofessional requirements prior to admission include completion of the proficiency and distribution requirements established by the College of Arts and Sciences with a minimum of 20 credits each in the humanities, natural sciences, and social sciences, and B STR 301; PHYS 114, 117; PSYCH 101; PSYCH 306; SOC 110; ZOOL 118; REHAB 290 with a minimum cumulative grade-point average of 2.50, as well as a cumulative grade-point average of 2.50 in all academic work on a 4.00 scale. Transfer students should consult the Division of Occupational Therapy to determine eligibility for the professional program. All interested applicants should obtain a detailed copy of the program requirements and selection process from the Division of Occupational Therapy.

Student Evaluation

The University grade-point system is used with the exception that grades below 2.0 in all required professional courses are not acceptable. Satisfactory scholarship requires the maintenance of a cumulative grade-point average of 2.50, which is the basis for promotion and graduation.

Returning Students

A student who has left the program and wishes to return to it will be required to reapply and to be presented to the occupational therapy Advisory and Evaluation Committee for consideration due to limited enrollment and space. *Graduation Requirements:* REHAB 320, 321, 332, 380, 414, 435, 442, 444-445, 446, 447, 448, 468, 469, 473, 477, 481, 482, 483, 484, 492, 499; B STR 331; PBSCI 451, 452, 553; and REHAB 494 (six months of field experience) with a minimum cumulative grade-point average of 2.50 in major courses.

Certification of Occupational Therapists

To provide occupational therapy services to any public educational program in the state of Washington, registered occupational therapists must be certified by the State Superintendent of Public Instruction as an educational staff associate.

Candidates for certification must demonstrate knowledge and competencies at acceptable levels of professional practice. They must be graduates from state, regionally, or nationally approved/accredited programs for the preparation of occupational therapists and registered by the American Occupational Therapy Association. In Washington State, the programs approved by the Board of Education for the preparation of occupational therapists are those of the University of Washington and the University of Puget Sound.

Application materials and information packets may be purchased for \$5 from the University Book Store, 4326 University Way Northeast, Seattle, Washington, 98105.

Additional information is available from Office of Certification and Licensing, Superintendent of Public Instruction, Old Capitol Building, Olympia, Washington 98504; (206) 753-6773.

Physical Therapy

Head

Jo Ann McMillan

Physical therapy is a health-care profession whose practitioners work in hospitals, clinics, nursing homes, and private practice. Physical therapy practitioners work with patients who are disabled by illness or accident or were born with a handicap. They evaluate neuromuscular, musculoskeletal, sensorimotor, and related cardiovascular and respiratory functions of the patient. Evaluation includes performing and interpreting tests to assist in diagnosis and to determine the degree of impairment of relevant aspects, such as muscle strength, motor development, functional capacity, or respiratory and circulatory efficiency. Evaluation provides the basis for the selection of appropriate therapeutic procedures and for the evaluation of the results of treatment.

Physical therapy practitioners plan and implement initial and subsequent treatment programs on the basis of test findings, and within the referral of the licensed physicians or dentists with whom they maintain contact regarding the



care of the patient. The treatments given by physical therapists and physical therapist assistants include exercises for increasing strength, endurance, coordination, and range of motion; stimuli to facilitate motor activity and learning; instruction in activities of daily living and the use of assistive devices; and the application of physical agents such as heat, cold, sound, and water to relieve pain or alter physiological status. In addition, they try to motivate and instruct the patient and others who provide care and support for the patient.

The University offers two patterns of education leading to basic professional certification in physical therapy, a baccalaureate degree program as well as a Master of Physical Therapy degree curriculum. The professional programs are approved by the American Physical Therapy Association.

Admission Requirements: Students are admitted to the baccalaureate program at the junior level. Detailed program requirements and selection process information may be obtained from the curriculum office. Students are urged to request this information early because the deadline for receipt of applications is February 15. At the time of application deadline, applicants must be legal residents of Washington (as defined by the University administration code), or of a state in which no accredited school of physical therapy is located. Requirements prior to admission include completion of the College of Arts and Sciences proficiency and distribution requirements with a minimum of 20 credits each in the humanities, natural sciences, and social sciences; and completion of the following prerequisite course work, which may be counted toward distribution requirements:

Physical Sciences: CHEM 140, 150, General Chemistry (4, 4); or CHEM 101, General Chemistry (5), CHEM 102, General and Organic Chemistry (5). PHYS 114, 115, 117, 118, General Physics and Laboratory (10).

Biological Sciences: B STR 301, General Anatomy (4 credits); ZOOL 118, Survey of Physiology (5) or ZOOL 208, Elementary Human Physiology (5); MICRO 301, General Microbiology (3); MICRO 302, General Microbiology Laboratory (2).

Social Sciences: PSYCH 101, General Psychology (5 credits); one additional psychology or psychiatry course (5) (only 2 credits from the additional course may be counted toward the prerequisite grade-point average).

Washington, Alaska, Idaho, and Montana applicants must earn a minimum grade-point average of 2.70 on the preceding courses and have a cumulative grade-point average of 2.70. Residents of other states must have a 3.50 on the prerequisites and 3.00 overall. Admission is competitive, based on demonstrated academic ability and apparent aptitude for physical therapy. Returning students who previously dropped out of the program must reapply and are subject to the same review process as that used for all other applicants. *Graduation Requirements:* The following courses must be completed satisfactorily in the scheduled sequence, beginning Autumn Quarter only, at the University: REHAB 320, 321; 332, 408, 414, 415, 416, 442, 443, 444-445, 451, 452, 460, 461, 462, 463, 464, 466-467, 471-472, 475, 476, 489, 490, 491, 495, 499, PATH 410; B STR 331.

Student Evaluation

The University grade-point system is used. A student in the professional phase of the curriculum must maintain a cumulative grade-point average of 2.50 in all required courses for satisfactory standing and for graduation from the curriculum. At the end of any academic quarter in which a student's performance falls below that point, he or she is placed on academic probation. Once on academic probation, a student is allowed two additional consecutive quarters to bring his or her curriculum grade-point average to 2.50. A student not meeting the above standard is dropped from the curriculum and is advised to transfer to an alternate major within the University or to withdraw from the University.

Any grade of less than 1.7 in a professional curriculum course will require that the course be repeated if recommended by the physical therapy faculty and approved by the Advisory and Evaluation Committee.

Prosthetics and Orthotics

Undergraduate Program Adviser

Bernard C. Simons BB911 University Hospital

The prosthetist-orthotist is part of a professional medical team devoted to the evaluation and treatment of the physically handicapped. He or she is responsible for the designing and fabricating of prosthetic and orthotic devices (artificial limbs and braces) and for helping handicapped patients of all ages to enjoy more functional and independent lives.

Bachelor of Science Degree

Admission Requirements: Students are admitted to this curriculum at the junior level. Preprofessional requirements prior to admission include completion of the College of Arts and Sciences proficiency requirements, as well as the distribution requirements with a minimum of 20 credits each in the humanities, natural sciences, and social sciences with a 2.00 cumulative grade-point average on a 4.00 scale, and completion by the end of Autumn Quarter or semester of the year prior to expected admission into the program of a minimum of 22 quarter credits of the 36-41 credits in the following prerequisite courses (or their equivalent for transfer students) with a minimum grade-point average of 2.50:

BIOL 101-102 (10 credits) *or* MICRO 301, 302 (3, 2); note that CHEM 102 is prerequisite for microbiology; PHYS 114, 115, 117, 118 (10); B STR 301 (4); ZOOL 118 or 208 (5); PSYCH 101 (5).

At the time of application a student must submit a reasonable plan for completion before the date of expected entry into the program of the balance of the prerequisite courses listed above. If by the time of expected entry into the program the student has not completed all prerequisite courses with a minimum grade-point average of 2.50 as well as a total grade-point average of 2.00, then that student will not be admitted to the program.

Graduation Requirements: The following courses must be taken in the scheduled sequence, beginning Autumn Quarter only, at the University of Washington: REHAB 320, 321, 332, 340, 341, 342, 343, 414, 420, 421, 423, 427, 428, 429, 430, 442, 443, 444-445, 451, 452.

Student Evaluation: The University grade-point system is used with the exception that a grade below 2.0 in any required professional courses is not acceptable. Satisfactory scholarship requires the maintenance of a cumulative grade-point average of 2.50 in the required courses, which is the basis for promotion and graduation.

Graduate Programs

Graduate Program Adviser Justus F. Lehmann

The graduate programs in rehabilitation medicine lead to the degrees of Master of Science, Master of Occupational Therapy, and Master of Physical Therapy. An applicant for admission to the Master of Science degree program must be enrolled, or have completed residency training, in the specialty of physical medicine and rehabilitation.

An applicant for admission to the Master of Occupational Therapy degree program must be a registered occupational therapist or have a college degree in a related field. Applicants must meet the requirements of the Graduate School and of the program.

The Master of Physical Therapy degree program is offered for persons who wish to qualify for entrance into the profession and to develop an area of specialization. Applicants should have a baccalaureate degree in a related field.

Master of Science Degree

It is anticipated that graduate students working toward the Master of Science degree will take some of the course work during the three-year residency and will devote an additional one or two years to the master's program. Opportunity is given to students who have already completed their residencies to combine the course work and research in a two-to-three-year program.

Master of Occupational Therapy Degree

This program is designed to prepare the candidate as an academic or clinical educator, administrator-supervisor, or researcher in the field of occupational therapy, or to develop leadership qualities in a selected area of specialization. Based on the applicant's needs and prior preparation, the program can be planned to cover a span of one to two years.

Admission Requirements: One-calendar-year program, open to the registered occupational therapist with a baccalaureate degree from an accredited institution. Graduate Record Examination score; one year of professional work experience desirable.

Two-calendar-year program approved by the American Occupational Therapy Association and the American Medical Association for the applicant with a baccalaureate degree in a related field from an accredited institution. Graduate Record Examination scores and prerequisites required.

Graduation Requirements: One-year program, minimum of 36 credits, of which 18 must be in courses at the 500 level or above, including established core courses and supporting courses in an area of special interest. Completion of an approved thesis.

Two-year program, minimum of 77 quarter credits, with approximately 30 credits in courses at the 500 level or above, six months of fieldwork, and completion of an approved thesis.

Detailed admission requirements and descriptions of the available programs may be obtained from the Division of Occupational Therapy.

Master of Physical Therapy Degree

This program combines the basic professional curriculum in physical therapy with an individual specialized plan so that in-depth preparation can be achieved in an area of interest for a career in administration, teaching, research, and/or consultation. Possible areas of focus include care of the multiple-handicapped child, orthopaedic physical therapy, rehabilitation of the severely disabled, pathokinesiology research, therapeutic use of energy, and neuromuscular mechanisms of movement. Approximately three years are required for completion of the entire program.

Admission Requirements: Special requirements for admission to the Master of Physical Therapy degree program include completion on the baccalaureate degree and course work prerequisite to the program; attainment of a 3.00 prerequisite and cumulative grade-point average; completion of the aptitude portion of the Graduate Record Examination; and completion of the departmental application process by February 15. Admission to this program is competitive.

Graduation Requirements: All students must meet the minimum requirements for a master's degree as outlined in the Graduate School section of this catalog. Students must complete satisfactorily the basic professional course work,

SCHOOL OF MEDICINE.



as well as a specific curriculum designed by the student in collaboration with his or her committee. All students are required to complete a major project and a manuscript suitable for publication.

Detailed information concerning admissions requirements and the departmental application procedure is available from the Division of Physical Therapy.

SURGERY

BB487 University Hospital

Faculty

John A. Schilling, Chairperson; Buehler, Carrico, Dellinger, Dillard, Engrav, Heimbach, Herman, Hessel, Ivey, Johansen, Jones, Lennard, Marchioro, Marvin, Merendino, Miller, Moe, Oreskovich, Radke, Rattazzi, Sikkema, Simonowitz, Stevenson, Strandness, Thiele, Voci, White, Winterscheid.

In the Department of Surgery, instruction is carried on during all four years of the student's training and is integrated with that of the other departments in the School of Medicine. The undergraduate instruction in surgery provides the student with a basic background of surgical principles and surgical diagnosis and a knowledge of surgical problems. In addition to the basic undergraduate instruction, a fully certified surgical residency program is available in general and thoracic surgery.

UROLOGY

BB1115 Health Sciences

Faculty ·

Julian Ansell, Chairperson; Barnes, Berger, Chapman, Correa, Keene, Mason, Miller, Mayo, Monda, Rajfer.

Urology is the surgical discipline concerned with diseases of the male genitourinary organs and the female urinary tract. Training for medical students starts in the second year and continues through the third and fourth years.

Training is also provided for interns, nurses, and physical medicine technologists and allied specialists.

An approved urology residency program is available.



Θ

NURSING

Dean

Rheba de Tornyay -

Associate Deans

Dorothy Crowley Florence Gray Alice Kuramoto Ildaura Murillo-Rohde

Faculty

Abrums, Barnard, Batey, Beauchaine, Bee, Benoliel, Betrus, Binn, Blackburn, Blainey, Boase, Booth, Boozer, Bowers, Brown, Bruno, Bulkley, Bumbalo, Campbell, Carnevali, Champoux, Chrisman, Clark, Cobb, Cornman, Cowan, Craven, Crowley, Cumings, Cunningham, Delecki, Denton, de Tornyay, Disbrow, Draye, Dye, Edwards, Ellerbe, Ellison, Estes, Eyres, Fast, Finch, Fine, Fuller, Gallucci, Gaut, Giblin, Goertzen, Grassley, C. Gray, F. Gray, Gurel, B. Hall, C. Hall, Hammond, Hanson, Hasselblad, Hay, Heinemann, Hoehn, Hoffman, Holland, Barbara Horn, Beverly Horn, Houk, J. Jones, M. Jones, Johnson-Crowley, Kang, Keefer, Kelley, Knapp, Knight, Kotchek, Kuramoto, Kvidera, La Fargue, K. Larson, M. Larson, LeBaron, Lee, Leitch, Lewis, Lindskog, D. Little, T. Little, Livak, Lobo, Loustau, McCorkle, McCreery, McLeod, Mann, Marvin, E. Mitchell, P. Mitchell, S. Mitchell, Mitsunaga, Molbo, Moniz, Morino, Muecke, Mukai, Murillo-Rohde, Nakagawa, Nakao, Newton, Nikolaisen, Norkool, O'Neil, Osborne, Ozuna, Patrick, Pesznecker, Peters, Pittman, Plunkett, Reichert, Richardson, Richmond, Rose, Roberts, Rokosky, Ruff, Russell, Sample, Schodde, Shamansky, Sharp, Sivarajan, Smith-DiJulio, Smyth, Snyder, Spietz, Spratlen, Stade, Stevens, Sullivan, Sweeny, Tyler, Underhill, Virden, P. Walker, W. Walker, Walters, Webster-Stratton, Wenner, Wheeler, Whitley, Wiegardt, Williams, Wolf-Wilets, N. Woods, S. Woods, Worthy, Youngberg.

Nursing has a unique societal role in assisting individuals, families, and community groups in coping with health problems of a physical, emotional, cultural, or social nature. All persons have a right to competent health-care services with positive consideration of, and regard for, color, creed, and ethnicity. In a pluralistic society, a variety of conditions and pressures exert an impact upon individuals, families, and community groups in their efforts to maintain a healthy state of well-being. Individuals and social groups vary in their ability to deal effectively with both life stresses and environmental conditions. The practice of nursing focuses upon ways to help individuals and groups to promote and maintain optimal health and to provide remedial care and treatment to a wide range of persons from different social, cultural, and economic groups without prejudgment on the basis of sex, color, creed, life-style, or cultural difference.

Philosophy

The philosophy of the School of Nursing supports the undergraduate and graduate programs within the framework of the overall philosophy of the University. The faculty assumes responsibility for the quality of the educational programs offered and for promoting effective nursing for the public through teaching, research, and service. Responsive to the changing needs within society and acknowledging the growing involvement of citizens concerned with their health care and the quality of their total environment, the faculty of the University of Washington School of Nursing accepts the following statements as a reflection of its beliefs: We believe that each human being is endowed with individual qualities but holds, in common with other human beings, the basic need for respect and recognition of personal dignity, worth, and uniqueness. The individual develops as a whole being and interacts within a culturally pluralistic society that includes various culturally defined values. Dynamic and reciprocal relationships with the total environment affect both health and the ability to develop human potential. It is the right of each human being to be concerned with the quality of life and to participate in decisions affecting personal well-being.

The ability to utilize one's full potential is basic to health. Health is influenced by the changes that affect human beings and their environment, and vice versa. All persons have a right to competent health-care services with consideration of, and positive regard for, color, creed, and ethnicity. The events of the present presage even more rapid change in the years ahead. Persons and social units vary in their ability to deal effectively with change and its results. It is essential the disciplines within the health-care systems understand the complexity and effects of change and the processes involved. In addition, health-care disciplines have responsibility for, and the ability to collaborate with, the recipients of their services.

Nursing is a health-care discipline and exists to promote health and provide care to all without prejudgment on a basis of sex, color, creed, life style, or cultural differences. Nursing has a professional responsibility to expand its body of knowledge through research. The profession should initiate and respond to changes pertinent to the health of human beings and their environment. Nursing is a caring process that involves working with others and through others. The process responds to the basic human need for compassion and dignity with consideration of, and positive regard for, color, creed, ethnicity. Caring encompasses the provision of those elements necessary for promoting, conserving, or restoring health, or enabling a dignified death. It includes those activities that persons would perform unaided if they had the strength, will, knowledge, or courage to do so. Implicit in caring is respect for the individual that is essential to the realization of his maximum potential for health. Caring is the acceptance of responsibility for another person or persons in situations where protection or assistance is needed. The caring process is demonstrated through nursing actions based on theories and knowledge from nursing, the physical and behavioral sciences, and the humanities. Nursing actions should be scientific, rational, deliberate, and humanistic.

Organization

The School of Nursing is organized as one of five autonomous schools within the Division of Health Sciences. It is located in the Health Sciences Center, a complex of buildings located on the south campus shared by the schools of Dentistry, Medicine, Nursing, and Public Health and Community Medicine, the Health Sciences Library, the University Hospital, and related research and training centers. Administrative responsibility for the School of Nursing is vested in the Dean. Faculty of the school is organized into four departments. Faculty members of each department are concerned with the advancement and transmission of knowledge in a particular field of nursing and share similar research, teaching, and community service interest.

Undergraduate students do not affiliate directly with a specific department. Programs of study are designed to draw upon knowledge and skills from all of the departments. At the graduate level, however, the student selects a departmental affiliation to gain a depth of knowledge and skill in a particular field of study in nursing.

COMMUNITY HEALTH CARE SYSTEMS

Chairperson

Barbara Horn T517 Health Sciences Teaching

Programs in the Community Health Care Systems Department focus upon: the nursing process in preventive health services, health maintenance behaviors and attitudes, and rehabilitation toward optimum wellness of individuals and families; the influence of social and cultural conditions on the delivery of personalized services to individuals, families, and high-risk populations; and health-delivery systems that maximize the usefulness of nursing to consumer groups.

Graduate pathways are offered in: (1) Advanced Community Health Nursing, which provides specialization in (a) transition services for patients/families with progressive illness, using advanced cancer as a model of personalized care; (b) teaching leadership; (c) occupational health, and (d) cross-cultural nursing. (2) Nursing Administration, which prepares nurses to assume leadership positions in health-care facilities. (3) Family Nurse Practitioner Program which prepares nurses to provide primary care to individuals and families. Inquiry, including independent research through conduct of a thesis, is an integral part of all pathways. Most pathways in this department require a minimum of five quarters of full-time study. Nursing Administration requires six quarters.

MATERNAL AND CHILD NURSING

Chairperson

Sally O'Neil T410 Health Sciences Teaching

Programs in maternal and child nursing focus upon the normal physiological and psychological stressors that center around reproduction and development inherent in the individual's life from birth through childbearing and childrearing years. The influence of the intergenerational biolog-



ical, developmental, social, and emotional adaptations of children and parents are of major interest. Stressors related to growth and development, preparation for family life, role adaptation, pregnancy, childbirth, and childrearing are content areas for teaching and research. Each student selects one of the following pathway specialties: Maternal-Infant, Nursing of Children, Pediatric Nurse Practitioner, Handicapped Child Care, or Predictive Nursing Care of Infants and Children. Completion of the program requires a minimum of four quarters of full-time study.

PHYSIOLOGICAL NURSING

Chairperson

Maxine Patrick T611 Health Sciences Teaching

Programs of study offered in this department are directed toward the preparation of professional nurses with a major interest in the care of adults with problems of a healthillness nature in which disturbances of a physiological nature represent a major element in the need for care. Courses offered in the department are directed to the transmission and expansion of a body of substantive knowledge upon which clinical practice is based. Courses are offered in both specialized and general areas of physiological nursing. Nursing specialty pathways available are: Cardiovascular, Gerontology, Nervous System, Oncology, Respiratory, Burn, Trauma, and Emergency Room.

PSYCHOSOCIAL NURSING

Chairperson

Betty Mitsunaga T407 Health Sciences Teaching

Programs in Psychosocial Nursing have the aim of preparing nurses for the treatment of clients, program planning, and program evaluation in mental-health-care delivery systems. The pathways of study include Interpersonal Systems, Family-Child Treatment, Management of Stress Response, Alcoholism and Drug Abuse Nursing, and Systems Oriented Community Mental Health. These pathways are built upon a required theoretical base of three courses. Students are expected to select at least two pathways that consist of seminars and practicums. Research, primary prevention, and community involvement are general themes that pervade all offerings of the department. Completion of the program usually requires at least five quarters.

UNDERGRADUATE PROGRAM

Associate Dean, Undergraduate Program, and Clinical Facilities Florence Gray T203 Health Sciences Teaching

T303 Health Sciences Teaching

Advisers -

Gail Bongard, Doris Carnevali T303 Health Sciences Teaching

The first nursing course given at the University of Washington was offered in June, 1918. The School of Nursing became an autonomous unit in 1945. The School of Nursing is recognized as one of the outstanding schools of nursing in the country and has prepared distinguished leaders, teachers, administrators, researchers, and practitioners who have been active in regional, national, and international nursing endeavors.

The University of Washington School of Nursing proposes to prepare nurses to give effective, safe, and competent nursing care. With continued experience and ongoing professional learning opportunities, these nurses will become increasingly proficient in providing general or specialized nursing services to individuals and groups. The graduates of our nursing programs are expected to collaborate with a variety of health disciplines in planning, implementing, and evaluating health-care services, but these graduates are specifically responsible for the quality of nursing care given. Nurses, as practitioners, are expected to be creative thinkers and initiators of change, and able to make independent decisions regarding nursing care, all based on a sound foundation of scientific and humanistic principles and research related to health care. The professional nurse also assumes the responsibility for directing nursing care of nursing assistants who have less preparation in order to maintain and coordinate giving quality care to individuals and groups.

Preparation of professional nurses capable of promoting and meeting present and future challenges demands a flexible curriculum responsive to change. Baccalaureate education in nursing assists an individual in becoming an informed, educated, and compassionate person with a foundation for competent nursing practice, professional leadership, and effective participation in community affairs. Basic to learning the above is the individual's selfawareness and personal involvement in the learning process. Baccalaureate education serves as a stimulus for the student to accept responsibility for development of his or her maximal potential and to continue in a life-long educational pursuit if he or she so desires. Students come to the program with diverse and varying educational, personal, and cultural experiences that are valuable to the program. Persons desiring baccalaureate education in nursing are allowed to enter at the point complementary to each individual's background. Throughout the program, students are encouraged to assume increasing self-direction and independence. Core content germane to professional nursing practice is provided for all students enrolled in baccalaureate education. Increased complexity of nursing knowledge and practice precludes intensive preparation in all major areas of nursing practice at the undergraduate level. Exposure to specialization is offered through opportunities to pursue selected nursing and related interests.

The baccalaureate graduate is prepared to make informed judgments and to do critical thinking. The graduate is able to assume the initiative and responsibility for making nursing decisions and formulating new approaches as necessitated by varying circumstances and technological advances. Essential to the development of the above processes is a curriculum based on knowledge and scientific findings from nursing, the physical and behavioral sciences, and the humanities. Opportunities for learning include experiences and environments that represent the multicultural composition of the region. Students and faculty share in the search for excellence in nursing through the manipulation, synthesis, and testing of theories and abstract ideas and their relationships.

Bachelor of Science in Nursing Degree

The curriculum leading to the Bachelor of Science in Nursing degree is designed for two types of students: (1) a student with no previous preparation in nursing, or (2) a graduate of a hospital or community college school of nursing, who is referred to as a registered nurse student.

Objectives

Upon completion of the undergraduate program, the School of Nursing faculty believes the student will be able to make an outstanding contribution to professional nursing. The student—

(1) Assesses with individuals and groups their health-illness status and context in order to determine nursing-care implications. (2) Collaborates with others in synthesizing plans to improve health care. (3) Formulates a plan of nursing care that contributes to the total plan of health care. (4) Implements plans for health and nursing care within broad health-care plans or systems. (5) Implements teaching to improve nursing and health care. (6) Evaluates the effectiveness of nursing care and health plans and systems. (7) Develops and maintains helpful relationships with individuals that would facilitate health care. (8) Is committed to using research knowledge applicable to nursing and health care. (9) Applies research skills to solve and/or study nursing and health problems. (10) Appreciates the historical aspects of the profession of nursing and health care and their relationship to current and futuristic goals in the delivery of health-care service. (11) Is characterized by the appropriate use of independent leadership and collaborative role relationships as indicated by the goals to be accomplished. (12) Is characterized by a concern for the uniqueness and rights of individuals and groups in relation to health care. (13) Is characterized by continually developing self-awareness. (14) Continues developing the ability to learn and be responsible for own learning. (15) Is characterized by using social actions with responsibility to bring about changes in the interest of promoting health. (16) Is characterized by the ability to use dynamic technological advances to improve nursing and health care. (17) Is committed to providing holistic health care, which includes consideration of ethnic diversity.

Description of Practitioner of Tomorrow

The graduate of the baccalaureate nursing program of the University of Washington School of Nursing will be prepared to function as a generalist with beginning competencies in a specialized area of nursing.

The graduate will be prepared to function in a variety of settings and be able to: (1) Obtain health histories and make general health assessments. (2) Provide safe and competent care in emergency situations and acute illnesses. (3) Provide supportive care to persons with chronic or terminal health problems. (4) Provide health teaching, guidance, and counseling. (5) Assist persons to maintain optimal health status. (6) Provide for continuity of health services. (7) Assume leadership responsibility for planning and evaluating nursing care. (8) Work effectively with all persons concerned with health-care problems.

The baccalaureate nurse, as a practitioner of nursing, will be accountable and responsible to clients for the quality of nursing, whether administered directly or indirectly.

Within the school philosophy, a curriculum has been developed to enable each student to achieve these objectives. It seeks to be relevant to today's social needs, but also looks forward to the future focus in health care. The curriculum emphasizes six core areas: human development; interpersonal-interaction skills; social, cultural, and health-care systems; research and scholarship skills; nursing process and skill in giving care to patients; and beginning specialization in a selected field of nursing. These areas build on a one-year base of the social and natural sciences.

Admissions

Admission to the Prenursing Program

Admission to the University with a designation of nursing as an area of interest allows the student to be considered a student in the School of Nursing prenursing component. This designation is possible for basic students, individuals with other degrees, and registered nurse students.

Admission to the Nursing Major

Admission to the nursing major takes place twice each year, Summer and Winter quarters, for both basic and registered nurse students.

In filling the enrollment quota for the professional part of the nursing program, preference is given those applicants, in the judgment of the school, best qualified to undertake the program. Equal consideration is given applicants already enrolled in the school or seeking transfer to it from elsewhere on the University campus or from another institution. Prospective transfer students should write to the School of Nursing Undergraduate Advising Office approximately three quarters before they wish to enter the professional part of the nursing program. Applications from minority students are given special consideration.

SCHOOL OF NURSING



Generic students must complete a total of 45 credits before the professional part of the program begins with registration in CONJ 317-318 (Introductory Anatomy and Physiology). Selection of generic students for the professional part of the program is based on the following criteria: applicant's admissibility to the University; applicant's scholastic standing; a minimum of 2.0 must be achieved in each required prerequisite; completion of 30 credits, which must include 10 of the natural science credits (including at least one of the required chemistry courses), English composition, PSYCH 101, SOC 110 or ANTH 202 plus other courses (electives) to bring the total to 30; indication of plans to complete 45 credits prior to enrollment in the professional component.

The 45 credits must include: CHEM 101 (5) and 102 (5), English composition (5), PSYCH 101 (5), SOC 110 or ANTH 202 (5), MATH 105 (5) or 106 (3), MICRO 301 and 302 (3-2), electives (10-12) to complete 45 credits.

Registered nurse students are admitted as upper-division majors with junior standing, and thus they must complete the prerequisites above. In addition, the registered nurse transfers a maximum of 40 nursing credits. This is done either by transfer of associate degree nursing courses or by translating diploma courses into University of Washington credits by taking and passing selected National League for Nursing (NLN) achievement tests. Scores indicating successful completion of the NLN tests, plus transcripts or plans showing that all prerequisites will have been met by the quarter of projected admission, are required in order to be considered for the selection pool. Selection of registered nurse students is based on applicant's admission to the University of Washington and on scholastic standing.

Additional information about specific criteria for all students and protocols and deadlines for submission of materials áre available from the School of Nursing Undergraduate Advising Office. Applicants to the nursing major must complete both the University of Washington admission form and the School of Nursing admission materials. Both are available from the School of Nursing Undergraduate Advising Office.

Admission With Advanced Standing

Students from other schools of nursing who wish to transfer into the advanced nursing courses at the University of Washington School of Nursing should be aware that limited clinical facilities and limited educational resources place definite restrictions on the number of transfer students that may be accommodated. Students who are contemplating transfer to this school should contact the School of Nursing Undergraduate Advising Office well in advance of the quarter they wish to enter. The Undergraduate Advising Office has the responsibility for deciding how the student's previous nursing program will coincide with the current curriculum requirements at the University of Washington. The Admissions and Continuation Committee determines the assignment of applicants to any available spaces.

Fifth-Year Students

Those students who already possess a baccalaureate degree and who wish to pursue a second baccalaureate degree in nursing are considered equally with other applicants. Procedure to be followed is the same as that for admission to the professional part of the program.

Students holding a baccalaureate degree in nursing with a deficiency in basic community health nursing and/or psychosocial nursing may be admitted as space is available with fifth-year status. A student admitted with fifth-year status is not in Graduate School.

Returning Former Students

Students who plan to withdraw from the nursing program for a period of time should contact the School of Nursing Undergraduate Advising Office at the time of withdrawal. These students should state their plans and proposed date of re-enrollment if they wish to complete their education at this School of Nursing. Based on this information and subsequent confirmation, vacancies in the professional part of the program can be allocated to returning former students if available and appropriate. In order to return to the University, these students must complete a former student enrollment application and submit it to the Registrar's Office by the prescribed deadline. There is no assurance that a place will be available for these students unless they are notified in writing by the chairperson of the Admission-Continuation Committee of the School of Nursing to this effect.

Advanced Credit Examinations

Because the faculty of the School of Nursing believes that students bring to the program a variety of competencies and knowledge, advanced credit examinations are planned for all nursing courses. All credit obtained by advanced credit examination is considered by University policy to be extension credit. A total of 90 credits may be earned by extension.

Continuation in Program

The School of Nursing reserves the privilege of retaining only those students who, in the judgment of the faculty, satisfy the requirements of scholarship, health, and personal suitability to the practice of nursing. Students must maintain a minimum 2.00 grade-point average at the University to continue in the nursing sequence of the professional program, and must attain a 2.0 minimum on all required, graded courses in the professional curriculum for graduation.

Graduation Requirements

Generic students. NURS 263, 281, 297, 302, 303, 300, 321, 322, 405, 323, 324, 361, 327, 328, 406, 403, 407, 400, 402, 423 or 424 or 425 or 426; CHEM 101, 102; PSYCH 101; ANTH 202 or SOC 110; MATH 105 or 106; CONJ 317-318; MICRO 301, 302; PHARM 315; a course in statistics; NUTR 301; English composition, 5 credits;

KINPE 205; electives, 25-27 credits. A total of 190 credits is required for the Bachelor of Science in Nursing degree.

Registered nurse students. NURS 350, 361, 354, 300, 405, 403, 407, 397, 398, 406, 402, 423 or 424 or 425 or 426; CHEM 101, 102; PSYCH 101; ANTH 202 or SOC 110; MATH 105 or 106; CONJ 317-318; MICRO 301, 302; a course in statistics; English composition, 5 credits; electives, 35-39 credits. A total of 190 credits is required for the Bachelor of Science in Nursing degree.

Fees, Expenditures, and Financial Assistance

Students are expected to anticipate their need for financial assistance and to apply to the Office of Student Financial Aid within the published dates. This is usually February 1 preceding the next academic year. Students who will be attending Summer Quarter should be sure to request funds to include Summer Quarter. General University scholarships are awarded on a competitive basis according to scholarship achievements, financial need, and participation in the extracurricular activities of the campus and community. Several scholarship funds and a loan fund are administered by the School of Nursing and are available to eligible students when funds are not available through the Office of Student Financial Aid. Information concerning funds administered by the School of Nursing is available in the Undergraduate Advising Office, T303 Health Sciences.

Students should be prepared to pay the cost of transportation between the University campus and the teaching units. The use of a car may be required at any time in the program and is a requirement for NURS 402 (Maximizing Health in the Community). Each student must have a current driver's license and 'meet state requirements, for insurance protection. Students should expect to spend approximately \$85 to \$100 for the purchase of uniforms in the sophomore year and at least \$10 for special achievement tests throughout the program.

Health Care

Before beginning clinical laboratory courses, students are required to have had a recent physical examination, a test for tuberculosis, and inoculations for tetanus, poliomyelitis, and diphtheria. Physical defects must be corrected at the student's own expense. In addition, all students must show serological evidence of immunity to rubella or be vaccinated with rubella vaccine.

Student Organizations and Activities

The University of Washington Organization of Nursing Students is an organization established to provide a vehicle for nursing students to participate in the activities of the School of Nursing and the University of Washington. Student representatives participate in departmental and school committees and in councils. School and departmental meetings are open to students. Dates and places are posted on the student bulletin board.

In addition to the nursing organization, there is a nursing honorary, Sigma Theta Tau, to which students are invited during the junior and senior years.

Continuing Nursing Education Programs

Associate Dean for Continuing Nursing Education

Alice Kuramoto T304 Health Sciences Teaching

To meet increasing demands and challenges for improved health care, the University of Washington School of Nursing offers a continuing nursing education program for registered nurses. The Continuing Nursing Education program provides the registered nurse a variety of educational offerings throughout the year. These educational offerings meet the identified and projected needs of nurses and provide an opportunity to maintain or update knowledge and skills in the nursing profession. They include workshops, conferences, and extension credit courses. Continuing nursing education offerings are provided off campus as well as in the Seattle area. The Continuing Nursing Education Program is accredited by the ANA Western Regional Accrediting Committee as a provider of continuing education for nursing. All of the courses are approved for CERP points.

Facilities and Services

The School of Nursing is part of the Health Sciences Center, which comprises the schools of Dentistry, Medicine, Nursing, and Pharmacy. The School of Nursing is located in the T wing fronting on Northeast Pacific Street. Available facilities include study carrells wired for the use of multimedia instruction, behavioral science laboratories with one-way mirrors-for observation and videotaping of interviews with individuals and interactions in groups, and an audiovisual production studio that provides opportunities for students to engage in innovative and creative modes of teaching and learning.

Augmenting the main campus library, the Health Sciences Library in the T wing incorporates the latest developments in planning and facilities. Some areas of the library remain open at night.

GRADUATE PROGRAMS

Also see Graduate Programs and Degree Policies, page 48.

Associate Dean, Graduaté Programs

Dorothy M. Crowley T301 Health Sciences Teaching

Graduate Program Adviser

Stella Hay T301 Health Sciences Teaching

The University of Washington School of Nursing has offered programs of study leading to the master's degree since 1937. It is recognized as having one of the largest, as well as one of the top-rated, graduate programs in the country. It has prepared distinguished teachers, administrators, researchers, and practitioners in nursing, of whom many



are actively engaged in leadership positions in nursing on local, state, regional, national, and/or international levels.

The School of Nursing offers graduate curricula leading to the degrees of Master of Arts, Master of Nursing, and the Doctor of Philosophy in nursing science. Opportunities for study at the post-master's or postdoctoral levels are individually planned. Additional information may be obtained by writing the associate dean for graduate programs.

Master's Programs

Majors are offered in the following areas: Community Health Care Systems, Maternal and Child Nursing, Physiological Nursing, and Psychosocial Nursing. Graduate courses offered in the School of Nursing provide opportunity for advanced study in the area of clinical specialty and for functional preparation in selected areas of clinical practice, teaching, and/or administration.

The faculty believes there are theories, concepts, and a scientific rationale that underlie the nursing process. Theories and concepts from related fields are reconceptualized and applied in each of the specialty areas as appropriate. Graduate offerings provide opportunity for the student to increase clinical skills, to develop teaching or administrative abilities, and to acquire research skills. Opportunities for learning include experiences and environments that represent the multicultural composition of the region. It is assumed that the student enters as a professional practitioner with basic knowledge and nursing ability and that, in addition to upper-division preparation in clinical nursing, the student's undergraduate education has provided a foundation in the liberal arts. Students come to the program with diverse and varying educational, personal, and cultural experiences that are valuable to the program.

The faculty recognizes that each student comes with individual goals and that the attainment of these goals will be achieved in various ways. Graduate study is characterized particularly by the student's involvement in independent study and research. Research, followed by the sharing of results for critical review of one's colleagues, is a component of all graduate programs. The results of independent study for the master's degree are set forth in a thesis.

Each student has the opportunity to test nursing theory, to observe and analyze phenomena in health situations in a specific clinical area, to identify researchable problems, and to specialize in one area of knowledge. Opportunity for the application of relevant theories is provided throughout the clinical field experience. Thus, the student achieves a base for continuing the refinement of such competencies after graduation.

The length of time required to complete the master's program varies among departments, depending upon the particular clinical pathway chosen, the number of credits carried each quarter, and the interests of the particular student. At least half of the total credits taken must be at the 500 level or above. Each student in the master's degree program carries out independent study in nursing and presents a written thesis. Within the first quarter of graduate study, the student should, with the help of the major adviser, plan his or her entire program of study to ensure a satisfactory sequence of courses.

Master of Nursing Degree

Emphasis is on advanced preparation in an area of specialization in nursing. Supporting courses from at least two fields outside of nursing are required. A foreign language is not required for this degree. A typical program would include:

and the second						L.	realls
Major: advanced nursing courses			٠.			•	. 19
Related fieldst courses in at least two other	er disciplines	• • •	•		•	•	. 12
Research: courses in research and thesis		• ,•	•	•	•	•	. 14
· · ·		'					45

Master of Arts Degree

This program includes a major in nursing and a minor in another discipline. Students are encouraged to select a minor that will serve as a basis for further post-master's study. Students are expected to meet the undergraduate prerequisites of the minor department. The required course work and exact number of credits may vary, depending on the minor field selected. A student seeking this degree must demonstrate a reading knowledge of one foreign language.

										- (Cre	dits
Major: advanced nursing courses	• • •		•				•					19
Minor: courses in another discipline									•			12
Research: courses in research and thesis		•		•	•	•	•			•		- 14
	5.											45

Admission to Graduate Standing

Admission to the graduate programs of the School of Nursing requires acceptance by the Graduate School as well as admission to the School of Nursing (see the Graduate School section of this catalog). Applicants are expected to be graduates of a baccalaureate degree program with an upper-division major in nursing accredited by the National League for Nursing. Transcripts of applicants who are graduates of programs not accredited by the National League for Nursing are evaluated on an individual basis. Graduate Record Examination (aptitude test) and successful completion of a basic course in statistics are required prior to admission. Professional experience prior to admission is desirable for students selecting majors in some programs, such as nursing administration and the family nurse practitioner.

Extra Fees and Expenses

Graduate students who are matriculated in advanced degree programs should have a current registered nurse license and plan to have available a minimum of \$200 for costs connected with the preparation of the master's thesis. Selected field instruction may be in one of several agencies, either in, or outside of, Seattle. Every student should have a car available for use.

Doctor of Philosophy Degree

This program leads to a Doctor of Philosophy degree in nursing science: The primary purpose of the program is to prepare scholars to develop and expand the body of knowledge upon which the practice of nursing rests. The program provides for rigorous research training related to five fields of nursing science: (1) Individual Adaptations to Health and Illness; (2) Family Adaptations to Health and Illness; (3) Environments: Supporting and Nonsupporting; (4) Clinical Therapeutics: Interpersonal; and (5) Clinical Therapeutics: Physical.

The intent of the program is to prepare persons to meet the substantial state, regional, and national need for doctorally prepared faculty in schools of nursing and for leadership positions in key service agencies in which nurse researchers are needed to study the many multifaceted problems in modern health-care delivery.

The doctoral degree is the highest degree conferred by the University. All requirements and regulations leading to the doctoral degree are mechanisms whereby the student may demonstrate present capacities and future promise for scholarly work. It is not conferred merely as a certificate to a prescribed course of study and research, no matter how long or faithfully pursued. The program of study of each student is developed collaboratively by the student and his or her supervisory committee as appropriate to the student's research interest.

Admission Requirements: All applicants must meet the general requirements for admission to Graduate School at the University of Washington. Applicants are requested to submit official transcripts of all work undertaken at the graduate and undergraduate levels, Graduate Record Examination scores, five references (at least two from former college or university professors and two from persons related to an area of professional experience), a statement of goals for doctoral study and a description of area of research interest, and evidence of scholarly work demonstrating potential for independent scholarly work. A personal interview may be required.

Graduation Requirements: Credits variable; one-half total program, including dissertation, must be in courses at the 500 level or above; a minimum of 27 credits for dissertation. Creditable passage of progression examination; completion of a program of study approved by the Supervisory Committee; creditable passage of the General Examination; completion of a minimum of three academic years of resident study, two of them at the University of Washington, with at least one year of continuous full-time residence prior to the General Examination; preparation of a dissertation that makes a significant contribution to knowledge and clearly indicates training in research; creditable passage of a Final Examination devoted to a defense of the dissertation and the area of research interest, and completion of the minimum general requirements of the Graduate School at the time the degree is awarded.

Graduate Student Association

All students enrolled in the graduate programs offered by the School of Nursing are eligible for membership in the Graduate Nursing Students' Association and are represented in the University's Graduate and Professional Student Senate.



PHARMACY

Dean Milo Gibaldi D303 Health Sciences

Associate Dean

Joseph A. Romano D303 Health Sciences

Pharmacy has been a component of the academic offerings of the University since 1894. Its heritage embraces the apothecary-chemist who compounded, mixed, and triturated all forms of natural and synthetic formulations, based upon a prescriber's recipe (Rx). During the late 1940s and 1950s (The Golden Age of Drug Development), the practice of pharmacy evolved to a more distributive function that required practitioners to promote and ensure rational drug therapy—"the right drug, for the right patient, at the right time."

The development of new, preformulated dosage forms during the late 1950s and 1960s reduced the necessity for pharmacists to use the mortar and pestle in preparing individual prescriptions, affording practitioners an opportunity to serve as sources of information on prescription and nonprescription medications, ancillary health supplies, and general health care. The pharmacy is easily accessible to consumers, and today's patient-oriented pharmacist is often the first and last source of professional advice. In fact, in many instances, pharmacy serves as the only free source of health-care information and guidance in the community.

The academic offerings at this university's School of Pharmacy emphasize the biological, chemical, and physical sciences that prepare students for intensive training in clinical and professional practice. The five-year curriculum, leading to the Bachelor of Science in Pharmacy degree, consists of two years' preprofessional training and three years' residence in the school's professional program. Professional course work includes: anatomy, biochemistry, biopharmaceutics/pharmacokinetics, compounding practice, medicinal chemistry, pathology, pharmacology, therapeutics, physiology, and clinical clerkships (students actively practicing pharmacy under close supervision at our affiliated hospital and community pharmacies).

As with other dynamic professions, pharmacy is constantly changing, and an ongoing review of our program is maintained in an effort to meet society's needs. Important issues, such as drug product selection, patient medication compliance, and drug interactions, are focused upon by the faculty and addressed in the curriculum.

Upon completion of this program, students find exciting opportunities to practice pharmacy in the community, in hospitals, in pharmaceutical industry, and in government service. Because the School of Pharmacy is fully accredited by the American Council on Pharmaceutical Education, graduates are eligible for licensure in all fifty states. Additionally, the school is a member of the American Association of Colleges of Pharmacy.

Beyond the professional degree in pharmacy, graduate education (Master of Science and Doctor of Philosophy degrees) is an integral component of the school. Faculty members, working closely with graduate students, are engaged in diversified pharmaceutical research, including drug synthesis, drug metabolism, the pharmacodynamics of drug activity, and the socioeconomic factors related to drug utilization. These activities are conducted at the University and at affiliated clinical facilities, often in collaboration with other health-care practitioners.

In addition to attention given to its professional and research-oriented graduate programs, the school has a major commitment to improving the quality of patient care. This service concern includes: responsibilities at affiliated teaching sites by faculty members engaged in providing direct patient care and therapeutic consultations; the University Drug Information Service, which disseminates unbiased information to health practitioners statewide; and contemporary continuing education programs offered to pharmacists and allied health-care practitioners.

School and Related Facilities

The School of Pharmacy faculty, staff, and facilities are located in both the Warren G. Magnuson Health Sciences Center and Bagley Hall. The Office of the Dean, pharmacy student advisory offices, faculty and staff offices of the Department of Pharmacy Practice, undergraduate and professional practice teaching laboratories, the Regional Medical Library, the University Drug Information Service, and the division of Continuing Pharmacy Education are located in the Magnuson Health Sciences Center. Bagley Hall houses the faculty and staff offices of the Department of Pharmaceutical Sciences, the school's audiovisual learning resource center, and undergraduate and graduate research laboratories for specialized training in certain areas of pharmaceutical sciences.

The University Hospital, Harborview Medical Center, Children's Orthopedic Hospital and Medical Center, Veterans Administration Hospital, Virginia Mason Hospital, and other Seattle area hospitals serve as major training facilities for undergraduate students. Students are assigned to the patient-care and service areas of these facilities to gain an understanding of drug-delivery systems, therapeutic treatment, and therapeutic planning.

The Drug Information Service (DIS) is operated by the University Hospital Pharmacy Service in conjunction with the School of Pharmacy and the Health Sciences Library. Located in the Health Sciences Library, the DIS provides drug information and consultation to health professionals and serves as a teaching laboratory for students in the clinical pharmacy and clerkship programs.

The University Hospital Outpatient Pharmacy, the Rubenstein Memorial Pharmacy in the Hall Health Center, and nearly a hundred community pharmacies throughout the state serve as ambulatory pharmacy training facilities. Students assigned to these pharmacies acquire skills in prescription practice under the direction of affiliate faculty pharmacists.

The University Hospital Inpatient Pharmacy and twenty other hospital pharmacies in the Puget Sound area serve as training sites for undergraduate and graduate programs in the institutional pharmacy. For elective externships, projects, and clerkships, the school makes use of pharmacies and other health-care facilities throughout the state. These facilities include community pharmacies, hospitals, clinics, law enforcement and governmental agencies, and public health units.

Student Organizations

Students are encouraged to participate in one or more campus organizations, especially the following organizations for pharmacy students: the student chapter of the American Pharmaceutical Association (the chapter is also an affiliate of the Washington State Pharmaceutical Association); Kappa Psi, a professional fraternity; or Rho Chi, the pharmaceutical honor society. All of these groups are affiliated with their respective national organizations, the first two of which have graduate groups throughout the nation and encourage continued participation after graduation.

Undergraduate Program

Advising

Lillie Jones Edward Krupski Jack E. Orr

Bachelor of Science in Pharmacy Degree

The pharmacy student advisory office concerns itself with undergraduate pharmacy advising, counseling, and academic program planning. Once the student is in the school, the office provides curriculum guidance and other assistance necessary for successful completion of the pharmacy program. It also coordinates the prepharmacy programs of the various two- and four-year state schools with the entrance requirements of the School of Pharmacy. The office is responsible for implementing the school's policy of encouraging women and ethnic minorities to seek admission.

Admission Requirements: Completion of the prepharmacy program is required for admission to the School of Pharmacy. The prepharmacy program may be satisfied by the following courses at the University of Washington or their equivalent at any accredited college or university:

C	edits
BIOL 210, 211, 212 (General Biology)	15 14 15
ENGL 171, 172 (College Writing) and speech or other writing course	. 9 .
or	
ENGL 181 (Expository Writing) and	0
MATH 105 (Elementary Eurotions)	5
	5
MATH 157 of 124 (Calculus)	
Microbiology of bacteriology 1	2
(recommended: socialogy asychology anthropology	
economics, interpersonal communications)	. 9
Other electives (applicants who have not completed one	
year of high school physics are required to	
complete two quarters of physics)	13
Total credits not fewer than	



Applicants who have completed the prerequisites for entering the School of Pharmacy should be aware that facilities are limited and admission is competitive. In order to be considered for admission:

1. All applicants not currently enrolled in the University of Washington must submit to the Office of Admissions an application for admission to the University. Two complete sets of transcripts from all colleges and one set from all high schools previously attended should be sent to the Office of Admissions by registrars of the institutions.

2. Submit to the School of Pharmacy a supplementary application together with a complete set of transcripts from all schools attended after graduation from high school.

3. Arrange for a personal interview with the Pharmacy Admissions Committee. In lieu of an interview, out-of-state applicants who find it a hardship to appear may submit three letters of recommendation, of which two must be from science professors.

4. Applicants are requested to submit Pharmacy College Admission Test (PCAT) scores.

The pharmacy supplementary application must be submitted with complete up-to-date scholastic records by April 1 to receive first consideration for admission. The date of April 1 applies only to applications for pharmacy. It does not apply to other schools and/or colleges in the University. Students are ordinarily admitted to the School of Pharmacy only at the beginning of Autumn Quarter.

An applicant who is admissible to the University is not necessarily assured of admission to the School of Pharmacy.

Application forms may be obtained by writing: University of Washington; School of Pharmacy; Chairperson, Admissions Committee; 303D Bagley, BG-20; Seattle, Washington 98195.

Applicants from other institutions who have not fulfilled the prepharmacy program should complete only the Application for Admission to an Undergraduate College or School and, if admissible to the University, will be assigned to the College of Arts and Sciences as premajors.

Curriculum

The curriculum continually is being revised as new courses are made available to meet the changing needs of the pharmacy profession. A copy of the latest revision may be obtained on request.

• All required courses in the prepharmacy and professional curriculum are to be taken for a grade when so offered.

First Professional Year

Autumn Quarter: PHARM 330, Pharmaceutical Calcula-

Winter Quarter: BIOC 405, Introduction to Biochemistry (3 credits); PHARM 333, Dispensing Practice (2); PHARM 450, Pharmacy Laws (3); elective (0-8); total—16.

Spring Quarter: BIOC 406, Introduction to Biochemistry (3 credits); B STR 301, General Anatomy (4); PHSCI 405, Biopharmaceutics and Pharmacokinetics (4); elective (0-5); total—16.

Second Professional Year

Autumn Quarter: PATH 410, Introduction to Pathology (3 credits); PHCOL 401, General Pharmacology (5); PHSCI 440, Medicinal Chemistry (3); PHARM 435, Social and Behavioral Aspects of Pharmacy Practice (2); PHARM 469, Pharmacy Experience Project II (1); elective (0-2); total—16.

Winter Quarter: PHCOL 402, General Pharmacology (5 credits); PHSCI 441, Medicinal Chemistry (3); PHARM 436, Social and Behavioral Aspects of Pharmacy Practice (2); PHARM 481, Introduction to Clinical Pharmacy (3); elective (0-3); total—16.

Spring Quarter: PHSCI 442, Medicinal Chemistry (3 credits); PHSCI 406, Clinical Pharmacokinetics (3); PHARM 484, Clinical Pharmacy (3); elective (0-7); total—16.

Third Professional Year

Autumn Quarter: PHARM 470, Externship in Pharmacy (0-6 credits); PHARM 482, Introduction to Clinical Clerkship (3); PHARM 485, Clinical Pharmacy (2); PHARM 487, Clinical Clerkship: Inpatient Care (0-6); PHARM 488, Clinical Clerkship: Outpatient Care (0-6); elective (0-11); total—16.

Winter Quarter: PHARM 470, Externship in Pharmacy (0-6 credits); PHARM 487, Clinical Clerkship: Inpatient Care (0-6); PHARM 488, Clinical Clerkship: Outpatient Care (0-6); elective (0-16); total—16.

Spring Quarter: PHARM 470, Extensibility in Pharmacy (0-6 credits); PHARM 487, Clinical Clerkship: Inpatient Care (0-6); PHARM 488, Clinical Clerkship: Outpatient Care (0-6); elective (0-16); total—16.

Students are required to complete a minimum of 400 experiential hours, or 12 quarter credits, in the following courses: PHARM 482, Introduction to Clinical Clerkship (3 quarter credits—100 experiential hours); PHARM 470, Externship in Pharmacy (6 credits—200 hours); and an additional 3 credits—100 hours from the following: PHARM 470 or PHARM 487, Clinical Clerkship: Inpatient Care, or PHARM 488, Clinical Clerkship: Outpatient Care.

Graduation Requirements

The pharmacy program is a five-year course of study that leads to a Bachelor of Science in Pharmacy degree. The professional program usually requires three years to complete, and most students spend the final three years in residence at the University. Students working toward the baccalaureate degree in pharmacy must meet certain general requirements of the University and the following school requirements: completion of the prescribed curriculum, with a minimum of 234 academic credits, and with a cumulative grade-point average of 2.00 in the professional courses and an overall cumulative average of 2.00. No more than 18 credits in advanced ROTC courses, no more than 6 credits in PHARM 495, and no more than 6 credits in professional courses numbered 499 may be applied toward graduation.

Licensure

In order to be admitted to the practice of pharmacy as a registered pharmacist in the state of Washington, the candidate must graduate from an accredited school of pharmacy, complete the internship requirements as prescribed by the State Board of Pharmacy, and pass the licensing examination.

A prospective pharmacy student should file an application for licensure as a pharmacy intern with the State Board of Pharmacy so that internship experience gained will be credited toward state requirements. The board establishes the nature and amount of internship experience required.

Additional information about licensure requirements may be obtained from the State Board of Pharmacy; Washington Education Association Building; 319 East Seventh Avenue; Olympia, Washington 98501.

PHARMACEUTICAL SCIENCES

305 Bagley

Faculty

Lynn R. Brady, Chairperson; Brady, Elmer, Fischer (emeritus), Gibaldi, Goodrich (emeritus), Huitric (emeritus), Hwang, Krupski, Levy, McCarthy, S. Nelson, W. Nelson, Slattery, Teng, Trager, Vincenzi.

The Department of Pharmaceutical Sciences provides the pharmaceutical sciences component of the pharmacy curriculum. Courses include background training in biopharmaceutics, pharmacokinetics, mechanisms of drug action and drug metabolism, medicinal chemistry, pharmaceutical analysis and pharmacognosy. Fundamentally, this basic body of knowledge is intended to meet the present needs and, with the contribution of continuing education, the future needs of pharmacy practice for expertise in the pharmaceutical sciences. A limited number of elective courses is available to nonmajors with suitable prerequisites. Scientific research activities of the faculty include studies on various problems of drug distribution and metabolism, identification of useful natural products, instrumental analysis, mechanisms of drug action, microbial metabolism and physiology, and structure-activity relationships. A number of projects involving drug distribution and drug metabolism are cooperative efforts with research groups in the School of Medicine.

Graduate Programs

Graduate Program Adviser

Lynn R. Brady 305 Bagley

The Department of Pharmaceutical Sciences offers programs of graduate study leading to the degrees of Master of Science and Doctor of Philosophy. The programs provide opportunities, for acquiring advanced expertise in biopharmaceutics, medicinal chemistry, pharmaceutical chemistry, pharmacognosy, and pharmacokinetics. Those pharmaceutical sciences, which apply diverse disciplinary knowledge and techniques to pharmaceutical problems related to bioavailability and pharmacokinetics, drug design, drug metabolism, formulation, production, and quality control, can qualify the graduate to assume a place in teaching, research, manufacturing, or other health-service affiliation.

When substantive information is available, permission may be granted for the student to bypass the master's degree and to proceed directly into a doctorate program. Evidence for reading competence in one foreign language (French, German, Japanese, or Russian) is required for all graduate students, and the student who has not satisfied this requirement prior to admission is expected to do so at the earliest opportunity. Academic accomplishments and progress toward meeting the requirements of the projected degree program for each student are reviewed at six-month intervals by a departmental graduate evaluations committee. Participation in a cumulative examination process is an additional requirement for the Ph.D. program.

Admission Requirements: Students who intend to work toward a Master of Science or 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 Pharmaceutical Sciences.

Students with undergraduate degrees in pharmacy or in the biological or physical sciences are accepted for graduate study in the pharmaceutical sciences. Undergraduates who plan to pursue graduate study may expedite their programs by selection of pertinent electives. Although the choice of electives varies with the student's selected field in the pharmaceutical sciences, graduate study requires adequate prep-

SCHOOL OF PHARMACY



aration in mathematics and in the biological and physical sciences.

Master of Science Degree

A student in the M.S. degree program must present at least 27 credits of course work, exclusive of thesis and nonthesis research. The student also must complete a research project, prepare an acceptable thesis, and pass a final examination.

Doctor of Philosophy Degree

A student in the Ph.D. program must present a minimum total of 45 credits of course work, exclusive of dissertation and nonthesis research. The credits earned for the master's degree may be applied toward the doctoral degree. The student must pass a General Examination for admission to candidacy for the doctoral degree, complete a research project, prepare an acceptable dissertation, and pass a Final Examination. The research for the doctoral degree must be done at this University.

PHARMACY PRACTICE

215 Health Sciences Annex II

Faculty

William H. Campbell, Chairperson; Christensen, Dawson, Edwards, Erickson, Fuller, Hall, Hammarlund, Horn, Ivey, Jones, Kradjan, Koup, Mueller, Orr, E. Plein (emeritus), J. Plein, Romano, Smith, Woo.

The Department of Pharmacy Practice is responsible for the components of the pharmacy curriculum that specifically relate to the provision of professional pharmaceutical services. These include courses in dispensing pharmacy, clinical pharmacy, hospital pharmacy, basic pharmaceutics, manufacturing pharmacy, and pharmacy administration.

Externships, service-oriented projects, and clinical clerkships are available for experiential learning of both traditional and innovative practice roles. The department offers graduate programs leading to the Master of Science degree with emphasis on clinical pharmacy, drug information service, and pharmacy administration. Courses concerning pharmacotherapeutics and drugs in society are also provided for nonpharmacy majors. In recognition of the importance of continuation of education for pharmacists and other health practitioners, various lectures, seminars, and workshops are sponsored both on and off campus. This function is recognized as a responsibility of the department and is further implemented by the Director of Continuing Education.

The Department of Pharmacy Practice is administratively responsible for operating the Rubenstein Memorial Pharmacy in the Hall Health Center and the Drug Service Cost Center. These facilities are also used as teaching sites for pharmacy students.

Research programs are conducted by faculty members of the Department of Pharmacy Practice on methods of delivery of pharmaceutical services in health care and on optimizing drug effects in patients. Development and evaluation of innovative teaching techniques also receive major attention. A pharmacy externship program is offered to provide students a better opportunity to relate their academic education to professional pharmacy practice.

Graduate Programs

Graduate Program Adviser

William H. Campbell 215 Health Sciences Annex II

The Department of Pharmacy Practice offers programs of graduate study leading to the Master of Science degree. The programs provide a broad education in pharmacy and the allied supporting sciences, completion of which can qualify the graduate to assume a place in advanced levels of professional practice.

These programs combine formal course work with independent study and research training in the area of specialization. Course work taken by the graduate student depends upon the student's background and chosen area of specialization. Programs are designed to be completed within a two-year period.

Admission Requirements: A student with an undergraduate degree in pharmacy and who meets requirements for admission to the Graduate School is eligible to apply for graduate study in the Department of Pharmacy Practice. In addition, all students must be eligible for licensure as pharmacists in Washington. For students interested in advanced clinical pharmacy work, it is highly desirable that their undergraduate preparation include completion of a clinical clerkship or externship as well as courses in such basic biomedical sciences as pathology, anatomy, and biochemistry.

Master of Science Degree

A student in the M.S. degree program must present at least 36 credits of course work, exclusive of thesis and nonthesis research. A nonthesis option is available.





Dean

Brewster C. Denny 266 Smith

Faculty

Brown, Crutchfield, Demmert, Denny, Elmore, Goodisman, Hall, Hashimoto, Jose, Kroll, Levi, Lindenberg, Lines, Locke, Lyden, Mackle, Marts, May, Miles, Miller, Pealy, Shipman, Wenk, Williams, Wolfle, Wolters. M. Eric Wolters, graduate program adviser.

Graduate Program

Master of Public Administration

Graduate School of Public Affairs is a graduate professional school providing education and research for the public service. The school offers a program of studies leading to the degree of Master of Public Administration, designed to prepare the student for service as a professional administrator in the public service at all levels—local, state, national, and international.

Graduates serve in such varied positions as foreign-service officers, city managers, budget analysts, and legislative staff assistants. The school draws upon those disciplines of the University that contribute to professional education and research in the field, and thus the faculty includes participating members from these disciplines. The school also cooperates with a number of University departments in doctoral programs that have a significant public policy or public administration content.

Admission Requirements: Admission to this program requires formal admission to the Graduate School as well as

PUBLIC AFFAIRS

acceptance by the Graduate School of Public Affairs. There is no formal requirement for specific undergraduate courses or majors. The school invites applications from students with such varied backgrounds as business administration, economics, engineering, history, political science, public health, social work, or other fields in the social and physical sciences to undertake a program leading to professional public service. The student usually needs a background in the social sciences and the nature and historical background of American institutions, basic preparation in general economics and statistics, and a mature capacity to digest reading and to express ideas in clear and lucid English. The student who lacks sufficient background in these areas may be required to make up these deficiencies by taking or auditing appropriate courses in addition to the course requirements for the degree.

Graduate Requirements: Ordinarily, the degree of Master of Public Administration is awarded upon the successful completion of two years of course work, or 60 quarter credits, an internship, and a degree project. Specific courses required or taken depend upon the curricular track selected and the student's interests. This is a nonthesis program. There is no formal foreign-language requirement.

A student may select a field of emphasis from two general concentrations: (1) public administration, for students primarily interested in general administrative or managerial positions in the public service, and (2) public policy, for students preparing for government positions that require professional preparation in one or more particular areas of public policy such as foreign affairs, science and public policy, social and health policy, natural resources, urban affairs, and the like. With the approval of a program adviser, the student selects courses from those offered by the school and by other University units. Central to the program are courses offered by numerous other schools and colleges throughout the University, and courses taught by cooperating and participating faculty serve as an integral part of the school's curriculum.

In addition to the basic course work and the internship, the student has the opportunity to participate in seminars at which distinguished public servants appear, in workshops, in conferences sponsored by the Graduate School of Public Affairs, and in the activities of the Institute of Governmental Research.

Midcareer Education

A substantial number of students in the school are public servants with several years of public service who, on a part- or full-time basis, take graduate work at midcareer to prepare themselves for new and broader policy and administrative responsibilities. The University is one of eight universities participating in the Education for Public Management program sponsored by the United States Office of Personnel Management. Under this program, approximately twelve federal and state officials enroll each year in the Graduate School of Public Affairs for a special midcareer educational program that emphasizes the administration of public policy.

Tribal Administration

The Graduate School of Public Affairs, in cooperation with the United Indians of All Tribes Foundation, has developed a Tribal Administration Program leading to a Master of Public Administration degree. The program combines the core of the existing M.P.A. program with course work and experiences directed at the specific needs of tribal and native corporation administrators. Students spend a minimum of one year at the University, followed by a year in the field.

Course work includes a number of specialized courses taught by Native American faculty, plus workshops and seminars by experts in the field.

Institute of Governmental Research

As a major research unit of the University, the Institute of Governmental Research performs a variety of roles concerned with problems of public policy and administration in the state of Washington and other Pacific Northwest states. In the performance of these roles, a primary mission of the institute is to work with other organizations of the University in bringing the highest standards and criteria of various disciplines to the solution of public problems.

Institute policies are developed through advisory committees composed of representatives of University schools and departments that wish to participate in efforts to formulate solutions to public policy issues. The institute also receives policy advice from committees composed of public officials and civic leaders. Thus, the institute is University-wide in its activities and interests and is an important link between the University and the world of public affairs.

The rapid urbanization of Washington State has created new problems and has intensified old ones for the state government and its local governments, as well as for federal and regional agencies. Consequently, in the activities of the institute staff and its relationships within the University, with public officials, and with citizen organizations, major program emphasis is on problems of urban public policy and administration. The institute develops and administers programs to increase opportunities for cooperative interdisciplinary research by faculty and graduate students on pressing problems of urban society that have lasting research significance.

The institute is administered on behalf of the University by the Dean of the Graduate School of Public Affairs as executive agent. The institute, with a substantial broadening in mission and an expansion of University research and service in urban affairs, is the successor organization to the Bureau of Governmental Research and Services.

Additional information and a detailed publication on this program may be obtained from the University of Washington, Graduate School of Public Affairs, Graduate Program Adviser, 253 Smith, DP-30, Seattle, Washington 98195.



PUBLIC HEALTH AND COMMUNITY MEDICINE

Dean

Robert W. Day F350 Health Sciences

Associate Dean

William C. Richardson F350 Health Sciences

Faculty

Beasley, Bell, Bergman, Bergner, Bice, Boatman, Bobbitt, Breslow, Breysse, Brodsky, Bruneau, Buchanan, Callen, Carter, Chapko, Chen, Christensen, Connell, Conrad, Cooney, Corbett, Covert, Daling, Davis, Day, DeRouen, DeWalle, Diehr, DiGiacomo, Dolan, Dowling, Durham, Eaton, Emanuel, Evashwick, Faigenblum, Farewell, Feigl, Fish, Fisher, Fox, Foy, Frank, Freeman, Gale, Geraci, Gilson, Goble, Grayston, Hakomori, Hall, Hallstrom, Harmon, Hatlen, Henderson, Hibbard, Hoover, Horstman, Inui, Jackson, Johnson, Kalman, Kenny, Kleinman, Koenig, Koepsell, Kronmal, Kuo, Lawrence, Lee, Lester, LoGerfo, Luchtel, MacStravic, Martin, McCaffree, Milner, Morgan, Moscovice, Penman, Perrin, A. Peterson, D. Peterson, M. Peterson, Polissar, Prentice, Rausch, Reeves, M. Richardson, W. Richardson, Riedel, Shortell, Spiers, Stibbs, Stoll, Temkin, Thomas, Thompson, Tompkins, Trivedi, Urban, Van Belle, Van Dusen, Wahl, Wang, Ward, Watts, Weiss, Wetzler, Williams, Wilson.

The School of Public Health and Community Medicine, established in 1970, comprises five academic departments: Biostatistics, Environmental Health, Epidemiology, Health Services, and Pathobiology. In addition, special academic programs in biomathematics, health administration and planning, and radiological sciences are sponsored by the departments of Biostatistics, Health Services, and Environmental Health, respectively.

Academic programs are characterized by their close relationships with the research and service programs of the school; by the careful selection of students; by their emphasis on flexibility for adaptation to the needs and interests of individual students; and by their interrelationships with existing programs in other units of the University. Through its academic programs, the school graduates highly qualified investigators, teachers, and specialists in a variety of disciplines relevant to public health and community medicine.

Community Involvement and Research

The School of Public Health and Community Medicine maintains a continued involvement in research, technical assistance, and consultation activities relevant to local, state, regional, and national needs. Members of the faculty serve on various advisory groups at all governmental and voluntary agency levels.

Faculty and students of the school collaborate in a number of major interdisciplinary and multidisciplinary studies. Representative examples include national Wilms Tumor Study, Northwest Lipid Research Center, Collaborative Study in Coronary Artery Disease, Group Health Cooperative of Puget Sound, and the Health Care Financing Administration. Specific arrangements exist between the Department of Environmental Health and the Washington State Department of Labor and Industries for consultation, training, and special studies in the area of occupational medicine and industrial hygiene. Faculty from the departments of Health Services, Biostatistics, Environmental Health, and Epidemiology collaborate in studies and other activities with the Washington State Department of Social and Health Services, the State Hospital Commission, planning agencies, and local county health departments. Clinical faculty appointments in a number of the departments include persons particularly skilled in aspects of the teaching and research programs but whose primary responsibilities are with governmental and voluntary health agencies and organizations.

The contributions of faculty members and students, as well as the findings from research programs, provide a wealth of knowledge and skills that are made available to the region through technical assistance, consultation, and continuing education. The school provides information and the skill of faculty and students in a broad range of health-related topics, including the management, design, and analysis of statistical data; planning and coordination of health services; studies of medical care; community survey design; implementation and evaluation; clinical trial design; industrial hygiene and occupational health and safety; health policy analysis; impact of infectious and chronic diseases on the community; and in a variety of health-related areas.

Increased public and professional concern for competency maintenance and quality assurance in health care has resulted in a growing emphasis on continuing and extended degree education. The school maintains a strong industrial hygiene continuing education component in cooperation with the Washington State Department of Labor and Industry. Technical assistance in continuing education is provided through needs assessment, curriculum design, and program design. The number of courses, seminars, and conferences participated in by school faculty continues to grow in relationship to the needs of the community and the Pacific Northwest.

Admission

Admission to the School of Public Health and Community Medicine is permitted only through one of the five departments. Inquiries concerning both degree program and residency training and related requests for applications should be directed to the departmental program advisers, as follows: Biostatistics, Richard A. Kronmal, Ph.D.; Environmental Health, Jack Hatlen, M.S.; Epidemiology, Noel S. Weiss, M.D.; Health Services, Frederick A. Connell, M.D.; Pathobiology, George E. Kenny, Ph.D.; or to the Office of the Dean.

If there is a problem determining the proper department to which to apply, inquiries should be sent to the Office of the Dean. Letters of inquiry should indicate as clearly as possible the writer's educational background, relevant work experience, general area of interest, type of training desired, and possible career goals.

The Graduate School of the University of Washington has administrative responsibility for graduate study in whatever division of the University it is undertaken. The Graduate School coordinates admissions and approves programs of study leading to graduate degrees. The student undertaking graduate education, therefore, must be admitted to the Graduate School, as well as to the school, college, or group in which he or she wishes to study. Graduate School application forms are sent to all persons interested in degree programs offered by this school. The school application also is considered complete when the following have been received:

By the Graduate School admissions office—the Graduate School application form; application fee; two copies of official transcripts covering all previous university-level education.

By the School of Public Health and Community Medicine—the School of Public Health and Community Medicine application form; a narrative statement indicating the education and career goals of the applicant; three letters of recommendation from persons competent to evaluate the applicant's professional abilities; test scores or interviews, if required by the particular program.

Most training begins with Summer Quarter or Autumn Quarter. Some programs allow entry at other times of the year. The deadlines for applications are: Summer Quarter, May 15; Autumn Quarter, July 1; Winter Quarter, November 1; Spring Quarter, February 1.

Applicants are strongly encouraged to submit their applications well in advance of the deadline. Those whose native language is not English must establish their competence in English, which may be accomplished by the passing of an English language proficiency test.

Financial Aid

Limited stipend support is available from a variety of sources. Some funds are available as general support. Several of the departments have training grant student support. In individual cases, it may be possible to arrange limited financial support for students whose area of research and teaching overlap with areas supported by federal research grants. Such support can be on a limited basis only and must be arranged with the principal investigator of each individual grant. A limited number of teaching assistant positions may be available. Inquiries about support may be sent to the program adviser of the department in which the applicant has a major interest.

Graduate Programs

Graduate degree programs offered by the School of Public Health and Community Medicine include:

Master of Public Health Degree

This degree is intended for the student with a background in the health field sufficient to give an opportunity to benefit



from the breadth requirements and to enable the student to make an informed choice with respect to specialty interests. Some degree of related work experience is generally required. A prior doctorate in the health field would satisfy this requirement. The M.P.H. is a school-wide degree requiring formal course work in the several areas of public health. Each student, in addition, must choose an area of concentration corresponding to one department of the school (usually Environmental Health, Epidemiology, or Health Services). The time required to complete an M.P.H. degree, including thesis, is normally six quarters.

For physician candidates for this degree, concurrent credit as a resident in general preventive medicine or public health is provided. Because the Board of Preventive Medicine requires a minimum of one year of graduate study and one or two years of residency, candidates with prior residency training in a cognate clinical field may work toward joint board certification. Students of the School of Medicine may enter a joint M.D./M.P.H. program, beginning with the second year of medical school.

Master of Science in Public Health Degree

The Master of Science in Public Health degree is offered in the following areas of specialization: environmental sanitation, industrial hygiene and safety, health services, epidemiology, and pathobiology (the biology of infectious agents). The Biomathematics Group, in which the Department of Biostatistics faculty participates, offers training in statistical theory, mathematics, and statistical analysis leading to a Master of Science degree. The Radiological Sciences Group, composed in part of faculty from the Department of Environmental Health, offers training in radiation biology, radiation dosimetry, and radiation protection leading to a master's degree.

Master of Health Administration Degree

A two-year program of studies leading to the degree of Master of Health Administration is offered by the faculty in the interdisciplinary Health Services Administration and Planning Group of the Graduate School. Administrative offices are located in the Department of Health Services. The program accommodates degree candidates in any one of three areas of specialization: health services administration, planning, and policy analysis. The curriculum is designed to be highly interdisciplinary, with a faculty drawn from several academic units within the University. Faculty of the Department of Health Services and collaborating faculty from a wide variety of graduate schools and academic departments on campus govern a curriculum leading to this degree.

See Interdisciplinay Graduate Degree Programs, page 215.

Doctor of Philosophy Degree

The Ph.D. degree is offered both by the Department of Epidemiology and by the Biomathematics Group. In addition, the Department of Health Services offers a "doctoral opportunities" program by which doctoral students from various disciplines and schools at the University may take an area of concentration in health services research.

Summer Program

The basic graduate courses in biostatistics, environmental health, epidemiology, and health services are offered during the six weeks beginning about July 1 of each year. A limited number of more advanced courses are also offered on a selective basis.

For prospective candidates entering the program during Summer Quarter, taking this course sequence permits easy and speedy transition to more specialized courses, individual study, and field and research work.

BIOSTATISTICS

F600 Health Sciences

Chairperson

Donovan J. Thompson

The biostatistics specialization prepares the student for technical positions in health research organizations and health-care agencies. It emphasizes mastery of quantitative methods (statistics, operations research, systems analysis), elements of computer programming, and data processing. In addition, students specialize in one or more healthrelated areas, such as epidemiology, biology, or health services research. (See also description of biomathematics program on page 217 for additional degree programs.)

ENVIRONMENTAL HEALTH

F463 Health Sciences

Chairperson

John T. Wilson, Jr.

Undergraduate Program

Bachelor of Science Degree

The Department of Environmental Health offers an undergraduate program for the study of environmental conditions that affect human health and well-being and thus are of major concern in the field of public health. Many environmental hazards have been successfully controlled or modified, but our highly technological and urbanized society continues to create new hazards and magnifies existing problems that threaten the social, physical, and mental well-being of all of us. A few of the problem areas requiring environmental health expertise are: maintaining adequate quality and quantities of food and drinking water; safe disposal of waste material; limiting air, noise, and visual pollution; ensuring safe and healthful housing; properly selecting and applying pesticides to control the spread of insect- and rodent-borne diseases; enhancing the working environment; and reducing or limiting occupational exposure to hazardous substances and unsafe conditions and practices. Once the environmental health specialist has identified relevant community and industrial health hazards, that person seeks to reduce or modify those problems. This is accomplished by educating the persons responsible on the need for change in individual behavior, in work practices, or in the physical facilities. The environmental health specialist enforces applicable laws, codes, ordinances, or regulations pertaining to environmental health when the educational approach is not effective or when an imminent health hazard exists.

The program of study in environmental health trains individuals in the techniques for assessing and managing our environment as it relates to health and safety and for examining the effectiveness and efficiency of community environmental health programs. This program of study is multidisciplinary, with strong foundations in the natural sciences. The courses and learning experiences are designed to provide students with the functional knowledge, skills, and attitudes necessary to initiate needed changes. Core courses must be taken and requirements must be met, but there also exists the opportunity to pursue areas of particular interest and need by individual students. The curriculum provides the student with a basic orientation and training in environmental health concepts and practice, while providing for career flexibility in a number of possible public health, environmental health, industrial hygiene and safety, and occupational health fields.

Most graduates are initially employed by local health agencies. A few start employment with state agencies, such as the Department of Social and Health Services and the Department of Labor and Industries, and, at the federal level, with the Occupational Safety and Health Administration in the Department of Labor or the Public Health Service. Employment in these upper-level governmental agencies, as well as most private industry, requires field experience in addition to the baccalaureate degree, if not a graduate degree.

Environmental health specialists also have established careers in areas such as comprehensive health planning, education, and private consultation activities. The student's creativity, initiative, interests, adaptability, and selection of elective courses determines, in large part, the professional preparedness at graduation and future employment and advancement.

A number of our graduates apply for further study in a variety of graduate programs, including environmental health, industrial hygiene and safety, air pollution, hospital or health-care administration, and radiological health, or professional programs in medicine or dentistry. It is strongly recommended that students have from one to three years of field experience prior to application for graduate study in a technical area.

Graduation Requirements

A student in this program must meet the distribution course requirements established by the College of Arts and Sciences: 20 credits in humanities, 20 credits in social sciences, and 30 credits in natural sciences (see Distribution List, *Bachelor's Degree Planbook*, distributed by College of Arts and Sciences Central Advising). He or she should take additional courses in the social sciences and humanities that help the student develop an awareness and understanding of the social issues and limited skills or techniques in community planning and communications. Preenvironmental health course requirements include CHEM 140, 150, 151, 160 and 231, 232, or 102; BIOL 210, 211, 212, or 101-102; P BIO 360; PHYS 114, 115, 116; MATH 105 or 106; MICRO 301, 302; ENGL 171 or 271; and ENGR 331.

Required introductory courses in environmental health and public health include: ENVH 411, EPI 420, and BIOST 472.

Environmental health majors are required to complete the technical courses that may relate to their future professional work. These include ENVH 430, 431 (Methods in Environmental Sampling and Analysis I, II), 440 (Water and Waste Sanitation), 441 (Food Sanitation), 450 (Measurement and Control of Air Pollution), 453 (Industrial Hygiene and Safety), 454 (Industrial Hygiene Laboratory), 442 (Vector Control), 443 (Human Habitat and Health) or 444 (Institutional Environmental Health), and 457 (Noise and the Environment). Toward the end of the student's academic training, the environmental health major is required to write on an environmental health topic that has been investigated. through library, field, and laboratory research and as a study project (ENVH 479, 480). Field training (ENVH 482, 483, 484), involving ten weeks of actual work experience, is required. It may be taken between the junior and senior years if basic environmental health courses have been completed during the senior year or directly following graduation.

Departmental Application Procedure

The process for applying for admission to the environmental health curriculum is as follows:

1. Submit a departmental admission application form during the last quarter of the sophomore year or after completion of at least 90 quarter credits.

2. Arrange for interviews by departmental faculty involved in the undergraduate program.

3. Have three letters of reference sent to this department. These letters should be from persons able to assess personal and academic capabilities.

The application form and other necessary materials may be obtained from any of the departmental advisers. Students interested in pursuing environmental health as a major or who want information about the field of environmental health are encouraged to make an appointment with a departmental adviser: Karen VanDusen or Jack B. Hatlen, F461 Health Sciences, telephone (206) 543-4252.

Graduate Program

Master of Science in Public Health Degree

Three optional routes lead to a master's degree: industrial hygiene and safety, environmental sanitation, and occupational medicine. All three routes provide training and experience in technology, management, and/or applied research.

The industrial hygiene and safety option focuses on the technical, psychological, and administrative aspects relevant to the prevention or control of industrial disease and accidental injury. Students in this option develop professional expertise in hygiene and safety.

The environmental sanitation option's goal is to educate and train individuals capable of identifying community environmental health problems and then to plan and manage effective control programs. Special emphasis may be placed in a single area of technology such as water or waste-water sanitation, environmental microbiology, foodborne-disease control, program management, environmental health education, or in general sanitation for communities or industry.

The occupational medicine option provides physicians clinical experiences, didactic instruction, and participation in field studies relating to industrial or work-related health problems. Research efforts focus on the etiology and prevention of occupational disease. Admission to this option, by special permission, is restricted to physicians and medical students.

Admission Requirements: Prerequisites for admission to this graduate program include:

1. Bachelor of Science or equivalent degree in environmental health, a physical science, or a biological science.

2. Admission to the Graduate School. A grade-point average of at least 3.00 overall or during the last year of college is a guide in considering the scholarship of an applicant.

3. Preference is given to applicants with two or more years' experience in environmental health practice who are applying for the environmental sanitation option.

4. The applicant is *required* to take the Graduate Record Examination. The Miller Analogies Test is optional.

Graduation Requirements: Six-quarter program of study, including field applications and research, totaling a minimum of 60 credits plus 9 credits of thesis. Submission of an acceptable thesis. Additional information regarding the program content, degree options, and recommendations on specific courses may be obtained from one of the graduate program advisers: Jack B. Hatlen, environmental sanitation, and Peter A. Breysse, industrial hygiene and safety.

Radiological Sciences

The Radiological Sciences Group, in which Department of Environmental Health faculty members participate, offers training leading to careers in health physics, radiological health, and radiation biology. Multiple options for the master's degree are available in order to satisfy the somewhat different requirements and interests of biological scientists, physical scientists, and engineers.

Career objectives include research or administrative positions in government laboratories and regulatory agencies, industry, and academic institutions. Additional information about this degree program may be found in the Interdisciplinary Graduate Degree Programs section of this catalog. Inquiries concerning the program should be addressed to the Chairperson of the Radiological Sciences Group.

EPIDEMIOLOGY

F263 Health Sciences

Chairperson

Donald R. Peterson

The objective of the epidemiology specialization is to produce future academicians, highly qualified as investigators and teachers in the area of epidemiology, and well-trained practitioners of epidemiology. A doctorate in a health field is desirable for admission to the epidemiology specialization, although applicants are considered if they have master's level or higher training in a relevant area, such as anthropology, biostatistics, microbiology, or nursing. The curriculum gives major emphasis to biostatistics and epidemiology, but it also is flexible in content to serve the particular goals of the individual student. Each student works with a faculty adviser or a supervisory committee. The conduct of an independent study (original research or field project) constitutes the most important aspect of the program.

HEALTH SERVICES

F346 Health Sciences

Specialization in health services offers graduate training in two areas: (1) Health Services/Community Medicine and (2) Health Services Administration and Planning. The program in Health Services/Community Medicine is open to individuals who have completed their professional health training, such as physicians, dentists, and nurses, and to others who have had substantial experience in the health field. This program offers a general curriculum that includes introduction to health systems and current issues regarding the provision of medical care, as well as methodologic training for research and program evaluation. Examples of areas of concentration include studies of patient and provider behaviors, evaluation of local, state, and federal health programs, the relationship of health-care financing schemes to the provision of medical care, and the study of the impact of technology on medical care costs and benefits. Students may take courses in other departments of the University, if deemed appropriate by their advisers. Extensive use is made of community agencies and resources. Students with a background in medicine may also qualify to receive concurrent credit for residency training in preventive medicine.

PATHOBIOLOGY

F161 Health Sciences

Chairperson

George E. Kenny

The pathobiology specialization prepares the student for a research career in academic institutions, research institutes, or public health laboratories. Pathobiology is defined as the study of pathogenic biological agents and their interactions with a host. The agents of interest range from multicellular parasites to viruses and also include tumors as a class of endogenous parasites. Host responses studied are primarily immunologic, although pathological and biochemical responses also are investigated. Training is solidly based in molecular biology with specific application to the study of infectious agents and host responses. Major course work in pathobiology is supplemented by appropriate courses in biochemistry, biostatistics, epidemiology, and microbiology. Admission preference is given a student with a baccalaureate degree in biology or biochemistry.

BIOMATHEMATICS

Chairperson

Richard A. Kronmal

The Biomathematics Group, in which the Department of Biostatistics faculty participates, offers training in mathematics, statistical analysis, and statistical theory. Career objectives include academic teaching and research, as well as positions in research or administrative agencies of federal or local government and private corporations. A career example might be the statistician who designs and analyzes clinical trials of new drug therapies. Information concerning the graduate program in biomathematics appears in the Interdisciplinary Graduate Degree Programs section of this catalog. Inquiries concerning this program should be addressed to the Chairperson of the Biomathematics Group.

HEALTH SERVICES ADMINISTRATION AND PLANNING

The graduate program in Health Services Administration and Planning offers a two-year course of study leading to the degree of Master of Health Administration. The M.H.A. degree is formally sponsored through the interdisciplinary group degree mechanism of the Graduate School. The program is administratively based in the School of Public Health and Community Medicine with its core teaching faculty appointed in the Department of Health Services. The course of study is designed to provide preparation for careers in management, planning, policy analysis, and similar roles 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. Additional information about this degree program may be found in the Interdisciplinary Graduate Degree Programs section of this catalog. Inquiries should be addressed to: Director, Graduate Program in Health Services Administration and Planning.

PUBLIC HEALTH AND COMMUNITY MEDICINE

Doctor of Philosophy Degree

Programs leading to the Ph.D. degree, offered by the Department of Epidemiology and by the Biomathematics Group, are described in the Interdisciplinary Graduate Degree Programs section of this catalog. Both programs differ from the master's degree program principally in the nature and scope of the programs' independent study project and the resulting dissertation, and in the expected time required to complete the program, usually a minimum of three years.

The prospective epidemiology Ph.D. candidate studies the distribution of disease in populations for mankind and seeks to identify factors that influence its occurrence. Course work includes a basic series on epidemiology, one or more courses in biostatistics, and seminars in both of these fields. Electives are dictated by the individual student's interest. Soon after admission, the student begins participation in an ongoing research project to gain familiarity with specific techniques and research methods. The student may plan and execute a particular minor phase of the project. The applicant for this program must have a degree in medicine, dentistry, or veterinary medicine, or be a qualified holder of a master's or higher degree in a relevant field, such as nursing, microbiology, biostatistics, or an appropriate social science. Others considered are students enrolled in the



schools of Dentistry or Medicine and recommended for the concurrent D.D.S.-Ph.D. or M.D.-Ph.D. program.

The Department of Health Services has a doctoral opportunities program in which doctoral students from various disciplines and schools at the University may take an area of concentration in health services research. The purpose of this program is to build upon the student's basic disciplinary knowledge and methodologies by showing how they can be applied to issues involved in the delivery of health services. Inquiries concerning this program should be addressed to Donald C. Riedel, Ph.D.



RESERVE OFFICER TRAINING PROGRAMS

The departments of Aerospace Studies, Military Science, and Naval Science offer ROTC programs under agreements between the University and the United States Air Force, Army, and Navy. Eligible freshman students, both male and female, may enroll in any one of the ROTC programs. Transfer or currently enrolled students who plan to attend the University at least six more quarters, excluding summer sessions, may apply for enrollment in ROTC. Participation in ROTC is elective.

The Department of Military Science offers a traditional four-year, and a special two-year, program each of which leads to a commission as a second lieutenant in the Army Reserve or active forces. Students may opt for simultaneous membership in reserves/National Guard and additional financial compensation. The special two-year option allows students to attain a reserve/National Guard commission and to serve as reserve second lieutenants prior to graduation.

The Department of Naval Science offers both a four-year and a two-year program leading to a commission as an ensign in the Navy or a second lieutenant in the Marine Corps.

The Air Force program consists of a two-year general military course and a two-year professional officer course, which lead to a commission as a second fleutenant in the United States Air Force. Any qualified male or female student may enroll in the general military course. Each qualified entering freshman may register for Air Force ROTC and be enrolled in the four-year program. Students to be given financial assistance are advised accordingly. Transfer students having eleven or more quarters remaining in school may also enroll in the four-year program. Students with at least two full years remaining in school as an undergraduate, graduate, or a combination of both may apply for the two-year program. AFROTC, NROTC, and AROTC counselors are available at all times in the departments of Aerospace Studies, Naval Science, and Military Science.

Students given financial assistance and entering the advanced or upper-division ROTC program must agree in writing to complete the program and to accept a commission in the service for which they are educated.

The specific courses and requirements for each service are described in the following sections. The courses are taught by regular officers assigned to the University by the Army, Navy, Marine Corps, and Air Force.

AEROSPACE STUDIES

Clark Hall

Faculty

Col. James Kennedy, USAF, Professor of Aerospace Studies; Estes, Gentry, Kim, Klein.

The Air Force ROTC program is designed to provide for the development of skills and attitudes vital to the career professional Air Force officer. The graduate qualifies for a commission and enters upon active duty in the Air Force.

Four-Year Program

The four-year Air Force ROTC program consists of a twoyear general military course and a two-year professional officer course. Any qualified male or female student may enroll in the general military course. This program consists of one classroom hour and one corps training hour per week during the freshman and sophomore years. Uniforms and textbooks are furnished.

After completing the general military course, cadets may apply for entrance to the professional officer course. Entrance is competitive.

Cadets selected for enrollment in the professional officer course are enlisted in the Air Force Reserve and receive subsistence pay of \$100 per month. They are furnished texts and uniforms and are required to attend three class periods and one corps training hour each week. Between the sophomore and junior years, each cadet is required to attend a four-week field training course at an Air Force base, for which he or she receives pay. Travel costs are paid by the Air Force.

Financial Assistance Grant Program

(a)

Each year a number of selected cadets in the four-year program are awarded AFROTC college scholarships. These cadets are enlisted in the Air Force Reserve and receive tuition, fees, books, uniforms, and \$100 subsistence per month. Course requirements are as described above.

Three- and two-year scholarships are also available for certain scientific/engineering and pre-health professions majors and pilot, navigator, and missile launch officer candidates. Limited numbers of two-year scholarships are available to students majoring in selected nontechnical academic disciplines. To take advantage of these three- and two-year scholarships, the student applies directly to the Air Force ROTC detachment during the freshman or sophomore year.

Two-Year Air Force ROTC Program

To provide for those students who are unable to participate in the four-year Air Force ROTC program, a two-year professional officer course is available on a competitive basis. Students in this program are required to attend a six-week field training course at an Air Force base during the summer preceding entry into this program. The student is paid during the six-week period. Course requirements, upon return to the campus, are as listed for the professional officer course. Uniform, texts, and \$100 subsistence per month are provided.

Prior Military Service

Those students with prior military service selected for the professional officer course may be given credit for the general military course. They also may be allowed to attend a four-week field training course instead of a six-week field training course. The four-week field training course may be taken either between the sophomore and junior years or between the junior and senior years. The student is paid during this four-week period. The rest of the course requirements are as listed for the professional officer course. Uniform, texts, and \$100 subsistence pay per month are provided.

Flight Training

Flight training is available to students enrolled in the AFROTC Flight Instruction Program (FIP). The Air Force pays the cost for up to twenty-five hours of flight instruction from an accredited flying school. Those who complete the FIP and receive commissions go on to Air Force pilot training to become Air Force pilots.

Four-year students must have 24 graded credits of aerospace studies, not including FIP, and two-year students must have 18 graded credits of aerospace studies, not including FIP, to satisfy departmental graduation requirements.

Inquiries about enrollment or other information should be addressed to the University of Washington; Professor of Aerospace Studies; Clark Hall, DU-10; Seattle, Washington 98195.

MILITARY SCIENCE

147 Savery

Faculty

Lt. Col. Ronald H. Thornquist, USA, Professor of Military Science; Bain, Camden, Crawford, Mazikowski.

The Department of Military Science offers the college student several elective options for the attainment of an Army officer's commission in reserve or active forces through Army ROTC while pursuing the academic degree of his or her choice.

Traditional Four-Year Program

Open to incoming freshman men and women, this program leads to a commission in either the Regular Army or the Army Reserve. Academic studies include courses in military history and tactics, principles of leadership, techniques of instruction, management and staff procedures, logistics, physical conditioning, and military law. First- and secondyear students may choose to take either the scheduled academic courses or to participate in selected extracurricular activities to receive program credit. Extracurricular activities include such options as Rangers, rifle team, color guard, training exercises, field trips, and related activities. There is no obligation of any kind during the first two years of the four-year Army ROTC program.

Placement credit toward completion of ROTC courses may be given for prior ROTC or military training. Veterans routinely receive full credit for the first two years of Army ROTC and may enter the advanced course directly. All military textbooks and uniform items are furnished without charge. Students in the advanced course receive a tax-free stipend of \$100 per month for a maximum of twenty months. In the advanced course, cadets are required to participate in the leadership development program, which is a practicum of skills and principles taught in the previous two
years. Cadets attend a six-week summer camp between their junior and senior years, during which they receive varied and challenging training and for which they 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, to accept a commission upon graduation, if offered, and to serve on active duty for three years after commissioning or three to six months' active duty training, with the balance of service in the Army Reserve or National Guard.

Two-Year Program

This program is open to qualified undergraduate and graduate students with at least two years in school remaining. Students may qualify for entrance into the advanced course under this program in either one of two ways. First, they may participate in a special summer program offered on the University campus. This is a two-week program covering the freshman and sophomore years of the normal basic ROTC work (M SCI 101, 102, 103, and M SCI 201, 202, 203). Fees are not charged for registration in this program, and students are free to register for and to take other University courses during Summer Quarter. Participation in the program includes individually arranged classwork to accommodate each student's summer work or academic program. Students who have taken some military science courses but who have not completed all courses in the first and second year of ROTC may also arrange to complete the remaining course requirements during this summer program.

The second alternative under this program requires attendance at a basic camp for six weeks at Fort Knox, Kentucky. Completion of this basic camp also qualifies students for direct entry into the advanced course. While at camp, the student receives pay, plus travel expenses to and from the camp location, and can compete for two-year scholarships. Academic subjects covered in the two-year program, are the same as those covered in the four-year programs. Both programs have the same military obligation.

Scholarship Program for Currently Enrolled Students

This program is open to students enrolled in ROTC. Selections are made on a regional level based upon the recommendation of the Professor of Military Science. The scholarship provides financial assistance during the remaining years of the student's enrollment (up to three years). Each scholarship pays for tuition, books, and laboratory expenses and provides, in addition, \$100 per month, tax free. All other advantages and obligations are the same as those of the four-year scholarship program. A \$750 annual scholarship is also available for those students who desire to accept commissions directly into the Washington National Guard. This noncompetitive scholarship is available to all qualified Army ROTC advanced course students in the Washington National Guard. Because these scholarship funds are limited, they are distributed on a first-come-firstserved basis.

Four-Year Scholarship Program

Application for 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 leads to a commission in the Regular Army or the Army Reserve. All tuition, laboratory fees, textbooks, and uniform items, plus tax-free retainer pay of \$100 per month for a maximum of four years, are provided by the Army. The program requires four years of academic study on campus, as well as a six-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 fouryear program. The student must sign a contract (with the consent of parents if under eighteen years of age) wherein he or she agrees to complete the program, to enlist in the Army Reserve, to accept a commission if offered, and to serve on active duty for four years after commissioning.

Additional information concerning the Army ROTC program may be obtained by writing: University of Washington; Professor of Military Science; 104 Clark, DU-20; Seattle, Washington 98195; by visiting the Army ROTC offices at 104 Clark, or by telephoning (206) 543-1930.

NAVAL SCIENCE

305 Clark

Faculty

Capt. P. K. Collins, USN, Professor of Naval Science; Cdr. M. W. Riley, USN, Associate Professor of Naval Science; Butler, Gole, Madden, St. Pierre, Winecoff, Woerman.

The Department of Naval Science offers University students the opportunity to engage in study leading to a commission in the United States Navy or Marine Corps while working toward a baccalaureate degree in an academic field. Two programs are offered.

Navy-Marine College Program

Each year a number of young men and women are accepted for four-year and two-year college programs. For the fouryear program, the professor of naval science accepts applications from qualified students prior to the beginning, and up through the end, of Autumn Quarter. Applications for the two-year program are accepted from current sophomores in community colleges or four-year colleges and must be received prior to April 15.

Those students selected for the two-year program attend a six-week course of instruction at the Naval Science Institute (NSI) during the summer prior to their junior year. Successful completion of NSI qualifies students for enrollment in the advanced course in the NROTC program. NROTC college program students pay their own college expenses, but receive subsistence pay of \$100 per month during their junior and senior years, including the intervening summer.

The Navy furnishes the uniforms and textbooks used in naval science courses. College program students may obtain scholarships through various avenues, including the national competition, by nominations for special competitive appointments by the professor of naval science, and by superior performance at the Naval Science Institute. Upon graduation, college program students are commissioned in the Navy Reserve or Marine Corps Reserve and serve on active duty for three years.

Navy-Marine Scholarship Program

Each year a number of young men and women are accepted for scholarship status in the four-year and two-year Naval ROTC scholarship programs. Selection for the four-year program 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, textbooks, and uniforms, and \$100 per month in subsistence pay. For the two-year scholarship program, applications from current sophomores, or juniors in fiveyear programs of study, must be received prior to April 15. Those selected by a central selection board attend a sixweek course of instruction at the Naval Science Institute (NSI) during the summer prior to their junior year. Successful completion of NSI qualifies these students for enrollment in the advanced course in the NROTC scholarship program. All scholarship students are appointed as midshipmen, USNR, and upon graduation are commissioned as regular officers in the United States Navy or Marine Corps,

All naval ROTC students take the same naval science courses during the first two years. Students who elect to be commissioned in the Marine Corps take Marine Corps subjects during their third and fourth years.

Additional information concerning the naval ROTC programs may be obtained by writing the University of Washington; Professor of Naval Science; 305 Clark, DU-40, Seattle, Washington 98195; or by visiting the NROTC unit on the campus.



SOCIAL WORK

Dean

Scott Briar 204 Eagleson

Associate Dean Naomi R. Gottlieb 207 Eagleson

Associate Dean

Edward C. Teather 205 Eagleson

Faculty

Allen, Anderson, Austin, Berleman, Blythe, Briar, Bryant, Burden, Catalano, Day, Dear, DeLange, Dixon, Duplica, Ellis, FallCreek, Farber, Gallegos, Gottlieb, Griswold, Gronewold (emeritus), Hall, Hanneman, Hawkins, Herrick, Hershey, Hooyman, Hunt (emeritus), Ishisaka, Jaffee, Johnson, Kelley, Kethley, Klingbeil, Leigh, Levy, Lewin (emeritus), Macdonald, Maier, R. Miller, S. Miller, Mundt, Nash, Northwood, Norton, Olson, Parsons (emeritus), Patti, Resnick, Richey, Roffman, Schinke, Smith (emeritus), Stier, Takagi, Teather, Valdez, Wacker, Walsh, Weatherley, Whittaker, Wysocki.

Adjunct Faculty

Jamero.

Clinical Faculty

Armstrong, Blackard, Buyagawan, Castle, Clement, Coughlin, Davis, Durgin, Evans, Gelzer, Golosman, Graham, Holland, Hull, Lawson, LeConte, Lytle, Manaois, Miller, Muench, Mykut, Ousley, Peterson, Rice, Richards, Rivara, Robinovitch, Schilling, Smith, Sprague, Stevens, Tomita, Twersky, Ware, West, C. Williams, V. Williams, Wilson.

The marked growth in the magnitude, complexity, and intensity of such social problems as poverty, racism, urban unrest, physical and mental illness, and crime and delinquency during the last forty years has generated the need for new, enlarged, and more effective social welfare programs to meet these problems. In response to this need, as well as to the rapid changes occurring in society, in the broad field of social welfare, and in the profession of social work, the School of Social Work has developed programs that have as their primary objective the preparation of persons for competent performance in a variety of professional roles and functions. The school's undergraduate, graduate, and continuing education offerings are designed to equip students possessing differing academic and experience backgrounds with the knowledge and skills needed for improved practice. Consistent with the aims of the University, the program of the School of Social Work has three major objectives: (1) the transmission of existing knowledge through the professional curriculum and participation in instructional offerings of other units of the University; (2) the acquisition of new knowledge through research and scholarship by the faculty and students; and (3) service to the community through collaborative training programs, sponsorship of professional institutes, and consultation.

Undergraduate Program

Director

William C. Berleman 109 Eagleson

The School of Social Work undergraduate program prepares students to receive a Bachelor of Arts degree with a major in the field of social welfare. Students who desire a basic liberal arts background with concentration in social welfare and the social and behavioral sciences may satisfy their interests by enrollment in this major. Specific objectives include preparation for human services occupations at the beginning level of practice competence, for graduate education in social work or related fields, as well as for informed participation in contemporary society. Students interested in other fields and disciplines have an opportunity to add an enriching experience to their program of study.

The education of students in an applied profession calls for integration of academic training and practical learning. The social welfare program is designed to provide students with the basic liberal arts and with an introduction to the theory and practice of social work. Requirements include introductory courses in social welfare history and policy, social welfare research, and the theory and practice of social work. In addition, students are expected to supplement their programs with relevant elective courses offered through the School of Social Work and elsewhere in the University. Classroom study during the senior year is accompanied by an extended practicum in a number of social agencies in which students participate directly in the provision of social services.

An increasing number of elective and specialized offerings in social welfare are available as service courses to students in other schools and colleges of the University.

Admission

Students contemplating this major spend their freshman and sophomore years as premajors, fulfilling the distribution requirements set forth by the College of Arts and Sciences. They should have junior status (90 credits) at the time of their admission to the program. Thenceforth, they are advised by the school's undergraduate program adviser. Additional information about admission procedures and an application form are available at the undergraduate social welfare office, 109 Eagleson.

Financial Aid

Information concerning scholarship awards, fellowships, stipends, and loans may be obtained from the Office of Financial Aid, 105 Schmitz, and from the chairperson of the Scholarship Committee, School of Social Work. A limited number of awards are available to graduate students.

Graduate Program

Graduate Program Adviser

Naomi R. Gottlieb

Admission to the graduate professional program of the

School of Social Work requires formal admission to the Graduate School as well as to the School of Social Work; hence, separate application forms should be submitted.

Master of Social Work Degree

A two-year program of study leads to the Master of Social Work degree. Students are prepared for professional work in social agencies and for programs serving individuals, families, and small groups. Graduates also may work in various capacities with governmental or community groups and organizations in social planning, research, or administrative activities. Consistent with its responsibility to the profession and to the public, the school exercises discretionary judgment concerning the suitability of students for admission to, or continuation in, the degree program.

The curriculum is composed of courses concerned with issues of social welfare; the philosophy, organization, and administration of service delivery systems; social work practice; human behavior and social change; and research methods. Field instructional experiences integral to the educational program are required during both years. Thus, through a blending of theory and practice, the student acquires the knowledge and skills necessary for professional competence.

In the course of his or her graduate education, the student chooses one of two major tracks: human services or community and organizational development.

Requirements for the degree include completion of the prescribed curriculum and a minimum of three quarters in residence at the school. Each student must present a total of 74 quarter credits in passing work and maintain a 3.00 grade-point average in all courses numbered 400 and above. The degree is awarded on the basis of the student's competence in theory and practice, as evidenced through satisfactory completion of classwork and practicum.

In addition to tuition costs and general fees, each student must plan for the costs of transportation to and from field instruction agencies.

Courses for Non-Social Work Majors

Class enrollment permitting, and with permission, a number of courses are available to students enrolled in other graduate and professional departments of the University. These are: SOC W 300, 395, 401, 409, 500, 502, 503, 504, 507, 509, 533, 541, 543, 560, 561, 564, 565, 570, 575, 585, 586, and 590.



DESCRIPTION OF COURSES

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Course listings in this section are arranged alphabetically according to college or school first, then according to department within each college or school. Each course listing includes prefix, course number, title, and credits. Each listing also may include quarter(s) offered, names of instructor(s), description of the course, and prerequisite(s), if any.

Specific information on courses offered in a particular quarter, including descriptions of courses approved since the publication of this catalog, appears in the quarterly Time Schedule.

Course Numbers

100-299

300-499

500-

Lower-division courses primarily for freshmen and sophomores.

Upper-division courses primarily for juniors, seniors, and postbaccalaureate (fifth-year) students. Graduate students may enroll in 300- and 400-level courses. When acceptable to the major department and the Graduate School, approved 400-level courses may be applied as graduate credit in the major field and approved 300-level courses may be applied in the supporting field(s).

Restricted to graduate students. (Courses numbered in the 500 and 600 series with P suffix denote professional courses for students in the School of Medicine, and such courses may not be applied as graduate credit in the Graduate School.) Undergraduate, postbaccalaureate, and nonmatriculated students who wish to register for 500-level courses must obtain permission from the instructor of the class, departmental Chairperson, or other designated person.

Credit Designation

ART 100 (5) ART 101-102 (5-5)

ART 100-(5-)

5 credits are received for the quarter.

Hyphenated course. Credit is earned, but may not be applied toward graduation until the entire sequence is completed. (An N grade may be given the first quarter and the final grade the second quarter.)

Course may take longer than one quarter to complete. Repeated registration may be necessary. An N grade is received until the final grade is submitted.

ART 100 (2, max. 8)	2 credits per quarter; course may be repeated up to four times to earn a maximum of 8 credits.	
ART 100 (1-5)	Up to 5 credits may be taken in a given quarter. Specific number is determined in consultation with instructor or adviser.	
ART 100 (1-5, max. 15)	Up to 5 credits may be taken in a given quarter. Course may be repeated to a maximum of 15 credits.	
ART 100 (*, max. 10)	Credit to be arranged per quarter; course may be repeated to a maximum of 10 credits.	
ART 100 (3 or 5)	3 or 5 credits are earned in a given quarter. Spe- cific amount is determined by school or college offering the course. The <i>Time Schedule</i> may in- dicate 3 credits, 5 credits, or 3 or 5 credits. Credits may vary by section.	
ART 100 (3 or 5, max. 15)	3 or 5 credits are earned in a given quarter. Course may be repeated to earn a maximum of 15 credits.	
ART 700 (*)	Credit is to be arranged with school or college offering the course. No maximum stated. Only 600-, 700-, and 800-level courses do not require a maximum.	
May be repeated for credit.	This statement can appear in the course descrip- tion, giving permission for repetition of the course for credit.	
Background Requ	ired	
Prerequisites	Courses to be completed or conditions to be met before a student is eligible to enroll in a specific course.	
Quarters Offered		
A,W,Sp,S	Indicates the quarter(s) the course is offered. A = Autumn, $W = Winter$, $Sp = Spring$, S = Summer.	
Examples:		
A DOT 100 A 3370		

ART 100 AWSp ART 100 offered Autumn, Winter, and Spring quarters.

ART 100, 101 A,W ART 100 offered Autumn Quarter. ART 101 offered Winter Quarter.

ART 100, 101 AW,WSp

ART 100 offered Autumn and Winter quarters. ART 101 offered Winter and Spring quarters.

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Graduate courses numbered 600, 601, 700, 750, or 800 are restricted to students in the Graduate School. They appear by number and title only where applicable under the departmental course listings in this catalog. Descriptions for these courses are listed below.

600 Independent Study or Research (*)

Individual readings or study, including independent study in preparation for doctoral examinations, research, etc. Prerequisite: permission of Supervisory Committee chairperson or graduate program adviser. Name of faculty member responsible for supervising the student should be indicated on program of studies.

601 Internship (3-9, max. 9)

Internship required of students in a graduate degree program other than Doctor of Arts. Permission of Supervisory Committee chairperson or graduate program adviser is a prerequisite. Name of faculty member responsible for supervising the student should be indicated on program of studies.

700 Master's Thesis (*)

Research for the master's thesis, including research preparatory or related thereto. Limited to premaster graduate students (i.e., those who have not yet completed the master's degree in their major field at the University of Washington). Prerequisite: permission of Supervisory Committee chairperson or graduate program adviser. Name of faculty member responsible for supervising the student should be indicated on program of studies.

750 Internship (*)

Internship required of all graduate students in the Doctor of Arts degree program.

800 Doctoral Dissertation (*)

Research for the doctoral dissertation and research preparatory or related thereto. Limited to graduate students who have completed the master's degree or the equivalent, or Candidate-level graduate students. Premaster students initiating doctoral dissertation research should register for 600. Prerequisite: permission of Supervisory Committee chairperson or graduate program adviser. Name of faculty member responsible for supervising the student should be indicated on program of studies.

COLLEGE OF ARCHITECTURE AND **URBAN PLANNING**

ARCHITECTURE

Courses for Undergraduates

ARCH 150, 151 Appreciation of Architecture I, II (2 or 3, 2 or 3) ASp,WS

Bosworth, Pundt Historical survey of the architecture of Western civilization. For nonmajors.

ARCH 152 Environmental Design Professions (3) Ronsteel

Survey of professional role in shaping physical environ-ment. For nonmajors.

ARCH 250 American Architecture and Urban Environments (2) Sp Pundt

Study and critical investigation of architecture and the problems of urban design in North America from colonial times to the present. For nonmajors.

ARCH 300, 301, 302 Introduction to Design: Laboratory (6,6,6) AWSp,AWSp,AWSp Registration for credit in these courses permits the stu-dent to choose from among a number of sections that introduce design theories, methods, and processes. Sections are given in various studio-seminar-lecture formats and include subjects in four general groups; technological determinants of design; visual-theoretical determinants of design; sociobehavioral determinants of design; intro-duction to design synthesis sections. Entry card required.

ARCH 303-304-305 Introduction to Design Synthesis (6-6-6) AWSp, AWSp, AWSp Provides initial awareness, knowledge, and basic skills needed to develop a mastery of the derivation of building form and the integrative aspects of architectural design. Enrollment limited to students entering the graduate pro-gram in architecture with baccalaureate degrees in fields other than architecture. Entry card required.

ARCH 310, 311, 312 Introduction to Design Graphics (2,2,2) AWSpS,AWSpS,AWSpS Donnette, Zuberbuhler

Lectures and laboratory in theories and processes of graphic communication for designers: lettering, drafting, multiview and paraline drawing, photographic simula-tion, descriptive geometry, perspective, shade and shadow, computer graphics, and freehand drawing. Entry card required.

ARCH 313 Introduction to Architectural Photography (2) AWSpS Stauh

Introduction to the basic elements and processes of architectural photography to include: camera controls, ex-posure technique, and photo processing. Student must provide own camera with lens, shutter, and aperture con-trols. Entry card required.

ARCH 314 Introduction to Architectural Sketching (2) AW Skill development in conceptualization of forms and their

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ARCH 315 Architectural Sketching (2) WSp See 314 for course description. Entry card required.

ARCH 320 Introduction to Structural Theory I (3) AS

Abrecht, Lebert, Onouye, Torrence Lectures on vectors, equilibrium of forces, graphic and analytical study of force systems, and load tracing in buildings. Entry card required.

ARCH 321 Introduction to Structural Theory II (3) AW

Albrecht, Lebert, Onouye, Torrence Nature of structural materials, their reactions to forces

and force systems, their strengths and elastic properties and methods of designing and joining structural mem-bers. Prerequisites: 320 and permission.

ARCH 322 Introduction to Structural Theory III (3) WSp

Albrecht, Lebert, Onouye, Torrence Simple building structural elements and systems. Beams and posts. Trussed structures. Introduction to lateral force and vertical force-resisting systems. Prerequisites: > 321 and permission.

ARCH 350 Survey of Environmental Arts I (3) A Pundt

Survey of architecture, city, and land form, from earliest times to circa 1150.

ARCH 351 Survey of Environmental Arts II (3) W Pundt

Survey of architecture, city, and land form, from circa 1150 to 1750.

ARCH 352 Survey of Environmental Arts III (3) Sp Pundt

Survey of architecture, city, and land form, from circa 1750 to the present.

ARCH 400, 401, 402 Introduction to Architectural Design Laboratory (6,6,6) AWSpS,AWSpS,AWSpS Design Laboratory (6,6,6) A WSDS, A WSDS, A WSDS, Registration for credit in these courses permits the stu-dent to choose from among a number of sections that in-troduce architectural design theories and processes. Sec-tions are given in various studio-seminar-lecture formats and include subjects in several groups: introduction to architectural design sections, case studies, and design studies; and introduction to urban design. Entry card re-ruined quired.

ARCH 410, 411, 412 Design Graphics Laboratory (2,2,2) AWSpS,AWSpS,AWSpS Donnette, Zuberbuhler

Continuation of design graphics laboratory with emphasis on advanced architectural graphics. Entry card required.

ARCH 413 Architectural Photography Projects (2) AWSp Staub

Projects involving the study of illumination and perspec-tive as related to the representation and perception of space, form, color, texture, pattern, and scale of architectural subjects. Student must provide own camera with lens, shutter, and aperture controls. Prerequisite: 313. Entry card required.

ARCH 414 Architectural Sketching (3) AS

Kelley Exercises in freehand representational drawing using charcoal, graphite, and conte crayon with emphasis on charcoal, graphite, and composition. Studies progress from geometric to nongeometric forms. Entry card required.

ARCH 416 Architectural Sketching (3) W Introduction to the use of watercolor as a monochromatic medium in sketching and rendering with emphasis on proportion, value, and composition. Representational drawing ranges from geometric to nongeometric forms. Entry card required.

ARCH 417 Architectural Sketching (3) Sp Studio and field exercises in drawing and sketching of natural and architectural subjects. Various media are uti-lized, including an introduction to the use of color in wa-tercolor sketching. Entry card required.

ARCH 420 Structural Design I (4) AS

Albrecht, Lebert, Onouye, Torrence Design of complete building frames in timber, laminated wood, and steel; considering earthquake resistance, building responses, continuity, and the structural design process. Entry card required.

ARCH 421 Structural Design II (4) AW

Albrecht, Lebert, Onouve, Torrence Development of basic reinforced and prestressed concrete design process and design of continuous structures in reinforced concrete, employing beams, girders, and slabs. Entry card required.

ARCH 422 Structural Design III (4) WSp Albrecht, Lebert, Onouye, Torrence

Design of reinforced concrete structures, including flat

slabs and plates, columns, footings, shearwalls and re-taining walls. Entry card required.

ARCH 426 Structural Unit Masonry (3) Sp Lebert

Structural behavior and design of reinforced brick, tile, and unit masonry structures. Offered jointly with CESM 487. Entry card required.

ARCH 427 Architectural Problems (3-7) AWSpS Entry card required.

ARCH 430 Materials and Processes (3) AWSp 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. Entry card required.

ARCH 431, 432 The Science of the Built

Environment (3,3) W,Sp Study of microclimatic controls in the built environment with special emphasis on lighting, acoustics, and thermal phenomena. Lectures, laboratory work, and student presentations. Entry card required.

ARCH 435 Principles and Practices of Environmental Lighting (3) Millet

nuturer Perception-based approach to the 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 in both interior and exterior measure-ments involving environment of interior and exterior measurements; impact of lighting design on energy conservation; relation of lighting design process to architectural design concepts. Entry card required.

ARCH 440 Introduction to PER Analysis (3) A Wise

Introduction to the measurement and quantitative analysis of variables encountered in person-environment relations research. Emphasis on basic statistics and decision theory used as design decision-making aids with behavioral data. Prepares students to utilize and critique published design research. Entry card required.

ARCH 441 Methods and Techniques of PER Research (3) W Wise

Introductory course to ways and means of discovery in person-environment relations. Requires a working knowledge of data summary measures, but is nonquantitative except in application of measures to class projects data. Involves reading and application of research techniques including: unobtrusive measures, direct assess-ment through interview and survey, simulation and experimental observation, and phenomenological re-search. Entry card required.

ARCH 442 Intermediate PER Research and Analysis (3) Sp

Wise

Extends material introduced in 440 to include multivari-ate studies and a more thorough treatment of statistical decision procedures. Understanding simulation and quantrative modeling projectures as a means of pretesting and evaluating design proposals is stressed along with the treatment of this information by appropriate decision-theoretic methods. Applied research problems as a means of developing the techniques. Entry card required.

ARCH 443 Experiential Design Notation (3) AWSpS Thiel

Lectures, seminars, and studio/field studies in philosophy, theory, and practice of intervention in the physical environment for socially preferred human experiences. Entry card required.

ARCH 444 User Analysis of Urban Spaces (3) Sp

Bonsteel, Grey Development and application of techniques for appraisal of the built environment so as to imply planning and de-sign criteria for urban open spaces. Offered jointly with URB P 444. For students in behavioral field studies in architecture, landscape architecture, and urban planning; others by entry card.

COLLEGE OF ARCHITECTURE AND URBAN PLANNING

ARCH 445 Environmental Design Research Through Photography (3) AWSpS

Alden Photographic approach to the collection, analysis, and presentation of visual information relevant to the design and evaluation of man-made environments. Case studies, lectures, and class discussions on technical, psychologi-cal, and visual problems, followed by five weeks of individual or team photographic projects resulting in com-pleted visual or audiovisual presentations. Entry card required.

ARCH 446 Greek Architecture (3) Sp Edmonson

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 and CL AR 446. Entry card required. (Offered alternate years; offered 1980.)

ARCH 447 Physical Structure and Human Interaction (3) W

Sasanoff

For social work and architectural students examining the effect of physical structure on human interaction. Entry card required.

ARCH 450 Survey of Environmental Arts (5) S Hildebrand

Environmental arts of architecture, landscape architec-ture, and urban planning. Historical evolution with spe-cial emphasis on factors shaping these arts in the Western world and the twentieth century. For nonmajors.

ARCH 451 History of Modern Architecture (3) A Pundt

Study and critical analysis of major architectural achievements since the mid-nineteenth century. Entry card required.

ARCH 453 Architecture of the Ancient World (3) W . Bosworth

Study and critical analysis of major architectural achieve-ments of ancient Greece and Rome. Entry card required.

ARCH 454 Romanesque and Gothic Architecture (3) W Hildebrand

Architecture of Western Europe from the decline of the Roman Empire through the fifteenth century. Entry card required.

ARCH 455 Renaissance and Baroque Architecture (3) Sp Pundt

Study and critical analysis of European architecture and urban design from *circa* 1450 to 1750. Entry card re-quired. (Offered alternate years.)

ARCH 456 History of Chicago School Architecture (3) WS Pundt

Study and critical investigation of the contribution of ma-jor architects in Chicago, the Midwest, and the West Coast from *circa* 1870 to 1920. Entry card required.

ARCH 457 Neoclassicism and Romanticism in Europe and America (3) Sp Pundt

Study and critical investigation of European and Ameri-can architecture and urban design from 1750 to 1850. En-try card required. (Offered alternate years.)

ARCH 458 South Asian Architecture (3) W Curtie

Introduction to South Asian architecture, its generating forces, parameters, and consequent environments. Pre-requisite: HSTAS 201. Entry card required.

ARCH 459 American Utilitarian Architecture (3) Sp Hildebrand

Examination of significant American environmental de-sign efforts arising from utilitarian needs (e.g., factories, bridges, mass housing schemes, and associated technical building innovations). Entry card required.

ARCH 460 Design Theory and Analysis (3) AWSpS

Nyberg, Seligmann Problematical nature of philosophies of architecture; in-teraction of philosophical concepts and architectural form and expression. Fundamentals of architectural criticism. Entry card required.

ARCH 461 Recent Developments in Architectural Theory (3) WSp Seligmann

Review of recent developments in architectural theory. Concentrates particularly on those that spring from recent work in the epistemology of science and in philosophy. Entry card required.

ARCH 480 Contract Drawings (3) ASp Lectures and drafting-room practice. Entry card required.

ARCH 495 Architectural Studies Abroad (9) Sp Studies conducted under faculty supervision in various locations outside the United States. Student may be registered concurrently in an appropriate studio section. Entry card required.

ARCH 498 Special Projects (1-12, max. 12) AWSpS Instructor-initiated and department-approved systematic study and offering of specialized subject matter. Topics vary and are announced in preceding quarter. Entry card required.

ARCH 499 Undergraduate Research (1-6, max. 6) AWSpS

Entry card required.

Courses for Graduates Only

ARCH 500, 501 Architectural Design Laboratory (6,6) AWSpS, AWSpS

Theories and processes in architectural design with emphasis on development of professional skills in design synthesis. Entry card required.

ARCH 502, 503, 504, 505 Architectural Studies Options (6,6,6,6) AWSpS,AWSpS,AWSpS,AWSpS A group of advanced architectural studies and sequences A group of auvalieu architectural visites and sequences in general architectural design synthesis, in special proj-ects examining particular architectural determinants in detail, and in architectural research. Entry card required.

ARCH 513 Design Communication I (3) AWSp Rohrer

Classwork in design illustration techniques together with workshop experience in developing individual experi-ments in graphic presentation. Entry card required.

ARCH 514 Design Communication II (3) WSp Study in advanced graphic presentation methods with limited classwork, and toward development of individual style and competency in media other than offered in 513. Entry card required.

ARCH 520 Advanced Wood Structures Design (3) Sp Albrecht

Study of design methods related to wood structures. Top-ics include nature of wood as a building material, plywood, glued laminated wood structures, timber piles and pile foundations, pole buildings and conventional wood building framing. Entry card required.

ARCH 521 Structural Design Through Model Studies (3) W

Albrecht

Theory of models, dimensional analysis, direct model analysis; studies employing specific materials, tech-niques of testing and measurement. Offered jointly with CESM 477. Entry card required.

ARCH 522 Skin-Resistant Structures (3) A Albrecht

Resistance mechanisms, structural systems employing plates, folded plates, shells, and membranes with appli-cations to the structural design process. Entry card required.

ARCH 523 Industrialized Building Systems (3) A Rosner

Consideration of the evolution of prefabrication, building products, components, construction methods, and building systems through the nineteenth and twentieth cen-turies. Enry card required.

ARCH 526 Advanced Architectural Studies (6) AWSpS

Advanced experimental studies dealing with significant architectural relationships involving scholarly investigation, development, and presentation of results. Entry card required.

ARCH 530, 531, 532 Graduate Studies in the Science of the Built Environment (3,3,3) A,W,Sp Graduate studies in microclimatic controls in the built environment, including individual opportunities for investi-gation in depth of lighting, acoustic and thermal condi-tions, as well as other related research interests. Entry card required.

ARCH 535 Graduate Seminar, Study Topics in Environmental Lighting (2) W Millet

Focus on individual student projects involving research and design for lighting. Entry card required.

ARCH 536 Acoustics Seminar (2) . Principles of acoustical designing as applied to buildings. Entry card required. (Offered alternate years.)

ARCH 550, 551 Graduate Seminar: Environmental Design Issues (3,3) A,W

Seminars concerning a wide variety of current issues in the area of environmental design. Seminar focuses on different special topics and is directed by seminar leaders who are authorities in their fields.

ARCH 560 Graduate Seminar on Architectural Theories (3) W

Seligmann

Recent developments in architectural theory, urban de-sign theory, criticism, and the methodology of criticism. Entry card required.

ARCH 571 Building Economics (3) A Mithun

Social, political, and economic factors affecting the location, construction, financing, and marketing of buildings. Entry card required.

ARCH 572 Specifications and Contracts (3) W Detailed organization and composition of contracts, specifications, and related contract documents. Entry card required.

ARCH 573 Professional Practice (3) Sp Operation of an architectural office and professional practice. Entry card required.

ARCH 575 Graduate Seminar: Research/Study Methods (3) AWSp Methods and techniques used in research/study, with par-

ticular emphasis on investigative procedures for graduate students in architecture; includes a review of methodologies from related disciplines as applied to recent and on-going research/study decision making. Assistance and guidance is given in the selection of a research/study topic, proposal writing, and thesis preparation. Offered on credit/no credit basis only. Entry card required.

ARCH 578 Computer Applications in Architecture (3) A Bonsteel

Studies of feasibility and the application of computer programs and automated systems for the building design process. Entry card required.

ARCH 591 Seminar on School Environment (3) W R. Schneider

Survey of problems and issues faced by architects and ed-ucators that are impacting on educational facilities. Di-rected readings and informal discussion of the people. processes, programming, planning, and evaluation of ways and means of accommodating changes due to identifiable problems and issues. Entry card required.

ARCH 593 Graduate Seminar on the Theory of Housing Design (3) A

Dietz

Comparison and evaluation of housing designs: develop-ing the ability to distinguish and apply appropriate refer-ents—historical, stylistic, social, and technical—to the systematic analysis of housing. Entry card required.

ARCH 594 Health Facilities Planning (3) W Bonsteel

Examination of the organization and execution of the to-tal planning process for health care facilities, with indi-vidual parallel studies in selected topics. Entry card required.

ARCH 596 Field Work in Professional Practice (9) Varey

On-location study under the supervision of a practicing professional involved in an aspect of environmental design. Offered on credit/no credit basis only. Entry card required.

ARCH 598 Special Topics for Graduate Students (1-6) AWSpS

Systematic study and offering of specialized subject mat-ter. Topics vary and are announced in the preceding quarter. May be repeated for credit. Entry card required.

ARCH 600 Independent Study or Research (*) AWSDS

Offered on credit/no credit basis only. Entry card required.

ARCH 700 Master's Thesis (*) AWSpS Offered on credit/no credit basis only. Entry card reauired.

BUILDING CONSTRUCTION

Courses for Undergraduates

B CON 301 Building Industry (3) A,

Eberharter Organization and functioning of the building industry: legal, ethical, business, and management aspects. Pre-requisite: permission of department. Entry card required.

B CON 303 Construction Safety (2) Sp Harrison

Explanation of the 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 and responsibility for compliance are emphasized. Offered on credit/no credit basis only.

B CON 310 History of Building (3) Sp Bosworth

Historical survey of building techniques and materials as conditioned by environmental, technical, and social influences.

B CON 330, 331, 332 Building Technology I, II, III (3,3,3) A,W,Sp Hopkins

Introduction to the functional and constructional characteristics of building components: electrical distribution, lighting, heating, air conditioning, plumbing, fire protec-tion, walls, floors, roofs, etc. Prerequisites: 330 for 331; 331 for 332. Entry card required.

B CON 401 Building Estimating (5) AW

Ossinger

The principles of building costs, estimating, and con-struction cost control. Prerequisites: 332, ARCH 310, 312. Entry card required.

B CON 420 Building Financing (3) W Flaherty

The financing of building construction: financial institu-tions, regulations, government participation, and financing principles.

B CON 470 Construction Management (3) Sp Rivet

Systematic study of management functions in the building industry: planning and scheduling, organization, time and equipment utilization, monitoring and expediting, project administration, cost control. Prerequisite: senior standing. Entry card required.

B CON 480 Law and the Contractor (3) Sp Siqueland

Basic legal aspects of construction of private and govern-mental projects. Survey of general principles relating to rights and liabilities of the contractor and other parties under construction contracts, including union-labor agreements. Major statutory and regulatory requirements affecting the contractor, including lien laws, environ-ment, and minority hiring practices. Prerequisite: senior standing. Entry card required.

B CON 496 Construction Practice (3) S Integration of classroom theory with practical experience through direct, on-the-job application for one summer. For majors in building construction with 135 credits completed. Applicants are selected under competitive appli-cation during Spring Quarter. Offered on credit/no credit basis only. Entry card required. B CON 498 Special Topics (1-10, max. 20) AWSpS Systematic study of specialized subject matter. Topic may vary each quarter. Prerequisite: permission of department Chairperson.

B CON 499 Undergraduate Research (*, max. 12) AWSpS

Individual or small-group studies in which students may select topics with approval of faculty sponsor and depart-ment. Prerequisite: permission of department. Entry card required.

LANDSCAPE ARCHITECTURE

Courses for Undergraduates

L ARC 300 Landscape Architecture Proficiency Program (16) S Nakano

Nakano Intensive learning experience by which student can de-velop or enhance perceptual awareness and design sensi-tivity to the natural and man-made landscape, plus basic skills necessary for more advanced course work required in the Bachelor of Landscape Architecture degree pro-gram: landscape perception, graphics, site analysis, and design, will be interrelated. Emphasis placed on examination of landscape environments through prob-lem-solving techniques that acknowledge holistic ap-proach to the environment. Case studies and hypothetical design problems provide basis for both studio work and design problems provide basis for both studio work and lecture/seminars. Students responsible for laboratory fee to cover cost of transportation, food, and lodging for all field trips associated with course. Diversity of teaching/learning modes are used to develop basic skills as well as a philosophic approach to perceptual awareness regarding man and nature, landscape graphics and pre-sentation techniques, site evaluation and behavioral studies, site anaysis techniques and methods, program devel-opment, design methodology, design alternatives and criteria, design vocabulary and details, and construction of simple structures and site details. Entry card required.

L ARC 301 Site Planning (6) A Buchanan, Haag, Nakano Introduction to site planning and landscape design, cov-ering the factors of site analysis and planning, resource utilization, site suitability related to specific programs and activities; and planning, design, construction, and behavioral studies for selected case study projects.

L ARC 302 Landscape Design Studio (6) W Buchanan, Haag, Nakano Urban design through landscape architecture. Design of

public use areas in the urban area. Project types for this course are waterfront development, commercial areas, campus and cultural centers, plazas and historical sites; recommendation for policy to be established as part of the design solution.

L ARC 303 Urban Recreational Design (6) Sp Untermann

Past, present, and future concepts of recreation design and theory, with an examination of the role of various governmental agencies and professional groups' in the field of recreation. Special studies in metropolitan, urhere of recreation. Special studies in metropontan, ur-ban, and neighborhood recreation areas; the design, poli-cies, and behavioral studies of existing parks, play-grounds, public places, and commercial recreation areas. Design projects dealing with the play environment for all ages.

L ARC 311 Landscape Communications (2) A Nakano

Natano Innoduction to communication techniques for various phases of the design process. Many techniques are intro-duced and their suitability and appropriateness for differ-ent purposes explored. Prerequisite: major status. Entry card required.

L ARC 331 Landscape Construction (4) W Kerr

Basic course in site engineering, correlating the design and technical aspects of site development and suitability. Grading, drainage, circulation requirements and align-ment, organization concepts relative to landscape resources, site evaluation, utilization and protection, and building and site program analysis and coordination.

L ARC 332 Landscape Construction (4) Sp Kert

Materials and structures in landscape construction. Design criteria and construction techniques for detail ele-ments of landscape architecture. Working drawings, specifications, cost estimates, and procedures.

L ARC 341 Site Planning (3) A Streatfield

Introduction to site planning and landscape design, covering the factors of site analysis and planning, resource utilization, site suitability related to specific programs and activities; and planning, design, construction, and behavioral studies for selected case study projects. Open to nonmajors.

L ARC 352 History of Landscape Architecture (3) w

Johnston

Analysis of the design treatment of the landscape as an art form and its relation to the culture of each period. Open to nonmajors.

L ARC 361 Theory and Perception of Landscape Architecture (3) A

Haag

Reciprocal relationships of man/nature are explored, with particular attention given to the cultural variations and in-terpretations of esthetics, landscape materials, and human behavior and their effects on site planning and proj-ect design. Landscape architecture philosophy related to the physical design problems and potentials of the Pacific Northwest. Open to nonmajors.

L ARC 363 Urban Recreation Design (3) Sp Untermann

Special recreational studies in metropolitan, urban, and neighborhood areas; the design, policies, and behavioral studies of existing parks, playgrounds, public places, and commercial recreational areas. Design projects dealing with the play environment for all ages. Open to nonmaiors.

L ARC 401 Landscape Design Studio (6) A Furtado

Scenic roads and lineal parks, riverways, and trails as design studies dealing with policy and planning implica-tions for scenic control in the landscape. Generally focusing on semirural areas or undeveloped urban areas.

L ARC 402 Landscape Design Studio (6) W

Jongejan, Small, Untermann

Large-scale site planning and design. Generally related to housing, new communities, and institutional develop-ment. Identification of landscape character, resources. and problems of site, cost factors, design alternatives and acquisitions for architectural direction, policy for land acquisition. Program development to maximize site utilization, and preservation of natural attributes.

L ARC 403 Landscape Design Studio (6) Sp Furtado, Streatfield

Environmental and technological aspects of site development. Project design studies in areas of "critical con-cern," related to environmental restraints, natural sys-tems, landscape character, and capacity of site to recover from human intervention. Generally deals with use of natural systems in the planning/design process, environ-mental issues in relation to federal, state, and local legislation.

L ARC 404 Landscape Design Studio (6) A Untermann

Untermann Elements of the urban landscape. Visual assessment and resource identification and implications for large-scale urban landscape planning. Landscape features, image factors, and design potentials for recreation, open-space character, and neighborhood identity. Design policy rec-ommendations and detailed design study for typical prob-lem area, from metropolitan to neighborhood scale.

L ARC 405 Landscape Design Studio (6) W Streatfield

Landscape planning and policies utilizing natural sys-tems. Examination of the ecological restraints and the design criteria for selected land use and development categories. Case studies dealing with landscape types, fea-tures, amenities, and cultural resources; their identification, classification, visual assessment, and interpretation for design planning, program development, and policy decisions. Metropolitan to regional scale.

L ARC 406 Landscape Design Studio (6) AWSpS Senior projects in landscape architecture, projects vary according to the student's particular emphasis and needs. Open only to majors in landscape architecture with fac-ulty permission and one quarter prior notice.

L ARC 411 Landscape Graphics (2) A Ruchanan

Delineation techniques and office presentation methods for landscape perspectives, sections, rendering of plant materials. Stresses plant identification and associations generally used in landscape architecture. Discussion of historical and contemporary examples of landscape drawing.

L ARC 412 Landscape Graphics (2) W Nakano

Office presentation techniques for various phases of land-scape architectural projects. Multimedia techniques and presentation methods suitable for public hearings, citizen groups, design commissions, and private clients. Individual projects and case-study examples.

L ARC 420 Plant Identification (3) A

Gutter Gutter Visual recognition of woody ornamental plants (native and introduced species) suitable for use in Pacific North-west landscapes. Plants with significant autumn characversi tausseques. Frants with significant autumn charac-teristics make up a majority of plants studied. Emphasis on design characteristics and horticultural requirements of each plant or plant group. Field study with laboratory reviews. Open to nonmajors. Prerequisite: BOT 113 or 231 or 10 media in biological prime states and the states of the study with the states of the stat 331, or 10 credits in biological science, or permission of instructor.

L ARC 421 Landscape Horticulture.(3) W Gutter

Basic horticultural principles with special attention given to the problems encountered in urban situations. Course deals with design implications and the effect of environmental influences, such as wind, sun, heat, precipitation, and soil, on plant growth; maintenance and related cost factors. Prerequisite: experience in plant sciences or BOT 331.

L ARC 422 Plants and Their Design Characteristics (3) Sp

Buchanan

Utilization of plants in the urban areas and as major elements of project design. Technical considerations for se-lection, climate, and cultural suitability; maintenance, costs, and availability. History and theory of composition and abstract design qualities of plants. Open to nonmaiors.

L ARC 423 Planting Design (5) Sp Gutter

Utilization of plants in the urban areas and as major ele-Contraction of praints in the urban areas and as major ele-ments of project design. Technical considerations for se-lection, climate, and cultural suitability; maintenance, costs, and availability. History and theory of composition and abstract design qualities of plants. Open to nonmaiors.

L ARC 433 Large-Scale Site Construction (4) A 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. Prerequisites: surveying and 331, or permission of instructor.

L ARC 462 Site Planning for Housing (3) W Small, Untermann

Large-scale site planning concerned primarily with housing as it relates to physical environmental conditions. Lectures cover methods for understanding and manipulat-ing the land and the house, plus insights into other issues evant to the site-planning process. Open to landscape architects, architects, planners, engineers, and business administration students interested in methods, procedures, rationale, and decision-making techniques in the physical planning of residential projects. Emphasis on high-density, low-rise housing.

L ARC 463 Natural Processes as Planning and Design Determinants (3) Sp Streatfield

Introductory lecture course relating methods, procedures, and rationale for use of natural process information— soils, vegetation, hydrology, physiography, wildlife, and geology. The planning/design process covers areas of critical concern, environmental restraints, natural sys-tems, landscape character, and capacity of site to recover

from human intervention. Open to planners, architects, foresters, geographers, etc.

L ARC 470 Landscape Architecture Tutorial

(2, max. 6) Tutorial course concerned with various aspects of project organization, programming, schelduling of work loads, graphic and verbal communication problems, data collection methods and interpretation, methodologies for landscape planting and design. Prerequisites: fourth- or fifthyear standing and one quarter advance permission of instructor.

L ARC 473 Office Procedure (3) W

Haag Professional practice in the private office and public agencies. Federal, state, and local controls and financing for public projects. Ethics, fees, proposal development, contracts, construction documents, supervision, operational aspects of a private office, relationship to other professionals.

L ARC 474 Project Design (6) Sp

Haag Detailed design studies of small- to medium-scale proj-ects. General focus on public landscape areas and so-cial/psychological uses of site: design master plan and trustic planting and construction documents, and profesdetails, planting and construction documents, and profes-sional office presentation of material. Prerequisite: fifthyear standing in the department or permission of instructor.

L ARC 476 Professional Operations (3-6, max. 6) Sp

Untermann

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. Offered on credit/no credit basis only. Prerequisite: permission of adviser.

L ARC 477 Landscape Architecture Consultancy Studio (3-6) AWSpS

Simulation of the professional relationship of the land-scape architect as a consultant to University students in other design planning and management disciplines (archi-tects, planners, urban designers, forest resources, etc.). Focus is on site analysis, master planning, schematic deroctus is on site analysis, master planning, schematic de-signs and detailed design, working drawings, and planning plans associated with student projects. Prerequi-sites: fourth- or fifth-year standing as a major in the De-partment of Landscape Architecture, permission of fac-ulty sponsor, and 3.00 grade-point average in previous londcome architecture over a work landscape architecture course work.

L ARC 495 Landscape Architectural Studies Abroad (1-10,max. 30) AWSp Studies conducted under faculty supervision in various locations outside the United States. Prerequisite: permission of instructor.

L ARC 498 Special Projects (1-10, max. 30)

AWSpS Special projects as arranged. Prerequisites: permission of instructor and one quarter prior notice.

L ARC 499 Undergraduate Research (1-6) AWSpS Individual or small-group studies pertaining to special problems, theories, or issues of landscape architecture and environmental issues. Prerequisites: permission of instructor and one quarter prior notice.

Courses for Graduates

L ARC 504 Regional Landscape Planning (6) W Streatfield

Studio in applied regional landscape planning in metro-politan regions to examine conflicting land use pressures of urban/rural fringe. Ecosystematic approach empha-sizes maintenance of landscape quality. Prerequisite: permission of instructor.

L ARC 522 Landscape Technology (3) Sp Lecture/seminar on design philosophy and construction technology related to landscape habitat development. Technologies and their appropriateness for rehabilitation, restoration, and creation of landscapes at site specific scale, maintenance programs, energy conservation, im-plementation problems and public policy. To be taken concurrently with 523. Prerequisite: permission of instructor.

L ARC 523 Landscape Technology (3) Sp Studio on application of technologies and their appropri-

ateness for rehabilitation, restoration, and creation of landscapes at site-specific scale. Examination of maintenance programs, energy conservation, implementation problems and public policy. To be taken concurrently with 522. Prerequisite: permission of instructor.

L ARC 561 Regional Landscape Planning and Design (2) A

Streatfield

Streathed Seminar on objectives, philosophy, history, and theory of regional landscape planning and design. Overview of the context of regional landscape planning, examination of critical issues in the Pacific Northwest region, and oppor-tunities and role of the landscape architect in addressing these issues. Prerequisite: permission of instructor.

L ARC 598 Special Topics (3, max. 9) AWSpS Systematic study of specialized regional landscape sub-ject matter, including history, technology, implementa-tion, and other topics depending on current interest/ needs. Topics vary and are announced in the preceding quarter. Prerequisite: permission of instructor.

L ARC 600 Independent Study or Research (*) AWSpS

L ARC 700 Master's Thesis (*) AWSpS

URBAN PLANNING

Courses for Undergraduates

URB P 300 Introduction to Urban Planning (3)

AWSpS Principles and theories of urban structure and institutions. Principles and meones or urgan 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 environ-mental conditions within the American political framework. Complementary nature of public and private responsibilities. Major procedures used by planners. Offered jointly with U D 315. Prerequisite: junior standing or permission of instructor.

URB P 340 American Urban Problems (3) AS Hancock

Study of major trends and problems in urban America that have grown out of our past or that are developing today. A new topic and new materials are presented each quarter. Topics are selected for their contemporary im-portance, environmental (biocultural) impact, and plan-ning implications. History is used as our chief record of the past, not as a blueprint of the present and future.

URB P 350 Introduction to Urban Development

(4) AWSpS Introduction to real estate markets, investment, appraisal, accessibility concepts, urban history, urban research, and related topics. Offered jointly with U D 310.

URB P 351 Private Investment in Urban

Development (4) AW Emphasizes the role of the private sector in urban development; valuation and investment theory; techniques of investment analysis and capital allocation. Offered jointly with U D 395.

URB P 381 Legal Aspects of Urban Development (3)

Legal aspects of modern land utilization including the urban plan, zoning, and private and public ownership-with preliminary discussion of the nature of property and a brief survey of real property law. Offered jointly with U D 320.

URB P 399 Future Patterns of Settlement (3) W Morrill, Schneider

Study of possible future patterns of human use of the environment from apocalyptic to glorious. Review of land-scape evolution. Problems of long-range regional and na-tional planning. Offered jointly with GEOG 399. Prerequisite: 340 or GEOG 207 or 277, or permission of instructor.

URB P 401 Urban Planning Policies and Programs (3) Sp Norton

Goals, processes of policy formulation, methods of plan-

ning effectuation, and related problems. Community, re-gional, state, and national programs. Prerequisite: 411 or permission of instructor.

URB P 407 Urban Planning Studio (5) Sp Arenas, Norton, Shinn

Synthesis of urban planning problems and methods in a laboratory section. For majors only. Prerequisite: 465 or equivalent substantive focus sequence.

URB P 410 Planning Theory (3) W Norton

Synthesis of theories and theorizing drawn from several disciplines and applied to urban planning. Particular em-phasis on explanatory concepts associated with a future-oriented rational decision process in complex bureaucratic organization. Prerequisite: 300.

URB P 411 Planning Process and Methods (3) Sp

Willer The urban plan and plan making. Emphasis on compre-hensive, coordinative urban planning. Methods and ana-plytical techniques used in planning public actions and policies. Various planning surveys and methods dis-cussed. Prerequisite: 410.

URB P 412 Forecasting Methods in Urban Planning (3) Sp J. B. Schneider

Examination of several forecasting methods, including trend extrapolation, Delphi, relevance trees, morphologi-cal boxes, cross-impact matrices, scenario generation, and literature monitoring techniques. Past failures and successes. Applications to urban planning problems.

URB P 420 Introduction to Quantitative Analysis in Urban Planning (3) A Bell

Data analysis for urban planning, statistical description, probability, sampling, estimation, hypothesis testing, Examples, including computer exercises, to be taken from planning literature using real data from assessors' files; building permit files, etc., and from other environ-mental design fields. Prerequisite: 421 or MATH 105.

URB P 421 Quantitative Analytical Models and Methods (3) W Bell

Survey of probabilistic and mathematical models and other techniques of operations research relevant to plan-ning. Emphasis placed upon linear and dynamic programming, critical path methods, queuing models, net-works and the Bayesian approach to decision making under uncertainty. Stress placed upon the underlying model and implications for planning rather than on mathematical detail. Prerequisite: 420 or permission of instructor

URB P 426 Transportation System Impact Analysis (3) Schneider

Review and evaluation of methods of forecasting the social, economic, political, environmental, and energy impacts of proposed transportation projects. Prerequi-sites: 412, CETC 425 or URB P 430, or permission of instructor.

URB P 429 On-line Planning of Urban Systems (3) W J. B. Schneider

J. 6. Scinetaer 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 fac-tors in man-computer systems design theory as it relates to problem-solving activity. Offered jointly with CETC 429.

URB P 430 Introduction to Urban Transportation (3) A Horwood

Identification of the framework, central concepts, constraints, and issues of the urban transportation planning problem. Offered jointly with CETC 425.

URB P 444 User Analysis of Urban Spaces (3) Sp Bonsteel, Grey

Development and application of techniques for appraisal of the built environment so as to imply planning and de-sign criteria for urban open spaces. Offered jointly with ARCH 444. For students in behavioral field studies in architecture, landscape architecture, and urban planning; others by permission of instructor.

URB P 446 Practical Experience (4, max. 8) AWSp 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. Prerequisite: permission of instructor.

URB P 447 Social Factors in Urban Planning (2) A Analyzing the impact of planning and planning policies on the social environment, including an examination of those social factors important to the planning process, such as neighborhood and community structure, age and sex composition, race, and class. Methods for evaluating and incorporating social information into the planning process. Prerequisite: 300, which may be taken concurrentiv.

URB P 448 Directed Social Change (3) A Amoss

dentral course for both undergraduate and graduate stu-dents on the theories and practice of directed social change and citizen involvement in the planning process.

URB P 449 Planning Problems of the Black Community (3) W Course objective is to enable student to acquire an under-

standing of the complex factors operating in urban com-munities that give rise to and sustain the inner-city ghetto and how planning has been related to these problems in both their creation and solution.

URB P 450 Urban Community Facilities (3) WS Norton

Relationships of goal structure and physical requirements of public facilities. Criteria pertinent to schools, parks, utilities, etc., and their effect on the comprehensive plan. Prerequisite: 300.

URB P 451 Housing (3) AS Arenas, Grey, Ludwig, Rabinowitz

Arenas, Grey, Ludwig, Rabinowitz Survey of housing and redevelopment problems, theo-ries, standards, and practice. Development of public poli-cies, finance, technological considerations, social factors and priorities. Offered jointly with U D 451. Prerequi-site: 300.

URB P 452 Urban Development Location

Practical workshop on empirical methods to conduct and evaluate locational studies. Offered jointly with U D

URB P 460 History of City Development (3) A Johnston

Analysis of city forms and designs emphasizing their re-lation to the culture of each period.

URB P 461 History of Urban Planning in the United States (3) W Hancock

Seminar inquiry into the origins, development, and sig-nificance of the American planning movement and the profession that emerged from it, as defined by some of its seminal innovators, theories, practices, and achieve-ments; and as evaluated by cultural realities thereby served. Emphasis on the twentieth-century American ur-ban record, foreign influences, and planning as an instru-ment for societal change.

URB P 465 Land Use (3) W

Shinn

Substantive presentation of land use as a focus for planbiostantico protestantico of and use a rocas a rocas of purplication of analysis, programming and implementation methods in preparation for 407. Seminar and group project sections. Prerequisite: 481.

URB P 466 Regional Planning and Development (5) Sp Thomas

Thomas Emphasis placed primarily on the process of implement-ing regional development policies in economically ad-vanced and lesser-developed countries. Resultant changes that occur in the distribution and structure of economic activities and settlement patterns are also stud-ied and evaluated. Offered jointly with GEOG 466.

URB P 467 Urban Planning Uses of Remote Sensing (3) Sp Grey

Using aerial photographs, related data, and maps in ur-

ban planning. Urban change analysis, land-use classification systems, other planning applications. Scale and resolution considerations. Development of proficiency through laboratory exercises. Prerequisite: 300 or equiva-lent; 465 recommended.

URB P 468 Land Use From Satellite Data (3) W Shinn

Digital data from Landsat, etc., are used to determine land-use and land-cover classification in urban and rural areas, "Hands-on" exercises on computer. Photointerpre-tation, statistics, land-use classification and verification are incorporated. Prerequisite: 465, 467 or permission of instructor

URB P 470 Introduction to Urban Design (3) Sp Rvan

Nyan Definitions and examples of basic urban design; impor-tance of urban physical form in the attainment of social objectives; heritage of urban design; designing parts of the city; theories of city building; the role of urban design in the fields of architecture, landscape architecture, civil engineering, and urban planning. Enrollment restricted to seniors with permission of instructor.

URB P 471 History of Urban Design (3) Sp Johnston

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.

URB P 472 Graphic Communication in Urban Planning (3) A Shinn

Shim Intended to introduce the nondesign student to the use of graphics and other representational techniques as a means of conceptualizing and expressing ideas, and for record-ing, analyzing, and controlling the environment. The course covers the use of drawing, three-dimensional models; mapping, diagrams, report layout, photography, exhibit preparation, etc., as tools for the effective com-munication of ideas.

URB P 475 Town as Artifact (3) Sp

Wolfe Woge Studies of contemporary and historic towns, utilizing work in cultural anthropology and settlement geography to examine urban form and structure. Focus on the physi-cal environment of the town as the container of social interaction. Human activity related to the "shelter" society builds, at the scale of the whole community. Prerequisite: 479.

URB P 479 The Urban Form (3) A

Wolfe Examination of the physical patterns of urban areas related to the forces producing them. Observation, identification, and methods of recording aspects of the urban scene. Prerequisite: 300.

URB P 480 Introduction to Urban, Suburban, and Metropolitan Political Systems (5)

Causes and consequences of variations in urban form and political structure. Social, economic, and cultural charac-teristics of different urban forms, and processes by which they have developed; emphasis on suburbanization and metropolitanism. Offered jointly with POL S 480. POL S 101 or 202 recommended.

URB P 481 Legal Basis for Planning (3) A

Bagne Political, legal, and administrative institutions closely re-Toritical, regar, and administrative institutions of au-thority and public representation and participation. Legal basis for planning and associated regulation. Prerequisite: 300.

URB P 498 Special Topics (1-6, max. 15) AWSpS Systematic study of specialized subject matter. Topics for each quarter vary, depending upon current interest and needs, and are announced in the preceding quarter. Pre-requisite:, permission of instructor.

URB P 499 Special Projects in Urban Planning (*, max. 6) AWSpS Independent/tutorial study for undergraduates. Individual reading, research, field work, or other special project, outlined in advance, approved by, and under the direc-tion of, the faculty adviser most appropriate for the proj-ect proposed. A report on the purposes, procedures, and results of the study is required. Prerequisites: senior standing and permission of the supervising instructor.

1

Courses for Graduates Only

URB P 500 Survey of Urban Planning (3) A Miller

Concepts and logic of planning as a professional activity. Evolution of guiding ideas in relation to changing social. economic, and environmental conditions within the american political framework. Major procedures used by planners. Critical appraisal. Open to graduate students in urban planning and to graduate students in architecture seeking the Urban Design Certificate.

URB P 501 Resources for Urban Planning (2) A Introduction to areas of specialized study in environmen-tal planning and policy programming. Organization for planning in the Seattle region; range of activities and em-phases, established and changing roles. Required of new graduate students; not open to others.

URB P 502 Metropolitan Planning Analysis (3) A Investigative and analytical techniques appropriate to plan preparation at metropolitan or regional scales, in-cluding consideration and evaluation of methodologies and organizing concepts derived from other disciplines.

URB P 506- General Urban Planning (2-) W

Arenas, Norton, Ryan Introduction to applied professional planning. Consideration of analysis, programming, and implementation methods in preparation for general urban planning labora-tory. Prerequisites: 500 and 501.

URB P -507 General Urban Planning Laboratory (-5) Sp >

Arenas. Norton, Ryan

Laboratory exercise in applied professional planning, utilizing a local study area to examine the realities of problem solving in situations of functional and normative conflict. Integration of analysis, programming, imple-mentation, and presentation phases of the planning process. Prerequisite: 506.

URB P 508 Specialized Planning Laboratory (5, max. 10) A

Several different sections or options are to be offered each year, such as regional-environmental planning, urban systems analysis, housing, metropolitan planning, urban design, and community services and organization. Prerequisites: 500 and 501. Some sections may have prerequisite urban planning lecture or seminar courses.

URB P 510 Theories and Methodologies of Planning I (4) W

Arenas, Ludwig, Ryan Survey of the philosophy, methods, and analytical tech-niques used in planning public actions and policies, with emphasis on the logic and assumptions on which these are based. Various planning surveys and methods dis-cussed. Open to graduate students in urban planning and to graduate students in architecture seeking the Urban Design Certificate. Prerequisite: 500.

URB P 511 Theories and Methodologies of Planning II (4) Sp

Arenas Factors relating to the timing, phasing, and programming of urban development. The bearing of amenity, density, etc., on the actual development process. Prerequisite: 510.

URB P 512 Research Seminar (2) A

Arenas, Wolfe

Development and presentation of advanced topics of individual investigation.

URB P 525 Evaluation in Urban Planning (3) W D. Miller

D. Multer Methods and techniques for a priori assessment of physi-cal improvement plans, program designs, public policies. Includes cost effectiveness and matrix or goal achieve-ment, as well as more conventional cost-benefit and costrevenue 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

URB P 527 Data Resources and Use Technology for Urban Analysis and Planning (3) A Horwood

Data resources, structure, access, and use technology for urban geographic, planning, and transportation analysis. United States census geography, content, and automated products. The urban region geographic base file, geocoding, and geoprocessing. Data base development in local agencies. Use of packaged computer programs, but not basic programming instruction. Offered jointly with CETC 527 and GEOG 527.

URB P 528 Automated Mapping and Graphing (3) Youngmann

Computer applications to statistical and areal analysis Laboratory problems adapted to specialized interests of students. Offered jointly with CETC 528 and GEOG 528. Prerequisite: basic statistics or permission of instructor.

URB P 529 Information Systems Applications to Urban and Regional Analysis (3) Sp Horwood, Staff

Horwood, Staff Logical design of information systems for analysis, pol-icy development, planning and plan monitoring in the context of land-use planning, environmental studies, land-resource management, and general public agency planning purposes. Data confidentiality considerations, case studies, and critical analyses of current information interview and critical analyses of current information systems programs. Offered jointly with CETC 529 and GEOG 529.

URB P 530 Land-Use Planning Models (3) A I. B. Schneider

Review of theoretical basis of several existing models used to forecast urban growth patterns and their associ-ated 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 CETC 525.

URB P 534 Airport Systems Planning (3) W Shinn

Investigation of environmental, sociopolitical, and economic features of air transportation system planning. Emerging technologies, intermodal relationships, the decision-making process. Scenarios of anticipated conflict and resolution problems. Offered jointly with CETC 535.

URB P 540 Seminar in Citizen Participation (3) W Amoss

Seminar on modes of citizen participation in public deci-sion making, advocacy planning, participant democracy, and community development are considered in terms of contemporary problems.

URB P 545 Minority Community Development (2) Sp

Sp Problems associated with the directed and planned devel-opment of urban minority communities: analysis of plan-ning policy and its role in the development process; ex-amination of specific areas of development, such as health, education, housing, and economics; and evalua-tion of certain current developmental programs.

URB P 546 Practicum (4, max. 8) AWSp

Amoss Off-campus experience under academic supervision in situations useful to the education of planners, such as 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. Offered on credit/no credit basis only. Prerequisite: permission of instructor.

URB P 550 Benefit-Cost Analysis Applied to Urban Development (3) Sp

Seyfried Practical application of benefit-cost methodology to the decision-making process for urban development. In a "workshop" format, benefit-cost analysis procedures are applied to urban development projects or programs, in-cluding urban renewal as defined by legislation. Theory or methodology is utilized as necessary to determine ob-jectives, to identify and to measure benefits and costs, and to specify decision criteria in terms of the public in-terest. Offered jointly with U D 550.

URB P 551 Allocation Processes in Urban and Regional Planning (3) A Grey, Rabinowitz

Greeral economic context of planning analysis and social decision making. Priorities and public budgets. Measure-ment of collective needs. Allocative processes applied to land use. Offered jointly with U D 551.

URB P 552 Survey of Urban Development (3) A Topical survey of urban development. Objective to pro-vide substantive information, methodology, theory, and

base for additional courses and seminars in area. Topics base for additional courses and seminars in area. Topics include urban economy and determinants of land use, capital investment in urban development, land tenure, ur-ban functions and public sector, urban development pol-icy and strategy. Offered jointly with U D 505. Prerequisite: permission of instructor.

URB P 553 Capital Investment in Urban

UKB F 555 Capital Investment in Orban Development (3) W Develops principles for evaluating opportunities to invest in urban real estate, discusses the question of determining the cost of capital for such investments, investigates some problems in the application of an appropriate in-vestment criterion to specific types of opportunities, and explores some aspects of the urban renewal problem. Of-fered jointly with UD 515 and FIN 515. Perequisite: 552, UD 505, or permission of instructor.

URB P 554 Seminar in Urban Development

Advanced workshop on empirical methods to conduct and evaluate locational studies. Offered jointly with U D 525. Prerequisite: one of the following: U D 505, U D 515, FIN 515, or permission of instructor.

URB P 557 Economics of Land-Use Regulation (3) W Grev

Taxation, subsidy, and other means to further public pur-poses in land utilization and development. Open space, transfer of development rights, tax allocation financing. Resource use, distributive and market effects of controls. offered jointly with U D 57. Prerequisite: 551 or 552 or permission of instructor.

URB P 565 Comparative Urbanism (3) W Wolfe

Characteristics and problems of urbanization in the world; comparisons of origins and development; physical form, land utilization, and planning. Selected major cities. Offered on credit/no credit basis only. Prerequisite: permission of instructor.

URB P 566 Regional Planning Seminar (3) W Thomas

Regional planning and development theories and methodologies. Critical evaluation of regional planning in selected "economically advanced" and "lesser devel-oped" countries. Offered jointly with GEOG 566. Prereq-uisite: 466 or GEOG 466.

URB P 567 Research Seminar: Geography and Development (3, max. 6) A

Thoma

Offered jointly with GEOG 567.

URB P 570 Urban Design Process (3) W

Wolfe

The study of concepts, methods, and processes basic to planning, design, and effectuation. Offered on credit/no credit basis only. Prerequisite: specialization in urban de-sign or permission of instructor.

URB P 571 Research and Analytical Methods for Urban Design (3) Sp Studies of the various arrangements of urban forms that affect perceptual experiences. Urban design considera-tions of the location of structures, open space, movement channels, and methods of implementing public policy decisions affecting urban design. Prerequisite: specializa-tion in urban design or permission of instructor.

URB P 580 Legal and Administrative Framework for Planning (3) A. Bagne, Rabinowitz Political, legal, and administrative institutions closely re-

lated to the planning process. Issues of devolution of authority and public representation and participation. Legal basis for planning and associated regulation.

URB P 591-592-593 Doctoral Seminar I, II, III

(2-2-2) A,W,Sp 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. Credits given on satisfactory completion of the three-quarter sequence. Prerequisite: master's degree or the equivalent in a planning discipline.

URB P 598 Special Topics (1-6, max. 15) AWSpS 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.

URB P 600 Independent Study or Research (*) AWSpS

URB P 700 Master's Thesis (*) AWSpS

URB P 800 Doctoral Dissertation (*) AWSpS

COLLEGE OF ARTS AND SCIENCES

AFRICAN STUDIES

See International Studies.

AMERICAN INDIAN STUDIES

Courses for Undergraduates

AIS 101 Introduction to American Indian Studies (3) A

Overview of the content, methods, and objectives of American Indian Studies. Contemporary Indian values and career development in a bicultural setting.

AIS 110 American Indian Song and Dance Traditions (3)

Vocal technique, instrumental accompaniment, and song and dance traditions from different cultural areas of native North America.

AIS 151 Indian Art of Northwest Coast (3) Studio course on Northwest Coast Indian/Eskimo art. Traditional and contemporary forms; principles of form, style, and techniques; values that influence In-dian/Eskimo art styles. Not open for credit to students who have taken ART 101.

AIS 170 Survey of North American Indian Art (5) Sp Oliver

Májor 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 215 Puget Sound Indian Literature in English (3) W Hilbert

Traditional and modern stories, life and tribal histories from various Indian groups of the Puget Sound area, in-cluding Tulalip, Swinomish, Skagit, Snohomish, Duwamish, Muckleshoot.

AIS 230 Contemporary Indian Issues (3)

Legal, socioeconomic, political, and educational status of reservation and urban Indians. Problems and controversies in social service and educational programs; tribal governments and self-determination; hunting, fishing, mineral and water rights. Not open for credit to students who have taken GIS 313.

AIS 240 American Indian Women in Society (5) And a set of the social structure; historical and con-temporary roles; changes in male-female relationships; problems and opportunities of contemporary women; the feminist movement and Indian rights. Not open for credit to students who have taken 475.

AIS 253 Wood Design (3, max. 9)

Studio course in wood sculpture utilizing Northwest In-dian hand tools. Properties of woods and their uses. Not open to students who have taken 475.

AIS 310 Linguistic Approach to Culture (3) Analytical study of language, focusing on North Ameri-can Indian languages. Language sound systems; univer-sal system of classifying and writing speech sounds; and sound transcription practice. Students select a language for extended study and transcription. Not open to stu-dents use hear tyles 475

dents who have taken 475.

AIS 313, 314, 315 American Indian Language: Salish (5,5,5)

The Salish language indigenous to the Seattle area. Objectives: (1) to have a command of the basic structure and vocabulary to the extent of being able to converse en-tirely in the language (at a simple and restricted level) and have total command of the sound system; (2) to be able, with the aid of a dictionary, to read the oral litera-ture that has been written and write down stories and other texts that the knowledgeable people of a tribe recount; (3) to understand those aspects of the Indian cul-tures and traditions not understandable through English. Not open for credit to students who have taken GIS 223 and 224. Prerequisites: upper-division standing and permission of instructor.

AIS 335 Legal Problems of the American Indian (5) Legal status of the American Indian with emphasis on the reservation; heirship, land ownership and use; mineral, water, fishing, and hunting rights; and problems related to self-determination. Not open for credit to students who have taken GIS 317.

AIS 340 Indian Children and Families (3) Psychosocial development of the Indian child and family. Historical changes in family structure; value orientations; and social adaptations to a bicultural environment.

AIS 350 Two-Dimensional Art of the Northwest Coast Indians (3, max. 9)

Studio course emphasizing principles of structure and style of two-dimensional art on the Pacific Northwest coast; analysis of traditional pieces (painted storage boxes and chests, house panels, ceremonial screens, etc.)

AIS 413, 414, 415 Lushootseed Literature (5,5,5) Reading and translating English transcriptions of Salish reading and translating English transcriptions of Salish oral literature and history, ethnobiological descriptions and Myth Age stories; transcription of tape recordings of different oral styles; and study of advanced grammatical structures. Prerequisites: 313, 314, 315.

AIS 435 Proseminar in Indian Legal Issues (3) W Continuation in depth of 335. Focuses intensively on corre issues in Indian law and legal development (e.g., tri-bal sovereignty, treaty law, jurisdiction) from the per-spective of emerging case law. Emphasizes legal analy-sis. Knowledge of basic Indian law required. Prerequisite: 335 or permission of instructor.

AIS 450 American Indian Song and Dance Tradition: Performance (3) W

Wapp Performance of various American Indian social dances, songs, and games. In-depth study of various American Indian vocal styles. Prerequisite: 110 or permission of instructor.

AIS 475 Special Topics in Indian Studies (1-5, max. 15) AWSpS

Current research and readings in American Indian Studies content areas.

AIS 499 Independent Study (1-5, max. 15) AWSpS Readings and/or research under faculty supervision.

ANTHROPOLOGY

Courses for Undergraduates

GENERAL

ANTH 100 Introduction to the Study of Man (5) Art in 100 introduction to the Subay of Man (5) Introduction to the subfields of archaeology, physical an-thropology, and sociocultural anthropology through the examination of selected problems in human physical, cul-tural, and social evolution. Not recommended for students who have had other courses in anthropology, archaeology, or physical anthropology. May not be counted toward the 50 credits required for the major in anthropology.

SOCIOCULTURAL ANTHROPOLOGY

ANTH 202 Principles of Social Anthropology (5) Introduction to analytical and comparative methods for the analysis of social and cultural systems. Training in fundamentals for more advanced courses in social anthropology.

ANTH 203 Introduction to Linguistic Anthropology

Survey of linguistic approaches, methods, and theories of use within anthropology. Lectures deal with descriptive linguistics, comparative and historical linguistics, ethnographic semantics, sociolinguistics, and language classi-fication.

ANTH 213 Africa (3)

Introduction to the cultures and societies of Africa with emphasis on sub-Saharan Africa.

ANTH 216 Oceania (3)

Contemporary and traditional life in the Pacific Basin.

ANTH 225 Community Development and Action (3) Use of concepts and examples of directed culture change to analyze community action and community development. Lectures are supplemented by case studies, films, and discussions with those who are actually working with directed culture change.

ANTH 230 Comparative Tribal Religion (5) W World's "folk" or "little traditions" of religious belief and practice. Cosmologies, eschatologies, notions of causality and of human nature. "Little traditions" as examples of man's imaginative attempts to create a relatively closed, knowable, and more-or-less manageable cosmos.

ANTH 301 Human Nature and Culture (3) Sources of variations in the customs, values, and beliefs of human groups. Appraisal of the anthropological notion of cultural relativism.

ANTH 302 Plants, Animals, and People (3) Hunn

Emphasis on the knowledge of, and attitudes toward, plants and animals of non-Western peoples. Role of re-source species as food and medicine and in tool manufacture, myth, and ritual. Hunters and gatherers, fishermen, pastoralists, and agriculturalists studied in comparison with contemporary Western societies.

ANTH 316 South Asia (3) Major cultural features of the Indian and Pakistan subcontinent.

ANTH 317 Southeast Asia (3)

Survey of the culture, history, and contemporary ethnol-ogy of the peoples of southeast Asian countries: Burma, Thailand, Laos, Cambodia, Vietnam, Malaysia, Indonesia, and the Philippines. Prerequisite: permission of instructor.

ANTH 318 Peoples and Cultures of the Islamic Middle East (3)

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 con-centrates on the transformation of the traditional life styles through the process of westernization and modernization.

ANTH 321 Introduction to the Anthropological Study of Religion (3) Introduction to the comparative study of religion as ap-

proached by the discipline of anthropology. Examination of various types of religious systems recognized by an-thropology. Recommended primarily for nonanthropol-ogy majors. RELIG 201 or 202 recommended.

ANTH 322 Peoples of South America (3) Contemporary societies of South America: economic, political, ethnic, and cultural characteristics; historical background. Prerequisite: permission of instructor.

ANTH 333 Art of the Northwest Coast Indian (3) Emphasis on the structure and style of two-dimensional art of the northern tribes. Offered jointly with ART H 333. Prerequisite: sophomore standing.

ANTH 334 Art of the Northwest Coast Indian (3) Holm

Three-dimensional art of the Northwest Coast cultural and cultural functions. Offered jointly with ART H 334. Prerequisite: sophomore standing.

ANTH 335 Art of the Northwest Coast Indian (3) Northwest Coast Indian art as related to drama and dance with special attention to the Kwakiuti Indians. Offered jointly with ART H 335: Prerequisite: sophomore standīng.

ANTH 350 Ecological Anthropology: Civilized and Primitive (3)

Evolution of social forms. Development of urban modes of life in the light of the common and distinctive social and cultural characteristics of cities, peasantries, and tri-bal groups or bands. The process of urbanization, disap-pearance of truly primitive peoples, and emergence of the peasant. Selected case studies from the past and the pres-

ANTH 352 Buddhism and Society: The Theravada Buddhist Tradition in South and Southeast Asia (5) A Keyes

Introduction to the religious tradition of Theravada Bud-Information to the religious trainform of Theravata Bud-dhism (as practiced in Sri Lanka, Burma, Thailand, Laos, and Cambodia) and examination of the variations in ethical orientations developed through Theravada Bud-dhist ideas. Offered jointly with RELIG 350. Rec-ommended: RELIG 202 or knowledge of one eastern religious tradition.

ANTH 353 Anthropological Studies of Women (5) Jacobs

Cross-cultural and comparative survey of the varieties of women's cultural experiences, statuses, and roles in cul-tural context and the anthropological theories used to actural context and the anthropological theories used to ac-count for them. Topics include: is biology destiny? studies of primates, woman the gatherer, work in prein-dustrial and industrial societies, women in folklore and music, matriarchy and matrilineal kinship, childbirth, and women's roles in economic development. Offered jointly with WOMEN 353. Prerequisites: 202 and WOMEN 200, or permission of instructor.

ANTH 354 The Comparative Study of Societies (3) van den Berghe

Compares entire societies at various levels of technological complexity to explore problems of their development and structural organization. Examines both historical and contemporary, and Western and non-Western societies. Offered jointly with SOC 354. Prerequisite: 202 or SOC 110.

ANTH 355 Aging in Cross-Cultural Perspective (3) Amoss

Amoss Survey of strategies for dealing with the fact of aging in various sociocultural systems. Relates the varieties of cultural solutions to the theories on aging, drawn from psychology and medicine, with emphasis on non-West-ern societies. Prerequisite: 202 or permission of instruc-

ANTH 360 Ecological Anthropology: Introduction to Cultural Ecology (5)

Hunn, Spain, Watson, Winans

Hum, Spain, Watson, Winans Ecology of subsistence economy. Examines and com-pares basic preindustrial subsistence strategies (e.g., hunting/gathering, maritime, pastoralism, agriculture) in the following contexts: interaction of subsistence strate-gies and natural environment; population size and distri-bution; population controls; productivity and cultural ev-olution; dynamic factors and prospects for man's future. Prerequisite: junior standing or permission of instructor.

ANTH 371 Political Anthropology (3)

ANTH 5/1 Folucial Anthropology (5) Ottenberg, Winars Theories of the development of political forms and of the social structural analysis of political organization. Authority, power, and concepts of politics and adminis-tration. Prerequisite: 202.

ANTH 372 Anthropology of Law (3)

Ottenberg, Winans

Major theories and studies in legal anthropology. Dispute settlement, juridical processes, and concepts of law and legal activities. Prerequisite: 202.

ANTH 401 West African Societies (3) Detailed analysis of social and cultural features, including the western Sudan area. Prerequisite: 202 or permission of instructor.

ANTH 402 Societies of Eastern and Southern Africa

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: 202 or permission of instructor.

ANTH 403 Traditional Chinese Society (5) Institutional forms of late traditional China-so

-societal, nolitical, economic, and religious-in light of contemporary social science theory. Attention is also given to mod-emizing change. Offered jointly with SISEA 443. Prerequisite: 202 or permission of instructor.

ANTH 404 Mainland Southeast Asian Societies (5) Intensive treatment of the kinship systems, religious in-stitutions, ecology, and sociopolitical systems of the peo-ples of mainland Southeast Asia. Prerequisite: 202 or permission of instructor

ANTH 408 New Guinea Societies (5)

Indigenous peoples of coastal and interior New Guinea and adjacent islands; their aboriginal cultures and modern and adjacent islands; their aboriginal cultures and modern development in spatial and temporal perspective. The studies deal intensively with the selected general prob-lems of ethnographic method and ethnological and socio-logical interpretation. Prerequisite: 202 or permission of instructor.

ANTH 409 Micronesian Societies (3) Comparative social anthropology of the social systems of high islands and coral atolls of Micronesia. Intensive treatment of the kinship, religion, ecology, and politics in both traditional and contemporary periods. Prerequi-sites: 202, and either 216 or permission of instructor.

ANTH 410 Polynesian Societies (3) Comparative social anthropology of the high and low is-lands of Polynesia, including the Polynesian outliers in Melanesia and Micronesia. History, ecology, economics, political organization, and ritual systems are covered as well as special topics such as colonialism, land tenure in relation to kinship, and child adoption. Prerequisites: 202, and either 216 or permission of instructor.

ANTH 411 Australian Aboriginal Societies (3) Examination of archaeological and linguistic evidence of distribution of, and relationships among, aboriginal groups before white contact. Ethnographic comparisons of local organization and land tenure, kinship, law, and religion. Past and present use of aboriginal data in social science theory. Prerequisites: 202, and either 216 or per-vision of lightnutces. mission of instructor.

ANTH 412 South Asian Social Structure (5)

Caste dynamics, political control, economic organiza-tion, and religion in Hindu-village India. Prerequisite: 202 or permission of instructor.

ANTH 415 North American Indians: Eastern Native America (3)

Amoss, Nason

Overview of traditional cultures of the East Coast and Great Plains, using anthropological perspectives and data. Insights from Native America that articulate human differences and similarities. History, ecozones, lan-guages, and representative culture areas (the Subarctic, Northeast, Southeast, and Plains). Prerequisite: 100 or 202 or a background in introductory anthropology.

ANTH 416 North American Indians: Western Native America (3) Amoss, Nason

Overview of traditional cultures of the West Coast and intermountain regions, using anthropological perspec-tives and data. Insights from Native America that articulate human differences and similarities. History, ecozones, languages, and representative culture areas (the Southwest, California, Great Basin, Plateau, and Arctic). Prerequisite: 100 or 202 or a background in introductory anthropology.

ANTH 417 North American Indians: Pacific Northwest (3)

Amoss Overview of traditional societies of the Pacific Northwest Alacka to porthern California; significant Overview of traditional societies of the Pacific Northwest from southern Alaska to northern California; significant areal features such as rank, totemic crests, guardian spir-its, the pollatch, fishing, and foraging illustrated by com-parisons and by selected ethnographic sketches; the con-temporary situation in the context of continuity with the past. Prerequisite: 100 or 202.

ANTH 418 Meso-American Society and Culture (3) Analysis of the social and cultural features of Meso-America. Prerequisite: 202 or permission of instructor.

ANTH 419 Peoples and Cultures of the Iranian Plateau (3)

Survey of the cultural features of the Iranian Plateau with particular attention to modern problems of cultural change. Prerequisite: permission of instructor.

ANTH 421 Belief, Ritual, and the Structure of Religion (5) W Amoss, Keyes

Systematic survey of the concepts, models, and theories Systematic survey of the concepts, models, and meones that characterize the anthropological study of religion. Consideration of religious phenomena with reference to those formulations that provide meaning for social experience and those actions that serve to fulfill social functions. Prerequisites: 202 or 321 or RELIG 201 and 202.

ANTH 422 Religious Systems (5) Sp

Anoss, Keyes Intensive examination of one type of religious system with reference to the anthropological study of religious phenomena. The type of religious system chosen for study varies. Prerequisite: 421 or RELIG 380.

ANTH 425 Applied Anthropology (3) Planned and directed social and cultural change. Prerequisite: 202 or permission of instructor.

ANTH 426 Peasant Culture and Society (5)

Survey of current methodological and theoretical ap-Comparative analysis of selected cases illustrating the re-lationship of peasant societies to other types of social sys-tems. Prerequisite: 202 or permission of instructor.

ANTH 427 Anthropology in Urban Settings (3) Sp Chrisman, Jacobs, Spain

Cross-cultural examination of theoretical issues in an-thropology as they have been studied in urban places. Discussion 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 volun-tary associations; law and politics; and the developments in anthropological method. Prerequisite: 202 or permission of instructor.

ANTH 428 Anthropological Perspectives on Ethnicity (3)

Extinitive (5) Keyes, Ottenberg Survey and evaluation of anthropological approaches to ethnicity and ethnic group relations, with reference to other models including race, caste, class, regional groupings, national, religion, and stratification. Discussion of research design for each approach. Data drawn from pre-colonial, colonial, and postcolonial periods. Prerequisite: 202 or permission of instructor.

ANTH 429 Expressive Culture (5) Anthropological view of the expressive aspects of cul-ture: plastic-graphic arts, myth and folktale, music, dance, humor and tragedy, play and games. Prerequisite: 202 or permission of instructor.

ANTH 431 Oral Traditions (3)

Oral traditions and verbal expression, examined anthropologically and in relation to student interests. Critical examination of relevant theories and methods of analysis. Prerequisite: 100 or 202.

ANTH 432 Visual Anthropology (3) The place of photography and films in ethnography; their use in the documentation and interpretation of cultural and social systems. Prerequisite: 202 or permission of instructor.

ANTH 433 Culture and Homosexuality: U.S.A. (3) Read

Read Descriptive and analytical treatment of homosexuality and culture in the United States. Cultural bases for the stigma of homosexuality; heterosexual lores of the "mas-culine" and "feminine"; cultural definitions of intra- and inter-sexual roles and their relationship to the homo-sexual stigma. Homosexuality and cultural alienation. Homosexual modes of communicating and expressing the stigmatized preference; institutionalized settings. Sym-bolism of homosexual ritualized behaviors. Prerequisite: 202 or permission of instructor. 202 or permission of instructor.

ANTH 434 Comparative Morals and Value Systems

Sociological functions of morality in simple societies. Prerequisite: 202 or permission of instructor.

ANTH 435 Primitive and Peasant Economic

Systems (5) Chief features of nonmonetary and simple monetary economies. The impact of monetary economy and industrial technology on preindustrial systems and those of limited monetary circulation. Prerequisite: 202 or permission of instructor.

ANTH 436 Comparative Family Organization (5) Harrell

Various forms of family organization and marriage ar-rangements in nonindustrial societies, emphasizing the effects of ecological and economic variation on family structure and the effects of family structure on relationships between parents, children, spouses, and siblings. Prerequisite: 202.

ANTH 437 Political Anthropology and Social Change (5)

Anthropological studies of local-level politics in colonial, modernizing, and encapsulated societies. Processual ap-proaches to the study of political change. Prerequisites: 202, 371, or permission of instructor.

ANTH 438 The Analysis of Kinship Systems (5) Kinship groups in evolutionary perspective; functional analyses of kin roles; structural analyses of kin statuses; the analysis of sets of kinship terminology; the culture of kinship. Prerequisite: 202 or permission of instructor.

ANTH 439 Law in Changing Societies (5) Anthropological viewpoints on legal aspects of colonial, modernizing, and encapsulated societies. Problems of plural legal systems and of conflicts in judicial systems. Prerequisites: 202, 372, or permission of instructor.

ANTH 440 Child-Rearing, Culture, and Health (3) Cross-cultural study of the child-rearing practices, the cultural norms, and the health behavior of children and adolescents in different societies. Comparative ap-proaches, diverse theoretical postures, and empirical research findings are used to study socialization practices and their relationship to cultural, social, and health sys-tems of selected cultures. Offered jointly with NURS 495. Recommended: courses in child development, introductory anthropology, and psychological anthropology.

ANTH 441 Introduction to Culture and Personality

(5) Systematic survey of the field of culture and personality Systematic survey of the field of culture and personality as a subdiscipline of social anthropology. The relevance of psychological variables for the study of social systems and culture. Prerequisite: 202 and any introductory course in general psychology or personality theory, or permission of instructor.

ANTH 442 Anthropological Aspects of Communication (5)

Introduction to communicational aspects of culture. Prerequisite: 202.

ANTH 444 Contemporary Chinese Society (5) Harrell

Analysis of society in the People's Republic of China as a Analysis of society in the People's Republic of China as a product of traditional Chinese society and the changes wrought upon it by the impact of the West and by the rev-olutionary policies and practices of the Chinese Com-munist Party. Offered jointly with SISEA 444. Prerequi-site: 403 or SISEA 443 or another acceptable course on Chinese society, or permission of instructor.

ANTH 445 Quantitative Methods in Anthropology (5) Atkins, Hunn

Introduction to elementary computer processing of typical anthropological data. Intended for students of anthropology. Prerequisites: one of 202, ARCHY 205, or PHY A 201; and STAT 311; or permission of instructor.

ANTH 446 Structural Anthropology (3) Contributions of Levi-Strauss and others to anthropol-ogy, with concentration on the holistic analysis of culture through myth, ritual, society, and cosmology. Prerequisite: 202 or permission of instructor.

ANTH 447 Religion in China (5) Sp Harrell

Place of religion in Chinese society, examining the doc-trines, practices, and social consequences of the eclectic folk religion, the elite Confucian, Taoist, and Buddhist traditions, syncretistic sects, and imported Christianity. Offered jointly with SISEA 445. Prerequisite: one course in Chinese society, politics, or history, or permission of instructor.

ANTH 450 Theory and Method in Linguistic

Anthropology (5) Various theories and methods used in linguistic anthropology, with focus on the goal of producing descriptively adequate grammar, carrying out research on world-view, ethnoscientific, sociolinguistic, or typological problems. Students carry out projects demonstrating their ability to apply theory and method to data gathered on a specific problem in one of these areas. Prerequisite: 203 or equivalent.

ANTH 451, 452, 453 Phonology (3,3,3) A,W,Sp Brame, Contreras, Kaisse Speech sounds, mechanism of their production, and

structuring of sounds in languages; generative view of phonology. Offered jointly with LING 451, 452, 453. Prerequisite: LING 200 or 400, either of which may be taken concurrently, or permission of instructor.

ANTH 455 Areal Linguistics (3, max. 6) Linguistics analyses of the languages of a selected area. Offered jointly with LING 455.

ANTH 458 Cross-Cultural Perspectives on Textiles and Costumes (3) Rveskv

Ryesky Technological, economic, social, ideological, esthetic, and communicative aspects of textiles and costume of non-Western societies, analyzed from perspectives de-rived from anthropology and other social sciences. Modi-fications in the design and use of textile products due to the invest of inducting aspirate. Offset injects with the impact of industrial society. Offered jointly with TSCS 458. Prerequisites: 10 credits in anthropology or sociology.

ANTH 459 Types and Techniques of Transcription (3)

Analysis of aims and problems in the written symbolization of structured data. Emphasis on field transcription of human movement, music, and language. Prerequisite: 202 or permission of instructor.

ANTH 460 History of Anthropology (5) History of developments in the several fields of general anthropology. Prerequisites: 202 and 15 additional credits in anthropology.

ANTH 461, 462, 463 Syntax (3,3,3) Newmever

Study of the structural properties of language; introduc-tion to generative transformational syntax. Offered jointly with LING 461, 462, 463. Prerequisite: LING 200 or 400, which may be taken concurrently, or permission of instructor.

ANTH 464 Language Policy and Cultural Identity (3)

Eastman, Schiffman

Examines linguistic policies of the modern national state and their impact on cultural identity, especially of lin-guistic minorities. In the United States, for example, demands for non-English medium schools and other use of manics for non-English are compared with language policy in other societies (Europe, Africa, Asia). Attention is paid to atti-tudes underlying second-language instruction, billin-gualism, and language loyalty among Americans of non-English language background. Examines the persistence of language minorities in some societies in terms of cardial minorities in some societies in terms of special cultural factors underlying language loyalty, such as religion, ethnic pride, and literacy. Offered jointly with LING 433. Prerequisite: 450 or LING 200 or 400.

ANTH 469 Special Studies in Anthropology (3) Delineation and analysis of a specific problem or related problems in anthropology. Offered occasionally by visi-tors or resident faculty. May be repeated for credit by permission. Prerequisite: 202 or permission of instructor.

ANTH 480 Introduction to Museology (3) Nason

Museum history, philosophy, and basic operations, including organization, income, collection management, conservation, exhibition, security, education, research, and ethics. Prerequisite: upper-division standing or per-mission of instructor.

ANTH 481 Museum Collection Management: Ethnology (3)

Ethnology (3) Lecture and work experience in museum collection man-agement in the ethnology collections of the Burke Memo-rial Washington State Museum, including: identification, cataloging, furnigation, storage, cleaning, inventory, and specimen preparation for exhibition. Work involves both archival and nonarchival museum specimens from North America, the Pacific, and Pacific Rim areas. Prerequi-site: 480 or permission of instructor.

ANTH 482 Museum Conservation (5)

Lecture and laboratory work in the recognition and

treatment of museum conservation problems for specimens of wood, fiber, stone, metal, and bone. Application of basic principles to specific conservation and restora-tion problems faced by curatorial personnel. Prerequi-sites: 480, 481 or permission of instructor.

ANTH 486 Human Family Systems: Biological and Social Aspects (3)

van den Berghe Survey of the biological bases for human mating and re-production, and an examination of the range of cross-cultural variability in human systems of kinship and marriage: comparisons between 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. Prerequisite: 100 or PHY A 201 or SOC 110.

ANTH 488 Advanced Topics in Museology (3) Focuses on one or more selected current topics in museology. Prerequisite: 480 or permission of instructor.

ANTH 489 Anthropology Practicum (3-9, max. 15) AWSpS

Faculty-supervised off-campus internships in organiza-tions where anthropological skills may be utilized in non-academic settings. Assistance with establishing educationally valuable individual projects for internships given totany valuation individual projects for internships given by faculty sponsor. Suitable intern organizations include museums, social service and other governmental agencies, and private non-profit service agencies. Prereq-uisites: major in anthropology and permission of instructor.

ANTH 490 Problems in Social Structure (3)

Selected current problems in the study of social structure. Prerequisites: 202, 20 additional credits in anthropology, and permission of instructor.

ANTH 493 Advanced Topics in Expressive Culture (3)

Analysis and testing of special domains of esthetic expression, such as graphic arts, oral literature, dance, and humor among non-Western peoples. Prerequisites: 202, 429, 450 (or 453), and permission of instructor.

ANTH 494 Problems in the Anthropology of Law and Politics (3, max. 6)

Ottenberg, Winans

Seminar in the interrelationships of law and politics. Po-litical aspects of procedural and substantive law. Law as a basis of political power and authority. The intertwining of political and legal processes. Prerequisites: 371 or 439 and 372 or 437, or permission of instructor.

ANTH 495 Advanced Problems in Ethnology (3) One or more current problems in ethnology. Seminar for-mat. Prerequisites: 25 credits in anthropology and permission of instructor.

ANTH 496 Problems in Psychological Anthropology (3)

Problem areas and new approaches to the study of culture and personality. Prerequisites: 441, 20 additional credits in anthropology, and permission of instructor.

ANTH 497 Cognitive Anthropology (3)

ANTH 497 Cognitive anthropological Humn Discussion and practical experience in the collection and analysis of data. Exemplary cognitive anthropological studies are replicated as class projects. Each project pro-vides a starting point for debating the central theoretical issues in this specialty. Prerequisites: 202 and major in anthropology, or permission of instructor.

ANTH 498 Seminar on Recent Advances in Medical

and Psychlatric Anthropology (3) Comparative studies of medical systems; cultural con-struction of illness categories and behaviors; health-seeking behavior; comparisons of indigenous and cosmopoliing behavior, comparisons of indigenous and cosmopor-tan practitioner-patient transactions; cross-cultural studies of the healing process; cultural analysis of affective and behavioral disorders; and applied clinical relevance of anthropological concepts and findings. Offered jointly with PBSCI 497. Prerequisites: 321 and permission of instructor.

ANTH 499 Undergraduate Research (*, max, 12; max, 18 for honors students only)

Prerequisite: permission of instructor.

COLLEGE OF ARTS AND SCIENCES

ARCHAEOLOGY

ARCHY 105 A Survey of World Prehistory (5) Wenke

World prehistory from cultural beginnings through the first Old and New World empires. Discussion of Pleistocene cultural developments, New World colonization, agricultural origins, the appearance of the first states and empires, and the evolution of ancient writing and technological systems. Emphasis on the archaeology of ancient Mesopotamia, Egypt, China, Europe, Peru, and Mexico. May not be counted toward the 50 credits required for the major in anthropology.

ARCHY 205 Principles of Archaeology (5) Introduction to the aims of archaeology and methods of reconstructing prehistory. Significance of various meth-ods of food collection and food production, of domestica-tion of plants and animals, and of agricultural systems. Tachreiners of define preherefacient experience Techniques of dating archaeological remains.

ARCHY 270 Field Course in Archaeology (12) Methods and techniques of field excavation as demonstrated through field experience. Prerequisite: per-mission of department. (Offered Summer Quarter only.)

ARCHY 303 Prehistoric Cultures of the Old World (3)

Beginnings of culture in the Old World to the Early Iron Age in Western Europe.

ARCHY 304 Prehistoric Cultures of the New World

Beginnings of culture of the New World from Pleistocene times until European exploration and conquest.

ARCHY 320 Prehistory of the Northwest Coast of America (5) Greengo

Prehistoric development of life-ways in the Pacific Northwest from the late Pleistocene Age to contact with Euroamericans. Strategies employed to adapt to the major kinds of environment, as well as stylistic systems in various types of artifacts and art forms. Audiovisual illustration and at least one field trip. 205 or ANTH 100 recommended.

ARCHY 371 Analysis of Archaeological Data (3) Introduction to archaeological data preparation and de-scription designed for students who have had field experience in archaeology. Prerequisites: 205 and permission of instructor.

ARCHY 468 Issues in Cultural Resource Management (1) Sp Dunnell, Grayson, Nason Review of federal and state cultural resource manage-

ment policies and the effects of these policies on the con-duct of projects that may impact cultural resources on public lands. Survey of related issues in museum man-agement. Prerequisite: 205, ANTH 202, or permission of instructor.

ARCHY 469 Special Studies in Archaeology (3, max. 6)

Consideration in detail of specific archaeological topics, either methodological or substantive in content, of cur-rent interest. Offered occasionally by resident, new, or visiting faculty. For advanced undergraduates and gradu-ate students. Prerequisites: 205 and permission of instructor

ARCHY 471 Trans-Pacific Contacts in Pre-Columbian Times (3)

Pre-Columbian Times (3) Investigation of numerous parallels in agricultural tech-niques, architecture, religious symbolism, astronomical and calendric systems, and various implements of spe-cific form between Asia, Oceania, Middle America, and South America beginning with the third or fourth mil-lenium before Christ. Prerequisites: 304 and permission of institution of the second se of instructor.

ARCHY 472 Early Man in the New World (3)

Examines the archaeological evidence for early human occupation of North and South America, with attention to geological, paleontological, climatic, and other environ-mental changes. Covers evidence for simple Paleolithic occupations preceding the widely acknowledged cultural sequence that began about twelve thousand years ago. Prerequisite: 304.

ARCHY 473 Prehistoric Cultures of Mexico (5) Pre-Hispanic culture history of Middle American civ-

ilizations in central and southern Mexico and the desert dwellers in northern Mexico. Prerequisite: 304 or permission of instructor.

ARCHY 474 Prehistoric Cultures of South America (3)

Archaeological history of the Andean region from the be-ginnings of agriculture to the culmination of Incan civ-ilization and related civilizations in Colombia, Ecuador, Peru, Bolivia, Chile, and Argentina. Archaeological his-tory of some tropical and subtropical regions of South America. Prerequisites: 304 and permission of instructor.

ARCHY 475 Archaeology of the Mayan Civilization

(3) Pre-Hispanic culture history of the Mayan peoples of Guatemala, the Yucatan peninsula, Honduras, and Chia-pas (Mexico). Prerequisites: 304 and permission of instructor.

ARCHY 476 Middle America Prehistory: Seminar Tour I (7) S

Seminar-tour of major archaeological sites and museums in Middle America. The course is designed to follow 473, Prehistoric Cultures of Mexico, and includes visits to the federal district of Mexico, Hidalgo, Morelos, Guerro, Puebla, Veracruz, Oaxaca, and Jalisco. Knowledge of Spanish recommended. Prerequisites: 304 and permission of instructor.

ARCHY 478 Prehistoric Cultures of North America: Western North America (3) Grayson

Archaeological history of the various regions of North America north of Mexico and west of the Rocky Moun-tains with primary emphasis on the far western area. Pre-requisite: 304 or permission of instructor.

ARCHY 479 Prehistoric Cultures of North America: Eastern North America (3) Sp Dunnell

Precolumbian culture history of the cultural areas within North America east of the Rocky Mountains and north of Mexico. Prerequisite: 304 or permission of instructor.

ARCHY 480 Advanced Archaeological Analysis:

Anoth two fastuates as the second sec and standard techniques for data manipulation. Includes the theoretical bases for techniques and their uses and limitations in cultural, historical, and processual ac-counts. Prerequisite: 371 or permission of instructor.

ARCHY 481 Advanced Archaeological Analysis: Environmental Remains (6) Dunnell, Grayson

Combination of lecture and practical laboratory instruc-Combination of lecture and practical laboratory instruc-tion in the preparation of archaeological data for analysis, emphasizing faunal, vegetal, edaphic, and other nontech-nological elements of archaeological assemblages and standard techniques for the manipulation of these data. Includes the theoretical bases for the techniques and their uses and limitations in cultural, historical, and processual accounts. Prerequisite: 371 or permission of instructor.

ARCHY 496 Quantitative Archaeological Analytic Techniques (3) Wenke

Wenke Introduction to quantitative approaches to archaeological problems; data-screening, numeric methods of classifica-tion and identification, graphical and computer-based seriation techniques, and the analysis of spatial patterning in artifact distributions. Prerequisites: 205, an introduc-tory descriptive statistics course, and permission of in-structor.

ARCHY 497 Archaeological Method and Theory I: Formal Theory (5) Examination of theoretical constructs in the analysis of

archaeological data. Terminology, typologies, and inter-regional comparisons. Prerequisites: 205, 20 additional credits in anthropology, and permission of instructor.

ARCHY 498 Archaeological Method and Theory II: Explanatory Theory (5) Conceptual frameworks employed by archaeologists in

obtaining explanation in the three major areas of culture history, cultural reconstruction, and explanatory prehis-tory, considering the nature of explanation as conceived in these areas, the basic assumptions employed in achiev-ing these aims, and an introduction to the methods employed. Prerequisites: 205 and 497.

ARCHY 499 Undergraduate Research (*, max. 12; max. 18 for honors students only) Prerequisite: permission of instructor.

PHYSICAL ANTHROPOLOGY

PHY A 201 Principles of Physical Anthropology (5) The evidence for primate evolution from the fossil record and from the morphological, genetic, and behavioral variability of living forms. Relationship of human genetics to the evolution of modern populations.

PHY A 370 Introduction to Primates (3) In-depth examination of the origin and the distribution of primates in time and space; growth and development, posture, and locomotion, sexual and intraspecific differ-ences, special sense organs, oral cavity, skin and hair, behavior, and major evolutionary trends. Prerequisite: 201

PHY A 375 Biology of Human Race (3) Sp Hurlich

Worldwide survey of the distribution and causes of variation in human biology: the distribution of human body shape and size, skin and eye color, genetic systems such as blood groups, and responses to cold, heat, and disease; their relation to processes of adaptation and natural selection, environment, and population history; and problems arising from previous attempts at classifying human vari-ability. Prerequisite: 201 or permission of instructor.

PHY A 381 Biological Aspects of African Populations (3)

Populations (3) Origin and biological nature of African populations with emphasis on the interaction of genetics, ecology, and so-ciocultural practices in extant populations. Biological perspective of black populations in the New World with emphasis on the United States. Prerequisite: 201 or BIOL 210, 211, 212.

PHY A 382 Human Population Biology (3) Nute

Principles of population biology as they apply to the human species, including basic genetic, demographic, and ecological aspects of human populations discussed from historical and present-day perspectives. Prerequisite: 201 or BIOL 210, 211, 212.

PHY A 384 Biological Aspects of American Indian **Populations (3)**

Peopling of the aboriginal New World, its population at time of discovery, and subsequent changes in genetics, physique, nutrition, and health. Emphasis is first placed upon the historical background through analysis of skeleupon the historical background through analysis of skele-tal remains in their proper archaeological setting. The ex-tant populations of living Indians of both continents are investigated with respect to biological parameters (ecol-ogy, demography, and genetics) and the relationship of their quality of life to their biobehavioral welfare. Intensive review of the American Southwest, Mexico, Guatemala, Venezuela, and Peru. Prerequisite: 201 or BIOL 210, 211, 212.

PHY A 387. Ecological Anthropology: Ecological and Biological Adaptation in Man (5) Hurlich

Man's biological legacy and present adaptability viewed from various aspects of human ecology; the cultural past, climate and geography, nutrition and disease, and pollu-tants and contaminants. Oriented in terms of natural and cultural selection of those who are to live to reproduce and those who are not, and of the physical and mental damage resulting from ecological factors. Prerequisites: 201 or BIOL 101-102 or 210.

PHY A 388 Fossil Man (3) Presentation of the major trends in the evolution of human morphology and behavior. The remains of fossil man, their geological context, age, and ecological set-ting, and how this information has been used to reconstruct man's early history. Changes in both morphology and adaptation to environment. Prerequisites: 201 or BIOL 210, 211, 212.

PHY A 390 Ecological Impact of Cities on People (3) Interdisciplinary, integrative approach to the effects of urban stresses upon the biobehavioral characteristics of city people in both developed and underdeveloped coun-

tries: pollution, poor nutrition, disease, social breakdown, maladaptive lifestyles, anonymity, and overstimu-lation. The multifactorial nature of these stresses is emphasized, as well as the mechanisms behind the responses to them. Prerequisite: 201.

PHY A 469 Special Topics in Physical Anthropology (3, max. 6) Eck. Hurlich, Newell, Nute, Swindler

Delineation and analysis of a specific problem or a more general area in physical anthropology. Offered occasion-ally by visitors or resident faculty. Prerequisite: permis-sion of instructor.

PHY A 473 Biological Adaptability of Human Populations (5) W Hurlich

Human variability in body composition, stature, skin and eye color, metabolic processes, reproductive rates, and circulatory physiology in environments that are at the ex-tremes with respect to cold, heat, altitude, nutritional de-privation, and urban concentration. Prerequisites: 201 and general physiology, or permission of instructor.

PHY A 478 Dental Anthropology (5) Intensive survey of the dentitions of primates from tree shrews to man. Emphasis placed on the range of metric and morphologic variability existing in the teeth of these animals, both in fossil and living groups. Environmental and genetic factors are considered within this ontogenetic and phylogenetic framework. Prerequisite: 201.

PHY A 480-481 Primate Anatomy: Structure and Function (5-5)

Function (5-5) Anatomy of various primates studied in detail with spe-cial reference to structural and functional relationships. The evolution and present ecology of primates as they re-late to the total anatomical picture. The laboratory con-sists of dissection of a specified primate and a study of the dentition and osteology. Prerequisite: 201 or permis-cion of instructor sion of instructor.

PHY A 482 Physical Anthropology: Population Genetics (5)

The population as a unit of study defined, and methods of analyzing the forces of evolution operative in human populations presented. Prerequisites: 201, 382, GENET 451 and statistics, or permission of instructor.

PHY A 484 Human Growth and Development (3) PHY A 484 Human Growth and Development (3) Principles of growth and development in man from the embryological period through old age. The interaction of genetics and the environment as they determine the growth and maturational processes. The evolutionary as-pects of human growth and development. Prerequisites: 201 and BIOL 210, 211, 212, or permission of instruc-tor tor.

PHY A 485 Primate and Human Growth Laboratory (2, max. 8) Laboratory dealing with current methods used to assess growth and development. Must be accompanied by 484 or 494.

PHY A 486 Primate Socioecology (3) Focus on the variety of social systems exhibited by non-human primates and adaptive significance of these societies; social systems in terms of the present ecology and evolutionary past of the species; the function of commu-nicatory gestures and vocalizations, tradition, kinship, and social roles in maintaining and structuring groups and social foles in manualining and structuring groups over generations; the relationship among mating systems, foraging strategies, ranging patterns, and ecological sep-aration/resource partitioning and their contribution to species-typical social organization. Field data and current socioecological theories of primate social structure. Perspecies 201

PHY A 487 Human and Comparative Osteology (3) Introduction to the vertebrate skeleton. The skeleton is described in detail, and various methods of determining age and sex are presented, as well as osteometry and modern statistical methods for handling such data. Prerequisite: permission of instructor.

PHY A 488 Primate Evolution (5) Eck

Prerequisite: 201.

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. Prerequisites: 201 and 370, GEOL 361, or per-mission of instruction mission of instructor.

PHY A 489 Early Evolution of the Hominidae (5) A Eck

Data and interpretations basic to the Pliocene and early Pleistocene evolution of the family Hominidae. Presentation of the geological contexts, ages, faunh associations, fossil and cultural remains of the hominid lineages. Prac-tical experience with the hominid fossil material, and explanation of the morphological and contextual similar-ties and differences. Prerequisites: 201 and 370, GEOL 361, or permission of instructor.

PHY A 490 Later Evolution of the Hominidae (3) W Eck

Data and interpretations basic to the middle and late Pleistocene evolution of the family *Hominidae*. Presentation of the geological contexts, ages, faunal associations, fossil and cultural remains of the hominid images. Practirossu and curura remains of the nominid images. Practi-cal experience with the hominid fossil material and ex-planation of the morphological and contextual similarities and differences. Prerequisites: 201, 370, and 489, GEOL 361, or permission of instructor.

PHY A 491 Molecular Aspects of Primate Evolution (3) Sp

Primate evolution from the perspective of molecular evo-lution. Mechanisms of change affecting informational and structural macromolecules, and their contributions to evolutionary diversification. Concordances and discordances between phylogenetic inferences based on biochemical and paleontological data. Prerequisites: 201 (or BIOL 210, 211, 212), and GENET 451, and permission of instructor.

PHY A 494 Nonhuman Primate Growth and Development (3)

Newell

from infancy to death with emphasis on the role of ontog-eny in the evolution of primates. Prerequisites: 201, 370, and statistics.

PHY A 499 Undergraduate Research

(*, max. 12; max. 18 for honors students only) AWSpS

Prerequisite: permission of instructor.

Courses for Graduates Only

GENERAL

ANTH 600 Independent Study or Research (*) AWSp

ANTH 700 Master's Thesis (*) Offered on credit/no credit basis only.

ANTH 800 Doctoral Dissertation (*) Offered on credit/no credit basis only.

SOCIOCULTURAL ANTHROPOLOGY

ANTH 500 Preceptorial Reading (6) For beginning graduate students who have not had ade-quate 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 in-volved in linguistic anthropology. See also course de-scription for 203. Not open to graduate students in the linguistic another linguistics program.

ANTH 507-508-509 Methods of Sociocultural Research (5-5-5)

Research (3-3-3) Core-course sequence intended for first-year graduate students in sociocultural anthropology. Survey of major issues, alternative strategies, and selected special topics in the design of anthropological research and the collec-tion, processing, and analysis of anthropological data. Prerequisite: graduate standing in anthropology or permission of instructor.

ANTH 510 Seminar on North American Indians (3) Advanced comparative treatment of selected aspects of the Indian cultures and societies of North America.

ANTH 512 Seminar on Oceania (3)

An advanced comparative treatment of selected aspects of the cultures and societies of Oceania.

ANTH 513 Seminar on Africa (3, max. 9) Advanced comparative treatment of selected aspects of the cultures and societies of Africa.

ANTH 516 Seminar on Southeast Asia (3, max. 9) Advanced comparative treatment of selected aspects of the cultures and societies of Southeast Asia.

ANTH 517 Seminar on South Asia (3) Advanced analysis of selected problems in South Asian ethnology and social structure. Prerequisite: 412.

ANTH 518 Seminar on Middle America (3) Advanced comparative treatment of selected aspects of the cultures and societies of Middle America.

ANTH 521 Seminar on the Anthropological Study of Religion (3, max. 9)

Advanced seminar in the anthropological study of reli-Auvated semina in the anticipulation study of reli-gion designed for students who have a background in the theory and applications of theory developed in the an-thropological study of religion. Seminar topics vary each quarter. Prerequisites: 422 and graduate standing; permission of instructor for graduate students ់ព 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 Acculturation and Ethnicity (3) Systematic analysis of psychological, social, and cultural implications of the contact of peoples.

ANTH 529 Seminar in Expressive Culture (3) Detailed study of selected topics in expressive culture from an anthropological point of view. Prerequisite: 429 or permission of instructor.

ANTH 537 Political Anthropology and Law (3, max. 6)

Seminar on special topics in politics and law and their in-terrelationships. Prerequisites: 437, 439, or permission of instructor.

ANTH 541 Seminar in Psychological Aspects of Culture (3)

Selected problems in the relation of culture and personality types. Prerequisite: 441 or permission of instructor.

ANTH 553 Analysis of Linguistic Structures (3, max. 6)

Syntactic and/or phonological analysis. Language varies. Offered jointly with LING 553. Prerequisite: permission of instructor.

ANTH 559 Seminar in Language and Culture (3) Theoretical and methodological problems in language and culture.

ANTH 561 Seminar in Methods and Theories (3, max. 9)

ANTH 563 Structural Functional Analysis (3. max. 9)

ANTH 564 Formal Methods of Analysis for Social

Anthropology (3) Seminar on selected nonstatistical mathematical methods and models of relevance to various problems in social anthropology.

ANTH 565-566-567 History and Theory of Sociocultural Anthropology (5-5-5) 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 rela-tion between theory and a growing body of ethnographic data. Prerequisites: graduate standing in anthropology or permission of instructor; 565 for 566; 566 for 567.

ANTH 571 Communicational Anthropology (3-9) Introduction to communicational aspects of culture. Prerequisite: permission of instructor.

ANTH 590 Seminar in Museum Theory (3) Nason

Fundamental theoretical issues involved in current museum administrative and operations work, including

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administrative structure, organizational conflicts, museum-community relations, and museum educational programming. Prerequisites: permission of instructor.

ANTH 591 Seminar in Museum Operations (3)

Nation, Quimby Designing hypothetical museums and creating a first year of operations. Design elements include architectural plan, staffing plan, initial and recurring budgets, security system, records system, educational plan, and policy making. Prerequisite: 590 or permission of instructor.

ANTH 592 Seminar in Museum Specimen Documentation (3) Seminar discussion of museum specimen documentation research approaches, including technological and raw material analyses, contextual studies, and esthetic stud-ies. Documentation of a collection and reference work. Prerequisites: 590, 591, or permission of instructor.

ARCHAĖOLOGY

ARCHY 501 Preceptorial Reading (6)

For beginning graduate students who have not had ade-quate training in the problems, principles, and methods involved in the reconstruction of prehistory. Not open to graduate students in the archaeology program.

ARCHY 570 Seminar in Theory and Method in Archaeology (3, max. 9)

ARCHY 571 Field Course in Archaeology (5) Study of prehistoric cultures through archaeological ex-cavation and analysis. Work is largely in the state of Washington, but other areas may be included. (Offered Summer Quarter only.)

ARCHY 572 Seminar in North American

Archaeology (3, max. 6) Selected problems in the archaeology of America north of Mexico. Prerequisite: 472 or permission of instructor.

ARCHY 573 Seminar in Middle American Archaeology (3, max. 6) Selected problems in the archaeology of Middle Amer-ica. Prerequisite: 473 or 475 or permission of instructor.

ARCHY 574 Seminar in South American

Archaeology (3, max. 6) Selected problems in the archaeology of South America and southern Central America. Prerequisite: 474 or permission of instructor.

ARCHY A 575 Strategy of Archaeology (6) Sp ' Dunnell

Dunnell Systematic examination of methods and techniques of field research in archaeology, acquainting students with sources of existing material and techniques of broad ap-plicability. Practical experience in archaeological map preparation, sampling design manufacture, and map in-terpretation. Prerequisite: permission of instructor.

ARCHY 591 Advanced Field Course in

ARCHY 591 Advanced Field Course in Archaeology (9) Designed for intermediate-level graduate students who have had some field experience and other graduate courses in archaeology. Field experience in Mexico; other geographical locations as arranged. Prerequisites: 497, 498, 571, 575, a working knowledge of Spanish, an appropriate area course (473 for Mexico) and permission of instructor.

ARCHY 600 Independent Study or Research (*) Prerequisite: permission of instructor.

PHYSICAL ANTHROPOLOGY

PHY A 502 Preceptorial Reading (6). For beginning graduate students who have not had ade-quate 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 physical anthropology program.

PHY A 570 Principles of Primate Taxonomy (3) Problems in primate classification involving considera-tion of living and fossil forms and the extent to which ap-plication of taxonomic principles can aid in both the defi-nition and solution of these problems. Prerequisite: 488 or 489 or permission of instructor.

PHY A 583 Topics in Growth and Development

(3, max. 9) Seminar dealing with various topics of primate growth and development. Topics vary from quarter to quarter. Prerequisite: 484 or 494 or permission of instructor.

PHY A 584 Topics in Ecology and Adaptation

(3, max. 9) Seminar dealing with various aspects of ecology and ad-aptation. Topics vary from quarter to quarter. Prerequi-site: 483 or permission of instructor.

PHY A 588 Topics in Primate Evolution (3) Emphasis on fossil taxa and their importance in under-standing the morphologies and distributions of members of modern taxa. Prerequisites: 488 and permission of instructor.

PHY A 589 Topics in Hominid Evolution (3) A Emphasis on the fossil taxa and their importance in understanding the evolutionary history of the modern genus. Prerequisites: 489 and permission of instructor.

PHY A 590 Current Issues in Human and Non-Human Primate Evolution (1, max. 15) Biweekly presentation by participants and guest lecturers of current literature and ongoing research in topics pertaining to human and nonhuman primate evolution, biol-

ogy, anatomy, genetics variation, and behavior. Prerequisite: graduate standing in physical anthropology or permission of instructor.

PHY A 600 Independent Study or Research (*) AWSpS

Prerequisite: permission of instructor.

ART

Courses for Undergraduates

ART 100 - Introduction to Art (3) Introduction to materials and techniques through studio activities. For nonmajors.

ART 101 Special Studies in Art for Nonmajors (3. max: 9)

Individual and group instruction in art with special projects, readings, and papers in art serving as a focus for studio work.

ART 105, 106, 107 Drawing (3,3,3) Perspective, light and shade, composition. Prerequisites: 105 for 106; 106 for 107.

ART 109, 110 Design (3,3) Art structure as the basis for creative work. Organization of line, space, and color. Prerequisite: 109 for 110.

ART 129 Appreciation of Design (3) Lectures on design fundamentals, illustrated with slides and paintings, pottery, textiles, etc. Reading and reference work.

ART 162 Survey of Interior Design (2) Survey of twentieth-century interior design practice and an overview of the profession in relation to architecture and other allied professions. Prerequisite: interior design major.

ART 197 Study Abroad: Nonmajor Individual Projects (3-5, max. 10)

Prerequisite: permission of Art advisory office.

ART 200 Art and the Child (3) Introductory orientation to art, designed to acquaint the student with the structural and esthetic elements of art and those art-related processes of self-expression and communication basic to a child's general education. Pre-requisite: prospective student in elementary education.

ART 201, 202, 203 Ceramic Art (3,3,3)

hand-building processes, wheel throwing, glazing, kiln firing. Prerequisites: 107, 110, for 201; 201 for 202; 202 for 203.

ART 204 Graphic Design: Context, Formulation, Performance (3)

Lectures and assignments exploring graphic design and its function in the context of specific visual situations. Primarily for nonmajors.

ART 205 Graphic Design (3)

Series of basic graphic design projects that involve the primary concerns of visual communication. Projects are intended to reveal the design abilities of the student as well as to offer an introduction to the profession. Prerequisites: 107, 110, major in graphic design.

ART 206 Graphic Design (5)

Basic graphic design projects in visual communication. Emphasis is placed on attitudes of investigation and implementation. Prerequisite: 205.

ART 207 Graphic Design: Visual Methods

(3, max. 6) (3, max. 6) First in a series of courses that apply the fundamentals of photography and photomechanical processes to design. Comprised of theory, demonstration; and laboratory. Prerequisite: 206.

ART 208 Graphic Design: Visual Methods

(3, max. 6) Photography/illustration and processes related to visual communications and advertising design. Prerequisite: 207.

ART 210 . Art and the Individual (3) Studio-lecture survey of contemporary art forms and their significance as they relate to the individual. One of a three-quarter series to develop a core of knowledge appropriate to prospective teachers of art. Prerequisite: sophomore standing in art education.

ART 211 Art in the Schools (3)

Studio-lecture survey of contemporary art forms and their significance as they relate to the schools. One of a threequarter series to develop a core of knowledge appropriate to prospective teachers of art. Prerequisite: sophomore standing in art education.

ART 212 Art in the Community (3)

Studio-lecture survey of contemporary at forms and their significance as they relate to the community. One of a three-quarter series to develop a core of knowledge appropriate to prospective teachers of art. Prerequisite; sophomore standing in art education.

ART 220 Drawing and Painting (6, max. 18) Integrated approach to drawing and painting for three consecutive quarters with the same instructor. Prerequi-sites: 107, 110, and permission.

ART 230 Introductory Photography I (3) Introduction to the basic theory, techniques, and pro-cesses of still photography. Emphasis on camera, film, and exposure. Student must provide camera with lens, shutter, and aperture controls. Prerequisite: art major or permission of Art advisory office.

ART 231 Introductory Photography II (3) Introduction to basic black-and-white darkroom procedures, equipment, and techniques. Emphasis on both darkroom printing and the camera. Student must provide camera with lens, shutter, and agerture controls. Prerequisite: 230 or permission of Art advisory office.

ART 232 Theory and Criticism of Photography (3) Study of photography based on its origins and develop-ment as an art form from early nineteenth century to the present day. Emphasis on photographic traditions and photographers of the twentieth century.

ART 245 Introduction to Printmaking (5) Survey of historical and current approaches in the art of printmaking. Processes include etching, woodcut, wood engraving, collagraphy, lithography, silk screen, li-noleum, photographic platemaking. Prerequisites: 107, 110.

ART 246 Images on Paper (5, max. 10) Combines traditional printmaking with drawing and painting. Experimental in nature. Involves working with various media and translating an image from one medium to another, understanding and dealing with the unique characteristics of each medium. Prerequisites: 107, 110.

ART 250 Design and Materials: Textiles—Printing and Dyeing (3, max. 9) Techniques include block printing, batik, tie and dye, discharging. Prerequisites: 107, 110.

ART 253 Design and Materials: Wood (3)

Shaping and forming of wood. Lamination and fabricat-ing techniques. Usage of hand and power tools. Prerequi-sites: 107, 110.

ART 254 Design and Materials: Metal (3) Basic techniques in manipulation and construction of metals. Prerequisites: 107, 110.

ART 255 Design and Materials: Textile Construction (3, max. 9) Knotting, hooking, stitching, and other nonwoven constructional techniques with a variety of textile fibers. Pre-requisites: 107, 110.

ART 256 Painting (3) Beginning oil painting. Prerequisites: 107, 110.

ART 257 Painting (3, max. 6) Oil painting. Prerequisite: 256.

ART 258 Jewelry Design (5) Introduction to jewelry design and construction through techniques of sawing, filing, soldering, forging, and cast-ing in silver, copper, bronze, and brass, as well as simple stone setting. Prerequisites: 107, 110.

ART 259 Water-Soluble Media (3, max. 9) Prerequisites: 107, 110.

ART 261, 262, 263 Introduction to Interior Design (3,3,3)

Graphics, structure, space analysis, and materials. Pre-requisites: 162 and permission for 261; 261 and permis-sion of Art advisory office for 262; 262 and permission of Art advisory office for 263.

ART 265 Intermediate Drawing (3, max. 9) Prerequisites: 107, 110.

ART 272 Beginning Sculpture Composition

(3, max. 6) Prindamentals of composition in the round and in relief. Prerequisites: 107, 110.

ART 274 Life Sculpture (5, max. 15) Work in clay from the posed model. Prerequisites: 107, 110

ART 300 Appreciation of the Crafts (3) ______ Lectures and illustration of historic, ethnic, and contemporary crafts analyzing design, materials, and techniques. Open to art majors and non-art majors. Pre-requisite: upper-division standing.

ART 301 Art Education: Crafts (3) Design in leather. Exploration of techniques and proc-esses leading to creative work. Prerequisites: 107, 110.

ART 302 Art Education: Crafts (3, max. 6) Bookbinding. The design and construction of books including decorative paper techniques. Prerequisites: 107, 110.

ART 303 Art Education: Crafts (3) Paper techniques and processes. Prerequisites: 107, 110.

ART 304 Art Education: Crafts (3) Textile techniques and processes. Prerequisites: 107, 110.

ART 307 Intermediate Painting (3, max. 6) Prerequisite: 6 credits in 257.

ART 309 Portrait Painting (3) Prerequisite: 6 credits in 307.

ART 310, 311, 312 Interior Design (5,5,5)

Analysis of interior spaces and furnishings in relation to human needs. Includes study of materials, scale draw-ings, models, and presentation. Prerequisites: 263 and TSCS 428 for 310; 310 for 311; 311 for 312.

ART 316, 317, 318 Design for Industry (5,5,5) ANN 310, 317, 310 Design for Industry (5,5,5) Product design, working drawings, models, presentation drawings, product analysis, display, marketing, Prereq-usites: junior standing in industrial design for 316; 316 for 317; 317 for 318.

ART 319, 320, 321 Furniture Design (5,5,5) Design for full-scale construction of furniture in the shop, including working drawings, scale models, and layout. Prerequisites: 312 for 319; 319 for 320; 320 for 321.

ART 325 Advanced Drawing (5, max. 15) Study on the advanced level involving history, practice, and theory of drawing as an art form. Prerequisite: 9 credits in 265.

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ART 328 The Film as Art (3) Historical development of film as an esthetic medium with an emphasis on pivotal film-makers and their unique contribution to the art of film.

ART 332 Intermediate Sculpture Composition

(5, max. 15) Advanced work in various media and techniques. Prereq-uisite: 6 credits in 272.

ART 335 Metal Casting (5) Introduction to foundry techniques as applied to fine arts casting of nonferrous material. Prerequisite: 6 credits in

ART 336 Advanced Metal Casting (5) Prerequisites: 335 and permission of Art advisory office.

ART 337 Welding (3, max. 6) Study and application of welding methods as a sculpture technique making use of oxyacetylene, electric arc, and heliarc. Prerequisite: 6 credits in 272.

ART 339 Film Making (5, max. 15)

Pundamentals of camera techniques: lens lighting, meter reading, filming speeds, film types, cinematic move-ment, camera movement. Fundamentals of film editing, splicing and timing, sound recording, and synchronizing. Prerequisite: permission of Art advisory office.

ART 340 Design for Printed Fabrics (3, max. 9) Hand-block and silk-screen printing; mass-production de-sign. Prerequisite: 250 or permission of Art advisory office.

ART 345 Etching (5) Traditional and contemporary methods of etching as a creative art form. Included are aquatint, hard-soft and lift ground mezzatint, burin, engraving, dry point, niello, crible, and others. Techniques, such as intaglio, relief, stencil, and others. Prerequisites: 107, 110.

ART 346 Collagraph (5) Fundamentals of positive plate buildup with hard, soft, and pliable materials. The interrelationship of individual graphic ideas, plate making, and various techniques of printing. Prerequisites: 107, 110.

ART 347 Lithography (5) General survey of historical and contemporary lithogra-phy. Studio problems using a variety of stone, plates, pa-pers, inks, and presses. Hand-drawn and photochemical methods. Prerequisites: 107, 110.

ART 348 Woodcut (5) Basic Eastern and Western approaches to the art of the woodcut. Various woods, tools, papers, inks, color, printing techniques. Prerequisites: 107, 110.

ART 349 Silk-screen (5) Studio problems employing the techniques of paper, glue, lacquer, film, hand, drawn-cut, and photochemical stencils. Prerequisites: 107, 110.

ART 350 Survey of Printmaking (3) Study of printmaking from the first forms of incised sur-faces through Chinese and European artists, the Japanese woodcut, the Expressionists, and twentieth-century art-ists. Prerequisites: 107, 110.

ART 353 Advanced Ceramic Art (5, max. 15) Advanced work in forming, decorating, and glazing. Pre-requisites: 203 and permission of Art advisory office.

ART 357 Metal Design (5) Processes of raising, soldering, forging in copper, pewter, silver. Prerequisites: 107, 110.

ART 358 Jewelry Design (5) Intermediate jewelry design, such as etching, reticula-tion, makume, electroforming, repousse, chasing, and advanced stone-setting methods. Prerequisite: 258.

ART 359 Enameling (5) Enamel design for metal work or jewelry, Champleve, Plique-a-jour, Limoges, cloissonne on copper, silver, or gold. Prerequisite: 357 or 358.

ART 360 Life (3, mar. 9) Drawing and painting from the model. Prerequisites: 9 credits in 265 and 6 credits in 257.

ART 361 Art Techniques (3, max. 9) Study of the materials and techniques of the artist and

their application to painting and drawing. Prerequisite: 6 credits in 257.

ART 366, 367, 368 Graphic Design (5,5,5) Intermediate graphic design. Theory and presentation. To be taken concurrently with 376, 377, 378. Prerequisites: 207 and 208 for 366; 366 for 367; 367 for 368.

ART 370 Intermediate Photography I (5) Individual projects in photography combining technical and conceptual objectives. Emphasis on visual organization and contemporary photographic directions. Prerequi-sites: 231 and permission of Art advisory office.

ART 371 Intermediate Photography II (5) The photo essay. Thematic investigation of time and space, using the photographic image. In-depth treatment of a single topic. Prerequisites: 231 and permission of Art advisory office.

ART 372 Intermediate Photography III (5) Detailed investigation of the negative and print in black-and-white photography. Emphasis on creative application of exposure, development, and printing techniques. In-cludes preparation of prints for exhibition. Prerequisites: 231 and permission of Art advisory office.

ART 376, 377, 378 Graphic Design (3,3,3) Intermediate graphic design. Specialized investigations. To be taken concurrently with 366, 367, 368. Prerequi-sites: 207 and 208 for 376; 376 for 377; 377 for 378.

ART 411 Advanced Photography (5, max. 15) Topics in advanced photography including: color print-ing, large-format photography, artificial lighting, and photographic image transformation. Prerequisite: 372 or permission of Art advisory office.

ART 421 Video Art (5, max. 15) Discussion, demonstrations, and practical experiments in closed-circuit television and videotape as creative media. Prerequisites: extensive work in printmaking and film and permission of Art advisory office.

ART 436 Sculpture Composition (5, mar. 15) Individual compositions in various media in large scale. Prerequisites: 15 credits in 332 and permission of Art advisory office.

ART 439 Advanced Film Making (5, max. 15) Advanced individual projects in film-making. Pre-requisities: 15 credits in 339 and permission of Art advisory office.

ART 445, 446, 447 Advanced Industrial Design (5,5,5)

(3,3,5) Market analysis and selected professional problems in in-dustrial design. Consultation techniques; psychological, sociological, and economic factors involved in designing for consumer acceptance. Prerequisites: 318 for 445; 445 for 446; 446 for 447.

ART 450 Advanced Etching (5) Advanced problems in etching; photo processes; combin-ing of techniques. Integration of the individual idea with the plate, printing, and color. Prerequisite: 345.

ART 451 Advanced Collagraph (5) Advanced problems in the art of the collagraph. Prerequisite: 346.

ART 452 Advanced Lithography (5) Advanced problems in lithography. Prerequisite: 347.

ART 453 Advanced Woodcut (5)

Advanced problems in the art of the woodcut. Prerequisite: 348.

ART 454 Advanced Silk-screen (5) Advanced problems in the art of silk-screen. Individual creativity stressed. Prerequisite: 349.

ART 455 Advanced Printmaking (5) Advanced problems integrating various processes and techniques. Matting, framing, multiples, exhibiting, stu-dio arrangement, shipping, dealers, museums, collect-ing, catalogs. Prerequisite: 30 credits in printmaking.

ART 457 Advanced Metal Design (5) Individual problems in metal design and construction. Prerequisite: 357.

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ART 458 Advanced Jewelry Design (5) Individual problems in jewelry design and construction. Prerequisite: 358.

ART 459 Advanced Enameling (5) Individual problems in enameling. Prerequisite: 359.

ART 460 Advanced Metal Design (5, max. 15) Advanced individual projects in metal design. Prerequi-site: permission of Art advisory office.

ART 463 Advanced Painting (5, max. 15) Development of individuality in painting through creative exercises. Prerequisites: 6 credits in 307 and 9 credits in 360.

ART 464 Advanced Painting/Drawing (5, max. 15) Advanced problems in composition. Prerequisite: 15 credits of 463.

ART 466, 467, 468 Graphic Design (5,5,5) Advanced graphic design. Theory and presentation. To be taken concurrently with 478, 479, 480. Prerequisites: 368, 378 for 466; 466 for 467; 467 for 468.

ART 472, 473, 474 Advanced Interior Design

(5,5,5) Comprehensive problems related to contemporary needs, both public areas and residences, usually offered in conjunction with off-campus designers. Further research of historic interior masterpieces. Models, materials and their sources, perspective and working drawings. Prereq-uisites: 312 for 472; 472 for 473; 473 for 474.

ART 478, 479, 480 Graphic Design (3,3,3) Advanced graphic design. Specialized investigations. To be taken concurrently with 466, 467, 468. Prerequisites: 368, 378 for 478; 478 for 479; 479 for 480.

ART 485 Advanced Ceramic Art (5, max. 15) Pottery design and construction, stoneware, clay bodies, glazes. Prerequisites: 15 credits in 353 and permission of Art advisory office.

ART 490 Art Education in the Schools (3) For school administrators and teachers requiring help in problems relating to the teaching of art. Workshop ex-periences, lectures, and discussions. No previous art ex-perience necessary. Prerequisite: teaching experience.

ART 491 Readings in Art Education (3 or 5, max. 15)

(3 or 5, max, 15) Basic readings in art education. Survey of leaders and movements that have contributed to the development of art education, with special attention to social and philo-sophical factors that have influenced art programs in American schools. Prerequisite: permission of Art advisory office.

ART 492 Field Study in Art Education (3, max. 9) Individual study of a selected problem in at education within a school setting under the direction of a faculty member. Prerequisite: permission of Art advisory office.

ART 493 Problems in Art Education (3, max. 9) Designed to consider significant and critical problems in the field of art education. Prerequisite: permission of Art advisory office.

ART 494 Instructional Materials in Art Education

(3, max. 9) Preparation of teaching materials in selected media appropriate to the learner and with concern for subject matter. Prerequisite: permission of Art advisory office.

ART 495 Graphic Design Seminars (5, max. 15) Independent and group work in graphic design theory. Prerequisite: fifth-year standing in graphic design.

ART 497 Study Abroad—Studio Individual Projects (3-10, max. 20) Prerequisite: permission of Art advisory office.

ART 498 Individual Projects-Painting/Sculpture (3 or 5, max. 15) Prerequisite: permission of Art advisory office.

ART 499 Individual Projects-Design (3 or 5, max. 15) Prerequisite: permission of Art advisory office.

Courses for Graduates Only

ART 500, 501, 502 Seminar in Art Education (3 or 5, 3 or 5, 3 or 5)

ART 509 Portrait Painting (3)

- ART 512 Seminar in Painting (3, max. 9)
- ART 513 Contemporary Studio Theories and Problems in Painting (3)
- ART 522 Sculpture (3 or 5, max. 15)
- ART 530 Design (3 or 5, max. 15)
- ART 550 Printmaking (3 or 5, max. 15)
- ART 553 Ceramic Art (3 or 5, max. 15)
- ART 560 Life Painting (3 or 5, max. 15)
- ART 563 Advanced Painting (3 or 5, max. 15)
- ART 600 Independent Study or Research (*)
- ART 700 Master's Thesis (*)

ART HISTORY

Courses for Undergraduates

ART H 200 Ideas in Art (5)

Selected monuments of art and architecture in the West-ern 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 philo-sophical, religious, scientific, political, literary, and artistic texts.

ART H 201 Survey of Western Art-Ancient (5) Introduction to the 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 (5) The arts of the Byzantine Empire, Islam, and Western Christendom through the fifteenth century.

ART H 203 Survey of Western Art-Modern (5) European art and its extensions from 1500 to the present.

ART H 204 Survey of Asian Art (5) Origins and interplay of major movements of South and East Asian art.

ART H 205 Survey of Tribal Art (5) Introduction to the arts of Sub-Saharan Africa and Oceania from prehistoric times to the present, and to the Pre-Columbian arts of the Americas.

ART H 230 Afro-American Art (3) History of Afro-American art from colonial times until the present, the African background and its extensions into the West Indies, Brazil, and Surinam.

ART H 296 Study Abroad: Art in London (3-5, max. 15)

General introduction to art and art history through the study of objects in London's museums, of buildings in and near London, and through selected readings and research projects. Specific course content is announced in Study Abroad bulletins. Prerequisite: permission of un-dergraduate adviser.

300-level courses cover narrower times, spaces, and types of art than 200-level surveys and constitute the core curriculum for majors (although most enrolless come from other majors). Good basic university prepa-ration (equivalent to upper-division standing) is needed. Relevant 200-level courses, although not required, may provide helpful background.

ART H 302 Egyptian Art (5) Arts and architecture of the Nile Valley from the Neo-lithic to the end of the Coptic period.

ART H 305 Introduction to Islamic Art and Civilization (5)

Islamic art and civilization as represented by five court cities (Cairo, Cordova-Granada, İstanbul, İsfahan, Dehli-Fatehpur-Sikri) and the art and architecture, literature, religious expression, and social modes characteristic of each. Field trips to various local collections.

ART H 311 Chinese Art (5)

Overview of the arts of China with emphasis on a structural approach to the styles found therein; a survey of Chinese esthetics and its relation to the major varieties of Chinese philosophy; and an indication of the larger pat-terns of development in the arts of China and their rela-tion to the growth of the Chinese cultural nation.

ART H 316 Japanese Painting (5) Survey of Japanese painting traditions from earliest times to the present. Examples of each tradition are illustrated and discussed in the context of Japanese cultural history. Analysis is made of painting styles as well as of the roles artists have played and the meaning their works have had in Japanese society.

ART H 321 Art of India (5)

Arts and architecture of India and peripheral regions from prehistoric times to the modern period.

ART H 333 Art of the Northwest Coast Indian (3) Emphasis on the structure and style of two-dimensional art of the northern tribes. Offered jointly with ANTH 333. Prerequisite: sophomore standing.

ART H 334 Art of the Northwest Coast Indian (3) Three-dimensional art of the Pacific Northwest coast cul-Anter area, with emphasis on esthetic principles, tech-niques, cultural functions. Offered jointly with ANTH 334. Prerequisite: sophomore standing.

ART H 335 Art of the Northwest Coast Indian (3) Northwest coast Indian art as related to drama and dance, with special attention to the Southern Kwakiutl. Offered jointly with ANTH 335. Prerequisite: sophomore standing.

ART H 337 African Art and Society (5) 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) ART H 340 Pre-Classical Art and Archaeology (3) 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 CL AD 240 with CL AR 340.

ART H 341 Greek Art and Archaeology (3)

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; illusat the day slides. Principal sites and monuments, as well as techniques and methods of excavation, are examined in an attempt to reconstruct the material culture of an-tiquity. Offered jointly with CL AR 341.

ART H 342 Roman Art and Archaeology (3) Roman architecture and art, with emphasis on the inno-vations of the Romans; illustrated by slides. Offered jointly with CL AR 342.

ART H 343 Hellenistic Art and Archaeology (3) Sp Langdon

Survey of the art of Greece and the eastern Mediterranean from the time of Alexander the Great to the Roman con-quest. Principal sites with their sculpture, painting, mo-saics, and minor arts examined in lectures with slides. Offered jointly with CL AR 343.

ART H 351 Early Medieval and Byzantine Art (5) 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) Art and architecture of Western Christendom from the time of Charlemagne to the Renaissance.

ART H 361 Italian Renaissance Art (5) Sculpture, painting, and architecture from 1300 to 1600.

ART H 371 Baroque Art (5)

Arts and architecture of Europe from the end of the sixteenth century to the first years of the eighteenth century.

ART H 372 Rococo to Romanticism (5)

Aki h 572 Roboto and a architecture from about 1710 to about 1830. Attention is also given to Central and Eastern Europe, Scandinavia, and the colonial Americas.

ART H 380 Nineteenth- and Twentleth-Century Art (5)

Arts and architecture of Europe and America from Realism to the present, with emphasis on stylistic and thematic changes in painting.

ART H 381 Art Since World War II (5)

Art of Europe and the United States in the decades since World War II: painting, sculpture, and architecture, mul-tiplication of new forms (video, performance pieces, land and installation pieces, etc.), changing context of patronage, publicity, and marketing.

ART H 391 Painting Since the Renaissance (3) Illustrated lectures. Prerequisite: 203.

ART H 392 English and American Interior Design (3)

Illustrated lectures on the evolution of furniture and interior architecture from about 1400 to about 1830. Prerequisite: 203.

ART H 393 Italian and French Interior Design (3) History of interior architecture and furnishings of Italy and France from the Dark Ages to the early nineteenth century. Prerequisite: 203.

ART H 396 Study Abroad: Art in London (3-5, max. 15)

(3-3, max, 15) Advanced or specialized work in art history based on materials available in the museums, private collections, libraries, and buildings of London, conducted through lectures, reading and research projects. Specific course content is determined by the assigned faculty member and is announced in Study Abroad bulletins. Prerequisite: permission of undergraduate adviser.

ART H 397 Art and Architecture of the Kansai (8) Study, conducted in the field and in lecture/discussion sessions, of all the important monuments of Japanese art in the temples, shrines, and museums of Kyoto, Otsu, Nara, Osaka, and their vicinities.

ART H 398 Study Abroad: Art in Provence (5, max. 15)

Monuments in and around Avignon. Emphasis on Roman and Romanesque architecture and sculpture, later medi-eval French painting, great works of all periods and countries in regional museums, and the Provencal landscape of Cezanne, Van Gogh, and Gauguin. Prerequisite: permission of undergraduate adviser.

ART H 399 Study Abroad: Individual Projects (3-10, max. 20) For participants in Study Abroad programs. Prerequisite: permission of undergraduate adviser.

400-level courses are intensive, quite narrow in scope, and addressed to current scholarly problems. A rela-tively high level of sophistication is needed. In general, sound prior humanistic training and knowledge of at least one of the following are required: art of the period or region at a general level (such ds that provided by the relevant 200- or 300-level course); social or cultural history of the subject area; literature and thought of the area; or a appropriate foreign language. area; or an appropriate foreign language.

ART H 400 Art History and Criticism (3, max. 9) 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 406 Islamic Art: The Book (3) Qur'anic calligraphy, illumination, Arab, Persian, Turk-ish and Indian painting, bookbinding, and papermaking. Prerequisite: permission of undergraduate adviser.

ART H 407 Islamic Religious Art: Mosques (3) Survey of Islamic religious att as seen primarily in the mosque and its decoration. Emphasis on the development of the mosque form and its various manifestations throughout the Islamic world. Attention is paid to the language and function of pattern and decoration as embod-ied in the mosque.

ART H 408 Royal Images: Byzantium, Sasanid Iran, Islam (3)

Signs and symbols of royal kingship in Byzantium, Sas-anid Iran, and Islam; three major Middle Eastern dynasties organized on principles of religious ideology; origins of royal symbols and their iconography in Mesopotamian and classical culture.

ART H 411 Early Chinese Painting: T'ang to Yüan

Study of the changing styles and attitudes accompanying the development of painting (particularly landscape painting) in China from earliest times.

ART H 412 Later Chinese Painting: Yuan Through Ch'ing (3)'

Chinese painting from the time that the study of individual masters becomes the main task at hand.

ART H 413 Selected Topics in Chinese Art

(3, max. 9) Variety of Chinese art, concentrating on a specific period in time or a specific problem in Chinese history. Topics might include the art of Bronze Age China, Chinese figure painting, or Chinese painting of the Sung Dynasty,

ART H 417 Buddhist Painting of China and Japan

(3) Survey of Buddhist painting in China and Japan from the fifth century until *circa* 1300.

ART H 418 Buddhist Sculpture of China and Japan (3)

Survey of Buddhist sculpture in China and Japan from the fifth century until circa 1300.

ART H 419 Chinese and Japanese Architecture (3) Religious and secular architecture of China and Japan, with emphasis on Japanese temples and shrines.

ART H 420 Art of the Japanese Print (3)

Foundations of Ukiyo-e in Japanese genre from the twelfth through the mid-seventeenth centuries; wood-block 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.

ART H 421 The Yamato-e Tradition (3) Oldest (twelfth-to-fourteenth-century) narrative hand-scrolls and their descendants, the paintings of Tosa and other court artists from the fifteenth century onward, and the art of the Rimpa movement from Koetsu and Sotatsu (seventeenth century) to the present.

ART H 422 The Kan-ga Tradition (3) Ink paintings of Japanese Zen priests from the fourteenth century onward, and the works of professional artists belonging to those families (Kano, Hasegawa, Unkoku, and Kaiho) in which Chinese academic painting has been the principal inspiration, from the sixteenth century to the present.

ART H 423 Japanese Genre Painting (3) Various types of "popular" painting in Japan, including the Namban-e and townsman-painter art of the sixteenth and seventeenth centuries, the entire spectrum of ukiyo-e, and the "realistic" art of the Maruyama-Shijo school, from the eighteenth century to the present.

ART H 424 The Nanga Tradition (3) Works of painting and calligraphy by Japanese artists who have been part of the Chinese scholar-painting tradition from the late seventeenth century to the present.

ART H 425 Modern Japanese Painting (3) Painting of the Meiji, Taisho, and Showa eras (1868 to the present) by artists working in the modern idiom of ei-ther Yoga or Nihonga.

ART H 428 East Asian Calligraphy (3, max. 9) Classical calligraphy tradition of China and Japan in his-tory and practice. Prerequisite: permission of under-graduate adviser.

ART H 431 Pre-Columbian Art (3) Stylistic and contextual study of the arts of pre-Colum-bian cultures of Central and South America from prehistoric times to European contact.

ART H 432 Oceanic Art (3) Stylistic and contextual study of the arts of Oceania, sia. Melanesia, and Australia.

ART H 436 Arts of Sub-Saharan Africa I (3) Stylistic and contextual study of the traditional agts of the Western Sudan and the Western Guinea coast with their archaeological antecedents.

through a survey of the cultures of Polynesia, Microne-

ART H 437 Arts of Sub-Saharan Africa II (3) Survey of the traditional arts of the Central Guinea coast, Nigeria, Cameroon, and Gabon, from precontact times to the present.

ART H 438 Arts of Sub-Saharan Africa III (3) Stylistic and contextual study of the arts of Zaire, An-gola, the Swahili coast, and southern Africa.

ART H 442 Greek and Roman Painting (3) A Langdon

Painted decoration on Greek vases, and Roman wall painting, with emphasis on the historic and stylistic development of each. Offered jointly with CL AR 442. (Of-fered alternate years; offered 1980-81.)

ART H 444 Greek and Roman Sculpture (3) History and development of Greek sculpture and sculp-

sarcophagi. Emphasis on Greek sculpture of the fifth cen-tury B.C. Offered jointly with CL AR 444. (Offered alternate years; offered 1980-81.)

ART H 446 Greek Architecture (3) 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 and ARCH 446. (Offered alternate years; offered 1980-81.)

ART H 454 Romanesque Art (3) Western European art in the eleventh and twelfth centuto Compostela in France and Spain.

ART H 459 Late Medieval Art of Germany and

Painting, printmaking, sculpture, and architecture of the fourteenth and fifteenth centuries.

ART H 460 Netherlandish Art-Late Medieval and Renaissance (3)

Arts and architecture of the northern and southern Neth-erlands from the last half of the fourteenth century through Pieter Bruegel.

ART H 461 Early Renaissance Painting in Italy (3) Painting of the fourteenth and fifteenth centuries in central and northern Italy.

ART H 462 High Renaissance Painting in Italy (3) Painting in central and northern Italy, *circa* 1480 to *circa* 1530: Leonardo, Raphael, the early Michelangelo, Sarto, Correggio, Bellini, Giorgione, and the early Titian.

ART H 463 Italian Renaissance Sculpture (3) From Nicola Pisano to Giambologna.

ART H 464 Late Renaissance Painting in Italy (3) Painting in central and northern Italy, *circa* 1515 to *circa* 1580: Pontormo, Rosso, Parmigianino, Beccafumi, the later Michelangelo, Vasari, Bronzino, Salviati, the later Titian, Tintoretto, and Veronese.

ART H 465 Italian Renaissance Architecture (3) From the cathedral of Florence to St. Peter's in Rome: the style, symbolism, and theory of architecture.

ART H 467 The German Renaissance (3) Painting, printmaking, sculpture, and architecture of the sixteenth century in Germany, Alsace, Austria, and Switzerland.

ART H 470 English Art, 1500-1800 (3)

ART H 470 English Art, ISOU-ISOU (3) Outline of English art, principally of painting, and to a lesser extent of architecture. Emphasis on patronage, on the conditions (such as the cult of the portrait, the prefer-ence for foreigners, and the accompanying disregard of native artists, the Grand Tour) that produced the decided peculiarities of English art, and the final triumph of the rative tradition native tradition.

ART H 471 Rome in the Seventeenth Century (3) Painting, sculpture, and architecture; concentration on Caravaggio, Bernini, Poussin, and Borromini.

ART H 472 French Art—Seventeenth Century (3) Painting, sculpture, and prints. Special attention is given. to relations with Italy and the lowlands.

ART H 473 Age of Rembrandt and Vermeer (3) Art of the Dutch Republic in the late sixteenth and seven-teenth centuries, concentrating on painting, prints, and drawings.

ART H 474 Studies in American Colonial Art (3. max. 6)

(3, max. 6) Surveys of architecture, town design, painting, sculpture, and the decorative arts in the eastern and southwestern colonies from original European settlement until the Rev-olutionary War. Key figures and developments in English att and architecture. Content varies from quarter to quarter.

ART H 475 The Age of Rubens (3) Flemish art from the late sixteenth century to about 1650. concentrating on the sources, influence, and European cultural milieu of the art of Peter Paul Rubens.

ART H 476 French Art-Eighteenth Century (3) Painting, sculpture, and prints; emphasis on the succes-sive phases of Rococo style and iconography and the emergence of Neoclassicism.

ART H 477 Religious Architecture in Colonial Mexico (3)

From the Great Conversion through Rococo: sixteenth-century monastic foundations and the metropolitan cathedrals; the Counterreformation, high Baroque, and Solo-monic styles; continuation of orthodox articulation in the eighteenth century and Churrigueresque.

ART H 481 Romanticism (3) Romantic tendencies of the late eighteenth and early nineteenth centuries, with emphasis on stylistic and iconographic study of painting in Spain, England, Ger-many, France, and the United States to about 1830.

ART H 482 Realism and Impressionism (3) Art and the world, 1830-80: High Romanticism through Realism and Impressionism, with emphasis on painting in France. Prerequisite: 380.

ART H 483 Post-Impressionism to 1918 (3)

ART H 483 Post-Impressionism to 1918 (3) Post-Impressionism and the great revolution of early twentieth-century art, with emphasis on painting. From the first revisions of Impressionism around 1880 (Ce-zanne, Seurat, Van Gogh, and Gauguin) to Fauvism, Cubism, Futurism, the Blaue Reiter, and the final burst of antistructure with Dadism. Prerequisite: 380.

ART H 484 Thematic Studies in Modern Art

(3, max. 6) Approach to art of the nineteenth/twentieth centuries through thematic content. The focus varies from year to year: for example, development of landscape painting; treatment of the figure; woman in art; the crisis in portrai-ture. Prerequisite: 203 or 380 or permission of undergraduate adviser.

ART H 485 Art Since World War I (3) Various aspects of art in Europe and the United States from 1918 to the present, from the point of view of style and iconography. Prerequisite: 380.

ART H 487 American Art From the Revolution to the Civil War (3)

Survey of painting, sculpture, and architecture during the federal and early industrial periods. Developments in printmaking, the decorative arts, and folk art.

ART H 489 Mexican Painting Since 1790 (3)

Colonial background and the emergence of the national style in thenineteenth century in portraiture, genre, and history painting; the persistence of naive art; the proto-modernists, *circa* 1880-1920; and the easel paintings and mural cycles of Diego Rivera and Jose Clemente Orozco.

ART H 490 American Naive Art in the Twentieth Century (3)

"Pioneer" primitives, and American artists recently or currently at work in this vein, with emphasis on the Pa-cific Northwest. What is naïve art? Under what circumstances does it arise, and how does one define it?

ART H 491 Esthetics of Modern Architecture (3) Rocuses on twentieth-century esthetic issues; artistic aims and accomplishments of particular individuals (e.g., Wright, Mies, Kahn, Ph. Johnson), effect of their art on

trends in architecture, and conflicts that occur when artistic sensibilities of the individual are at odds with those of the public that the architect must please. Prerequisite: upper-division standing.

ART H 499 Individual Projects (3, max. 9) Not offered for graduate credit. Prerequisite: permission of undergraduate adviser.

Courses for Graduates Only

ART H 500 Methods of Art History (3) Introduction to the specialized bibliography of art histori-cal research and to the wide variety of approaches to art historical problems of all periods and regions. Prerequi-site: graduate standing in art history; others by permission of graduate program adviser.

ART H 501, 502, 503 Seminar in the General Field of Art (3.3.3)

ART H 511 Seminar in Chinese Art (3, max. 9) Critical appraisal of the principal research methods, theories, and types of literature dealing with the art of China. Prerequisite: permission of graduate program adviser.

ART H 515 Seminar in Japanese Art (3, max. 9) Critical appraisal of the principal research methods, theo-ries, and types of literature dealing with the art of Japan. Pretequisite: permission of graduate program adviser.

ART H 521 Seminar in Indian Art (3, max. 9) Critical appraisal of the principal research methods, theo-ries, and types of literature dealing with the art of India. Prerequisite: 321 or permission of graduate program adviser.

ART H 531 Seminar in Trihal Art (3, max. 9) Methodological and cross-disciplinary problems in the visual arts of precolonial Africa, Oceania, and America. Specific content varies. Prerequisite: permission of graduate program adviser.

ART H 533 Seminar in North American Indian Art (3, max. 9) Problems in North American Indian visual arts. Content

vories. Style, iconography, cross-cultural comparison, methodology, attribution, and history of research and collection are potential subjects. Prerequisite: permission of graduate program adviser.

ART H 541 Seminar in Greek and Roman Art (3) Langdon

In-depth study of selected topics and problems of the art of ancient Greece and Rome. Offered jointly with CL AR 541. Prerequisite: permission of graduate program adviser.

ART H 566 Seminar in North European Art (3, max. 9)

Deals with problems of style and iconography of the northern European masters of the fourteenth through sev-enteenth centuries. Prerequisite: permission of graduate program adviser.

ART H 577 Seminar in Baroque Art (3, max. 9) 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. Prerequisite: permission of graduate program adviser.

ART H 581 Seminar in Modern Art (3, max. 9) Art-historical problems of the nineteenth and twentieth centuries. Prerequisite: permission of graduate program adviser.

ART H 590 Seminar in Criticism of Contemporary Art (3, max. 9)

Contemporary art and appropriate critical methodology. Prerequisite: 581.

ART H 600 Independent Study or Research (*)

- ART H 700 Master's Thesis (*)
- ART H 800 Doctoral Dissertation (*)

ASIAN AMERICAN STUDIES

Courses for Undergraduates

AAS 108 Language and Study Skills (3-5) AWSp8 Development of reading, writing, listening, speaking, and study skills. For EOP students who have been approved by the Asian American Studies Program. Prerequisite: permission of department adviser.

AAS 205 Asian American Cultures (5) A Kashima, D. Lee, Staff Asian American subcultures; evolution of Asian American cultures in the United States from 1850 to 1950-immigration patterns, evolution of subcultures, evacua-tion, interracial relations, assimilation, and signs of social disorganization. Not open to students who have taken GIS 305.

AAS 206 Contemporary Problems of Asian Americans (5) W

Bacho

Recent Asian American issues from 1950 to the present. Topics include ghetto communities, civil rights, identity problems and ethnicity, social organizations, political movements, bilingualism/biculturalism, and recent immigration.

AAS 305 Asian American Cultures for Teachers (5) W Morishima

Specially designed for teachers who wish to learn more about the history, culture, and current concerns of Asians in the United States. Implications for elementary and secondary school are considered. Not open to students who have taken 205, 405, or GIS 305. Prerequisite: permission of instructor.

AAS 350 Chinese-American History and Culture (3) Sp D. Lee

Experience of the Chinese in America from 1850 to the present. Special attention to the transformative process present. Special attention to the transformative process from an immigrant community to an ethnic society. Im-migration pattern and problems, racism and the anti-Chi-nese movement, ethnic sociopolitical and economic insti-tutions, community issues, Chinese-American culture, ethnic politics involving the community. China and America, local variations in Chinese America. Prerequi-site: 205 or equivalent or permission of instructor.

AAS 360 Filipino American History and Culture (3) Sp

Bacho

History and culture of the Filipino in America and the in-fluence of an admixture of Filipino, Spanish, and Ameriactivities of the Filipino immigrant and his or her de-scendants. Not open to students who have taken GIS 360. Prerequisite: 205 or permission of instructor.

AAS 370 Japanese American History and Culture (3) Sp Kashima

Adsuma 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, oc-cupations, and future orientations. Prerequisite: 205 or equivalent or permission of instructor.

AAS 400 Asian American Literary Expression (5)

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AAS two result relation to the set of the se Asian American writer. Prerequisite: 205, 405, or per-mission of instructor. (Last time offered: Spring Quarter 1982.)

AAS 405 Asian American Culture (5) Kashima, D. Lee, Staff Historical and cultural experience of Asians in the United

Historical and cultural experience of Asians in the United States from 1850 to 1950. Immigration and settlement patterns, race relations, occupational patterns, evacua-tion, social organizations, and contemporary problems. Extended research paper required. Not open to students who have taken 205 or 305 or GIS 305. Prerequisite: graduate standing or permission of instructor. (Last time offered: Spring Quarter 1982.)

AAS 442 Social Policy and the Asian American Community (5) W Bacho

Theoretical bases of a variety of social policies. Organizational and power structures in a variety of social insti-tutions. Real-life examples enable students to see the implications of social policies for an ethnic community. Prerequisite: 205 or equivalent or permission of instructor.

AAS 443 Undergraduate Field Experience (3-5, max. 15) AWSpS

Kashima

Faculty-supervised practicum experience in a variety of community settings and agencies dealing with Asian Americans. Prerequisites: 205 or 206 or 442, or equivalent, and permission of instructor.

AAS 490 Asian American Studies—Special Topics (3, max. 9) AWSpS

Prerequisite: 205 or permission of instructor.

AAS 499 Undergraduate Independent Study (1-5, max. 10) AWSpS

Prerequisites: 205 or equivalent and permission of instructor.

ASIAN LANGUAGES AND LITERATURE

Courses for Undergraduates

ALTAIC

ALTAI 401, 402, 403 Written Mongolian (3,3,3) A,W,Sp

Norman Introduction to Mongolian written in the vertical script. Texts of different periods and genres. Prerequisite: per-mission of instructor. (Offered alternate years.)

ALTAI 405, 406, 407 Manchu (3,3,3) A,W,Sp Norman

Introduction to Manchu, with principal focus on the structure of the language. Reading of texts of different genres. Prerequisite: permission of instructor. (Offered alternate years.)

ASIAN

ASIAN 401 Introduction to Asian Linguistics (3) A Cooke, Schiffman, Shapiro

Introduction to linguistic analysis, with particular empha-sis on the languages of East, Southeast, South, and Central Asia. Specific topics include phonetics, phonemics, morphology, syntax lexicography, historical reconstruction, linguistic typology, and comparative grammar. Survey of major languages and language families of Asia. Speakers of diverse Asian languages used as subjects of linguistic analysis. No prior knowledge of linguistics is required. Prerequisite: two years of an Asian language or permission of instructor.

CHINESE

CHIN 101, 102, 103 Basic Cantonese (5,5,5) A.W.Sp Kwok

Instruction in a major dialect, stressing phonology and grammar, and using basic dialogues and cultural materi-als. Prerequisites: 101 for 102, 102 for 103, and permission of department.

CHIN 111, 112, 113 First-Year Chinese (5,5,5) A,W,Sp Norman

Introduction to the standard language. Emphasis on learning correct pronunciation and basic structure. Drill in oral use of the language. Active usage of a minimum of six hundred characters by end of year. No credit for 111, 112 if 121 taken, or for 111, 112, 113 if 134 taken, or for 113 if 222 taken.

CHIN 121 Accelerated Chinese (10) A Norman

Covers same material as 111 and 112. In conjunction with 222 and 223, allows completion of two years' lan-guage study in one school year. No credit if 111, 112 taken.

CHIN 134 First-Year Intensive Chinese (15) S Norman

Equivalent of 111, 112, 113. Introduction to the standard

language; correct pronunciation and basic structure; drill in oral use of the language; active usage of a minimum of six hundred characters. Especially recommended for students (particularly graduate students) who plan to devote more time to other subjects during the regular academic year. No credit if 111, 112, 113 taken.

CHIN 211, 212, 213 Second-Year Chinese (5,5,5) A,W,Sp Norman

Continuation of 111, 112, 113. Learning of characters and reading of texts is emphasized. Oral practice and structural drill are continued. No credit for 211 if 222 taken, or for 212, 213 if 223 taken, or for 211, 212, 213 if 234 taken. Prerequisite: 113 or equivalent.

CHIN 222 Accelerated Chinese (10) W Norman

Covers same material as 113 and 211. In conjunction with 121 and 223, allows completion of two years' lan-guage study in one school year. No credit if 113, 211 taken. Prerequisite: 121 or equivalent.

CHIN 223 Accelerated Chinese (10) Sp Norman

Covers same material as 212 and 213, In conjunction with 121 and 222, allows completion of two years language study in one school year. No credit if 212, 213 taken. Prerequisite: 222 or equivalent.

CHIN 234 Second-Year Intensive Chinese (15) S Equivalent of 211, 212, 213. No credit if 211, 212, 213 taken. Prerequisite: 113 or equivalent. (Offered Summer Ouarter only.)

CHIN 301, 302, 303 Advanced Chinese Conversation (5,5,5) A,W,Sp C. N. Wang

Extensive practice in conversational Chinese, as if the students were in a native environment. Primarily for majors in Chinese language and literature and related fields. Prerequisites: 213 or equivalent, and permission of department.

CHIN 311, 312, 313 Third-Year Chinese (5,5,5)

A,W,Sp Reading of unedited texts of many types—newspaper ar-ticles, essays, short stories. Oral practice and structural drill are continued. No credit if 334 taken. Prerequisite: 213 or equivalent.

CHIN 334 Third-Year Intensive Chinese (15) S Equivalent of 311, 312, 313. Reading of unedited texts of many types—newspaper articles, essays, short stories. Oral practice and structural drill. No credit if 311, 312, 313 taken. Prerequisites: 213 or equivalent and permission of instructor.

CHIN 407 Chinese Reference Works and **Bibliography (3)** A

Introduction to the search of library information on Chinese studies through the use of basic reference works and modern library methods, with twenty-five percent of class time dealing with individual student's subject inter-est. Prerequisite: 313 or equivalent.

CHIN 415, 416, 417 Readings in Social Science Texts (3,3,3) A,W,Sp Introduction to reading current materials from People's Detablished Chica Control and Control a Republic of China. Prerequisite: 313 or equivalent.

CHIN 441, 442, 443 Structure of Chinese (3,3,3)

A,W,Sp Practical phonetics with special application to the prob-lem of articulation improvement. Morphology with appli-cation to vocabulary building, use of particles and syn-tax. Prerequisite: 313 or equivalent.

CHIN 451, 452, 453 First-Year Classical Chinese (5,5,5) A,W,Sp Serruys

Serroys Study of classical language based on selected texts of pre-Han literary works. Focus on systematic sentence analysis and distinctive functions of grammatical parti-cles. To be taken in sequence. Prerequisite: 213 or equivalent.

CHIN 454 Accelerated Classical Chinese (10) S Serruys

Same focus and method as 451, 452, 453. Nonmajors only. Prerequisite: 213 or equivalent.

CHIN 481, 482, 483 Modern Chinese Literature (5,5,5) A,W,Sp

Brandauer

Modern literary texts in the original language, concen-trating on the short story and the essay. Works studied come from May Fourth writers and from writers in the People's Republic of China and Taiwan. Literary, histor-ical, and social significance with an introduction to bibliographic and reference resources. Prerequisite: 313 or equivalent.

CHIN 499 Undergraduate Research (3-5, max. 15)

AWSpS For Chinese language and literature majors. Prerequisite: permission of instructor.

HINDI

HINDI 311, 312, 313 Elementary Hindi (5,5,5) A,W,Sp Shapiro

Introduction to modern literary Hindi. Conversational drills. Introduction to Devanagari script and Hindi prose composition. (Formerly 201, 202, 203.)

HINDI 321, 322, 323 Intermediate Hindi (5,5,5) A,W,Sp Hawley, Shapiro

Systematic expansion of vocabulary and grammatical forms and structures. Oral and writing practice based on Hindi prose readings. Prerequisite: 313 or equivalent. (Formerly 301, 302, 303.)

HINDI 401, 402, 403 Advanced Hindi (5,5,5)

A,W,Sp Hawley, Shapiro

Rapid reading of contemporary Hindi prose, poetry, and drama. Advanced conversation and composition. Prerequisite: 323 or equivalent.

HINDI 499 Undergraduate Research (3-5, max. 15) AWSpS Primarily for Hindi language and literature majors. Pre-

requisite: permission of instructor.

INDIAN

INDN 400 Practicum in South Asian Languages (3, max. 18) AWSp Ruegg, Schiffman, Shapiro, Thrasher Introduction to any one of various South Asian languages (e.g., Kannada, Nepali, Punjabi, Sinhala, Marathi, Telugu, Braj) not regularly taught on a tutorial basis or as reading courses. Students may receive credit for more than one such language, and should check with relevant instructors for more information. Purcentistice nervisite instructors for more information. Prerequisite: permission of instructor.

INDN 401, 402 Pali (3,3) W,Sp

Ruegg Introduction to Pali language and literature. Prerequisite: SNKRT 401 or equivalent, or specialization in a relevant south/southeast Asian language.

INDN 499 Undergraduate Research (3-5, max. 15) AWSpS Primarily for South Asian language and literature majors.

Prerequisite: permission of instructor.

JAPANESE

JAPAN 111, 112, 113 First-Year Japanese (5,5,5) A,W,Sp Niwa

Introduction to spoken Japanese, pronunciation, conversation, oral composition, and grammar; reading of ro-manized Japanese; introduction to modern written Japanese in 113. No credit if 134 or 331 taken.

JAPAN 134 First-Year Intensive Japanese (15) S Niwa

Equivalent of 111, 112, 113. Introduction to spoken Japanese, pronunciation, conversation, and grammar, reading of romanized Japanese; introduction to modern written Japanese. No credit if 111, 112, 113, or 331 taken.

JAPAN 211, 212, 213 Second-Year Japanese (5,5,5) A,W,Sp

Niwa

Reading and translation of modern Japanese. Continued oral work in Japanese. No credit if 234 or 332 taken. Prerequisite: 113 or equivalent.

COLLEGE OF ARTS AND SCIENCES

JAPAN 234 Second-Year Intensive Japanese (15) S

Equivalent of 211, 212, 213. Reading and translation of modern graded materials. Continued oral work in Japa-nese. No credit if 211, 212, 213, or 332 taken. Prerequisites: 113 or equivalent and permission of instructor.

JAPAN 311, 312, 313 Third-Year Japanese (5,5,5) A,W,Sp Miller

Reading and translation of modern Japanese at a more advanced level. Continued oral work. No credit if 333 taken. Prerequisite: 213 or equivalent.

JAPAN 331 Intensive First-Year Japanese (15) A Niwa

Equivalent of 111, 112, 113 requiring full-time commit-ment by the student. In conjunction with 332 and 333, al-lows completion of three years' language study in one school year. No credit if 111, 112, 113, or 134 taken. Prerequisite: permission of instructor.

JAPAN 332 Intensive Second-Year Japanese (15) W Niwa

Equivalent of 211, 212, 213, requiring full-time commitment by the student. In conjunction with 331 and 333, allows completion of three years' language study in one school year. No credit if 211, 212, 213, or 234 taken. Prerequisites: 331 or equivalent, and permission of instructor.

JAPAN 333 Intensive Third-Year Japanese (15) Sp

Niwa, Equivalent of 311, 312, 313, requiring full-time commit-ment by the student. In conjunction with 331 and 332, al-lows completion of three years' language study in one school year. No credit if 311, 312, 313 taken. Prerequi-sites: 332 or equivalent, and permission of instructor.

JAPAN 405, 406 History of the Japanese Language (3,3) W,Sp Miller

or equivalent, and ASIAN 401. (Offered alternate years.)

JAPAN 431, 432, 433 Readings in Modern Japanese Literature (5,5,5) A,W,Sp

Rubin

Reading and discussion of selected modern literary texts in the original language, concentrating on the short story and novel, and with close attention to grammar and syntax. Prerequisite: 313 or equivalent.

JAPAN 451, 452, 453 Readings in Japanese for China and Korea Specialists (5,5,5) A,W,Sp Hiraga

Reading of scholarly prose on China and Korea, espe-cially books and articles of past fifty years, with emphasis on grammar and style. Introduction to reference works useful to China and Korea specialists, and needs of the individual student. Completion of three quarters with 3.0 or above fulfills Japanese reading requirement for de-partment majors in Chinese and Korean. Prerequisites: 113; and (for China specialists) CHIN 313 and 453, or (for Korea specialists) KOR 467; or permission of instructor.

JAPAN 461, 462, 463 Advanced Japanese Readings (3,3,3) A,W,Sp Miller

Directed readings and translation of modern Japanese prose selections in fields reflecting interests of students including language, linguistics, and the social sciences. Prerequisite: 313 or equivalent or permission of instructor.

JAPAN 471, 472, 473 Readings in Classical Japanese Literature (5,5,5) A, W, Sp

McKinnon Readings in prose, poetry, and drama, antiquity to nine-teenth century. Prerequisite: 313 or equivalent.

JAPAN 499 Undergraduate Research

(3-5, max. 15) AWSpS For Japanese language and literature majors. Prerequi-site: permission of instructor.

KOREAN

KOR 301, 302, 303 Introduction to Korean (5,5,5) A,W,Sp Lukoff

Introduction to the fundamentals of Korean writing, us-

ing the native alphabet, pronunciation, and grammar. (Formerly 211, 212, 213.)

KOR 304 Spoken Korean (10) S

Lukoff Supplements courses offered during academic year. Language as spoken in ordinary conversational situations. Phonetic accuracy and appropriateness of idiom. May be taken any summer after the first year. Class discussion in Korean. Prerequisite: 303 or permission of instructor.

KOR 311, 312, 313 Introduction to Korean Writing in Mixed Script (5,5,5) A,W,Sp Lukoff

Systematic expansion of vocabulary and grammatical forms of standard Korean; introduction of Chinese characters in mixed script. Prerequisite: 303 or equivalent.

KOR 411, 412, 413 Readings in Contemporary Korean (5,5,5) A,W,Sp Lukoff

411 completes the introduction to Korean writing in a variety of contemporary styles. Materials from pub-lished works include informal essays, short stories, oneact plays, academic essays, and newspaper editorials. Prerequisite: 313 or equivalent.

KOR 415 Writings of North Korea (3) A Lukoff

Features of North Korean usage that distinguish it from traditional standard Korean. Materials selected from North Korean books and journals are studied, read, and translated. Prerequisite: 413 or equivalent.

KOR 416 Korean Narrative and Dramatic Literature (3) W

Lukoff

Linguistic features rather than purely literary qualifies of modern Korean literature, and attention to figures of speech and sophisticated linguistic expression. Prerequisite: 413 or equivalent.

KOR 417 Readings in Korean Journals (3) Sp

Lukoff Special idiom in current use in various fields, from inter-national and domestic affairs to politics, business, and problems of everyday life. Selections from newspapers, news magazines, and other journals. Prerequisite: 413 or equivalent.

KOR 465, 466, 467 Readings in Korean Documents (5,5,5) A,W,Sp 465: Korean bibliography and references. Prerequisite: 413 or permission. 466, 467: primarily for students in the social sciences majoring in the Korean field. Prerequisite: 465 or permission of instructor.

KOR 499 Undergraduate Research (3-5, max. 15) AWSpS

For Korean language and literature majors. Prerequisite: permission of instructor.

SANSKRIT

SNKRT 301, 302, 303 Introduction to Sanskrit (5,5,5) A,W,Sp Thrasher

Basic grammatical structure and vocabulary of the classical language; reading of elementary texts from the epic and classical periods written in the Devanagari script.

SNKRT 401, 402, 403 Intermediate Sanskrit (5,5,5) A,W,Sp Thrasher

Advanced classical grammar; rapid reading of a kāvya text or texts, ordinarily a drama or major prose work. Prerequisite: 303.

SNKRT 411, 412, 413 Advanced Sanskrit (5,5,5) A,W,Sp Thrasher

Intensive reading and analysis of classical texts, chosen from the sastraic or belletristic literatures. Prerequisite: 403 or permission of instructor.

SNKRT 491, 492, 493 Vedic Studies (3,3,3) A,W,Sp Thrasher

Readings of selected Vedic texts, with linguistic, religious, and historical analyses. Includes extensive background material on Vedic religion, literature, and culture. Prerequisite: 303 or equivalent,

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SNKRT 494 Readings in Religious Classics of India (5) Sp Potter, Thrasher

Introduction to the older religious literature, with empha-sis on the Upanisads, the Dharmasastras, and the Bhagavad Gita. Rapid reading of the texts, plus content analysis of the developing religious forms. Prerequisite: 402.

SNKRT 495 Studies in Indian Thought (3, max. 9) A

Religious and philosophical traditions in South Asia. The original documents studied vary from year to year. Pre-requisites: ability to undertake the study of original documents and an introduction to Buddhist thought.

SNKRT 499 Undergraduate Research (3-5, max, 15) AWSp Primarily for Sanskrit language and literature majors. Prerequisite: permission of instructor.

TAGALOG

TAGLG 101, 102, 103 Elementary Tagalog (5,5,5) A,W,Sp Sumulong

Introduction to the standard language of the Philippines, emphasizing pronunciation and elementary conversation; grammatical elements and basic structures; some reading and writing. Includes discussion of the culture and literature. Prerequisite: permission of instructor.

TAGLG 201, 202, 203 Second-Year Tagalog (3,3,3) A,W,Sp Sumulong

fuency, aural comprehension, vocabulary, and grammar; oral and written composition; reading of articles and short stories of historical and cultural interest. Prerequi-site: 103 or permission of instructor.

TAMIL

TAMIL 311, 312, 313 Elementary Tamil (5.5.5) A,W,Sp Schiffman

Introduction to the modern spoken language; emphasis on basic sentence types and transformation drills. The writ-ing system and literary dialect are introduced. (Formerly 201, 202, 203.)

TAMIL 321, 322, 323 Intermediate Tamil (5,5,5) A,W,Sp Schiffman

Intensified use of the modern spoken language, beginning with moderately difficult conversation and drills, and working up to more advanced materials, including radio plays. Continuation of work with written language. Prerequisite: 313 or equivalent. (Formerly 301, 302, 303.)

TAMIL 401, 402, 403 Advanced Tamil (5,5,5) A,W,Sp Schiffman

Readings in modern literary Tamil, including the modern novel and short story. Continued practice in the collo-quial dialect. Prerequisite; 323 or equivalent.

TAMIL 455 Structure of Dravidian (3) Schiffman

Comparative analysis of the phonologies and morpholo-gies of the major Dravidian languages.

TAMIL 499 Undergraduate Research (3-5, max. 15) AWSpS

Primarily for Tamil language and literature majors. Prerequisite: permission of instructor.

THAI

THAI 301, 302, 303 Basic Thai (5,5,5) A,W,Sp

Cooke Introduction to modern spoken and written Thai. Emphasis on spoken language competence with addi-tional skills in elementary reading and spelling.

THAI 401, 402, 403 Intermediate Thai (5,5,5) A,W,Sp

Cooke

Short stories; articles on Thai history, geography, culture, politics, economics, etc. Primary emphasis on read-ing, translation, comprehension, and grammar. Prerequisite: 303.

THAI 411, 412, 413 Readings in Thai (5,5,5) A,W,Sp Cooke

Advanced reading and translation of selections from various Thai authors, with occasional practice in conversation and composition. Prerequisite: 403.

THAI 499 Undergraduate Research (3-5, max. 25)

AWSpS For Thai language and literature majors. Prerequisite: permission of instructor.

TIBETAN

TIB 304, 305, 306 Colloquial Tibetan (5,5,5) A,W,Sp Nornang

Introduction to phonology, morphology, and syntax of spoken Tibetan, Lhasa dialect. (Offered alternate years.) (Formerly 201, 202, 203.)

TIB 307, 308, 309 Intermediate Colloquial Tibetan (5,5,5) A,W,Sp Nornang

Instruction and drill in advanced colloquial sentence pat-terns and syntactical constructions. Prerequisite: 306 or equivalent. (Formerly 301, 302, 303.)

TIB 311, 312, 313 Literary Tibetan (3,3,3) A,W,Sp Wylie

Introduction to the phonology, grammar, and syntax of written Tibetan. Materials selected for rapid development of reading knowledge. (Offered alternate years.)

TIB 407, 408, 409 Advanced Colloquial Tibetan (5,5,5) A,W,Sp

Advanced instruction and practice in colloquial Tibetan, Lhasa dialect, intended to build on previous oral-aural experience and increase fluency in the modern spoken language. Prerequisite: 309 or equivalent.

TIB 411, 412, 413 Readings in Tibetan (3,3,3)

A,W,Sp Wylie Selections from various Tibetan materials. Prerequisite: 313 or equivalent.

TIB 415, 416, 417 Readings in Tibetan Literature (3,3,3) A,W,Sp Nornang

Reading of selections from Tibetan philosophical litera-ture. May be taken in any sequence. Prerequisite: 413 or permission of instructor.

TIB 499 Undergraduate Research (3-5, max. 15) AWSpS

For Asian languages and literature majors. Prerequisite: permission of instructor.

TIRKIC

TKIC 301, 302, 303 Introduction to Uzbek (3,3,3) A,W,Sp Cirtautas

Introduction to the modern written and spoken language.

TKIC 341, 342, 343 Introduction to a Second Turkic Language of Central Asia (3,3,3) A,W,Sp Cirtautas

Introduction to phonology, morphology, and syntax of a second modern Turkic language of Central Asia, such as Kirghiz, Kazakh, Tatar, Turkmen, Uighur, or Azerbaijani. Prerequisite: permission of instructor.

TKIC 401, 402, 403 Intermediate Uzbek (3,3,3) A,W,Sp Cirtautas

Continuation of Turkic 301, 302, 303. Oral work, gram-mar, and readings in Uzbek literature. Prerequisite: 303 or permission of instructor.

TKIC 404 Introduction to Turkic Studies (3) A Cirtautas

Introduction to the bibliography, problems and methods of research in the field of Turkic studies (language, literature, and ethnography of past and present Turkic peoples).

TKIC 411, 412, 413 Advanced Uzbek (3,3.3) A,W,Sp Cirtautas

Continuation of 401, 402, 403. Readings from selected Uzbek writers. Prerequisite: 403 or equivalent.

TKIC 499 Undergraduate Research (3-5, max. 15) AWSpS For Turkic language and literature majors. Prerequisite:

permission of instructor.

LITERATURE COURSES IN ENGLISH

ASIAN 263 Great Works of Asian Literature (5) Sp

Brandauer

Introduction to selected major works of Asian literature. Taught on a rotational basis with the literary traditions of China, Japan, India, etc., 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.

CHIN 293 Introduction to Literature and Ideas in China (5) Sp

Knechtges Introduction to basic concepts of Chinese thought (Con-fucianism, Taoism, and Buddhism) as reflected in philosophical writings and literature. Focus on a single idea (e.g., human nature) for an entire quarter. In English; no previous course work on China required.

CHIN 361 Ideas and Literature in China, Early Period, in English (5) A Wang

Historical survey of the major works of early Chinese literature (beginnings to third century A.D.), including introduction to early classics, and the development of pointroduction to early classics, and the development of po-etry, rhyme-prose, and narrative and philosophical prose; major themes and ideas, with special emphasis on Confu-cianism and Taoism; reference to the political and social context, and relevant developments in the other arts. Previous course work on China not required. Prerequisite: permission of instructor.

CHIN 362 Ideas and Literature in China, Middle Period, in English (5) W

Knechiges Historical survey of the major works of Middle Chinese literature (third to thirteenth centuries A.D.), including introduction to the development of classical poetry, "song-verse" (tz'u), the classical essay, and classical short story; major themes and ideas, with special empha-sis on Confucianism, Taoism, and Buddhism; political and social context, and relevant developments in the other arts. Previous course work on China not required. Prerequisite: permission of instructor.

CHIN 363 Ideas and Literature in China, Modern Period, in English (5) Sp Brandauer

Branauer **b** Historical survey of the major works of modern Chinese literature (thirteenth century A.D. to the present), includ-ing introduction to the development of vernacular litera-ture such as the short story, drama, and novel; major themes and ideas, with special emphasis on Confucia-nism, Taoism, and Buddhism; political and social con-text, and relevant developments in the other arts. Previtext, and relevant developments in the other arts. Previ-ous course work on China not required. Prerequisite: permission of instructor.

INDN 420 Classical Indian Literature in English (5) Hawley

Major classical works in Indian literature, both South and North, up to the thirteenth century: epics, dramas, and lyrics. Major themes, their philosophical and religious backgrounds, and correlation with music and the visual arts.

INDN 421 Modern Indian Literature in English (5) W Hawley

Major works in Indian literature from the medieval period onward, considered against their cultural back-ground. Special attention to medieval lyrics and other forms of the modern period, especially novels and short stories.

JAPAN 321 Japan in Literature and Film: I (5) Rubin

Literary history of Japan from the eighth to the late twelfth centuries, with readings in *The Tale of Genji* and other major works of the imperial court, plus films re-flecting the architecture, life, and natural milieu of classical Japan.

JAPAN 322 Japan in Literature and Film: II (5) W Rubin

Literary history of Japan from the thirteenth to early ninewarrior culture and townsman culture, plus films on the Nö, Burraku puppet, and Kabuki theaters, and other as-pects of medical and early modern Japanese esthetic life. Recommended: 321.

JAPAN 323 Japan in Literature and Film: III (5) A Rubin

Literary history of Japan in the modern period, with read-ings in the major novelists on the clash of cultures, the generational struggle, war, and the search for inner peace, plus films that portray these themes and reflect the variety of modern Japanese life. Recommended: 321 and 222 322

JAPAN 425 The Japanese Novel in English (5) A McKinnon

Close examination and discussion of several classical and modern Japanese novels, with emphasis on theme and in-ternal structure and their relationship to the Japanese prose tradition. Prerequisites: 321, 322, 323, or permission of instructor.

JAPAN 426 Japanese Poetry in English (5) W McKinnon

The waka tradition: its sources, developments, and deviations, including *Haika*; poetic theory and criteria and their significance for the Japanese literary vision, both ancient and modern. Prerequisites: 321, 322, 323, or permission of instructor.

JAPAN 427 Japanese Drama in English (5) Sp McKinnon

Examination of the Nö, Kyogen, Joruri, and Kubuki forms, with particular emphasis on the interrelationship of lyrical, narrative, and dramatic elements in the Japanese theater tradition. Prerequisite: 321, 322, 323, or permission of instructor.

KOR 320 Korean Literature in English (5) Sp Historical development of Korean literature. Special con-sideration of the relationship with Chinese and Japanese literature.

TKIC 320 Eastern Turkic Literature in English (3) So

. Cirtautas

Covers both the historical (Chagatai XV-XIX Centuries) and the modern (mainly Uzbek) periods of Eastern Turk-ish literature. History, types of literary works, and char-acteristic elements of prose and poetry are presented by using selected material translated into English. (Offered alternate years.)

Courses for Graduates Only

ALTAIC

ALTAI 579 Comparative Altaic Linguistics (3) Norman

Comparative phonology and morphology of Mongolian, Turkic, and other Altaic languages. Offered jointly with LING 579. Prerequisite: permission of instructor.

ASIAN LANGUAGES AND LITERATURE

ASIAN 585 Seminar in Buddhism (3, max. 27) AWSp Ruegg

Systems of Buddhist thought with special reference to Combines the methods of specialists in South, Central, and East Asian Buddhism with those of historians of religion and philosophy. Prerequisite: permission of instructor.

ASIAN 600 AWSpS	Independent Study	or Research (*)

COLLEGE OF ARTS AND SCIENCES

ASIAN 800 Doctoral Dissertation (*) AWSpS

CHINESE

CHIN 540 Seminar on Chinese Linguistics (3, max. 9) WSp Norman

Problems of Old and Middle Chinese phonology; dialec-tology. Prerequisites: 453 and ASIAN 401.

CHIN.542, 543, 544 Ancient Script (4,4,4) . Sp,Sp,Sp

Serruys Structure of Chinese characters, development of Chinese script, and related problems; selected texts of inscrip-tions. 542: Shuo Wen; 543: bronzes; 544: bone inscriptions. Prerequisite: permission of instructor. (Offered successive years.)

CHIN 551, 552 Second-Year Classical Chinese (5,5) **A,W** . Serruys

Continuation of 451, 452, 453. Problems of textual criticism and grammar. 551: focus on early Chou texts. 552: focus on texts of Han times. Prerequisite: 453 or equivalent.

CHIN 553 Second-Year Classical Chinese (5) Sp Knechtges

Readings in middle and late classical Chinese texts. Emphasis on ku-wen prose and historical texts. Prerequisite: 453 or equivalent.

CHIN 560 Proseminar in Chinese Literature (5, max. 15) AWSp Knechtges

Methods and materials in the study of Chinese literature. Problems in Chinese literary history. Prerequisite: completion of the Autumn Quarter course prerequisite for Winter and Spring quarters.

CHIN 561, 562, 563 Studies in Chinese Literature (5,5,5) A,W,Sp

Wang 561: literature of the Chou and Han periods. 562: litera-ture from Wei to T'ang times. 563: literature since the end of T'ang. Prerequisite: permission of instructor.

CHIN 573 Seminar in Chinese Poetry (5, max. 15) Sp Wang

Directed study of selected works of poetry. Subject emphasis varies each year. Prerequisite: permission of instructor.

CHIN 580 Readings in Vernacular Chinese Fiction (5, max. 15) A

Brandauer Readings and discussion of traditional vernacular texts. Emphasis on Sung, Yuan, and Ming short stories, such as those found in the San-yen collections; and on Ming and Ch'ing full-length novels, such as the Shui-hu chuan, Hsi-yu chi, and Hung-lou meng. Prerequisite: permission of instructor.

CHIN 582 Seminar in Chinese Fiction (5, max. 15) W

Brandauer

Directed study of selected works of fiction, focusing on the vernacular short story and novel. Prerequisite: permission of instructor.

CHIN 591, 592, 593 Studies in the History of Chinese Thought (5,5,5) A,W,Sp Directed readings in selected traditional philosophical texts (Chuang-tzu, Han-fei-tzu, Lun-heng, Shih-shuo

hsin-yu), and documents of political thoughts and institutions. Subject emphasis varies each quarter. Prerequisite: permission of instructor.

HINDI

HINDI 501, 502, 503 Studies in Medieval Hindi Literature (3,3,3) A,W,Sp Hawley

Representative readings in medieval Hindi literature. Works by varying authors emphasized in different years. Prerequisite: 403 or equivalent.

HINDI 510 Structure of Hindi (3) Shapiro

Grammatical analysis of Hindi, phonology, syntax, and semantics. Readings from both Western and native gram-

marians. Prerequisite: 403 or permission of instructor. Recommended: course in linguistics.

INDIAN

INDN 530 Readings in Pali Literature (3, max. 18) AWSp

Rueg Readings and interpretation of intermediate and advanced texts in Pali, dealing with the Theravada countries of south and southeast Asia (Sri Lanka, Burma, Thailand, etc.). Prerequisite: 402 or equivalent.

JAPANESE

JAPAN 501 Readings in Bibliographical Materials (5) Sp

Hiraga Intensive reading and discussion of materials from princi-pal bibliographical sources in the social sciences and the humanities pertaining to Asia. Reports on selected topics and problems. Prerequisite: 413 or permission of instruc-tor. (Offered alternate years.)

JAPAN 505, 506, 507 Readings in Documentary Japanese (5,5,5) A,W,Sp Hiraga

505: introduction to Kambun, 506: readings in docu-ments of ancient and medieval periods. 507: readings in documents since the beginning of the Tokugawa period. Prerequisite: permission of instructor.

JAPAN 531, 532, 533 Advanced Readings in Modern Japanese Literature (5,5,5) A,W,Sp Rubin

Rapid reading of modern literary texts; discussion of style, content, and problems of literary translation. Pre-requisite: 413 or 433 or equivalent.

JAPAN 540 Seminar on Japanese Linguistics

(3, max. 9) Miller

Problems in the history and structure of the Japanese language. Topics vary each quarter, according to the needs and interests of the students. Prerequisites: 405 and 406, or permission of instructor.

JAPAN 561 Classical Japanese Theatre (5) A

McKinnon

Major Japanese theatrical traditions and related folk theatre traditions. Individual works as literature and as theatre. Study of classical Japanese theatre: Nö, Kyogen. Prerequisite: 473.

JAPAN 562 Popular Japanese Theatre (5) W McKinnon

Major Japanese theatrical traditions and related folk thea-tre traditions. Individual works as literature and as theatre. Popular theatre forms: Kabuki, Bunraku, and related folk art forms. Prerequisite: 473.

JAPAN 563 Twentleth-Century Japanese Theatre (5) Sp McKinnon

Major Japanese theatrical traditions and related folk thea-tre traditions. Individual works as literature and as theatre. Twentieth-century Japanese theatre and films. Prerequisite: 473.

JAPAN 571, 572, 573 Advanced Readings in Classical Japanese Literature (5,5,5) A,W,Sp McKinnon

Continued readings in classical literary texts. Prerequi-site: 473 or permission of instructor.

JAPAN 590 Seminar in Japanese Literature (5, max. 15) AWSp McKinnon

Close examination of selected periods, writers, or genres, including problems of literary criticism in Japanese litera-ture. Prerequisite: permission of instructor.

KOREAN

KOR 501, 502, 503 Seminar in Korean (3-5, 3-5, 3-5) A,W,Sp Lukoff

Topics in Korean linguistics. Prerequisite: permission of instructor.

KOR 521, 522, 523 Modern Korean Literature (5,5,5) A,W,Sp Readings in important works in Korean literature of the

twentieth century. Prerequisite: 413 or permission of in-structor. (Offered alternate years.)

KOR 531, 532, 533 Classical Korean Literature (5,5,5) A,W,Sp Selected works, primarily in Hangul up to the twentieth

century, including representative authors in prose, po-etry, and drama. Prerequisite: permission of instructor. (Offered alternate years.)

KOR 541, 542, 543 Readings in Hanmun Texts (5,5,5) A,W,Sp

Readings from representative authors from the fifteenth to the late nineteenth centuries. Prerequisites: 413, CHIN 451 or JAPAN 413, or permission of instructor. (Offered alternate years.)

KOR 550, 551, 552 Seminar in Korean Literature

(3-5, 3-5, 3-5) A.W.Sp Close examination of selected periods, writers, or genres, including literary criticism in Korean literature. Prerequi-site: 543 or 523 or permission of instructor. (Offered alternate years.)

SANSKRIT

SNKRT 550 Seminar on Sanskrit Literature (3, max. 9)

Thrasher

Close examination of selected authors, periods, or tradi-tions, within the context of Indian literary history. Prerequisite: 403 or permission of instructor. (Offered alternate years.)

SNKRT 555 Seminar on Sanskrit Grammar (3, max. 6) Thrasher

Selected problems relating to the history of the Sanskrit language; reading and critical examination of the method-ology of Panani's grammar. Prerequisite: 403 or permis-sion of instructor. (Offered alternate years.)

SNKRT 560 Readings in Philosophical Sanskrit (3, max. 9) AWSp

Potter, Ruegg, Thrasher Intensive reading and analysis of Hindu or Buddhist philosophical texts. Prerequisite: 494 or permission of instructor

SNKRT 581, 582 Readings in Buddhist Texts (3, max. 9; 3, max. 9) W,Sp

Ruegg-Interpretation of original sources. Texts vary from year to year. Prerequisites: ability to study sources in the original languages and an introduction to Buddhist thought.

TAMIL

TAMIL 501, 502, 503 Studies in Tamil Literature (3,3,3) A,W,Sp Schiffman

Introduction to Tamil literature, beginning with Sangam poetry and culminating in modern post-independence fic-tion. Prerequisite: 403 or permission of instructor.

TIBETAN

TIB 511, 512, 513 Advanced Literary Tibetan (3,3,3) Á,W,Śp

Wylie

Reading of manuscripts and xylographs with emphasis on biographical, historical, and geographical material. Prerequisite: 413 or equivalent.

TIB 531, 532, 533 Buddhist Tibetan (3, max. 9; 3, max. 9; 3, max. 9) A,W,Sp

Reading and analysis of Tibetan Buddhist texts and asso-ciated literature. Selections vary each quarter and may be taken out of sequence. Prerequisite: 413 or permission of

TURKIC

TKIC 542, 543 Comparative and Historical Grammar of Turkic Languages (3,3) W,Sp Cirtautas

Classification of the Turkic languages; alphabets used; phonology, morphology, and syntax; lexical composi-tion; structure changing developments. Prerequisites: 303 and 404, or TKISH 103. (Offered alternate years.)

TKIC 546 Old Turkic (3) W Cirtautas

Introduction to Runic script; phonology, morphology, and syntax of the oldest form of Turkic; reading and translation of seventh- and eighth-century inscriptions of historical importance. Prerequisite: permission of instruc-tor. (Offered alternate years.)

TKIC 547 Old Uighur (3) Sp 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 permis-sion of instructor. (Offered alternate years.)

TKIC 561, 562 Middle Turkic (3,3) A,W Cinanas

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. (Offered alternate years.)

TKIC 563 Seminar on Turkic Literature (5) Sp Cirtautas

Topics in oral and written literature. Prerequisite: permission of instructor. (Offered alternate years.)

ASTRONOMY

Courses for Undergraduates

ASTR 101 Astronomy (5) AWSp

Emphasis on the astronomical concepts fundamental to our present understanding of the universe: the solar sys-tem, stars, galaxies, and cosmology. No credit for students who have taken 102, 201.

ASTR 102 Introduction to Astronomy (5) Sp

Introduction to astronomy for students who have had high school physics or the equivalent introduction to physics at the college level. No credit for students who have taken 101, 201, or 301. Prerequisites: one year of high school physics or PHYS 101-102 or PHYS 110, 111. 112.

ASTR 110 Cosmology: A Cosmic Perspective (3) Historical discussion of man's continuing quest for an understanding of the physical universe. Emphasis on ap-preciation of modern cosmological ideas in the context of Greek and Renaissance thought, as well as current scien-tific concepts of the structure and evolution of our ex-tending under the structure and evolution of our expanding universe. No credit for students who have taken 201.

ASTR, 150 The Planets (3)

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 relationship of man and his earth to the other planets.

ASTR 201 The Universe and the Origin of Life (5) Sequel to 101 or 102, emphasizing modern views of the atomic and molecular evolution of the universe from the atomic and molecular evolution of the universe from the initial "big bang" through the formation of the solar system and the emergence of biologic forms on the earth. The latter part of the course considers questions about the existence of, and communication with, extraterrestrial in-telligent life, and finally the ultimate fate of the cosmos. Prerequisite: 101 or 102, or PHYS 110 or 114 or 121. No credit for students who have taken 110.

ASTR 301 Astronomy for Scientists and Engineers

(3) Introduction to astronomy for students in the physical sci-ences. Prerequisite: PHYS 123.

ASTR 321 The Solar System (3) A

Solar System (J) A Solar system; planetary atmospheres, surfaces and inter-ors, the moon, comets. The solar wind and interplanetary medium. Formation of the solar system. Three hours of lecture per week. Prerequisites: PHYS 221, 222, 223, or equivalent.

ASTR 322 The Contents of Our Galaxy (3) W

Introduction to astronomy. Basic properties of stars, stel-lar systems, interstellar dust and gas, and the structure of our galaxy. Prerequisites: PHYS 221, 222, 223, or equivalent.

ASTR 323 Extragalactic Astronomy and Cosmology

(3) Sp Galaxies, optical and radio morphology and properties. Clusters and galaxies, the red shift controversy, radio sources, and quasars. Observational cosmology. Prereq-uisites: 101 or 102 or 322, and PHYS 221, 222, 223, or equivalent.

ASTR 431 Stellar Spectra (3) A

Basic discussion of the structure of stellar atmospheres and spectroscopic abundance analysis. Prerequisites: 101 or 102 or 322, and PHYS 221, 222, 223; PHYS 421 should be taken concurrently.

ASTR 432 Stellar Structure and Evolution (3) W Theory of stellar structure, energy sources, and stellar evolution. Observational tests. Prerequisites: 101 or 102 or 322, and PHYS 221, 222, 223, or equivalent.

ASTR 433 Interstellar Material (3) Sp Interstellar gas, temperature, density, and ionization. In-terstellar molecules. Properties of interstellar dust. Ac-tive galactic nuclei and quasar spectra and their interpre-tation. Prerequisites: 101 or 102 or 322, and PHYS 221, 222 and PHYS 221, 222, 223, and 421.

ASTR 497 Topics in Current Astronomy (1-3) Recent developments in one field of astronomy or astrophysics. Prerequisite varies according to the subject matter.

ASTR 499 Undergraduate Research (*, max. 15)

AWSp Special astronomical problems and observational proj-ects, by arrangement with instructor. Prerequisite: permission of instructor.

Courses for Graduates Only

ASTR 500 Seminar in Elementary Astronomy Instruction (1, max. 5)

Seminar in the preparation of lecture and workshop mate-rials with emphasis on demonstration and visual aids, and on evaluation of students' progress.

ASTR 507 Physical Foundations of Astrophysics I

(3) Survey of the thermodynamics from an astronomer's point of view: black body radiation, basic radiative trans-fer, equation of state, degenerate gases, crystallization of high density, introduction to hydrodynamics and gas dy-namics for astronomers: turbulence, convection, shock waves, radiation gas dynamics.

ASTR 508 Physical Foundations of Astrophysics II (3)

Introduction to magnetohydrodynamics, basic theorems and application to stellar and interstellar magnetic fields. Introduction to plasma physics, waves in a plasma, kinetic theory and transport phenomena in astrophysics. Prerequisite: PHYS 513 or equivalent.

ASTR 511 Galactic Structure (3) Kinematics, dynamics, and contents of the galaxy. Spiral structure. Structure of other galaxies. Evolution of galax-

ASTR 512 Extragalactic Astronomy (3) Types of galaxies. Integrated properties, content, and dy-namics. Extragalactic distance scale, groups and clusters. Radio sources. Observational cosmology.

ASTR 513 Cosmology (3)

Homogeneous isotropic models. Microwave and X-ray background radiation, radio galaxies, quasars. Nucleosynthesis, galaxy formation.

ASTR 521, 522 Stellar Atmospheres (3,3) Theory of continuous radiation and spectral line forma-tion. 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 chromo-sphere, and corona, solar activity (especially sunspots and solar flares), sun's radio emission, solar-terrestrial relations. Prerequisite: 521.

ASTR 531 Stellar Interiors (3)

Physical laws governing the temperature, pressure, and

clear energy generation. Models of main sequence stars. Prerequisite: PHYS 421 or equivalent.

ASTR 532 Stellar Evolution (3)

Theoretical and observational approaches to stellar evolu-tion. Structure of red giants and white dwarfs. Prerequisite: 531.

mass distribution in stars. Equation of state, opacity, nu-

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) A -

Leovy Problems of origin, evolution, and structure of planetary atmospheres, emphasizing elements common to all plan-etary atmospheres; roles of radiation, chemistry, and dyearly annespectes; roles of radiation, citerinstry, and dy-namical processes; new results on the atmospheres of Venus, Mars, Jupiter, and other solar system objects in the context of comparative planetology. For students in-terested in atmospheric processes or those specifically in-terested in planets. Offered jointly with ATM S 555 and CDUVE SC GPHYS 555.

ASTR 556 Planetary Surfaces (3) Adams

Comparison of surface processes and conditions on Mercomparison of surface processes and conditions on Mer-cury, 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 from manned and unmanned space missions. Offered jointly with GEOL 556 and GPHYS 556.

ASTR 557 Origin of the Solar System (3) Brownlee

Nebular and non-nebular theories of the origin of the so-lar system; collapse from the interstellar medium, grain growth in the solar nebula, formation of planetesimals and planets, early evolution of the planets and other pos-sible planetary systems; examination of the physical and chemical evidence upon which the ideas concerning the GEOL 557 and GPHYS 557.

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. Prerequisite: permission of department.

ASTR 576 Astronomy Colloquium (1, max. 20) Current research topics in astronomy and astrophysics. Prerequisite: permission of department.

ASTR 581 Techniques in Optical Astronomy (3) S Theory and practice of obtaining optical data. Astronomi-Cal photoelectric photometers, spectrum scaners, spec-trographs, interferometers, image tube, and TV systems. Data-reduction techniques with emphasis on statistical analysis using digital computers. Observations with MRO 30-inch telescope.

ASTR 582 Techniques in Radio Astronomy (3)

ASTR 582 Techniques in Radio Astronomy (3) Theory and practice in the use of radio telescopes and re-ceivers of all kinds. Course includes experiments using $10' \times 40'$ student radio telescope in West Seattle. His-tory, basic definitions, and place of radio astronomy; ba-sics of Fourier transforms; general antenna theory; theory and practice of parabolic reflectors, other filled apertures, interformation of the provide the seatture archites arrays interferometers of many kinds, aperture synthesis arrays, and very long baseline interferometry; microwave receiver systems.

ASTR 597 Topics in Observational Astrophysics (1-5, max. 20)

- ASTR 598 Topics in Theoretical Astrophysics (1-5, max. 20)
- ASTR 600 Independent Study or Research (*)
- ASTR 700 Master's Thesis (*) AWSp
- ASTR 800 Doctoral Dissertation (*) AWSp

ATMOSPHERIC SCIENCES

Courses for Undergraduates

ATM S 101 Survey of the Atmosphere (5) AWSpS Composition and structure of earth's atmosphere; relation of earth to sun and consequent geographical temperature distribution; processes within the atmosphere that pro-duce rain, snow, and other condensation phenomena; tropical and extratropical storms, thunderstorms, chinooks, and cold waves. No more than a total of 5 credits allowed in 101, 201, and 301. Prerequisites: high school algebra and geometry.

ATM S 109 Geophysical Phenomena (4) Sp LaChavelle

Simple techniques of observation and applications. Field Simple techniques of observation and applications. Field study of variety of phenomena such as color of the sky, motion of a waterfall, shape of a snowflake, and the sound of wind. Use of 8-mm. motion picture techniques, including time-lapse studies. Offered jointly with GEOL 109. Prerequisite: permission of instructor.

ATM S 201 Introduction to the Atmosphere (3) W Survey of the most important topics in meteorology de-signed for beginning premajors or majors in physical scisigned to beginning premajors of majors in physical sci-ence, engineering, and other technical fields. Composi-tion and structure, radiative processes, water substance and processes, air motions. No more than a total of 5 credits allowed in 101, 201, and 301. Prerequisites: one year of high school physics and MATH 124.

ATM S 301 Introduction to Atmospheric Sciences (5) A

Reed, Houze

Designed for majors in atmospheric sciences and related fields. Composition and structure of the atmosphere. Solar and terrestrial radiation. Water substance and processes. Thermodynamic processes. Air motions. Physical properties and processes of the upper atmosphere. No more than a total of 5 credits allowed in 101, 201, and 301. Prerequisites: MATH 124 and PHYS 123, or equivalent.

ATM S 321 Physical Climatology (5) W

Hartmann

Evolution and present state of Earth's climate. Climates of the planets used as examples to show importance of primary climate controls: radiation, planetary dimen-sions, and atmospheric composition. Details of physical processes determining distribution of climatic regimes on Earth, including deserts and rain forests. Prerequisite: 301.

ATM S 329 Microclimatology (3) WSp Fritschen

v Study of the interaction of biological and meteorological processes with applications to forestry, recreation, wild-life, landscape design, and architecture. Surface energy balances in terms of evaporation, radiation exchange, air and soil temperature, wind speed, and humidity in the lower layer of the atmosphere. Effects of plane, concave, and convex surfaces, vegetal coverings, temperature, and wind distribution. Offered jointly with FOR B 329. Pre-requisite: 101 or 201 or 301, or permission of instructor.

ATM S 340 Introduction to Atmospheric Physics (5) Sp Hobbs

Earth's field of gravity. Atmospheric thermodynamics; properties and distribution of atmospheric gases. Prerequisite: MATH 125 or permission of instructor.

ATM S 350 Atmospheric Structure and Analysis (5) W

Houze, Reed, Wallace

Atmospheric soundings. Thermodynamic diagrams. Cir-culation systems and their diagnosis: general circulation, monscons, extratropical cyclones and fronts, convective phenomena, tropical systems, mountain waves, and other small-scale phenomena. Scalar and streamline analysis. Applications of radar and satellite data. Prerequisites: 362 or equivalent, MATH 126, PHYS 123.

ATM S 362 Instruments and Observations (3) A

Principles of operation of instruments for measuring pres-sure, temperature, humidity, wind, solar and infrared ra-diation, precipitation amounts and particle size, ozone and other chemicals, condensation, and ice nuclei. Methods of using these instruments, manipulation of output data to put them in usable format, including analog to digital converters, microprocessors, satellites. Prerequi-sites: MATH 126, PHYS 123.

ATM S 390 Honors Tutorial in Atmospheric Sciences *, max. 6) Sp

Review and discussion of selected problems in atmospheric sciences. Introduction to research methods. Pre-sentation of a research paper. Prerequisites: MATH 124, PHYS 123.

ATM S 406 Geophysics: The Atmosphere (3) W Leovy

Designed as part of geophysics sequence (see GPHYS 403-407). Structure and composition of the atmosphere, atmospheric radiation, use of meteorological data, humidity and cloud processes, structure and dynamics of large-scale weather systems. Offered jointly with GPHYS 406. Prerequisite: GPHYS 404 or permission of instruc-

ATM S 431 Atmospheric Physics (5) A

Businger, Fleagle

Introduction to cloud and precipitation processes with emphasis on the microphysics. Solar and terrestrial radia-tion, transfer processes and applications. Prerequisites: 340 or PHYS 222, and MATH 327 or equivalent.

ATM S 432 Atmospheric Physics (3) Sp Businger, Fleagle

Electromagnetic principles and application to the atmosphere, properties of waves, atmospheric probing, natural signal phenomena, effects of nuclear explosions. Prereq-uisites: 340 or PHYS 222 or equivalent, and MATH 327, or equivalent.

ATM S 435 Introduction to Cloud Processes (3) W Hobbs, Houze

Processes of cloud formation and modification. Con-densation of water vapor. Instrumentation for cloud phys-ics research. Structure of clouds. Growth of precipitation in warm clouds and cold clouds. Artificial modification of clouds and precipitation. Electrical properties of clouds. Prerequisite: 340 or permission of instructor.

ATM S 441 Atmospheric Motions (5) A Hartmann, Holton, Houze, Reed, Wallace

Fundamental forces, basic conservation laws, elementary applications of the equations of motion, circulation, vor-ticity, planetary boundary layer. Includes laboratory ex-ercises. Prerequisites: 301, MATH 327. ~

ATM S 442 Atmospheric Motions (5) W Hartmann, Holton, Houze, Reed, Wallace Diagnostic analysis, linear wave theory, numerical pre-diction, baroclinic instability, the general circulation. Includes laboratory exercises. Prerequisite: 441.

ATM S 450 Atmospheric Data Analysis (5) W Reed, Wallace

Statistical and other methods employed in atmospheric data analysis. Frequency distributions, sampling theory. linear correlation, elementary time-series analysis, objec-tive map analysis. Prerequisites: 351, ENGR 141, or equivalent.

ATM S 452 Forecasting Laboratory (5) Sp Houze, Reed, Wallace

Daily practice in map analysis and forecasting, using cur-rent weather data. Severe-storm forecasting. Statistical methods. Prerequisites: 351 and 441.

ATM S 458 Introduction to Air Chemistry (4) A The atmosphere as a chemical system; analytical and physical chemistry of trace atmospheric constituents, both natural and man made. Offered jointly with CEWA

458. Prerequisite: CHEM 160,

ATM S 460 Atmospheric Dispersion of Pollutants (1) A Badgley, Harrison

Methods of estimating transport and diffusion by the atmosphere of airborne materials introduced near the earth surface. Emphasis on practical methods used by manu-facturing concerns and control agencies rather than on theory. Prerequisites: MATH 124, ENGR 141, concur-rent registration in 458 or CEWA 458.

ATM S 462 Sea-Air Transfer Processes (6) S Classroom work and field observations relating to the physical processes occurring at ocean-atmosphere boundary. Transfer of energy, momentum, and moisture and their effects on small-scale and large-scale phenomena, including fog formation, convection, modification of air masses. Prerequisite: 442 or permission of instructor. ATM S 492 Readings in Meteorology or Climatology (*) AWSp Prerequisite: permission of instructor.

ATM S 493 Special Problems in Meteorology or Climatology (*) AWSp Prerequisite: permission of instructor.

Courses for Graduates Only

ATM S 501 Fundamentals of Physical and Synoptic Meteorology (6) A Hobbs, Wallace

Fundamentals of hydrostatics, thermodynamics, radiative ransfer with application to planetary atmospheres. Glo-bal energy balance and general circulation. Atmospheric chemistry. Cloud physics. Elementary synoptic analysis. Description and qualitative physical interpretation of atmospheric composition, structure, and motions.

ATM S 510 Physics of Ice (3) A

Hobbs, Raymond Structure of the water molecule. Crystallographic struc-tures of ice. Electrical, optical, thermal, and mechanical properties of ice. Growth of ice from the vapor and liquid phases. Ice in the atmosphere. Offered jointly with GPHYS 510. Prerequisite: permission of instructor.

ATM S 511 Glaciology I: Formation of Snow and Ice Masses (3) W Raymond

Snow climatology. Transport of snow by wind. Transfer of radiative, sensible, and latent heat at the surface of snow and ice. Freezing of natural water bodies. Heat and mass budget of ice masses. Theories of ice ages. Offered jointly with GPHYS 511. Prerequisite: 510 or permission of instructor.

ATM S 512 Glaciology II: Dynamic Glaciology (3) Sp

Raymond Rheology of ice. Internal deformation and sliding of gla-ciers. Thermal regime of glaciers. Steady flow, dynamic response to changing climate, and surges. Deformation and drift of sea ice. Snow and avalanche dynamics. Of-fered jointly with GPHYS 512. Prerequisites: 510, 511, or permission of instructor,

ATM S 513 Glaciology III: Structural Glaciology (3) A

Raymond

Snow metamorphism and primary layering. Dynamic metamorphism, flow structures, and relation to ice deformation. Structure of river, lake, and sea ice. The role and behavior of foreign matter. Physical processes of struc-tural change and relationship between structures and bulk physical properties. Offered jointly with GPHYS 513. Prerequisites: 510, 511, 512, or permission of instructor.

ATM S 514 Field Glaciology (6) Sp LaChapelle, Raymond

Structure and metamorphism of snow cover. Energy exchange at melting snow and ice surfaces. Deformation and flow of glaciers. Climatology and mass budgets. Glacier features. Emphasis on instrumentation, field techniques, and data analysis. Offered jointly with GPHYS 514. Prerequisite: 511 or 512 or permission of instructor.

ATM S 521 Seminar in Atmospheric Dynamics (*) AWSo

Holton

Directed at current research in the subject. For advanced students. Prerequisite: permission of instructor.

ATM S 523 Seminar in Cloud Physics (*) ASp Hobbs

See 521 for course description.

ATM S 524 Seminar in Energy Transfer (*) AWSp Businger See 521 for course description.

ATM S 525 Seminar in Atmospheric Problems Associated With Air Polintion (2) W Charlson, Harrison

Seminar for both engineers and atmospheric scientists in the atmospheric problems related to air pollution. A wide variety of topics is covered. Offered jointly with CEWA 525. Prerequisite: 301 or permission of instructor.

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ATM S 526 Seminar in Glaciology (*) ASp LaChapelle See 521 for course description.

ATM S 531 Structure of the Upper Atmosphere (3) A Leovv

Structure of atmosphere above the tropopause. Roles of photochemistry, diffusion, and escape in determining composition. Absorption and emission of radiation, and thermal structure. Formation and properties of the iono-sphere. Offered jointly with GPHYS 531. Prerequisite: PHYS 324.

ATM S 533 Atmospheric Radiation I (3) Sp AIM S 535 Atmospheric Ramaton I (3) Sp Principles of radiative energy exchange in planetary at-mospheres with emphasis on emission and absorption of infrared and microwave radiation. Applications to atmo-spheric and surface energy balance and remote sensing. Prerequisite: PHYS 221 or permission of instructor.

ATM S 534 Atmospheric Radiation II (3) A Leovv

Leony Principles of radiative transfer in planetary atmospheres with emphasis on single and multiple scattering of visible and infrared radiation. Applications to surface energy balance and radiative transfer. Prerequisite: 533 or permission of instructor.

ATM S 535 The Physics of Clouds (3) Sp Hobbs, Houze

Rouge, rouge Studies of the dynamics and microphysics of cloud and precipitation systems, with emphasis on numerical mod-els and their verification. Prerequisite: 435 or permission of instructor.

ATM S 541 Dynamic Meteorology (3) W Holton, Leovy Fundamental conservation laws, hydrostatic approxi-

mation, primitive equations, vorticity and divergence equations, correlation theorem, potential vorticity, gravity waves, Rossby waves, Ekman layer. Prerequisite: 501, A A 567 or equivalent.

ATM S 542 Dynamic Meteorology (3) Sp

Holton, Leovy Quasi-geostrophic motions, baroclinic instability, numerical prediction, internal waves, convection, tropical mo-tions. Prerequisite: 541.

ATM S 543 Planetary Fluid Dynamics (3) A Holton

Spectral modeling, two-dimensional turbulence, pre-dictability, models of frontogenesis, wave-mean flow in-teraction, stratospheric dynamics, equatorial waves. Prerequisite: 542.

ATM S 545 The General Circulation of Atmosphere (3) Sp Wallace

Requirements of the global angular momentum heat, mass, and energy budgets upon atmospheric motions as deduced from observations. A study of the physical processes through which these budgets are satisfied. Prerequisite: 442 or permission of instructor.

ATM S 546 Introduction to Atmospheric Turbulence (3) A

Badgley, Businger

Review of derivation of Navier-Stokes equations; turbulent and laminar flow; Reynolds averaging and statistical description of turbulent flow; characteristics of isotropic urbulence; velocity correlations and spectra; turbulent energy equation and scalar variance equation. The clo-sure problem and some examples of how to do it; observational evidence.

ATM S 547, 548 Atmospheric Turbulence (3,3)

W.Sp Badgley, Businger 547: turbulent flux of heat, momentum, and moisture in the layer of the atmosphere next to the earth; Richard-ing of the atmosphere next to the earth; Richard-ing of the atmosphere next to the earth; Richard-ing of the atmosphere next to the earth; Richard-ing of the atmosphere next to the earth; Richard-ing of the atmosphere next to the earth; Richard-ing of the atmosphere next to the earth; Richard-ing of the atmosphere next to the earth; Richard-ing of the atmosphere next to the earth; Richard-ing of the atmosphere next to the earth; Richard-to the atmosphere next to the earth; Richard-to the atmosphere next to the earth; Richard-to the atmosphere next to the earth; Richard-to the atmosphere next to the earth; Richard-to the atmosphere next to the the atmosphere next to the earth; Richard-to the atmosphere next to the earth; Richard-to the atmosphere next to the earth; Richard-to the atmosphere next to the earth; Richard-to the atmosphere next to the earth; Richard-to the atmosphere next to the earth; Richard-to the atmosphere next to the earth; Richard-to the atmosphere next to the earth; Richard-to the atmosphere next to the earth; Richard-to the atmosphere next to the earth; Richard-to the atmosphere next to the earth; Richard-to the atmosphere next to the earth; Richard-to the atmosphere next to the earth; Richard-to the atmosphere next to the earth; Richard-to the atmosphere next to the earth; Richard-to the atmosphere next to the earth; Richard-tot the atmosphere next to the a son's stability criterion; free convection. 548: diffusion of matter in the atmosphere; application of Fickian and statistical theories of diffusion; use of Lagrangian and Bulerian correlation functions. Prerequisite: 546 for 547.

ATM S 551 Synoptic Analysis (3) W Houze

Analysis of synoptic charts. Practice in weather forecasting using guidance from numerical prediction models. Laboratory exercises to illustrate fundamental dynamic principles, develop analytical skill. Examples from literature of nonroutine types of synoptic analysis. (Offered odd-numbered years.)

ATM S 552 Objective Analysis (3) W Wallace

Wallace Review of objective analysis techniques commonly ap-plied to atmospheric problems; examples from the mete-orological literature and class projects. Superposed epoch analysis, cross-spectrum analysis, filtering, eigenvector analysis, optimum interpolation techniques. Prerequisite: FORTRAN programming. (Offered even-numbered vears.)

ATM S 555 · Planetary Atmospheres (3) A

Problems of origin, evolution, and structure of planetary atmospheres, emphasizing elements common to all plan-etary atmospheres; roles of radiation, chemistry, and dycarry annospeces, tores of naturation, cuentistry, and dy-namical processes; new results on the atmospheres of Ve-nus, Mars, Jupiter, and other solar system objects in the context of comparative planetology. For students interested in atmospheric processes or those specifically interested in planets. Offered jointly with ASTR 555 and CHIVE see GPHYS 555.

ATM S 565 Seminar in Atmospheric Science Policy Problems (1-3) W Fleagle

Decision making and policy determination in major na-tional atmospheric programs. Case studies of policy de-velopment for the Global Atmospheric Research Pro-gram, climate change, weather modification, and air quality. Individual student study of selected topics, with emphasis on developing and evaluating alternate policies. Oral presentation and term paper. Offered jointly with SMT 565. Prerequisite: SMT 540 or permission of instructor.

ATM S 571 Theoretical Climatology (3) W Hartmann

Theoretical and dynamical aspects of climatology; re-Incortect and systematic aspects of clinical contrology, its sponse of the atmosphere to perturbations of the extrinsic climatic controls; feedback loops, development of a hier-archy of physical and mathematical models describing climatic states and transitions; critical evaluation of cli-mate forecasting. Prerequisites: 441 and 442, or permis-sion of instructor.

ATM S 580 Atmospheric Photochemistry and Chemical Kinetics (3) W Harrison

Stratospheric and tropospheric chemistries. Concepts of chemical rate processes and photoexcitation. Photoactive species in the atmosphere. Interactions between chemis-try and atmospheric motions. Ozone, nitrogen oxides, carbon oxides, sulfur oxides. Very minor species. Hypotheses of chemistry and climate.

ATM S 600 Independent Study or Research (*)

ATM S 700 Master's Thesis (*)

ATM S 800 Doctoral Dissertation (*)

BIOLOGY

The courses in biology listed below are administered by several departments, Other courses in biology are listed under such headings as Biochemistry, Biological Struc-ture, Botany, Microbiology and Immunology, and Zoology.

BIOL 100 Introductory Biology (5) AWSpS Clark, Tsukada

Introduction to biological principles and concepts, and Introduction to biological principles and concepts, and the application of biological knowledge to problems of man and society; development of an awareness of sci-ence. Offered principally by the departments of Botany, Genetics, and Zoology. Emphasis is determined by staff member offering course. For nonscience majors only.

BIOL 101-102 General Biology (5-5) A,W Cleland, Denton, Edwards, Palka

Principles of living systems as viewed at levels from the subcellular to the community. Emphasis on structural and Subcritical analysis of biological organization—its adapt-edness, its genetic diversity, its energetics—leading to an evolutionary synthesis. The position of man in the bio-logical world. For nonmajors and others desiring a two-quarter introduction to biology. Both courses must be taken to regime gradient to be a set of the s taken to receive credit.

BIOL 103 Introduction to Biology (5) AWSp Piternick

Introduction to basic biological concepts within the con-text of human biology. Primarily for students in the Edu-cational Opportunity Program. No credit allowed if 100 has been taken. Prerequisite: permission of instructor.

BIOL 104 Biology for Elementary School Teachers (5) WSp Piternick

Basic concepts of biology, with emphasis on background needed for confident use of the new science curriculum materials in the elementary school. Prerequisite: permission of instructor.

BIOL 210, 211, 212 Introductory Biology (5,5,5) AWSp, AWSp, AWSp Introduction to the phenomena of life for students intend

Introduction to the phenomena of life for students intend⁵ ing to go on to more advanced biology courses and into preprofessional programs. Emphasis on features common to all living things: molecular and subcellular phenom-ena; cellular structure, metabolism and energetics; genetic regulation of development; the nature, functional properties, and evolution of plant and animal organisms and groups of organisms. Waiting list for 210 is main-tained in 226 Johnson two quarters in advance. Prerequi-site: two quarters of collese chemistry: organic chemistry. sites: two quarters of college chemistry; organic chemis-try concurrent with or prior to 210 (recommended, not required); 210 for 211; 211 for 212, or permission of Bi-ology office.

BIOL 401 Cell Biology (3) ASp

Whiteley Structure and function of the cell. Prerequisites: 210, 211, 212 or equivalent; one upper-division course in a re-lated area (embryology, histology, physiology, or biochemistry).

BIOL 402 Cell Biology Laboratory (2) Whiteley

Prerequisites: 401, which must be taken concurrently, and permission of instructor.

BIOL 454 Evolutionary Mechanisms (3) W Kruckeberg, Slatkin

Kruckeberg, Slatkin Evolutionary change as determined by mutation, recom-bination, and selection. Effects of the genetic system, isolating mechanisms, hydribization, and polyploidy on speciation. Examples of microevolutionary and mega-evolutionary changes from plant and animal kingdoms. For advanced undergraduate and graduate students in the biological sciences. Prerequisite: GENET 451 or equiva-lent lent.

BIOL 460 Biology of Eukaryotic Micro-organisms (5) A Whisler

Introduction to the comparative biology of the algae, fungi, and protozoa. Emphasis on the life history, physi-ology, and structure of protists most commonly used in contemporary biological research. Prerequisites: 210, 211, 212 or 101-102 or introductory microbiology.

BIOL 472 Principles of Ecology (3) W Bliss, Edmondson, Paine, Schoener

Population biology, interactions between organisms in

biological communities, relationship of community to en-vironment, principles of natural selection. Prerequisites: 15 credits in biological sciences and upper-division standing, or permission of instructor.

BIOL 473 Limnology (3) A

Edmondson

Biological, physical, and chemical features of lakes and other inland waters. Prerequisites: 15 credits in biological sciences, 10 credits in college chemistry and upper-division standing, or permission of instructor.

BIOL 474 Ecology Laboratory (3) Edmondson

Students may be required to share a portion of the trans-portation costs of field trips. Prerequisites: 472 and permission of instructor.

BIOL 475 Limnology Laboratory (2)

Edmondson

Examination of biota of fresh waters, survey of limnological methods, and analysis of data. Prerequi-sites: 473 and permission of instructor.

COLLEGE OF ARTS AND SCIENCES

BIOL 499 Independent Studies in Biology Instruction (1-5, max. 15) AWSpS Clark, Piternick

Individual exploration and direct experience with modes of thought and activity in biology instruction. Prerequi-site: permission of instructor.

Courses for Graduates Only

BIOL 501 Advanced Cytology (5) Detailed study of the structure and function of the cell. Prerequisite: permission of instructor.

BIOL 508 Cellular Physiology (3)

Whiteley The cell membrane and permeability, cytoplasmic physi-ology, intracellular energetics and biosynthesis, physiol-ogy of cell division, cell movement. (BIOL 508 and 509 may be elected separately, or in either sequence.) Prerequisite: 401 or permission of instructor.

BIOL 509 Cellular Physiology (3)

Chemistry and physiology of the interkinetic and dividing nucleus, nucleocytoplasmic interactions, physiology of differentiated cells. (BIOL 508 and 509 may be elected separately, or in either sequence.) Prerequisite: permission of instructor.

BIOL 510 Cellular Physiology Laboratory (2) Whitelev

Prerequisites: concurrent registration in 508 or 509, and permission of instructor.

BIOL 573 Topics in Limnology (2 or 3) Edmondson

Readings in the literature of limnology, with detailed discussion of modern problems. May be repeated for credit. Prerequisite: permission of instructor.

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BIOL 575 Topics in Physical and Chemical Limnology (3) W Stuiver

Current linnological, hydrological, and environmental problems, such as biogeochemical cycling and the dating of sediments. Emphasis on carbon, oxygen, and sulfur isotope ratio tracers in natural processes. Prerequisite: 473 or permission of instructor.

BIOL 586 Analysis of Development (3, max. 6) A Analysis of structural, physiological, and molecular levels of developmental processes including gametogen-esis, fertilization, cell and tissue movements, induction, and cytodifferentiation. Prerequisites: ZOOL 456 and BIOC 442, or permission of instructor.

BIOL 587 Analysis of Development Laboratory (1-5, max. 5) WSp

Series of intensive workshops in developmental biology, Series of intensive workshops in developmental biology, each extending over seven to ten days. Each is based on problems under study in the laboratory of the instructors involved, using materials, methods, and approaches characteristic of that laboratory. Prerequisites: 586 and permission of instructor.

BIOL 591 Problems in Biological Instruction (1)

Seminar in biological instruction; teaching techniques, course and curricula planning. Prerequisite: graduate standing.

BIOL 592 Instructional Skills for Science Teaching Assistants (1) ASp Clark

Emphasis on the improvement of each student's basic teaching skills. Videotape analysis of student's presentations. Prerequisite: graduate standing.

BIOL 593 Instructional Methods in University Science Teaching (1) W Clark

Traditional and innovative methods in university science teaching: lecture method, use of media, discussion method, testing, individualized instruction and educational technology, inquiry methods, and other innova-tions. Design of college science courses at different levels. Prerequisite: graduate standing.

BLACK STUDIES

Courses for Undergraduates

BLK S 200 Proseminar in Black Studies: New Educational Directions (5) AWSp Williams, Young

Interdisciplinary survey of Black Studies, presenting the unique Black perspective on the relevant disciplines in arts and sciences.

BLK S 210 Perspectives on Black Language (3) Williams

Aspects of the dialect spoken by the majority of Black Americans. History of Black dialect from its West Afri-can roots. Detailed linguistic description of its salient syntactic, phonological, and semantic features; exploration of its artistic uses through poetry, folktales, oral his-tories, oral street traditions, and Black sermons. Discus-sion of the future of Black English. Introduction to linguistics, Afro-American literature, and/or African literature recommended.

BLK S 230 Resources in Afro-American Research I (3) Wright

Compilation of annotated subject bibliography of Black Studies topics, with emphasis on secondary sources, general reference sources, and social sciences.

BLK S 250 The Afro-American and the U.S. Supreme Court (5)

Laws passed by Congress, and the Constitution as inter-preted by the Supreme Court, dealing with the conditions of Afro-Americans in the United States.

BLK S 280 Creative Expression for African-American Children (5) A Young

New and developing theories and practices of creative expression for African-American children. Students demonstrate techniques and practices learned.

BLK S 301 Community Practice (3-5, max. 15) Internship in various Seattle community service agencies (e.g., CAMP, Planned Parenthood). Students contribute their newly acquired skills and knowledge to the Black community. Experience in working with professional community organizers. Recommended: junior or senior therefore. standing.

BLK S 310 Philosophy of West Africa (3)

Bantu and Yoruba philosophical systems in the context of cultural relativism. Belief systems as an adaptive tool for solving social and environmental problems. African philosophy as an esthetic system, approached from historical and cross-cultural perspectives.

BLK S 400 The Black Esthetic (3)

The Black esthetic as distinct from the mainstream of American culture. Problems and issues of being Black in America. Focuses on the various art forms (e.g., theatre, music, and literature) from historical, social, and political perspectives.

BLK S 490 Research in the Black Community

BLK S 490 Research in the Black Community (1-5, max. 10) AWSp Black, Chandler, Steele, Williams, Young Identification and investigation of the problems and needs of the Black community. Methods and alternatives of approaching these problems and needs. Students des-ignate their areas of interest and subsequently pursue re-search and problem solving. Prerequisite: permission of instructor.

BLK S 492 Special Topics in Black Studies (3-5, max. 15) AWSpS Williams, Young 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 Black Studies issues. Topics vary. Prerequisite: 200 or permission of instructor.

BOTANY

Courses for Undergraduates

Students may be required to pay part of the transporta-tion costs of field trips for the following courses: 113, 313, 331, 355, 421, 446, 452, 462, 464, 543, 547, 554.

BOT 110 Plants in the Human Environment (5) AWSpS

Basic course on plants, emphasizing diversity, economic importance, and function of plants in vegetation systems and human communities. Some independent fieldwork may be required. For nonmajors.

BOT 113 Elementary Plant Classification (5) SpS Denton

Introduction to plant classification; field study and laboratory identification of the common plant families and the conspicuous flora of western and central Washington. Two full-day field trips required of all students.

BOT 301 Plant Propagation (2) AWSp Nishitani

Practical course in methods of plant propagation by seeds, cuttings, budding, layering, bulls, divisions, and other special structures. Includes consideration of care and handling of plants in the home, garden, and green-house. Prerequisites: BIOL 101-102 or equivalent.

BOT 310 Plants, Man, and Ecology (5) W del Moral

del Moral Survey of major ecological principles, stressing plant dominated systems and their interactions with human populations. Topics include the distribution, structure, and functions of terrestrial systems, succession, forms of disturbance, ecosystem conservation, and management principles. Prerequisite: 110 or 113 or equivalent, or BIOL 100. Does not count toward a botany major unit re-minement. quirement.

BOT 320 The Plant Kingdom (5) ASp Introduction to the major groups of the plant kingdom. Structure and reproduction and the theories of evolutionary relationships of the phyla. Not open to students who have taken 220. Prerequisites: BIOL 101-102 or equivalent.

BOT 331 Ornamental Plants (3) Sp

BOT 351 Ornamental Plants (3) Sp Kruckeberg, Tsukada Identification, recognition, and use of cultivated trees and shrubs. Emphasis on laboratory and field study of woody species used in Pacific Northwest landscapes; plant exploration and origins of ornamentals. For nonma-jors, teaching majors in biology, and students in forestry and landscape design. Prerequisite: 113 or 10 credits in biological science. biological science.

BOT 350 Introduction to Plant Geography (4) W del Moral, Tsukada

Patterns of world vegetation distributions; the relationships between vegetation and climate; introduction to general theories of plant distribution. Emphasis on the af-finities between vegetation in different parts of the world.

BOT 354 Introduction to Plant Ecology (3) A Bliss, del Moral

Basic concepts of plant ecology, including studies of the environment-plant interface, the biotic environment, plant populations, communities, and ecosystems. Em-phasis on the analysis of community structure and func-tion. Prerequisite: BIOL 101-102 or 211.

BOT 355 Plant Ecology Laboratory (2) A

Bliss, del Moral

Field, greenhouse, and laboratory studies in plant ecology. Includes introduction to computer-assisted data analysis. Prerequisite: 354, which may be taken concurrently.

BOT 360 General Mycology (5) W Ammirati, Whisler

General survey of the fungi with emphasis on life cycles, structure, physiology, economic importance. Prerequi-site: 10 credits in biological science or permission of instructor.

Bendich, Cleland, Halperin, Meeuse, S. Waaland, Walker

Study of nutrition, assimilation, transport, growth, pho-tosynthesis, and cellular respiration in plants, with the aid of simple physical and chemical principles. For non-majors. Prerequisites: BIOL 211 or 101-102, and CHEM 102, or permission of instructor.

BOT 380 Economic Botany (3) A

Tsukada Plants useful or harmful to man; their taxonomic and morphological characteristics, and chemical constituents; history, distribution, production, usage, and roles in prehistoric and modern cultures and civilization. Prerequisite: 110 or 113 or 10 credits in biological sciences.

BOT 421 Bryology (3)

Taxonomy of mosses, with emphasis on the moss flora of the Pacific Northwest. Intensive practice in identification of mosses in laboratory. Field study for collections, rec-ognition, and natural history of mosses. For undergraduate and graduate majors in botany and related fields. (Offered upon demand.)

BOT 431 Topics in Horticultural Botany

(3, max. 6) *Kruckeberg* Topics include selected families or genera of ornamental importance, urban stress, hardiness, propagation, plant breeding, plant introduction, and diseases of ornamentals. Prerequisite: 331 or equivalent.

BOT 433 Advanced Systematics (5) A Denton, Kruckeberg

Study of taxonomic principles, emphasizing the bases for classification and the analysis of characters used in taxo-nomic studies. Major plant families studied. Prerequi-sites: 113 and permission of instructor. (Offered alternate years; offered 1981-82.)

BOT 434 Advanced Systematics (5) W Denton

Taxonomic theory and practice; nomenclature; classification systems, historical and modern; individual project required. Prerequisites: 433 and permission of in-structor. (Offered alternate years; offered 1981-82.)

BOT 441 Comparative Morphology of Vascular Plants (5) A

DiMichele, Halperin

Detailed study of the morphology (structures and life cycles) of the angiosperms, gymnosperms, ferns, and other nonseed vascular plants. The history of each group is re-viewed to trace the derivation of modern structures and processes and to reveal the major evolutionary trends. Prerequisite: BIOL 211 or 101-102, or equivalents. (Offered alternate years.)

BOT 444 Plant Anatomy (5) W DiMichele

Study of the origin and differentiation of tissue systems; practice in interpretation of histology of plant materials. Prerequisite: BIOL 101-102 or 211. (Offered alternate years; offered 1980-81.)

BOT 445 - Marine Botany (8) ASp

Norris Survey of plants represented in marine environments: natural history; ecology, distribution, habitat, adaptation, and trophic interrelationships. Offered at Friday Harbor

Laboratories. Prerequisites: appropriate credits in biolog-ical sciences, concurrent registration in ZOOL 430, and permission of the Director of Friday Harbor Laboratories.

BOT 446 Algology (5) Sp Cattolico, J. R. Waaland

Cattolico, J. R. Waaland Examination of algal phyla from the viewpoint of mor-phological and physiological characteristics important to their systematics. Emphasis on phylogeny of various lines of evolution in algae, relationships between algae and other parts of plant and animal kingdoms, algal geog-raphy and species of economic importance. Prerequisite: 320 or BIOL 211 or permission of instructor.

BOT 448 Marine Algal Ecology (3) A J. R. Waaland

The marine environment in relation to the distribution of The marine environment in relation to the distribution of marine algae, xonation of benthic algae, interactions of algae and animals and the biological basis for phycoge-ography. Prerequisite: 445 or 446, or permission of in-structor. (Offered alternate years; offered 1981-82.)

BOT 452 Vegetation of Western Washington (5) S del Moral, Kruckeberg Intensive field course; phytosociological methods applied to several distinctive Washington vegetation types; focus to several distinctive washington regeardon types, focus on unusual habitats, biogeographic patterns, and rare plants. Extended periods are spent in three locations (Mount Baker region, Mount Rainier region, and Cle Elum River area). Fee to defray costs of transportation, housing, food: approximately \$120. Prerequisites: 113 or equivalent, and permission of instructor.

BOT 456 Plant Community Ecology (5) Sp del Moral

Development of plant community theory; theory of vege-

tation structure and typal identification; numerical methods for vegetation description and pattern analysis; gradi-ent analysis; competition and allelopathy in complex systems; vegetation dynamics; niche theory. Laboratory emphasizes sampling design and field and computer methods to characterize vegetation and vegetation pro-cesses. Two weekend field trips required. (Offered alternate years; offered 1980-81.)

BOT 460 Slime Molds (5)

Haskins

Life history, development, genetics, physiology, and tax-onomy of slime molds. Prerequisites: 360 or MICRO 400, or permission of instructor.

BOT 462 Basidiomycetes (5) A

Ammirati

Structure and classification of the basidiomycetes. Prerequisite: 360 or permission of instructor.

BOT 463 Phycomycetes and Related Fungi (5) A Whisler

Life history, development, taxonomy, and physiology of slime molds and phycomycetes. Prerequisites: 360, MICRO 400, or permission of instructor. (Offered alternate years; offered 1980-81.)

BOT 464 Ascomycetes (5) Sp Structure and classification of the ascomycetes. Pre- requisite: 360 or permission of instructor. (Offered alternate years; offered 1980-81.)

BOT 466 Rusts, Smuts, and Fungi Imperfecti (5) Structure, classification, and biology of rusts, smuts, and imperfect fungi, with particular emphasis on the role of these fungi in plant pathology. Prerequisite: 360 or per-mission of instructor. (Offered upon demand.)

BOT 467 Aphyllophorales (5) AS Structure and classification of major groups of the Aphyl-lophorales (Basidiomycetes), with emphasis on their ecodevelopments in their taxonomy. Prerequisite: 360 or permission of instructor.

BOT 468 Fungi Imperfecti (5) WS Structure and modern bases for classification of the im-perfect fungi (Deuteromycetes). Considers economically important species and plant pathogens. Prerequisite: 360 or permission of instructor.

BOT 472 Plant Physiology (5) Sp Bendich, Cleland, Halperin, Meeuse, Walker Covers the same field as 371, but stresses biochemical approaches. Recommended for biology majors. Not open to students who have taken 371. Prerequisites: BIOL 101-102 or 211, and completion of, or concurrent regis-tration in, CHEM 232, or permission of instructor.

BOT 475 Reproductive Biology of the Flowering Plants (5) Sp Меецье

Strategies and tactics of plant dispersal and pollination; morphological, physiological, and behavioral adaptations of animal pollinators and dispersers; physiology of seed of annual pointators and unpersons, physical context; biochemistry and permination in an ecological context; biochemistry and physiology of plant fertilization; practi-cal and theoretical (evolutionary) implications of all the above. Prerequisities: 113 and BIOL 211 or BOT 371 or 472, or permission of instructor.

BOT 476 Mineral Nutrition (3) A

Walker Absorption, translocation, and utilization of essential mineral elements. Soil culture and solutions as nutrient in theory and media for the growth of plants considered in theory and practice. Prerequisite: 371 or 472, or equivalent. (Of-fered alternate years; offered 1980-81.)

BOT 478 Plant Morphogenesis (3) A

BOT 478 Plant Morphogenesis (3) A Halperin Course progresses from a general review of the subcellu-lar machinery controlling development (information stor-age, macromolecular assembly, metabolic regulation, cell cycle, etc.), as studied in micro-organisms, animals, and plants, to a study of development at the cell, tissue, and organ level in multicellular plants. Reading based on primary sources. Prerequisite: BIOL 211 or BOT 371 or equivalents.

BOT 480 Plant Cytology (3) W Haskins, J. R. Waaland

Analysis of structure and function of plant cells. Empha-

sis on the ultrastructure of plant cells and cell compo-nents. Prerequisites: 15 credits in biological science.

BOT 481 Plant Cytology Laboratory (2) W Haskins, J. R. Waaland

Bright-field and phase-contrast microscopy; cytochemi-cal methods; demonstration of optical equipment; individual projects may be required. Prerequisite: 480.

BOT 490 Undergraduate Seminar (1) Presentation and discussion of special topics in botany.

BOT 498 Special Problems in Botany (1-15) AWSp Students with suitable background in botany (1-15) AWSP Students with suitable background in botany may enroll for special study in algology, anatomy, bryology, cytol-ogy, morphology, physiology, or taxonomy. Prerequi-site: permission of instructor.

Courses for Graduates Only

BOT 501 Tutorial in Botany (1-5, max. 10) AWSp Small-group study and discussion of a specified topic in the plant sciences, largely in fields not covered by courses and existing special area seminars. Impetus for registration would come from two or more graduate students finding a faculty member who shares with them an interest in the topic. Prerequisite: permission of instructor.

BOT 520 Seminar (1) AWSp Prerequisite: permission of instructor.

BOT 521 Topics in Plant Physiology (2, max. 10)

AWSp Bendich, Cleland, Halperin, Meeuse, Walker Modern trends and methods in plant physiology. Prereq-

BOT 522 Seminar in Morphology and Taxonomy (2, max. 10) AWSp Denton, DiMichele, Kruckeberg Current research and trends in morphology and taxonomy of higher plants. Prerequisite: permission of instructor.

BOT 523 Selected Topics in Mycology (2, max. 10) AWSp Ammirati, Whisler

Selected topics from all phases of mycology. Prerequisite: permission of instructor.

BOT 524 Topics in Algology (2, max. 10) AWSp Cattolico, Norris, J. R. Waaland, S. Waaland Selected topics from all phases of algology. Prerequisite: permission of instructor.

BOT 525 Topics in Plant Ecology (2, max. 10)

AWSp Bliss, del Moral, Leopold, Tsukada Selected topics from various phases of plant ecology. Prerequisite: permission of instructor.

BOT 526 Topics in Palynology (2, max. 6) AWSp Leopold, Tsukada

Discussion and review of literature in pollen structure, disposition in sediments, and paleoecology. Prerequisite: permission of instructor.

BOT 528 Plant Nucleic Acids and Subcellular Regulation (3) A Bendich, Cattolico

Current research and trends in plant nucleic acids, including such topics as plastid and nuclear genomes, regula-tion of organelle biogenesis, the cell cycle, and evolution.

BOT 543 Freshwater Algae (5) A Norris

Morphology, life histories, systematics, and ecology of freshwater algae, with emphasis on the local flora. Stud-ies made on algae collected in the field and on specimens grown in laboratory culture. Not open to students who have taken 443. Prerequisite: 320 or permission of in-structor. (Offered alternate years; offered 1980-81.)

BOT 545 Marine Algology (9) S Norris, J. R. Waaland Morphology, life histories, systematics, and ecology of marine algae, with emphasis on the local flora. Prerequisite: 320 or permission of the Director of Friday Harbor Laboratories. (Consult Friday Harbor Laboratories bulletin for the year offered.)

BOT 547 Phytoplankton Morphology and Taxonomy (5) A Norris

Advanced discussion of phytoplankton morphology with emphasis on characteristics important to their taxonomy. Emphasis on cytology of the organisms, their life histo-ries, adaptive morphological characteristics, and isolation and culture of phytoplankton organisms. Prerequi-site: 445 or 446, or permission of instructor. (Offered alternate years; offered 1981-82.)

BOT 549 Advanced Algology (9) S Norris, J. R. Waaland

Varied marine algal flora of the San Juan region. Topic changes from year to year. Individual research projects. Prerequisites: 545 or equivalent and permission of the Di-rector of Friday Harbor Laboratories. (Consult Friday Harbor Laboratories bulletin for the year offered.)

BOT 552 Vegetation of North America (5) W Bliss

Detailed analysis of the biomes of America north of Co-Imbia, including principles of plant geography, floris-, tics, climate, soils, ecophysiology, paleobotany, vegeta-tion structure, and community patterns. Prerequisite: 350 or 450.

BOT 554 Palynology and Quaternary Phytogeography (5) A Tsukada

Study of former vegetation and environments by relating the fossil pollen record to ecological principles; funda-mentals and applications of pollen-spore morphology and pollen analysis through lectures and practical experiences in the laboratory and field. Two full-day (Friday and Sat-urday) field trips required of all students. Prerequisites: 113 or 313; BIOL 4/2, or permission of instructor. (Of-fered alternate years; offered 1980-81.)

BOT 565 Marine Mycology (9) Whisler

Taxonomy and morphology of aquatic fungi with em-phasis on marine forms. Prerequisites: 320 or 360 or 20 credits in biology and permission of the Director of Friday Harbor Laboratories. (Consult Friday Harbor Laboratories bulletin for the year offered.)

BOT 569 Development in Lower Plants (5) Sp

S. Waaland Survey of developmental systems in algae and fungi. Comparative study of control of thevelopment with an emphasis on photoregulation, cell wall interactions, and hormonal control. Prerequisite: 320 or permission of instructor. (Offered alternate years; offered 1980-81.)

BOT 570 Plant Metabolism (3) A

Meeuse Metabolism of organic compounds, with emphasis on photosynthesis and cellular respiration. Prerequisites: 472, and CHEM 232 or equivalent, and permission of instructor. (Offered alternate years; offered 1980-81.)

BOT 571 Plant Metabolism Laboratory (2) A Meeuse

Prerequisite: concurrent registration in 570.

BOT 572 Water Relations (3) Sp Walker

Permeability and water relationships, with special emphasis on influences affecting behavior of plants in the field. (Offered alternate years; offered 1981-82.)

BOT 573 Water Relations Laboratory (2) Sp Walker

Prerequisite: concurrent registration in 572. (Offered al-ternate years; offered 1981-82.)

BOT 574 Physiological Plant Ecology (5) Sp Bliss, Walker

Theory and practice of the measurement of important enreceived and practice of the measurement of migrature of vironmental variables in plant ecology (radiation, tem-perature, light, wind, humidity) and the basic responses of the plants. Some aspects of plant interactions, es-pecially allelopathy; primary emphasis on reactions of the individual plant, with some implications to ecosystems included. Prerequisites: introductory courses in plant physiology and plant ecology.

BOT 577 Plant Growth and Development (3) W Cleland

Control of growth, development, and differentiation in higher plants by hormones. Prerequisite: 472 or permis-sion of instructor. (Offered alternate years; offered 1981-82.)

BOT 579 Environmental Control of Plant Growth and Development (3) W Cleland

Effects of light, temperature, and water stress on the growth, development, and metabolism of higher plants. Prerequisite: 371 or 472 or permission of instructor. (Offered alternate years; offered 1980-81.)

BOT 580 Methods in Subceilular and Macromolecular Analysis (3) A Bendich, Cattolico

Introduces the theory underlying basic laboratory techni-ques used in the isolation and quantitation of subcellular and macromolecular components. Discusses the practical problems in applying techniques such as radio-isotope methodology, chromatography, electrophoresis, and cell fractionation.

BOT 581 Laboratory Techniques in Plant Molecular Biology (5) A Bendich

Procedures for the use of radioisotopes, with emphasis on The problem of microbial contamination during radiola-beling of plant materials: Extraction of proteins and nu-cleic acids, as well as their fractionation by gel electro-phoresis, column chromatography, and density gradient centrifugation. *In vitro* translation of RNA. Prerequisite: permission of instructor.

BOT 600 Independent Study or Research (*) AWSp

BOT 700 Master's Thesis (*) AWSp

BOT 800 Doctoral Dissertation (*)

CHEMISTRY

Courses for Undergraduates

CHEM 100 Chemical Science (5) Sp Terminal survey course for nonscience majors. Not to be considered as preparation for other chemistry courses. No credit given to those who have taken one unit or more of high school chemistry.

CHEM 101 General Chemistry (5) AWSpS For nonscience and nonengineering majors who plan to terminate their study of chemistry with 101 or 102. Molecular theory, quantitative relationships in chemical pro-cesses, solutions, ionic equilibria, acids, bases, and salts. Chemistry of common metals and nonmetals. Students Cnemistry of common metals and nonmetals. Suddents with strong high school background in chemistry are urged to take an exemption examination (consult Educational Assessment Center). For students with one year of high school chemistry, not more than 5 credits allowed from among 101, 105, and 140 or 145.

CHEM 102 General and Organic Chemistry (5) AWSoS

Organic compounds; hydrocarbons, alcohols, aldehydes, ketones, ethers, acids, aromatics, fats and oils, proteins, and carbohydrates. Students who plan to take 231 should not take 102. Prerequisite: 101 or 101 exemption exami-

CHEM 105 Introduction to General Chemistry (3) ÀWS

AWS For students without a full year of high school chemistry who plan to take 140 or 145. (When 105 is not available, 101 may be helpful.) Basic introduction to chemistry for physical science, biological science, premedical, engi-neering majors who intend to take a year or more of college chemistry. Emphasis on quantitative reasoning. For students with one year of high school chemistry, not more than 5 credits allowed from among 105, 101, and 140 or 145. 140 or 145.

CHEM 140 General Chemistry (4) AWSpS For science, engineering, and other majors who plan to take a year or more of chemistry courses. Chemical reac-tions, basic principles, equilibrium systems, structure and bonding, properties of matter. Prerequisites: high school chemistry or physics (both recommended), or 101 or 105; and qualification for MATH 124 or passage of the 140 placement test (consult Educational Assessment Cen-ter) ter).

CHEM 145 General Chemistry (4) A Parallels 140. For science, engineering, and other majors who plan to continue their study of chemistry through physical chemistry. Assumes strong high school back-ground in chemistry, or 105 and good aptitude for study of science. Mathematics prerequisite the same as for 140.

CHEM 150 General Chemistry (4) AWSpS Continuation of 140. Concurrent registration in 151 rec-ommended. Prerequisite: 140 or 145.

CHEM 151 General Chemistry Laboratory (2) AWSpS

Experiments illustrating quantitative relationships in chemistry. Prerequisite: concurrent registration in, or prior completion of, 150 or 155.

CHEM 155 General Chemistry (4) W To follow 145. Parallels 150. Prerequisite: 145.

CHEM 157 General Chemistry Honors Laboratory

(3) W Introduction to quantitative chemistry. Prerequisites: 150 or 155 concurrently, and permission of adviser,

CHEM 160 General Chemistry (4) AWSpS Chemistry of representative elements, metals, and nonmetals. Introduction to organic and nuclear chemistry. Prerequisite: 150 or 155.

CHEM 164 General and Introductory Environmental Chemistry (5) Sp

Parallels 160. Beyond the coverage of descriptive general chemistry of 160, additional material emphasizes envi-ronmental applications of basic chemistry. Prerequisite: 150 or 155.

CHEM 167 General Chemistry Honors Laboratory (3) Sp To follow 157. Prerequisite: 157.

CHEM 170 Qualitative Analysis (3) S Semimicroqualitative analysis for common cations and anions; separation and identification procedures. Prereq-uisites: 151 and 160 (160 may be taken concurrently).

CHEM 198 Tutorial Study (1, max. 3) For chemistry majors only. Discussion in small groups of aspects of chemistry of current interest to undergradu-ates. Not to be taken concurrently with 199. Prerequi-sites: permission of chemistry adviser and grade-point average of 3.00 for freshmen, 2.50 for sophomores.

CHEM 199 Special Problems (1, max. 6) AWSpS

Problems relating to experimental chemistry. For chemis-try majors only. Prerequisites: permission of chemistry adviser and a chemistry grade-point average above 3.00.

CHEM 231 Organic Chemistry (3) AWSpS

For students planning two or three quarters of organic chemistry. Structure, nomenclature, reactions, and syn-thesis of the main types of organic compounds. Prerequisite: 150 or 155.

CHEM 232 Organic Chemistry (3) AWSpS Continuation of 231 for students planning only two quar-ters of organic chemistry. Prerequisite: 231.

CHEM 235 Organic Chemistry (3) AWSpS Continuation of 231 for those desiring three quarters of organic chemistry. Further discussion of transformations of organic molecules, especially aromatic systems. Prerequisite: 231.

CHEM 236 Organic Chemistry (3) AWSpS Continuation of 235 for those desiring three quarters of organic chemistry. Consideration of polyfunctional com-pounds and natural products. Study of sugars, amino acids, and heterocycles. Prerequisite: 235.

CHEM 241 Organic Chemistry Laboratory (3)

AWSpS Usually to accompany 231. Preparation of representative compounds. Prerequisites: 231, which may be taken concurrently, and one laboratory course in chemistry.

CHEM 242 Organic Chemistry Laboratory (3)

AWSpS Usually to accompany 232 or 236. Preparations and qual-itative organic analysis. Prerequisites: 232 or 235, either of which may be taken concurrently, and 241.

CHEM 321 Quantitative Analysis (5) AWSpS Volumetric and gravimetric. Prerequisites: 150 or 155, and 151 or strong high school laboratory preparation. Not intended for students who have completed 167.

CHEM 335 Honors-Organic Chemistry (4) A For chemistry majors and other qualified students plan-ning three or more quarters of organic chemistry. Struc-ture, nomenclature, reactions, and synthesis of organic compounds. Theory and mechanism of organic reactions. Prerequisite: 160 or 155.

CHEM 336 Honors—Organic Chemistry (4) W Continuation of 335. Prerequisite: 335.

CHEM 337 Honors-Organic Chemistry (4) Sp Continuation of 336. Prerequisite: 336.

CHEM 346 Organic Chemistry Honors Laboratory

(3) W Usually to accompany 336. Prerequisite: 336, which may be taken concurrently.

CHEM 347 Organic and Qualitative Organic

Honors Laboratory (3) Sp Continuation of 346. Usually to accompany 337. Prereq-uisites: 337, which may be taken concurrently, and 346.

CHEM 350 Elementary Physical Chemistry (3) WS Survey of some major topics in physical chemistry. Pre-requisites: two quarters of general chemistry. PHYS 116, and MATH 125 (126 recommended) or 157.

CHEM 351 Elementary Physical Chemistry (3) SpS Continuation of 350. Prerequisite: 350.

CHEM 410 Radiochemical Techniques and

Radioactivity Measurements (3) Sp Introductory general service course for students planning further work in nuclear or tracer applications. Safety procedures, detection and measurement of nuclear radia-tions, radiochemical and tracer techniques. Prerequisites; 150 or 155, MATH 124 and PHYS 116.

CHEM 414 Chemistry of the Main Group Elements (3) W

The elements and their compounds in relation to the peri-odic system. Prerequisites: senior standing and 457, or 351 and 455.

CHEM 415 The Chemical Bond (3) W The nature of the chemical bond. Emphasis on simple bonding theories, molecular orbital methods, symmetry, and group theory. Includes some experience in carrying out molecular orbital calculations on the computer. Prerequisite: 455.

CHEM 416 Chemistry of the Transition Metal Elements (3) A

Prerequisite: senior standing. Recommended: 351 or 457.

CHEM 418 Radiochemistry (3) W Natural radioactivity, nuclear systematics and reactions, radioactive decay processes, decay laws, statistical con-siderations, applications of radioactivity. Prerequisite: 455

CHEM 426 Instrumental Analysis (4) Sp

Introduction to modern instrumental methods of chemical analysis. Prerequisite: 321 or 167.

CHEM 427 Advanced Quantitative Theory (3) A Principles of analytical chemistry. Prerequisites: 321 or 167, 232 or 236 or 337, and 457.

CHEM 435 Introductory Biophysical Chemistry (3)

Survey of the statics and dynamics of biophysical bio-chemical processes. Prerequisites: organic and physical chemistry.

CHEM 436 Introductory Bio-organic Chemistry (3)

Sp Topics in biosynthetic chemistry. Emphasis on primary metabolic products (α -amino acids, carbohydrates, fatty acids, Krebs cycle intermediates, mevalonic acid) and secondary natural products (acetogenins, alkaloids, fla-vonokds, steroids). Prerequisite: 236 or 337.

CHEM 450 Applied Physical Chemistry (3) Sp

Topics related to chemistry in environmental, biological, and material science. Emphasis on methods rather than theory. Includes heterogeneous equilibrium in multicom-ponent systems, ionic solutions, nonideal solutions and

gases, surface chemistry and catalysis, and thermody-namic calculations using tabulated data. Primarily for un-dergraduates and graduates in related fields, but accept-able for chemistry majors. Prerequisite: 350 or 456. Recommended: 351 or 457.

CHEM 455 Physical Chemistry (3) ASpS -

Introduction to quantum chemistry and spectroscopy. Theory of quantum mechanics presented at an elementary level and applied to the electronic structure of molecules and to molecular spectra. Prerequisites: 150 or 155, MATH 126 (238 recommended), and college physics. Honors section available Winter Quarter.

CHEM 456 Physical Chemistry (3) AWS Chemical thermodynamics. Laws of thermodynamics presented with applications to phase equilibria, chemical equilibria, and solutions. Prerequisites: 150 or 155, MATH 126 (238 recommended), and college physics. May be taken without 455. Honors section available Autumn Ouarter.

CHEM 457 Physical Chemistry (3) ASp Introduction to statistical mechanics, kinetic theory, chemical kinetics, and statistical thermodynamics. Other topics of physical chemistry not in 455 or 456 may be covered. Prerequisites: 455 and 456. Honors section available Spring Quarter.

CHEM 460 Physical Measurements in Chemistry (4) ASp Observation and interpretation of infrared, ultraviolet,

Observation and interpretation of infrared, ultraviolet, NMR, and mass spectra with emphasis on the determina-tion of structure of polyatomic molecules. Noise rejection and small signal problems, statistics, feedback and con-trol, data processing, and design of experiments. Prereq-uisites: two quarters of organic chemistry, 350 or 455 or 456, either of which may be taken concurrently.

CHEM 461 Physical Chemistry Laboratory (2-3) AWSp

Physical measurements in chemistry. Vacuum and hightemperature techniques, calorimetry, spectroscopic meth-ods, electrical measurements. Prerequisites: 455, 457 or 351. Recommended: 460.

CHEM 462 Techniques of Synthetic Chemistry (2-3) ASp

(2-3) ASP Techniques of synthetic chemistry with examples from organic, inorganic, and biological chemistry. Vacuum line synthesis, low- and high-temperature techniques, high-pressure syntheses, photochemical reactions, radio-chemical synthesis, gas phase reactions, etc. Chromatography and separation techniques. Prerequisite: 347 or 242.

CHEM 463 Separations and Analysis (2-3) AWSp Techniques of spectroscopic analysis of structure UV, IR, NMR, mass spectroscopy. Prerequisite: 460, which may be taken concurrently.

CHEM 470 Physical Chemistry of Macromolecules (3) A Solution thermodynamics, chain dimensions, rubber elas-

ticity, solid-state morphology, and viscolastic behavior of high polymers. Prerequisites: 457 or 351 or equivalent, and FOR P 488 or CH E 570. (Offered alternate years.)

CHEM 471 Physical Chemistry of Macromolecules (3) W Classical hydrodynamic methods, and modern optical cor-

Classical hydrodynamic methods, and modern opicial cor-relation and pulse techniques for studying dynamical mo-tions and conformations of macromolecules, especially bi-opolymers, in solution. Cooperative thermal transitions, optical properties, and polyelectrolyte effects. Prerequi-sites: 457 or 351 and 455. Recommended: 470. (Offered alternate years.)

CHEM 498 Teaching Experience in Chemistry (1, max. 6) AWSp Students are trained as assistants in laboratories and quiz

sections. For chemistry majors, especially those planning graduate work. Prerequisites: permission of instructor, grade-point average above 3.00, and upper-division stand-ing.

CHEM 499 Undergraduate Research (*, max. 12) AWSpS

AWSpS For qualified chemistry majors in the bachelor of science curriculum, especially those planning graduate work. Pre-requisites: permission of adviser and grade-point average above 3.00 in chemistry courses.

Courses for Graduates Only

CHEM 508 Advanced Inorganic Chemistry (3, max. 9) Sp

Discussion of selected applications of nuclear magnetic resonance spectrometry, electronic, infrared, and Raman spec-troscopy, magnetic susceptibility measurements, Moss-bauer spectrometry and isotope replacement studies in the understanding of structure and bonding in inorganic compounds.

CHEM 510 Current Problems in Inorganic and Nuclear Chemistry (3, max. 12) Sp

Nuclear Chemistry (3, max, 12, 5) Fordoctoral candidates in inorganic chemistry. Current top-ics (e.g., acid-base theory); halogens; hydrides; groups III and IV; interstitial, chelate, and high-temperature chemistry; inorganic free radicals.

CHEM 520 Current Problems in Analytical Chemistry (2, max. 12) AWSp For doctoral candidates in analytical chemistry. Current topics (e.g., electrochemistry, trace analysis, methods of data treatment, analytical instrumentation theory).

CHEM 526 Advanced Analytical Analysis (3, max, 9) W

Modern topics in analytical chemistry; emphasis on chemometrics and mass spectrometry. See instructor for topics covered during any particular quarter. Prerequisite: gradu-ate standing. (Offered alternate years.)

CHEM 530 Advanced Organic Chemistry (3) A Electronic mechanisms in organic chemistry. An introduc-tion to the theory of organic reactions. Prerequisite: 337 or equivalent.

CHEM 531 Advanced Organic Chemistry (3) W Discussion of the principal reactions of synthetic organic chemistry, with emphasis on practical methods. Transfor-mation of functional groups. Prerequisite: 530.

CHEM 532 Advanced Organic Chemistry (3) Sp Kinetics and equilibria as related to the mechanisms of organic reactions. Absolute rate theory. Stereochemistry and the steric course of reactions. Prerequisite: 531.

CHEM 540 Current Problems in Organic Chemistry

(3, max. 18) AWSp For doctoral candidates in organic chemistry. Discussions of topics of current interest and importance. See the department for instructor and topic during any particular quarter.

CHEM 550 Introduction to Quantum Chemistry (3) A

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: 455.

CHEM 551 Introduction to Quantum Chemistry (3) Sp Electronic structure of many-electron atoms and molecules;

vibration and rotation levels of molecules; effects of particle exchange; angular momentum and group theory; spectros-copic selection rules. Prerequisite: 550.

CHEM 552, 553 Statistical Mechanics (3,3) W,A

(3,3) w,A 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. Prerequisites: 455 and 456 (concurrent registration permitted) or equiva-lent for 552; 552 for 553.

CHEM 559 Chemical Kinetics (3) Sp Modern experimental methods and fundamental theories of reaction rates. Role of vibrational excitation in unimolecular and bimolecular reactions. Energy transfer. None-quilibrium systems and microscopic rate parameters. Pre-requisite: 457 or 552.

CHEM 560 Current Problems in Physical Chemistry (3, max. 9) ASp For doctoral candidates in physical chemistry. A discus-

sion of topics selected from active research fields. See the 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, polyelectrolytes.

CHEM 562 Surface and Membrane Chemistry

(3, max. 9) Advanced treatment of multiphase equilibrium; chemi-sorption and contact catalysis; micelles, theory of membrane formation, potentials, and action; physical adsorption and surface-area measurement. Prerequisites: 456 or other courses in basic thermodynamics and MATH 238. Recommended: 552.

CHEM 563 Magnetic Resonance Methods in Chemistry (3, max. 9) Magnetic resonance phenomena in molecular systems. Topics include the chemical shift and spin-spin splitting in proton and 13C NMR, quadrupole interactions in NOR, hyperfine interaction and zero field splittings in ESR. Applications of magnetic resonance to the study of molecular structures and dynamics, including electronic properties of excited states as revealed by optical detec-tion of magnetic resonance.

CHEM 581 Topics in Inorganic Chemistry

(3, max. 18) AWSp Open only to students accepted for doctoral work in chemistry.

CHEM 582 Topics in Analytical Chemistry (3, max. 18) AWSp

Open only to students accepted for doctoral work in chemistry.

CHEM 583 Topics in Organic Chemistry (3, max. 18) AWSp

Open only to students accepted for doctoral work in chemistry.

CHEM 585 Topics in Physical Chemistry (3, max. 18) AWSp Open only to students accepted for doctoral work in

chemistry.

CHEM 590 Seminar in General Chemistry (1, max. 18) AWSpS

CHEM 591 Seminar in Inorganic Chemistry (1, max. 18) AWSpS

CHEM 592 Seminar in Analytical Chemistry (1, max. 18) AWSpS

CHEM 593 Seminar in Organic Chemistry (1, max. 18) AWSpS

CHEM 594 Seminar in X-Ray Crystallography (1, max. 18) AWSpS

CHEM 595 Seminar in Physical Chemistry (1, max. 18) AWSpS -

CHEM 600 Independent Study or Research (*) AWSpS Prerequisite: permission of adviser.

CHEM 700 Master's Thesis (*) AWSpS Prerequisite: permission of adviser.

CHEM 800 Doctoral Dissertation (*) Prerequisite: permission of adviser.

CHICANO STUDIES

CHSTU 102 Introduction to Chicano Studies (5) AW Gamboo

Interdisciplinary course designed to survey the history, economics, politics, art, literature, and thought of the Chicano and to examine the modern Chicano Movement. Analyzes the interdisciplinary nature of Chicano Studies and prepares the student for advanced courses in Chicano Studies. Not open to students who have taken GIS 302.

CHSTU 110 Beginning Mexican Folk Dance (3) A Gonzalez-Radke Fundamental technique course to increase appreciation and awareness of Mexican people and their culture through acquaintance with their folk customs, historical backgrounds, costumes, and music. Expressive interpretation through the re-creation of specific modes and styles of movement characteristic of regional dance forms. Regions include Oaxaca, Michoacan, Norte, and Jalisco. Not open to students who have taken GIS 110.

CHSTU 202 Intermediate Chicano Studies (3) AW Gamboa

Camboa Interdisciplinary course designed to deepen the under-standing of the Chicano experience: deals primarily with situations affecting present-day Chicanismo through analysis of problems in education, politics, society, and literature. Not open to students who have taken GIS 304.

CHSTU 204 History of Chicanos in Washington State (5) Sp Gamboa

Provides a basic understanding of Chicano history in Washington State: causes, extent, and results of the Chicano presence from earliest Spanish explorations to the present; contemporary problems of Chicanos in a broader national context. Not open to students who have taken GIS 201.

CHSTU 207' Chicano Consumer: Past and Present (3) AW Aguirre

Coordinates Chicano economic history with contemporary economic problems of Chicanos, emphasizing so-cial, psychological, and financial aspects that have in the past and continue in the present to deprive the Chicanos of their economic freedom. Not open to students who have taken GIS 207 or 208.

CHSTU 210 Beginning/Intermediate Mexican Dance (3) W Gonzalez-Radke

Interdisciplinary course covering a restricted number of topics dealing with regional Mexican folk dancing. Top-ics are dance, costumes, music, and customs, with concentration on the regions of Oaxaca, Michoacan, and Jalisco. Not open to students who have taken GIS 111.

CHSTU 305 Advanced Chicano Studies (3) S Gamboa

Advanced interdisciplinary course that looks at a restricted number of topics dealing directly with Chican-ismo as a developmental process and its stabilization within the United States. Curanderismo, Chicano folk magic, and its relation to contemporary Chicano values; a study of the barrio, its problems and proposed solutions; the migrant, his life and misery within the system; folk expression, oral tradition related to previous topics and perpetuation of phenomena through oral means. Not open to students who have taken GIS 305.

CHSTU 310 Intermediate Mexican Folk Dance (3) . Sp Gonzalez-Radke

Expands the knowledge of Mexican folklore through re-search, dance, and music, enables the students to create their own folk dance through the development of their own choreography. Prerequisite: 110 or 210 or equivalent.

CHSTU 391 Independent Study (1-6, max. 10) AWSpS

Gamboa, Vasquez

Camboa, Vasquez Students engage in a variety of Chicano Studies topics and develop projects of their choosing under direction of Chicano Studies faculty members in various disciplines. Students may work individually or in teams, depending on project and scope. Prerequisite: permission of instructor

CHSTU 491 Special Topics in Chicano Studies (3-5, max. 10) A

Interdisciplinary course that provides the opportunity to concentrate on one specific aspect of the Chicano Experi-ence, and to gain full mastery of the same at the undergraduate level.

CHINA REGIONAL STUDIES

See International Studies.

CINEMA STUDIES

Courses for Undergraduates

CINE 201 Elements of Cinema (5) A Dale

Introduction to the art of cinema performed through exposition and examination of basic cinematic procedures. Prerequisite: sophomore standing or above.

CINE 202 Classics of the Cinema I (5) W

Jameson Historical study and critical assessment of the cinema from the beginnings to the 1930s, based on lectures and discussions of a selection of film classics. Prerequisite: 201.

CINE 203 Classics of the Cinema II (5) Sp Jameson

Historical study and critical assessment of the cinema since the mid-Thirties, based on lectures, discussions, and viewings of ten to eleven core films. Prerequisites: 201. 202.

CINE 399 Studies in American Cinema (5) Jameson

Course content may vary, but centers on some aspect of American cinema; for instance, Major American Direc-tors of the Fifties, the Western, and American auteurs. Students are urged to take the 200 sequence of Cinema Studies courses prior to this course.

CINE 404 Women and the Cinematic Imagination (5, max. 15) W Murphy

Examines women's roles in film and the current body of Examines works to be a minimum and content body of criticism assessing the history of women in the cinema. Topics, which vary each quarter, include: Women in For-eign Films, The Actress and the Director, and Films by Women. Offered jointly with WOMEN 404. Prerequi-sites: 201, 202, 203, or permission of instructor.

CINE 450 Cinema Studies: Special Topics (5, max. 20)

Inmeson

Special topics, the subject matter and depth of which are not included in other film courses. Emphasis placed on film movements, national cinemas not covered in other departments, genre courses, and *auteur* courses. Topics of Interdisciplinary character: film and the other arts. Pre-requisites: 201, 202, 203.

CINE 460 American Directors (5) In-depth study of individual directors essential to the def-

inition of the American cinema. The director to be examinition of the American cinema. The director to be exam-ined is determined each time the course is offered and includes such distinguished artists as: King Vidor, Nicho-las Ray, Samuel Fuller, John Huston. Focus on the direc-tor's evolving style and thematic concerns, as well as his contribution to the art of the cinema. Prerequisite: 201 or 202 or 203 or equivalents.

CINE 461 Howard Hawks (5)

Study of selected films by American film-maker Howard Hawks, author of a classical work in almost every ci-nematic genre. Emphasis on Hawks's existentialism as expressed in his concepts of heroic professionalism, community, language, time, and death, as well as the director's consistent stylistic and thematic concern with the conflict between existential ignorance and enlighten-ment. Prerequisite: 201 or 202 or 203 or equivalents.

CINE 462 Sam Peckinpah (5) A thematic and stylistic examination of the films of Sam-uel David Peckinpah, emphasizing the director's unidentity, masculine friendship, the hero as outsider at odds with communal and historical order and progress, heroic acknowledgement and transcendence of the power of time, and redemption through violent action and death. Prerequisite: 201 or 202 or 203 or equivalents.

CLASSICS

Courses for Undergraduates

CLASSICS COURSES IN ENGLISH

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 classi-cal studies. The 300-level courses deal with broader sub-jects 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) AWSpS

besigned to improve and increase English vocabulary through a study of the Latin and Greek elements in En-glish, with emphasis on words in current literary and scientific use. No auditors. Knowledge of Latin or Greek is not required.

CLAS 205 Bioscientific Vocabulary Building From Latin and Greek (3) AWSpS

Designed to help the student master the scientific vocabu-lary of his 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.

CLAS 210 Greek and Roman Classics in English (5) AWSp

Bliquez, Grummel, Harmon, Langdon, MacKay,

McDiarmid, Northrup, Pascal, Rutland Introduction to classical literature through a study of the major Greek and Latin authors in modern translation. Lectures given by various members of the staff.

CLAS 320 Greek and Roman Private and Public Life (3) A or Sp

Bliquez Study of the civic and social practices and institutions of everyday Greek and Roman private and public life, in-cluding 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.

CLAS 322 Intellectual History of Classical Greece (5) Sp Northrup

Normal Development of Greek thought from mythic and poetic formulations to description, analysis, and systematic ab-straction; based on the study of a variety of poetic, histor-ical, and philosophical texts, from Homer to the Hellenistic age.

CLAS 420 Roman Politics: The Rise and Fall of Political Freedom (3) Grummel

The political theory of the Romans, the realities of repub-Ince point a metry of the kontaits, the teames of reputer lican power politics, and the tensions and conflicts that brought about the loss of political freedom. Special atten-tion is given to contrasts and comparisons with our own political institutions as they were conceived by the fram-ers of the Constitution and as they function today.

CLAS 422 Greek Historians and Philosophers in English (3)

Readings, lectures, and discussion of select historical and philosophic texts in English translation.

CLAS 424 The Epic Tradition (5) A

MacKay, Northrup

Ancient and medieval epic and heroic poetry of Europe in English: the Iliad, Odyssey, and Aeneld; the Roland or a comparable work from the medieval oral tradition; pre-Greek forerunners, other Greeco-Roman literary epics, and later medieval and Renaissance developments and adaptations of the genre. Choice of reading material var-ies according to instructor's preference and may include Germanic, Asian, etc. Offered jointly with C LIT 424.

CLAS 427 Greek and Roman Tragedy in English (3) W McDiarmid

Study of the development of Greek and Roman trag-edy, with extensive readings in representative plays of Aeschylus, Sophocles, Euripides, and Seneca.

CLAS 428 Greek and Roman Comedy in English (3) A or Sp Pascal

Readings from the comedies of Aristophanes, Plautus, and Terence.

CLAS 430 Greek and Roman Mythology (3) AWS6

Grummel, Northrup, Pascal, Rutland Principal myths found in classical and later literature.

CLAS 435 The Ancient Novel (3) W Pascal

Study of the origins and growth of fiction and the novel in the Latin tradition.

CLAS 440 Greek and Roman Critics in English (3) Grummel

Literary theories of the Greeks and the Romans as seen in the writings of Plato, Aristotle, Longinus, and other ma-jor classical authors. Attention is given to their influence on modern literary critics.

CLAS 445 Greek and Roman Religion (3) A Langdon Religion in the social life of the Greeks and Romans,

Reingion in the social inte of the Greeks and Romans, with emphasis placed on their public rituals and festivals. Attention is given to the priesthoods, personal piety, ritu-als of purification and healing, and the conflict of reli-gions in the early Roman Empire. Many lectures illus-trated by slides. Prerequisite: one course in ancient bittom, exclusive realization to the reliable II of 201 are history, or classics, or religious studies; RELIG 201 preferred

CLASSICAL ARCHAEOLOGY

CL AR 340 Pre-Classical Art and Archaeology (3) A Langdon

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) W Bliquez, Langdon 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) Sp Pascal

Roman architecture and art, with emphasis on the inno-vations of the Romans; illustrated by slides. Offered jointly with ART H 342.

CL AR 343 Hellenistic Art and Archaeology (3) Sp 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, mo-saics, and minor arts examined in lectures illustrated with slides. Offered jointly with ART H 343.

CL AR 442 Greek and Roman Painting (3) A

Study of painted decoration on Greek vases, and Roman wall painting, with emphasis on the historical and stylis-tic development of each. Offered jointly with ART H 442. (Offered alternate years; offered 1980-81.)

CL AR 444 Greek and Roman Sculpture (3) W Langdon

History and development of Greek sculpture and sculp-History and development of Creek sculpture and sculp-tors, their Roman copyists, and Roman portraits and sar-cophagi. Emphasis on Greek sculpture of the fifth cen-tury B.C. Offered jointly with ART H 444. (Offered alternate years; offered 1980-81.)

CL AR 446 Greek Architecture (3) Sp

Langdon Detailed study of Greek architecture from its beginnings, with special emphasis on the Periclean building program in fifth-century Athens. Offered jointly with ARCH 446 and ART H 446. (Offered alternate years; offered 1980-81.)

GREEK

GRK 101, 102, 103 Elementary Greek (5,5,5)

A,W,Sp 101, 102: an intensive study of grammar, with reading and writing of simple Attic prose; 103: reading of selec-tions from classical Greek literature. Prerequisites: 101 for 102, 102 for 103.

GRK 300, 301 Greek Language, Accelerated (3,3) Intensive introduction to Attic Greek. Not accepted as upper-division credit toward a major in Greek or Classics. Prerequisites: for 300, permission of undergraduate adviser; 300 for 301.

GRK 305, 306 Attic Prose (3,3) A,W

Selections from Attic prose, including Plato's *Republic*, Book I, Plato's *Apology*, and the orations of Lysias. To be taken concurrently with 310, 311. Prerequisites: 103 for 305; 305 for 306.

GRK 307 Homer (3) Sp Selections from the *lliad* or *Odyssey*. To be taken concur-rently with 312. Prerequisite: 306.

GRK 308 Introduction to Koine Greek Texts (3) Sp Williams

Reading and discussion of selected religious and philo-sophical texts from Koine Greek. Prerequisite: 306. (Offered alternate years; offered Spring Quarter 1982.)

GRK 310, 311, 312 Grammar and Composition (2,2,2) A.W.Sp To be taken concurrently with 305, 306, 307. Prerequi-

site: 103.

GRK 401-402-403 Elementary Modern Greek (5-5-5)

Introduction to spoken modern Greek, with emphasis on conversational skills. Reading of contemporary writers of demotic Greek. The artificial literary language (Kathare-vousa) is introduced but not explored in depth. Some experience in language study desirable.

Prerequisite for following 400-level Greek courses: four years of high school Greek or 307 or permission of undergraduate adviser.

GRK 413 The Pre-Socratic Philosophers (3) A McDiarmid ·

See above. (Offered alternate years; offered 1980-81.)

GRK 414 Plato (3) W MacKay, McDiarmid

See above. (Offered alternate years; offered 1980-81.)

GRK 415 Aristotle (3) Sp MacKay

See above. (Offered alternate years; offered 1980-81.)

GRK 422 Herodotus and the Persian Wars (3) A Bliquez

See above. (Offered alternate years; offered 1981-82.)

GRK 424 Thucydides and the Peloponnesian War (3) W Bliquez

See above. (Offered alternate years: offered 1981-82.)

GRK 426 Attic Orators (3) Sp Bliquez, MacKay See above. (Offered alternate years; offered 1981-82.)

GRK 442, 443, 444 Greek Drama (3,3,3) A,W,Sp Harmon, McDiarmid

See above. (Offered alternate years; offered 1981-82.)

GRK 449 Greek Epic (3) A Northrup

See above. (Offered alternate years; offered 1980-81.)

GRK 451 Lyric Poetry (3) W

Grummel See above. (Offered alternate years; offered 1980-81.)

GRK 453 Pindar: The Epinician Odes (3) Sp McDiarmid See above. (Offered alternate years; offered 1980-81.)

GRK 461 Early Greek Literature (3-5, max. 15) S Readings and discussion of selected authors of the early Greek period.

GRK 462 Literature of Classical Athens

(3-5, max. 15) S Readings and discussion of selected authors of classical

Athens.

GRK 463 Hellenistic Greek Literature

(3-5, max. 15) S Readings and discussion of selected authors of the Hellenistic Age.

GRK 490 Supervised Study (*, max. 18) AWSp Special work in literary and philosophical texts for gradu-ates and undergraduates. Prerequisite: permission of un-dergraduate adviser.

GRK 499 Undergraduate Research (*, max. 18) AWSp Prerequisite: permission of undergraduate adviser.

LATIN

LAT 101, 102, 103 Elementary Latin (5,5,5)

A,W,Sp 101, 102: an intensive study of grammar, with reading and writing of simple Latin prose; 103: reading of selec-tions from classical Latin literature. Prerequisites: 101 for 102, 102 for 103.

LAT 300, 301 Latin Language, Accelerated (3,3) A.W

Intensive introduction to classical Latin. Not accepted as upper-division credit toward a major in Latin or classics. Prerequisites: for 300, permission of undergraduate adviser; 300 for 301.

LAT 305 Introduction to Latin Literature (3) A Readings in prose and poetry from various Latin authors. To be taken concurrently with 310. Prerequisite: two years of high school Latin or 103.

LAT 306 Cicero and Ovid (3) W Readings from the orations of Cicero and the elegiac verse of Ovid. To be taken concurrently with 311. Prerequisite: 305.

LAT 307 Vergil (3) Sp Selections from the first six books of the Aeneid. To be taken concurrently with 312. Prerequisite: 306.

LAT 310, 311, 312 Grammar and Composition (2,2,2) A,W,Sp To be taken concurrently with 305, 306, 307. Prerequisite: 103.

LAT 401 Medieval Latin (3) Sp

Pascal Prerequisite: permission of instructor.

Prerequisite for following 400-level Latin courses: four years of high school Latin, or 307, or permission of undergraduate adviser.

LAT 412 Lucretius (3) A Grummel

See above. (Offered alternate years; offered 1981-82.)

LAT 413 Cicero's Philosophical Works (3) W Grummel

See above. (Offered alternate years; offered 1981-82.)

LAT 414 Seneca (3) Sp Grummel

See above. (Offered alternate years; offered 1981-82.)

LAT 422 Livy (3) A Rutland

See above. (Offered alternate years; offered 1980-81.)

LAT 423 Cicero and Sailust (3) W

Rutland See above. (Offered alternate years; offered 1980-81.)

LAT 424 Tacitus (3) Sp Rutland See above. (Offered alternate years; offered 1980-81.)

LAT 447 Roman Lyric (3) A

See above. (Offered alternate years; offered 1981-82.)

LAT 449 Roman Elegy (3) W Harmo

See above. (Offered alternate years; offered 1981-82.)

LAT 451 Roman Satire (3) Sp -Bliquez, Rutland See above. (Offered alternate years; offered 1981-82.)

LAT 457 Roman Drama (3) A Pascal

See above. (Offered alternate years; offered 1980-81.)

LAT 458 Roman Epic (3) W Harmon

See above. (Offered alternate years; offered 1980-81.)

LAT 459 Roman Pastoral (3) Sp Grummel

See above. (Offered alternate years; offered 1980-81.)

LAT 461 Latin Literature of the Republic

(3-5, max. 15) S Readings and discussion of selected authors from the era of the Roman Republic.

LAT 462 Latin Literature of the Augustan Age (3-5, max. 15) S

Readings and discussion of selected authors from the Augustan era.

LAT 463 Latin Literature of the Empire (3-5, max. 15) S Readings and discussion of selected authors from the

Roman Empire.

LAT 475 Improvement of Teaching: Latin (3) S Grummel, Pascal

Examination and evaluation of the various methods of teaching Latin; audiovisual aids; testing materials; textbooks; relation of Latin to other languages; Latin deriva-tives in English vocabulary. Offered jointly with EDC&I 438. (Offered Summer Quarter only.)

LAT 476 Caesar for High School Teachers (3) S Grummel, Pascal

Unterpretation of Caesar's works in the light of their his-torical, political, literary, and geographical background, with special reference to the problems of high school teaching. Offered jointly with EDC&I 439. (Offered Summer Quarter only.)

LAT 490 Supervised Study (*, max. 18) AWSp Special work in literary and philosophical texts for gradu-ates and undergraduates. Prerequisite: permission of un-dergraduate adviser.

LAT 499 Undergraduate Research (*, max. 18) AWSp

Prerequisite: permission of undergraduate adviser.

Courses for Graduates Only

CLASSICS

CLAS 700 Master's Thesis (*)

CLAS 800 Doctoral Dissertation (*)

CLASSICAL ARCHAEOLOGY

CL AR 511 .Mycenaean Archaeology (3) The art, architecture, and culture of Greece in the late Bronze Age, with emphasis on recent archaeological and linguistic discoveries.

CL AR 513 Athenian Topography (3)

Langdon Detailed consideration of the topography and monuments of ancient Athens from the beginning through the Roman period.

CL AR 515 Attic Epigraphy (3)

Langdon

Study of Athenian inscriptions with emphasis on their historical value. The classification and editing of inscriptions, epigraphical techniques, and special problems are treated in detail.

CL AR 541 Seminar in Greek and Roman Art (3) Langdon

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 (3)

Phonological developments of Greek and Latin from Indo-European to the classical periods of both languages.

CL LI 503 History of the Greek Language (3) W

Northrup 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 (3) Sp Morphological and syntactical development of the Latin language; the development of Latin as a literary language.

CL LI 506 Italic Dialects (3) Principal remains of the non-Latin languages and dialects of ancient Italy.

CL LI 508 Greek Dialects (3) Non-Attic dialects of ancient Greek, based on a study of inscriptions and the literary remains.

CL LI 510 Mycenaean Greek (3) Study of the Linear-B tablets found in Crete and on the Greek mainland.

GREEK

GRK 520 Seminar (3, max. 27) AWSp Bliquez, Harmon, MacKay, McDiarmid, Northrup

In the courses numbered 580 through 589, graduate students read extensively in texts appearing on the Ph.D. Greek reading list.

GRK 580 Greek Tragedy (3) A Bliquez, McDiarmid (Offered alternate years; offered 1980-81.)

GRK 582 Herodotus and Thucydides (3) W Bliquez (Offered alternate years; offered 1980-81.)

GRK 584 Plutarch, Xenophon, Demosthenes (3) Sp Bliquez

(Offered alternate years; offered 1980-81.)

GRK 585 Plato, "Republic" (3) A MacKay, McDiarmid (Offered alternate years; offered 1981-82.)

GRK 587 Aristotle, Politics or Ethics (3) W MacKay, McDiarmid (Offered alternate years; offered 1981-82.)

GRK 589 Aristophanes (3) Sp Bliquez (Offered alternate years; offered 1981-82.)

GRK 590 Supervised Study (*, max. 18) AWSp Prerequisite: permission of graduate adviser.

GRK 600 Independent Study or Research (*) AWSp

LATIN

LAT 520 Seminar (3, max. 27) AWSp Grummel, Harmon, Pascal, Rutland

In the courses numbered 580 through 589, graduate students read extensively in texts appearing on the Ph.D. Latin reading list

LAT 580 Roman Rhetoric (3) A Grumme (Offered alternate years; offered 1980-81.)

LAT 582 Augustan Poetry (3) W Grummel, Harmon (Offered alternate years; offered 1980-81.)

LAT 584 Survey of Latin Poetry (3) Sp

LAT 585 The Civil War: Caesar, Cicero, Lucan (3) A Grummel

(Offered alternate years; offered 1981-82.)

LAT 587 Roman Comedy, Menander, and Petronius (3) W Pascal

(Offered alternate years; offered 1981-82.)

LAT 589 Prose of the Roman Empire (3) Sp Rutland (Offered alternate years; offered 1981-82.)

LAT 590 Supervised Study (*, max. 18) AWSp Prerequisite: permission of graduate adviser.

LAT 600 Independent Study or Research (*) AWSp

COMMUNICATIONS

Courses for Undergraduates

COMMUNICATIONS

CMU 150 The Mass Media (5) Organization, operation, and control of the mass media in America; social functions of mass communication. Open to nonmajors.

CMU 200 The Communication Process (5) Intrapersonal, interpersonal, small-group, organizational, mass and societal communication; functions of communication. Open to nonmajors.

CMU 214 History of Mass Media in America (5) Includes print press, motion pictures, radio, and televi-sion. Role of the press in the development of the American nation, democratic systems, and Western culture. Open to nonmajors.

CMU 220 Intercultural Communication (5) Communicating across cultures and subcultures. Coding techniques, modes of self-perception, and symbolic rep-resentation of values. Open to nonmajors.

CMU 250 Survey of Radio and Television (3) History of broadcasting. Organization and regulation of the industry. Commercial aspects, educational use, pro-gramming. Open only to nonmajors.

JOURNALISM

CMU 291 Photography (3) Elementary news photography, photo processing, and picture editing. Open only to majors.

CMU 292 Advanced Still Photography (3) Black-and-white; introduction to color, Darkroom techniques. Field assignments. Prerequisites: 291 and permission of instructor.

CMU 300 Fundamentals of Applied Communication (5)

Practice in communicating in variety of social relation-Practice in communicating in variety of social relation-ships: intimate; employer-employee; instructor-student; client-belper; public organization. Problem areas include: cooperation, competition, instruction, and invention. Prerequisite: 200 or permission of instructor.

CMU 314 The Role of the Magazine in America (3) Significance of specialized periodicals as vehicles of popular expression. Open to nonmajors.

CMU 316 Contemporary Affairs (3) Contexts of major news events

CMU 320 Legal Aspects of Communications (5) Regulations governing publication and broadcast in the mass media. Open to nonmajors.

CMU 321 News Writing (4) Journalistic forms, diction, and conventions. News values. Prerequisites: major standing, typewriting.

CMU 322 Reporting (4) News gathering and writing. Open only to majors. Pre-requisite: 321.

CMU 323 Special Reporting Topics (4, max. 12) Topics vary with instructor. Open only to majors. Prereq-uisite: 322.

CMU 324 Critical Writing for the Mass Media (4) Editorials, commentaries, reviews: Prerequisite: 321 or permission of instructor.

CMU 325 Copy Editing (4) Open only to majors. Prerequisites: 321 and permission of departmental adviser.

CMU 326 Magazine Article Writing (3) Prerequisite: permission of departmental adviser.

CMU 327 Legislative Reporting (12) W Full-time coverage of Washington legislature for a daily newspaper. Selected students live in Olympia, interview legislative delegations, report committee and floor ses-sions, gubernatorial and other press conferences. Open only to majors. Prerequisites: 321, 322, POL S 482, and permission of instructor.

CMU 399 Editorial Practicum Seminar

(2-6, max. 6)

Supervised academic work done in connection with edi-torial internship. Designed to extend the student's knowl-edge of professional perspectives. Does not apply to re-quired 50 credits in communications. Open only to majors. Prerequisites: 320, 321, 322, and permission of instructor.

CMU 415 Production Editing (4) Sp Williams

Williams Editorial role in preparation of scientific and technical materials for production (typesetting, layout, printing, binding, distribution). The editor's responsibilities and prerogatives as they relate to those of other professionals in the production end of the publications field. Offered jointly with STC 415. Prerequisite: STC 402 or permis-sion of instructor.

PUBLIC RELATIONS

CMU 338 Public Relations (3) . Special communication problems in business and indus-try, education, government, and social service agencies. Management of public relations.

CMU 339 Problems in Public Relations (3) Group practice in applying techniques to problems of lo-cal businesses and agencies. Prerequisite: 338.

ADVERTISING

CMU 340 Introduction to Advertising (5) Advertising as a marketing and promotional tool. Adver-tiser, agency, and media practices. Role in mass media, marketing, economics, and consumer socialization.

CMU 341 Beginning Advertising Copy and Layout

(3) Writing effective copy; developing creative approaches. Specific approaches and strategies. Open only to majors. Prerequisite: 340 or permission of departmental adviser.

CMU 342 Advanced Advertising Copy and Layout

(3) Multimedia creative and writing experience. Open to ma-jors only. Prerequisite: 341.

CMU 344 Advertising Media Planning (3) Characteristics of the media. Demographic, geographic, and psychographic factors in developing a target audi-ence. Writing of local and national media plans. Open only to majors. Prerequisite: 340.

CMU 345 Advertising Campaigns (5) Preparation of an advertising plan for a product or ser-vice. Open only to majors. Prerequisites: 341 and 344, or permission of departmental adviser.

CMU 347 Advertising Internship (2-5, max. 6) Internships are assigned to qualified students through the cooperation of the industry working with the school. Open only to majors. Does not apply to required 50 credits in communications. Prerequisites: 341 or 344, de-pending on nature of internship; 120 credits completed.

CMU 348 Advertising Research (3) Problems relevant to advertisers, agencies, media, and syndicated services. Conceptualization in mass commu-nication context. Review of literature. Open only to majors. Prerequisite: 340.

CMU 449 Advertising Seminar (3) Presentations by industry professionals of current prac-tice. Prerequisites: senior standing in advertising sequence and permission of instructor.

RADIO-TELEVISION AND BROADCAST JOURNALISM

CMU 349 Radio and Television Advertising (5) Analysis of network and local advertising campaigns. Economics of programming. Open to nonmajors by permission of instructor.

CMU 353 Radio and Television News Writing (3) Gathering, writing, editing, and programming. Open only to majors. Prerequisite: 321, 360, or permission of instructor.

CMU 354 Basic Visual Communication (3) Basics common to all visual media, plus motion. Use of electronic and film materials in news and public affairs programming; emphasis on visual continuity and editorial judgment. Open only to majors.

CMU 355 Television News Techniques (2)

Writing and presentation of news, utilizing film and vid-eotape in production. Recommended: relevant courses in broadcast news and production.

CMU 356, 357 News Broadcasting (3,3) Preparation and presentation of news broadcasts; editing radio news program; use of visuals; television newscast performance. Open only to majors. Prerequisite: 353.

CMU 360 Broadcasting Writing and Production (6) Creating broadcast messages other than news; production emphasis, radio. Open only to majors.

CMU 361 Television Production (5) Application of tools and crafts to communication of ideas. Closed-circuit presentation of student program; critique. Prerequisites: 360 and permission of instructor.

CMU 365 · Television Workshop Laboratory

(2-4, max. 8) Advanced program planning, research, direction, and production; on-the-air presentation. Prerequisites: 3.0 grade in 361 and permission of instructor.

CMU 367 Broadcast Internship (2-5, max. 6)

Experience in the day-to-day operation of a broadcast sta-tion. Internship credit may not be applied to fulfill spe-cific course requirements or to 50-credit requirement for a communications major. Prerequisites: 320, 321, 349, 353, 360, and courses determined by faculty coordinator.

CMU 371 Radio Workshop Laboratory (3, max. 6) Supervised practice in University's FM station KCMU. Open only to majors. Prerequisite: 353 or 360.

CMU 373 Television Writing (3)

Practice in writing programs; camera, direction, and production problems.

CMU 374 Advanced Television Writing (3) Development of an original television script of profes-sional quality. Prerequisite: 373.

CMU 377 The Documentary (3) History, background, aims, creative aspects. Function in mass media. Open to nonmajors.

Courses for Undergraduate and Graduate Students

200 or permission of instructor.

CMU 400 Communications Theory (3) Applicability of theory. Important communication phenomena and principles of communicating. Nature of communicating. Useful perspectives on communicating. Analysis of communicating and its effects. Prerequisite:

CMU 402 Government and Mass Communication (3)

(3) The Anglo-American concept of freedom of communica-tion; its evolution under federal and state constitutions. Tension areas, judicial decisions, statutes, and adminis-trative regulations affecting publishing, broadcasting, etc.

CMU 406 Structure and Process of the Mass Media (5) Organization for information and entertainment. Conse-

quences of public policy. Place in American political economy. Prerequisites: 150 or 214 or permission of instructor.

CMU 407 Content Analysis (3) W Techniques used in the systematic study of messages.

CMU 409 Experimentation in Communication (3) Techniques of experimentation in the study of communi-cating. Prerequisite: elementary statistics.

CMU 410 Policy Research in Communication (5) Communication problems of policy-making groups: Citi-zen needs for participation. Contributions of theory and research to policy communication.

CMU 411 Mass Communications Research (5) Sample surveys, content analysis, or experimental techniques, depending upon interests of class and instruc-tor. Recommended: relevant courses in the social sciences.

CMU 414 History and Communications (5) Development of mass communication in the United States. Emphasis on journalism and its response to change in social, political, and ethical patterns. Prerequi-site: 214.

CMU 443 Social Functions of Advertising (3) The institution in contemporary society; special attention to enduring issues. Prerequisite: 340 or permission of departmental adviser.

CMU 447 Communication and Consumer Behavior (5)

Consumer information-processing and buying behavior. Review of research. Prerequisites: 200, 340, and 348, or permission of instructor.

CMU 450 Broadcast Programming (3) Critical study of broadcast programming and the forces that shape it. Prerequisites: 150 or 214, and 200.

CMU 459 Television in the Schools (3) S

Contributions of instructional television. Utilization in the classroom. Offered jointly with EDC&I 488. Not open to graduate students in communications who have a broadcasting emphasis.

CMU 463 Television Production Workshop for Teachers (5)

Presentation of instruction through television. Offered jointly with EDC&I 489. Open only to nonmajors.

CMU 470 Theory and Criticism of Broadcasting (3) Application of critical standards to the sociological functions and esthetic elements of broadcast media. Recom-mended: relevant courses in the social sciences or humanities.

CMU 474 The Educational Role of the Mass Media (232)

Summer only. Critical study of the media's role in informing the individual to fulfill his or her responsibilities.

CMU 476 Noncommercial Telecommunications (3) History of educational radio and television as it relates to the current public and instructional systems of broadcast-ing. Emphasis on political/financial relationships.

CMU 480 Propaganda (5) Analysis of selective information techniques and involuntary exposure of audience. Role of propaganda in countries other than the United States.

CMU 481 Public Opinion and Communication (5) Collective behavior and its methodology. Polls evaluated as referenda on government policies, as manipulative in-struments, and as expressions of the commonality of thought. Role of the mass media. Recommended: rele-vant courses in political science, sociology, psychology, or communications.

CMU 483 International Communication Systems (5) Patterns, institutions, cultural influences, functions of the media in particular foreign areas. Problems of cultural compatibility and structural linkage.

CMU 495, 496, 497 Honors Seminar in Communications (3,3,3)

Analysis of the contributions to communication of the be-havioral sciences (first quarter) and the humanities (sec-ond quarter), in preparation for the writing of an honors thesis in 497. Prerequisite: senior honors standing.

CMU 498 Problems in Communications (1-5, max. 10)

Research and individual study. Prerequisite: permission of instructor.

Courses for Graduates Only

CMU 500, 501 Seminar in Theory of Communication (5,5)

Procedures for analyzing concepts and theoretical mate-rial to provide basis for one's research. How to make productive use of the literature. Procedures for theorizing about empirical findings and generalizations. Typolo-gies, models, theories, laws, and working hypotheses. Prerequisite: permission of instructor.

CMU 502 Seminar in Government and Mass

Communication (3) Directed independent research into legal problems of mass communication, institutions, and media operations.

CMU 505 Communication and Politics (3) Primary literature dealing with communication and American political behavior. Prerequisite: 406.

CMU 506 Seminar in Mass Media Structure (3) A Simpson

Directed independent research into structural aspects of American mass communications.

CMU 507 Computer Applications in Communication Research (3)

Potential of the computer for use in behavioral science. Prerequisites: elementary programming, elementary statistics,

CMU 508, 509 Communication Research (5,5) Basic methodological questions in communication re-search. Foundations in history and philosophy of science. Prerequisite: permission of instructor.

CMU 511 Seminar in Communication Research (3, max. 15)

Individual research projects undertaken collectively within a given area of study, under direction of faculty member. Prerequisite: permission of instructor.

CMU 512, 513, 514 Seminar in History and Communications (3,3,3) Development of the historical approach to communica-tions research. Study of historical method, bibliography, and criticism.

CMU 543 Seminar in Advertising in Society (3) Frazer

Interacting historical, social, economic, and legal influ-ences shaping institutional character. Prerequisite: per-mission of instructor.

CMU 547 Seminar in Communication and **Consumer Behavior (3)**

Directed reading and research in communication and con-sumer behavior. Emphasis on conceptualization and orig-inal research. Prerequisite: permission of instructor.

CMU 550 Advanced Communication Methods (1-3, max. 3)

Directed individual projects at a level acceptable by print or broadcast media. Advanced techniques of research and production analyzed and applied. Open only to students seeking the Master of Communications degree.

CMU 570 Seminar in the Theory and Criticism of Broadcasting (3) Criticism of the function and performance of broadcast

ing. Use of primary sources, including systematic data gathering and analysis. Prerequisite: 470.

CMU 580 Seminar in Propaganda (3) Analysis of propaganda as historical and behavioral phe-nomena. United States and international perspectives. Interdisciplinary focus.

CMU 581 Seminar in Public Opinion and

Communication (3) Conceptual and methodological approaches to public opinion and communication as historical and behavioral phenomena. United States and international perspectives. Recommended: appropriate background in the social sciences.

CMU 583 Seminar in International Communication Systems (3)

International communications and contemporary issues that affect the functioning of global communication sys-tems. Interdisciplinary focus.

CMU 584 Seminar in Regional Communication Systems (3, max. 6)

Communication as a factor in economic, sociocultural, varies with specialization of instructor. Consult graduate secretary for details. Interdisciplinary focus.

CMU 585 Seminar in Comparative Methodologies

(3) Conceptual and methodological approaches to compara-tive studies of international communication systems. Recommended: appropriate background in the social sciences.

CMU 586 Telecommunications Structure and Policies (3)

Structures and policies governing the functioning of com-munication technologies and data flow.

CMU 597 Practicum in Communication Research

(1-5, max. 10) Individual participation by a qualified graduate student in an ongoing research project under the direction of a fac-ulty member. Prerequisites: 501, 509.

CMU 598 Selected Readings (1-5, max. 10) Prerequisite: permission of Supervisory Committee chair-

person.

CMU 600 Independent Study or Research (*) AWSpS

Individual readings or study, including independent study in preparation for doctoral examinations. Prerequisite: permission of Supervisory Committee chairperson.

CMU 700 Master's Thesis (*)

CMU 800 Doctoral Dissertation (*)

COMPARATIVE HISTORY OF IDEAS

CHID 221 Richard Wagner's Ring of the Nibelung (5) À Yarbro

Yarbro Study of the Ring, considering the interrelationships of nusic, drama, text, and philosophy within the unity of the work. Major themes and symbols, with particular at-tention to the relationship of the work to Jungian arche-types and the Hero cycle. Not open to students who have taken GIS 242.

CHID 490 Colloquium in the History of Ideas (5) Examination of basic theoretical issues and some of the major figures who have contributed to the development of the discipline of the history of ideas. Includes nature of ideas and their functions in knowing, their social func-tions, ways they develop and change, and effects of such change; problem of the transmisson of ideas; and some representative studies of particular ideas. Prerequisites: advanced standing in the history of ideas and permission of instructor.

CHID 491 Senior Thesis (5) AWSp Preparation of a senior thesis under the direction and su-pervision of a faculty member. Prerequisites: 490 and permission of program adviser.

CHID 499 Undergraduate Independent Study or Research (1-5, max. 10) AWSp Supervised independent study for students who wish to pursue topics not available in regular course offerings. Prerequisite: permission of program adviser.

COMPARATIVE LITERATURE

All Comparative Literature courses are taught in English unless otherwise indicated. It is recommended that students enrolling in 300- or 400-level courses have taken 10-15 creding in 300 of 400-teven humanities courses; in 500-level courses, that they have a reading knowledge of at least one foreign language. Content of many courses varies from quarter to quarter. Consult the Com-parative Literature office for quarterly course descrip-tions. tions.

Courses for Undergraduates

C LIT 240 Writing in Comparative Literature (5) Comparative approach to literature and a workshop in writing comparative papers. Emphasis on cross-cultural comparison of literary masterpieces. Readings in English with an option to read selected texts in the original languages (French, German, Italian, Russian, Spanish, or a Scandinavian language—varies each quarter). Writing in English. Basic reading knowledge of one of the above languages recommended.

C LIT 250 Themes in World Literature: Parents and Children (5) A

Introduction to world literature, from the Renaissance to Introduction to world internative, from the Renaissance to modern times, based upon the theme of "parents and chil-dren." Selections drawn from European, English, and American literature, not limited to period and genre. Focus upon the motive of generational conflict.

C LIT 251 Themes in World Literature: Love, Sex, and Murder (5) W

Introduction to 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 261, 262, 263 Modern African Literature (3-5,3-5,3-5) A,W,Sp African literature from the colonial period to the present with specific references to the themes of nostalgia, rebellion, and humanism. Representative works in prose, po-etry, and drama. Among authors studied: Achebe, Mphahlele, Oyono, Paton, Senghor, Soyinka, Tutuola.

C LIT 300 Comparative Literature: Genres (5) A Major genres of world literature: poetry, fiction, drama. Readings, in English, from a wide selection of national literatures.

C LIT 301 Comparative Literature: Periods (5) W Major periods of world literature. Readings, in English, from a wide selection of national literatures.

C LIT 302 Comparative Literature: Themes (5) Sp Major themes of world literature. Readings, in English, from a wide selection of national literatures.

C LIT 310 The Concept of Revolution in Modern

Literature and Thought (5) The idea of revolution, as it evolved in the wake of the American and French Revolutions, in major works of Western literature and thought from the Enlightenment and the period of romanticism to contemporary treat-ments of the revolutionary theme.

C LIT 315 Literature of Absurdity (5) French, German, British, and American absurd novels and plays, 1940-65, including Sartre, Camus, Ionesco, Beckett, Albec, Pinter, and others. Background lectures in philosophy and literature.

C LIT 357 Literature and Film (3-5, max. 10)

The film as an art form, with particular reference to the literary dimension of film and to the interaction of litera-ture with the other artistic media employed in the form. Films are shown as an integral part of the course. Course content varies.

C LIT 396 Special Studies in Comparative Literature (3-5, max. 10) Offered occasionally by visitors or resident faculty. Content varies.

C LIT 401 Modern European Drama (5) Selected plays, read in English, by Ibsen, Strindberg, Chekhov, Pirandello, Brecht, Camus, Durrenmatt, the absurdists, and otherr, representing naturalism, expres-sionism, theatricalism, and other movements that have shaped the modern European theater.

C LIT 405 Romanticism (5)

Literature, philosophy, esthetics, and culture of Western romanticism. Emphasis on literature and criticism and on historical and philosophical aspects of the romantic movement in Europe and the United States.

C LIT 407 Literary Impressionism (5) Selected novels, stories, poems, and plays by Fet, Gar-shin, Chekhov, Crane, Conrad, James, Bunin, and

Proust, which are frequently identified with the im-pressionist trend in Western literature from 1850 to 1920.

C LIT 410 Literary Motifs (3-5, max. 10) Important fictional figures, situations, and plots that, through their repeated recurrence in world literature, ap-pear to have a profound and universal significance for the human imagination. Course content varies.

C LIT 415 The Comic in Literature (5) Masterpieces of comic literature emphasizing various modes and uses of the comic.

C LIT 424 The Epic Tradition (5) A 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-Comparable work from the medieval oral tradition; pre-Greek forerrunners, other Greeco-Roman literary epics, and later medieval and Renaissance developments and adaptations of the genre. Choice of reading material var-ies with instructor's preference and might include Ger-manic, Asian, etc. Offered jointly with CLAS 424. Liter-ary background recommended.

C LIT 430 Islam and Europe (3-5)

Literary and cultural relations between Europe and the Islamic cultures of the Near East and North Africa. For centuries there has been a vital interaction between the European literary community and the Near Eastern literary ary community, the one with which it has the closest link. Course content varies, dealing with some aspect of this interaction (i.e., Arabic-Spanish relations, Balkan-Turkish relations, the image of Persia in Goethe and/or Fitzgerald).

C LIT 440 The Novel (3-5, max. 10) The novel as a genre. Material varies with individual fac-ulty members who offer it, but, normally, the larger tech-nical, social, and philosophical questions are illustrated through intensive study of novels by two or more writers from different national cultures.

C LIT 472 Studies in Narrative (3-5, max. 10)

Narrative styles and developments from antiquity to the present. Course content varies.

C LIT 480 Modern European Poetry (5) Selected works read in English, by French, German, Ital-ian, and Spanish poets from the Romantic period to the present.

C LIT 490 Directed Study or Research

(1-5, max. 10) AWSpS

Individual study of topics in comparative literature by ar-rangement with the instructor and the Comparative Literature office.

C LIT 496 Special Studies in Comparative Literature (3-5, max. 15) Offered occasionally by visitors or resident faculty.

Courses for Graduates Only

Consult the Comparative Literature office for informa-tion on the quarter and year the courses below will be of-fered. Graduate-level course numbers merely distinguish courses and do not indicate ascending level of knowledge required to take the course. Reading knowledge of at least one foreign language recommended.

C LIT 510 Theories and Methods of Comparative Literary History (5)

Lectures on comparative theory and practice from Vico to the present; seminar papers on comparative topics rele-vant to the student's fields of concentration.

C LIT 511 Literary Translation (5) 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 513, 514 History of European Literary Theory and Criticism I, II (5,5) Main concepts of literary theory and literary criticism in the Western world as they have developed from the Mid-dle Ages to the present. Emphasis on the philosophical background from which the literary ideas emerged.

C LIT 515 Recent Trends in Literary Criticism (3-5)

Recent trends in literary criticism; in particular, structural, and philosophical approaches.

C LIT 522 Twentieth-Century Literature (3-5) Selected movements, schools, and trends of significance in literature of Europe and the Americas during the twen-tieth century. Phenomena such as symbolism, surrealism, dada, expressionism, neorealism, existentialism, the houveau roman, and the absurd may be considered. Texts in English, French, and German figure most prom-imently, but Spanish, Italian, Russian, and other materials may also be dealt with. Course content and emphasis vary.

C LIT 525 The Baroque in Criticism and Literature

C LIT 525 The Baroque in Crincism and Laterature (3-5, max. 15) Origins and history of the term as used in literary criti-cism, accompanied by a study of representative Baroque literature in various countries. Included are such works as *Don Quixote, Phedre*, and French, Spanish, Italian, and German poetry available in translation, but preferably to be read in the original.

C LIT 546 Studies in the Renaissance (3-5, max. 10) Aspects of Western European literature during the Renaissance. Course content varies.

C LIT 547 Classical Tradition in Medieval and Renaissance Europe (3-5, max. 15) Intensive study of a single topic or genre. Course content

varies.

C LIT 548 The Romantic Movement (3-5, max. 10) Chief authors, works, and/or themes of the Romantic movement in Europe and America. Course content may varv.

C LIT 550 European Realism (3-5) European Realism (Balzac, Flaubert, Turgenev, Dos-toevsky, Tolstoy, the representative Victorians, and the writers of "poetic realism") in connection with various esthetic doctrines and subsequent critical appraisals.

C LIT 551 The Symbolist Movement (3-5, max. 10) The Symbolist movement from its beginnings in nine-teenth-century French poetry through later developments in European poetry, fiction, and drama. Related develop-ments in philosophy, critical theory, and the other arts. Reading knowledge of French required.

C LIT 555 Studies in Irony (3-5) Irony in literary, philosophical, and satirical masterpieces from the classical period to contemporary literature.

C LIT 560 Classical Rhetoric and Literature (3-5) Influence and importance of classical rhetoric in Euro-pean literary works of the seventeenth and eighteenth centuries. Texts and examples chosen in English, French,

Italian, and German literatures.

C LIT 570 The Novel: Theory and Practice (3-5, max. 15)

Two two-hour seminars comparing 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 mul-tilingual points of view. Course content varies.

C LIT 574 Literary Motifs (3-5, max. 10) Examination of important fictional figures, situations, and plots that, through their repeated recurrence in world literature, appear to have a profound and universal signif-icance for the human imagination. 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. The student is required to present a comparative paper on a chosen topic with qualified conclusions. Course emphasis varies. Prerequi-site: at least one East Asian language (e.g., Chinese). (Offered alternate years.)

C LIT 580 Literature and Other Disciplines (3-5, max. 15)

Seminar examining relationships or parallels between literature and other disciplines such as philosophy, psy-chology, sociology, anthropology, or political science. Course content varies.

C LIT 596 Special Studies in Comparative Literature (3-5, max. 15) Offered occasionally by visitors or resident faculty. Course content varies.

C LIT 600 Independent Study or Research (*) AWSpS

C LIT 700 Master's Thesis (*) AWSpS

C LIT 800 Doctoral Dissertation (*) AWSpS

COMPARATIVE RELIGION

See International Studies.

COMPUTER SCIENCE

See Interschool or Intercollege Programs.

DANCE ·

Courses for Undergraduates

DANCE 101, 102, 103 Ballet Technique I (3, max. 6; 3; 3) A,W,Sp Boris, Green

Introduction to basic vocabulary of ballet technique. Em-phasis on flexibility, strength, balance, endurance, rhyth-mic awareness, and spatial perception. Prerequisites: per-mission of instructor for 101; 101 or permission of instructor for 102; 102 or permission of instructor for 103 103.

DANCE 104, 105, 106 Modern Dance Technique I (3, max. 6; 3; 3) A.W.Sp Andersen, Skinner, Evans Company

Basic vocabulary of movement skills; coordinated control of limbs and torso; refinement of perception of moving in time and space; integration of dance patterns into brief sequences. Prerequisites: permission of instructor for 104; 104 or permission of instructor for 105; 105 or permission of instructor for 106.

DANCE 107, 108, 109 Beginning Dance Techniques (3,3,3) A,W,Sp Andersen, Boris

Team-taught class in ballet and modern contemporary dance techniques. Basic concepts and elements of each idiom; technique of both idioms taught with awareness of their relationships and their differences. Prerequisites: permission of instructor for 107; 107 or permission of in-structor for 108; 108 or permission of instructor for 109.

DANCE 123, 124, 125 Contemporary Dance I, II, III (1,1,1) A,W,Sp

Concepts and techniques of dance as a modern art form. Prerequisites: 123 or permission of instructor for 124; 124 or permission of instructor for 125.

DANCE 145 Introduction to Dance History and Literature (1) AW Andersen, Boris, Skinner

Source readings in dance history from 1581 to the present. Dance as a theatre art. Conducted as a discussion group.

DANCE 201, 202, 203 Ballet Technique II (3,3,3) A.W.Sp Boris, Green

Continued development of all beginning areas. Expan-sion of ballet vocabulary, increased complexity of combi-

nations. Prerequisites: 103 or permission of instructor for 201; 201 or permission of instructor for 202; 202 or permission of instructor for 203.

DANCE 204, 205, 206 Modern Dance Technique II (3,3,3) A,W,Sp

Andersen, Skinner, Evans Company Intermediate. Continued development of flexibility, strength, correct body placement, stamina, and rhythmic awareness; expansion of movement vocabulary; dance studies involving a variety of patterns. Prerequisites: 106 or permission of instructor for 204; 204 or permission of instructor for 205; 205 or permission of instructor for 206.

DANCE 220 Pointe Technique (1, max. 6) AWSp Fundamentals of the technique of dancing on the toes (en pointe). Prerequisites: 103 or permission of instructor and concurrent registration in a ballet technique course.

DANCE 223 Men's Special Techniques (1, max. 6)

AWSp Specific areas of technique that emphasize strength, stamina, elevation, and all other elements in which the masculine principle prevails. Open to men and women. Prerequisites: 103 or permission of instructor and concurrent registration in a dance technique course.

DANCE 231 Folk/Ethnic Dances of Western

DAINCE 251 FULL FAILE DAILES & VICENTIA Cultures (1, max. 6) Folk dances of Western cultures (i.e., Irish, American square, Spanish, Scandinavian, or Scottish). See quar-terly *Time Schedule* for specific offering. Prerequisite: 103 or permission of instructor.

DANCE 232 Folk/Ethnic Dances of Eastern Europe

DANCE 232 FOUNDATION DANCES OF EASTERN EAST OF and Middle East (1, max. 6) Folk dances of Eastern Europe and the Middle East (i.e., Greek, Balkan, Russian, African). See quarterly *Time Schedule* for specific offering. Prerequisite: 103 or permission of instructor.

DANCE 233 Folk/Ethnic Dances of Eastern Cultures (1, max. 6)

Folk dances of Eastern cultures (i.e., Korean, Japanese, East Indian, Cambodian). See quarterly Time Schedule for specific offering. Prerequisite: 103 or permission of instructor

DANCE 240 Structure of Music in Relation to Dance (2)

Dance (2) The common meters (4/4, 2/4, 3/4, 6/8), note values, tempi, and musical terminology. Modes of study are four, eight, and sixteen-bar student compositions, hand-held percussion instruments, and student choreog-raphy of specific note values and phrase lengths. Primary goals are rhythmic development and establishment of the platiential terment directed patients. relationship between time and motion.

DANCE 241 Structure of Music in Relation to Dance (2)

Continues the study of note values. Odd-numbered meters 5, 7, and 9, mixed meter, vertical multiple meter, rhythmic tala, and rhythmic modulation are introduced. Modes of study similar to those used in 240, with more emphasis on conga drums and hand drums. Prerequisite: 240 or permission of instructor.

DANCE 242 Structure of Music in Relation to Dance (2)

Relates the material of 240 and 241 to traditional dance scores (Tchaikovsky, Stravinsky, Prokofieff, etc.) and certain scores not traditionally danced. Involves analysis in terms of rhythm, meter, phrase length, and form. Pre-requisite: 241 or permission of instructor...

DANCE 250 Exploring the Articulate Body (3) AWSp Hackney

Basic body connections and joint articulations. Principles of dynamic body alignment, patterning efficient lines of muscular use, weight initiation, connections from lowerbody support to upper-body freedom. Based on the Bar-tenieff fundamentals as developed by the Laban Institute of Movement. Prerequisites: permission of instructor and concurrent registration in a basic dance technique course.

DANCE 251, 252, 253 Dance/Movement Notation (3,3,3) AWSp Hackney

Three-quarter sequence in analyzing and recording the structural elements of movement as developed by Rudolf Laban and others. 251: elementary notation; 252: inter-

mediate notation; 253: reconstruction of a work from a notated score. Prerequisites: permission of instructor for 251; 251 or permission of instructor for 252; 252 or permission of instructor for 253.

DANCE 254 Effort/Shape (3) AWSp

Hackney Laban's effort/shape concepts. What makes movement expressive, how to see movement textures clearly, how to broaden the dynamic range of one's movements. Prerequisite: permission of instructor.

DANCE 271 Choreographic Workshop (2, max. 6) AWSp

Logical extension of the basic dance techniques, folk-ethnic, and special techniques classes to provide a perform-ing experience for students enrolled in any of these classes. Prerequisites: permission of instructor and concurrent registration in a dance technique course.

DANCE 282 Fundamentals of Rhythm (2)

Understanding of fundamental rhythm concepts and their application in the development of technique and style in basic dance forms.

DANCE 301, 302, 303 Ballet Technique III (3, max. 6; 3, max. 6; 3, max. 6) A,W,Sp Boris, Green

Advanced-intermediate level: continued development and expansion in all areas of technique. Prerequisites: 203 or permission of instructor for 301; 301 or permission of in-structor for 302; 302 or permission of instructor for 303.

DANCE 304, 305, 306 Modern Dance Technique III (3, max. 6; 3, max. 6; 3, max. 6) A,W,Sp Andersen, Skinner, Evans Company Intermediate-advanced. Increased refinement of kines-

thetic training and its application to dance sequences of greater complexity. Prerequisites: 206 or permission of instructor for 304; 304 or permission of instructor for 305; 305 or permission of instructor for 306.

DANCE 322 Repertory (2) AWSp

Evans Company Learning and performing pieces from professional dance repertoire, including reconstructions from notated scores. Prerequisites: permission of instructor and concurrent registration in a dance technique course. Evans Company

DANCE 324 Partnering Techniques (1, max. 6)

AWSp Partnering: technique and practice necessary for two or more persons dancing together. Prerequisites: 203 or permission of instructor and concurrent registration in a dance technique course.

DANCE 325 Pre-Classic Dance Forms (1, max. 6) Court, social, and country dance forms originating in western Europe between the fourteenth and seventeenth centuries that serve as exemplary models of period form and style. Prerequisite: 103 or permission of instructor.

DANCE 326 Jazz Technique (2, max. 12) AWSp Evans Company

Study of dance specific to the idiom of jazz; emphasis on the characteristics of movement and music that constitute the fundamental elements of the style. Prerequisite: 103 or permission of instructor.

DANCE 329 Tap and Soft-Shoe Technique (1, max. 6) AWSp Evans Company Study and practice of tap and soft-shoe technique. Pre-requisite: permission of instructor.

DANCE 345 History of Dance (3) Sp

Skinner

Roots of contemporary dance as an art form and its rela-tionship to developments in ballet and other art forms since the turn of the century.

DANCE 365 Dance Composition (3, max. 9) AWSp Skinner

Study of dynamic forms that arise out of juxtaposition of movement elements in time and space; counterpoint, reading from the works of Suzanne Langer. Prerequisite: permission of instructor.

DANCE 401, 402, 403 Ballet Techniques IV (3, max. 6; 3, max. 6; 3, max. 6) A,W,Sp

Boris. Green

Advanced professional level. Prerequisites: 303 or per-

mission of instructor for 401; 401 or permission of in-structor for 402; 402 or permission of instructor for 403.

DANCE 404, 405, 406 Modern Dance Techniques IV (3, max. 6; 3, max. 6; 3, max. 6) A,W,Sp Andersen, Skinner, Evans Company

Advanced. Technical skills applied to longer dance se-Autorated is realized as the applied to tonget tanks so quences; development of a personal style; projection of mood, emotion, or dtamatic situation; readiness of re-sponse to a choreographer's wishes. Prerequisites: 306 or permission of instructor for 404; 404 or permission of in-structor for 405; 405 or permission of instructor for 406.

DANCE 464 Contemporary Dance Workshop (1, max. 3) AWSp Skinner

Improvisation as an art and skill; indeterminacy and chance procedures in choreography. Prerequisite: permis-sion of instructor.

DANCE 465 Experimental Dance Workshop (3, max. 9) AWSp Workshop-laboratory designed to explore experimental approaches to dance. Prerequisite: permission of instructor.

DANCE 470 Dance Production Activities (1-3, max. 12) AWSp

Green

Participation in dance productions, either studio show-ings or public performances, conducted under faculty direction or supervision. Prerequisite: permission of instructor.

DANCE 471 University of Washington Dance Theatre (3) AWSp Andersen

Performing company for advanced-level students. Open only by audition and/or invitation of the artistic director. Maintains seven-hour-a-week rehearsal schedule with regularly scheduled performances during the academic year. Prerequisites: audition and permission of instructor.

DANCE 499 Undergraduate Independent Study (*, max. 6) AWSp

DRAMA

Courses for Undergraduates

DRAMA 101 Introduction to the Theatre (5) AWSp Introduction to the theater as an art form with emphasis on the play in production. The role of the various theatre artists: actors, directors, designers, and playwrights. Re-quired attendance at one or more performances. Lecture and discussion groups. Open to nonmajors.

DRAMA 102 Play Analysis (5) Lorenzen, Winchell, Wolcott Descriptive analysis of plays, both modern and historical, to provide tools for the student to read a text critically and creatively.

DRAMA 151, 152, 153 Acting (3,3,3) Theory and practice of fundamentals. Prerequisites: 151 for 152; 152 for 153.

DRAMA 200 Drama and the Child (3) AWSp Introduction to the use of drama and its related arts as a means of developing the processes of self-expression and communication basic to a child's general education.

DRAMA 201,202 Introduction to Black Theatre (5,3) A,₩ McCoy

Historical survey of Black theatre. 201: African ritual Historical survey of Black theatre. 201: African ritual and ceremonial prototypes; Black theatrical activity in nineteenth-century America; minstrelsy; the Negro re-naissance; Negro theatre during the Depression; Negro theatre during World War II; postwar Negro theatre and "Big Business." 202: Revolutionary Black theatre; the 1960s; Black women in the theatre; a new image; new au-diences; contemporary trends. Prerequisite: 201 for 202 or permission of instructor.

DRAMA 210, 211, 212 Theatre Technical Practice (3,3,3)

(3,5,5) Intensive lecture-laboratory in basic theories, techniques, and equipment of stage scenery, lighting, costumes. 210: scene construction and stage technical procedures. 211: costumes. 212: lighting and technical procedures.

DRAMA 230 Introduction to Children's Drama (2) Pearson, Valentinetti, Zeder

Survey of children's drama with an emphasis on philoso-phies and practices. Includes children's theatre, creative dramatics, and puppetry. Open to nonmajors.

DRAMA 251, 252, 253 Acting (3,3,3) A,W,Sp Theory and practice of fundamentals. 251: development of fundamental aptitudes in acting (focus, recall, sense memory) through improvisation and basic scene work. 252: analysis and development of characterization. 253: advanced analysis, character rhythm, extended scene work. Prerequisites: 251 for 252; 252 for 253.

DRAMA 265 Black Theatre Workshop (3) Sp McCoy

Studio course using Black arts materials that introduces the student to basic skills and techniques associated with performance, while also developing self-awareness and confidence. Prerequisite: 202 or concurrent registration, or permission of instructor.

DRAMA 290, 291, 292 Theatre Technical Practices Laboratory (1,1,1) AWSp,AWSp,AWSp Laboratory course involving specific production assign-ment, either in-shop or in-theatre or both. Prerequisites: 210 for 290 or concurrent registration; 211 for 291 or concurrent registration; 212 for 292 or concurrent regis-tration tration.

DRAMA 298 Theatre Production (1-2, max. 9)

AWsp Laboratory course for students participating in School of Drama productions. Prerequisite: being cast in a produc-tion or receiving a crew assignment.

DRAMA 314 Beginning Design for the Theatre (3) ASp Dahlstrom

Introduction to the conventions of developing and pre-senting designs for theatre environments. Focus on developing facility in simple perspective drawing, basic ren-dering media, and basic theatre design concepts and practices. Individual design project required. Prerequi-site: 210.

DRAMA 316 Theatrical Makeup (2) AWSp Galstaun

Basic principles, with intensive practice in application of makeup for use on proscenium and arena stages. Open to nonmajors.

DRAMA 325, 326 Play Production (5,5) 325: fundamentals of scenery, lighting, and costume de-sign and construction. 326: fundamentals of directing, especially for high school, with some acting. Open to nonmaiors.

DRAMA 330 Children's Theatre (3) W Zeder

History, theory, and techniques of performance for chil-dren's theatre. Emphasis on play selection, critical analy-sis, and rehearsal procedures. Prerequisites: 230 and sophomore standing, or permission of instructor.

DRAMA 331 Puppetry (3) AWSp

Valentinetti

Introduction to puppetry; construction and use of simple puppets as a visual aid in education, recreation, and therapy. Prerequisite: junior standing.

DRAMA 336 Drama in the Elementary School (3) Theory and practice of fundamentals of playacting as they relate to teaching children through improvisation and problem solving, emphasizing child development; correlation with language arts. Prerequisites: 251 and permission of instructor.

DRAMA 337 Fundamentals of Creative Dramatics (3)

Pearson, Zeder

Introduction to concepts and principles of creative dra-matics. Intensive personal involvement in activities and exercises that illuminate the foundations of learning through drama. Emphasis on sensory awareness, play theory, creativity, and playmaking through improvisa-tion. Prerequisite: 230 or permission of instructor.

DRAMA 338 Creative Dramatics (3) Analysis of basic principles and techniques of the cre-ative process in informal drama; observation of children and youth.

DRAMA 351, 352, 353 Advanced Acting (3,3,3) A,W,Sp Loper, Winchell

Intensive course sequence in acting with integrated laboratory work in movement and voice. Improvisation, mime, scene analysis, and emphasis on realistic acting with introduction to styles and genres. Prerequisites: au-dition for 351; 351 for 352; 352 for 353.

DRAMA 361 Chicano Drama (3) Focuses on the impact of the religious, economic, politi-cal, and class structure of Mexico, and traces the historical and philosophical evolution of modern-day Chicano drama. Prerequisite: HSTAA 180 or permission of instructor.

DRAMA 371 History of the Western Theatre and Its Literature to 1400 (5) A Lorenzen, Winchell, Wolcott

Theatre history and dramatic literature of ancient Greece and Rome and of the Middle Ages in Europe. Emphasis on the development of the physical theatre, the nature of dramatic production during these periods, and the rela-tionship of playhouse to performance of dramatic texts. Primarily for drama majors; open to others with a back-ground in the history and/or literature of the period.

DRAMA 372 History of the Western Theatre and Its Literature: 1400-1700 (5) W Lorenzen, Winchell, Wolcott Theatre history and dramatic literature of the European and English Renaissance, with special focus on Italy, France, and England in the period 1500-1700. Introduces the student to the neoclassic theatre and the underlying neoclassic drama, to the Commedia dell'Arte, and to the theatre of Subacement, the court massures of Inion Jones theatre of Shakespeare, the court masques of Inigo Jones, and the theatrical activity of the English Restoration. Pri-marily for drama majors; open to others with a back-ground in the history and/or literature of the period.

DRAMA 373 History of the Western Theatre and Its Literature: 1700-1941 (5) Sp

Lorenzen, Winchell, Wolcott

Theatre history and dramatic literature of Europe, Eng-Interme nistory and dramatic interature of Europe, Eng-land, and America. Development of the modern play-house, and of modern dramatic and critical theory. The growth of the actor-manager and star systems; emergence of the director. Theatrical production and its response to romanticism and realism, to melodrama, social drama, and musical theatre forms. Primarily for drama majors; open to others with a background in the history and/or literature of the period. literature of the period.

DRAMA 374 History of the Greek Theatre and Its Drama (5) Wolcott

Examination of the relationship of the physical theatre and the productions that took place within that theatre, with particular emphasis on the text performed, styles of acting, scenic elements, and the critical theories that in-fluenced the theatre of the period. Prerequisite: 371 or permission of instructor.

DRAMA 377 History of the European Renaissance Theatre and Its Drama (5) Wolcott

See 374 for course description. Prerequisite: 372 or permission of instructor.

DRAMA 378 History of the English Theatre and Its Drama: 1500-1700 (5) Lorenzen

See 374 for course description. Prerequisite: 372 or permission of instructor.

DRAMA 401 Summer Theatre (15, max. 30) S

Intensive, practical experience in all aspects of the thea-tre arts. A modified stock company engages in extensive rehearsal and performance of selected plays, participates in workshop sessions in acting, costume, movement, scene construction, makeup and scene study, and sup-ports both artistically and technically the summer theatre performance program. For persons with a strong commit-ment to all aspects of the drama in performance. Regis-tration in both summer terms required.

DRAMA 410, 411, 412 Advanced Theatre Technical Practices (2-4, max. 12; 2-4, max. 12; 2-4, max. 12) AWSp,AWSp,AWSp Production-related apprenticeship, under faculty-staff su-pervision. 410: scene construction and scene painting. 411: costumes. 412: lighting. Prerequisites: 210 or 418 or permission of instructor for 410; 211 or permission of in-tructors for 411: 212 or premission of instructor for 412. structor for 411; 212 or permission of instructor for 412.

DRAMA 413 Advanced Scene Construction (3) A Special problems in scene construction materials and rig-ging. Prerequisites: 210, 212, 290, 292, 410 or equiva-lent practical experience, and 420.

DRAMA 414 Scene Design (3, max. 6) W

Dahlstrom, Devin, Forrester Theory, practice, and rendering of scene designs. Repeat of course involves intermediate designs, models, etc. Prerequisites: 210, 314, ART H 203, or equivalent.

DRAMA 415 Stage Costume Design (3, max. 6) W Crider

Charr Theory, practice, and rendering of costume designs for the theatre. Repeat of course involves intermediate de-signs. Prerequisites: 211, ART 109 and ART H 203 or equivalent or permission of instructor; 416 for repeat of course.

DRAMA 416 History of Clothing and Costume (5) A Crider

Survey history of Western clothing and theatrical costume; emphasis on civil dress with attention to the dis-tinctions in clothing for the stage. Open to nonmajors. Prerequisite: junior standing.

DRAMA 417 Advanced Stage Costume Construction (3, max. 6) W Crider

Techniques of costume construction, including study of fabrics, color, fundamentals of pattern adaptation, and draping for historic clothing reconstruction. Prerequi-sites: 211, 416, or permission of instructor.

DRAMA 418, Scene Painting (3, max. 6) Sp Dahlstrom, Forrester

Lecture-laboratory with focus on techniques and princi-ples of scene painting. Uses of various media and types of equipment as applicable to varied scenic pieces. Pre-requisite: 210 or permission of instructor.

DRAMA 419 Stage Lighting (3) W Devin

Theories and methods of lighting with emphasis on lighting plots. Laboratories consist of analysis of lighting instruments and control, color experiments, and basic circuitries. Prerequisite: 212 or equivalent.

DRAMA 420 Design and Technical Drafting

(2, max. 4) ASp Devin, Forrester

Laboratory and project critique covering stage design graphics and technical drawing; specifically: designer's elevations, ground plans, sections, detail drawing, trans-position of design drawing information to technical draw-ings. Prerequisite: 210.

DRAMA 421 Drawing and Rendering Techniques for the Theatre (2) A Forrester

Weekly figure-drawing laboratories with live model and weekly field trips for laboratories in drawing natural phenomena and architectural detail. Discussion of research methods and studies in historical drawing styles. Practice in use of several media and techniques of expression. Prerequisites: 210 and 211.

DRAMA 431 Fundamentals of Puppetry

(3, max. 9) Valentinetti

Puppetry as a theatre art; construction and use of puppets and marionettes for formal presentations; basic principles of playwriting and staging. Prerequisite: 331 or permission of instructor.

DRAMA 432 Advanced Puppetry (3, max. 9) Volentinetti

Projects and participation in formal theatre productions or field work in hospitals, clinics, and special schools. Prerequisite: 331 or permission of instructor.

DRAMA 433 Children's Theatre Workshop: Performance for Young Audiences (3) A Pearson

Rehearsal and performance of polished scenes for young audiences in schools and community organizations. Examination of both children's theatre scripts and classic and modern scripts appropriate for junior high and high school audiences. Prerequisites: 253 and permission of instructor.

DRAMA 434 Playwriting for Young Audiences (3) Zeder

Basic principles of dramatic structure and play construc-tion, with special attention to the demands of writing for young audiences. Adaptation of narrative material. Prerequisite: permission of instructor.

DRAMA 435 Theatre in the Schools (3) Sp 7eder

Practical experiences in researching, devising, rehearsright and presenting actor/teacher, theatre-in-education programs to groups of school children in the Seattle area. Programs pertinent to school curriculum or to a particular group of children involve both performance by actors and participation of children. Prerequisite: 253 or permission of instructor of instructor.

DRAMA 436 Creative Drama Teaching Methods (3) w Pearson

Analysis of basic principles and techniques of leading in-formal drama. Examination of relationship between drama and selected theories of child development. Practi-cal experience in planning and leading peers in drama sessions in class. Observation of children in laboratory classes. Prerequisite: 336 or 338 or permission of instructor.

DRAMA 438 Creative Dramatics and Laboratory

(3) ASp Application of basic principles and techniques of creative dramatics through leadership experience. Open to non-majors. Prerequisite: 338.

DRAMA 451, 452, 453 Rehearsal and Performance (3,3,3)

Theory and practice of period styles. 451: Shakespeare. 452: Moliere and restoration. 453: classical and nonreal-istic modern. Prerequisites: audition for 451; 451 for 452; 452 for 453.

DRAMA 457 Studio I (12, max. 36) AWSp Hobbs, Turner, York

Skill development in acting, voice, speech, and move-ment necessary for professional training in acting. Pre-requisite: admission to the Professional Actor Training program.

DRAMA 458 Studio II (12, max. 36) AWSp

Hobbs, Turner, York Continuation of 457. Prerequisites: 457 and completion of the first year of the Professional Actor Training program.

DRAMA 459. Studio III (6, max. 18) AWSp

Dicking 455- Studio III (6, IEE: 16) AVSp *Hobbs*, Turner, York Specialized and individualized work relating to the main curriculum of the third year of the Professional Actor Training program. Prerequisites: 458 and completion of the second year of the Professional Actor Training program.

DRAMA 460 Introduction to Directing (3) A Sydow

Student is introduced to the art of the stage director. Pre-requisites: 102; 253 or 353; 210, 211, 212; and permission of instructor.

DRAMA 461, 462 Elementary Directing (3,3) W,Sp Sydow

Elementary study of the art of the stage director. Prerequisites: 460 and permission of instructor for 461; 461 and permission of instructor for 462.

DRAMA 463 Intermediate Projects in Directing (2, max. 6) AWSp Sydow

Prerequisites: 462 or equivalent and permission of instructor.

DRAMA 465 American Ethnic Theatre Workshop (3, max. 9) AWSp *McCoy* Theatre workshop experience in the emerging dramas of American ethnic minorities through in-class and produc-tion articlation Drama interpretion of instructions. tion participation. Prerequisite: permission of instructor.

DRAMA 466 Directing Apprenticeship (2-5, max. 15) AWSp

Hostetler

Apprenticeship with professional director or association with thesis director as stage manager or assistant. Prerequisites: 210, 211, 212, 290, 291, 292, and 253 or 353, or graduate standing, and permission of instructor.

DRAMA 472 History of the English Theatre and Its Drama: 1700-1900 (5) Lorenzen

Examination of the relationship of the physical theatre and the productions that took place within that theatre. Particu-lar emphasis on the text performed; styles of acting, scenic elements, and the critical theories that influenced the theatre of the period. Prerequisite: 373 or permission of instructor.

DRAMA 473 History of the European Theatre and Its Drama From 1875 (5) Sp Winchell

See 472 for course description. Prerequisite: 373 or permission of instructor.

DRAMA 476 English and American Theatre and Drama: Post-World War II (5) W Winchell, Wolcott

Examines the relationships between the physical theatre and the dramatic text as they are expressive of the social, political, philosophical, religious, and psychological ideas that mediate between "culture" and "civilization." Emphasis on these major playwrights: Edward Bond, Ed-ward Albee, David Hare, David Rabe, Harold Pinter, and John Guare. Interaction between European, English, and American theatrical forms.

DRAMA 490 Special Studies in Acting-Directing (1-6, max. 6) AWSp Prerequisite: permission of instructor.

DRAMA 491 Special Studies in Design-Technical (1-6, max. 6) AWSp Prerequisite: permission of instructor.

DRAMA 492 Special Studies in Children's Drama (1-6, max. 6) AWSp

Prerequisite: permission of instructor.

DRAMA 493 Playwriting (3, max. 9)

Zeder Professional course. Prerequisite: ENGL 374 or permission of instructor.

DRAMA 494 Special Studies in Theatre and Drama

(5) AWSp (5) AWSp Hostetler, Loper, Lorenzen, Winchell, Wolcott Topics in drama, history, and criticism. See the quarterly *Time Schedule* for specific topic to be offered in a given quarter. Prerequisites: 102, 473, 476, or permission of insimictor

DRAMA 496 Stage Costume Problems (2, max. 8)

Crider Series of specialized courses directed to specific areas and problems of stage costume design and execution: accessories, textiles, masks, wigs, and analysis of construction of historic clothing and/or specialized clothing. Prerequi-sites: 211, 416, and permission of instructor.

DRAMA 497 Theatre Organization and Management (3) Sp

Devin

Theoretical and practical examination of the professional theatre organization and management: legal structures, funding, business practice, unions, and operational pro-cedures. Open to nonmajors.

DRAMA 498 Theatre Production (1-2, max, 9) AWSD -

Laboratory course for students participating in School of Drama productions. Prerequisite: being cast in a production or receiving a crew assignment.

DRAMA 499 Undergraduate Research (1-5, max. 15) AWSp

Prerequisite: permission of instructor.

Courses for Graduates Only

DRAMA 501 Methods of Theatre Research (3) Practical application of research methods appropriate for scholarly study in theatre history, dramatic theory, and critical analysis. Written projects include techniques of documentation, critical appraisal of sources, and pictorial evidence.

DRAMA 510 Design Studio I (3, max. 9) AWSp -Dahlstrom, Forrester

Dahistrom, Forrester Three-quarter sequential investigation of space, light, texture, and color in total theatre design, concurrently stressing mastery of the media and methods of presenta-tion and execution. Prerequisite: concurrent registration in 517 or 518 or 519

DRAMA 511 Design Studio II (3, max. 9) AWSp Dahlstrom, Forrester

Artistic principles and techniques as a basis for creative work in theatre design. Studio work in composition, color, line, space, and light and shade. Reports and outside reading may be required. Prerequisites: 510, 517, 518, 519

DRAMA 512 Advanced Stage Lighting Design (3, max. 6) Devin

Advanced work in design of lighting for drama, opera, and dance; color theory; laboratory experimentation with color, fabric, paint, texture, and light; discussion of School of Drama production lighting. Prerequisites: 419 and 420 or permission of instructor.

DRAMA 513 Technical Direction (3, max. 9) AWSp Devin

Practical experience in mounting scenery for a current production; study of materials, techniques, management, and equipment of technical theatre. Prerequisites: 413 and permission of instructor.

DRAMA 517, 518, 519 Studies in Historic Design (3,3,3) Dahlstrom, Forrester

Investigation of artistic principles and modes that influenced the art, architecture, furniture, and decor of se-lected historic periods. Prerequisites: 517 for 518; 518 for 519, or permission of instructor.

DRAMA 520 Advanced Theatre Practicum (1-5, max. 15) AWSp Professional student internship with professional theatres:

scenery, lighting, scene painting, costume, acting, directing, stage management, theatre management. Prerequisite: permission of instructor.

DRAMA 530 Directing for Young Audiences (3) W Pearson

Pearson Practical experience in directing plays for young audi-ences, with particular attention to story theatre, development of performance pieces through improvisa-tion, and participation plays. Exposure to young audi-ences with a focus on developmental needs of audience age groups. Prerequisite: 462 or permission of instructor.

DRAMA 531 The Visual Image for Young Audiences (3) Sp

Crider, Zeder

Application of basic principles of design to children's theatre. Both critical and creative involvement of students.

DRAMA 532 Management Principles for Children's Theatre (3)

Provides theoretical and practical approach to manage-ment of children's theatre and related children's arts programs. Special focus on demands of touring companies, liaison with schools, season selection, publicity, fund raising, budgets, community relationships, and the need for a philosophy of management. Prerequisite: graduate standing.

DRAMA 535 Graduate Colloquium in Child Drama (1, max. 6) AWSp Pearson, Zeder

Pearson, *Ceaer* Analysis, discussion, and critique of special studies, pro-ductions, research, and thesis projects being done in the field of child drama by graduate students in the School of Drama. Prerequisite: permission of instructor.

DRAMA 536, 537, 538 Seminar in Children's Drama (4,4,4) A,W,Sp Pearson, Valentinetti, Zeder Critical study of philosophies and practices—past and present—of the children's drama movement in the United

States; examination of current problems in children's drama education. Prerequisite: permission of instructor.

DRAMA 539 Professional Problems in Children's

Drama (2, max. 12) AWSp Observation and critical investigation and discussion of the artistic principles and practices of selected children's

drama programs and related arts projects in the greater Seattle area. Prerequisite: permission of instructor.

DRAMA 551, 552, 553 Teaching of Acting (3,3,3) A,W,Sp Winchell

Fundamentals of acting in conjunction with 351, 352, 353. 551: participation in 351 to learn the basic exer-cises. 552 and 553: supervision of scene work for stu-dents registered in 352, 353. Prerequisite: permission of instructor.

DRAMA 555 Special Problems in Acting (6, max. 18) AWSp

Hobbs, Turner, York

Audition techniques, style problems, popular entertain-ment techniques, Prerequisites: 458 and completion of the second year of the Professional Actor Training Program.

DRAMA 562 Advanced Directing Projects (3, max. 15) AWSp Prerequisites: 6 credits in 463 or equivalent and permis-

sion of instructor.

DRAMA 563 Seminar in Directing (2, max. 18) AWSp

Sydow

Seminar discussion on working problems of major productions in which the student is involved; examination of problems of the stage director on the advanced level. Prerequisites: graduate standing in drama and permission of instructor.

DRAMA 571, 572, 573 Problems in Theatre History Research (3,3,3) A,W,Sp Lorenzen, Wolcott

Methods and techniques of research in theatre history. Relationship of theatre arts to other arts and society in major periods of theatre history. Prerequisites: 571 for 572; 572 for 573.

DRAMA 575, 576, 577 Seminar in Theatre History (3,3,3) A,W,Sp Lorenzen, Wolcott Prerequisites: 571, 572, 573.

DRAMA 581, 582, 583 Analysis of Dramatic Literature (3,3,3) A,W,Sp Loper, Winchell

Modes of analysis intended for graduate students in drama (design, directing, and theatre history). Intensive analytical work on a limited number of play texts selected from the classical Greek period to the present.

DRAMA 585, 586, 587 Seminar in Drama (3,3,3) A,W,Sp Loper, Winchell

Seminar inquiring into the relationships between scholarship, criticism, and theatre art. Prerequisite: permission of instructor.

DRAMA 599 Advanced Studies in Theatre Arts (1-5, max. 10) AWSp Independent projects or group study of specialized as-pects of theatre arts. Prerequisite: permission of instructor.

DRAMA 600 Independent Study or Research (*) AWSp

DRAMA 700 Master's Thesis (*) AWSp

DRAMA 800 Doctoral Dissertation (*) AWSp

ECONOMICS -

Courses for Undergraduates

INTRODUCTORY COURSES

ECON 200 Introduction to Economics (5) AWSpS Introduction to economic reasoning. The development of Introduction to economic reasoning. The development of the basic tools of economic theory and their application to contemporary problems. No more than 5 credits from 200 and 211 may be counted toward any degree.

ECON 201 Introduction to Microeconomic Theory (5) AWSpS

Study of the allocation of resources and the distribution of income with emphasis on a market system. Some basic theoretical tools are developed and used to analyze a vari-ety of problems of current interest. Prerequisites: 200 and three semesters of high school algebra.

ECON 211 General Economics (3) AWSp

Survey of basic principles of economics (3) AWSP national income, price analysis, and allocation of re-sources. Primarily for engineering and forestry students. No credit if 200 has been taken.

ECON 260 Economic History of the Western World (5)

(3) Analysis of the sources of long-run economic change from Neolithic times to the present. Develops basic ana-lytical concepts of economic change and applies them to human history. First half of the course deals with economic development up to settlement of the American colonies; last half deals with American economic development.

ECON 312 Current Economic Problems (5) S Review of some basic economic tools and concepts,

Review of some basic economic tools and concepts, which are then applied to problems of current interest. Emphasis on teaching students how to approach and ana-lyze problems on their own. Useful to teachers of high school social problems courses but not intended for this, group only. Credit may not be applied toward a major in economics. Prerequisite: 200 or equivalent, or permis-sion of instructor. sion of instructor.

GENERAL THEORY

ECON 300 Intermediate Price Theory (5) AWSpS Pundamental concepts and principles. Demand, supply, market price, and the determination of price under com-petitive and monopolistic conditions; relation between price and costs. Prerequisites: 201 and MATH 157 or 124, or equivalent.

ECON 301 National Income Analysis (5) AWSpS Analysis of the determinants of the aggregate level of employment, output, prices, and income of an economy. Prerequisites: 201 and MATH 157 or 124, or equivalent.

ECON 306 Development of Economic Thought (5) From the early modern period to the present, with some discussion of its relation to natural science and other so-cial sciences. The main subjects treated are Adam Smith and the classical school, Karl Marx, later Marxism, and the transition to J. M. Keynes. Prerequisites: 200, 201, or equivalent.

ECON 400 Fundamentals of Microtheory (3)

Fundamentals of microtheory with emphasis on applica-tions to public policy. Designed primatily for graduate students majoring in fields other than economics. No credit given if 300 has been taken for credit. Prerequisite: permission of undergraduate adviser. Recommended: 200 or equivalent.

ECON 401' Fundamentals of Macrotheory (3) Fundamentals of macrotheory with emphasis on applica-tions to public policy. Designed primarily for graduate students majoring in fields other than economics. No credit given if 301 has been taken for credit. Perequisite: permission of undergraduate adviser. Recommended: 200 or equivalent.

ECON 406 Undergraduate Seminar in Economics

(5) Seminar provides undergraduate student an opportunity to apply the tools of economic analysis in a critical exam-indice of theoretical and empirical work. A list of topics for the seminars is available in the Department of topics nomics office. Enrollment preference is given to majors in their junior or sophomore years. Prerequisites: 201 and permission of instructor.

ECON 409 Undergraduate Seminar in Political Economy (5) Sp

Levi, North Undergraduate seminar in political economy with focus on Marxian and public-choice approaches to political economy. Explores the questions raised by each apeconomy. 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. Offered jointly with POL S 409. Pre-requisites: 300, POL S 201, and permission of instructor.

ECON 410 Introduction to Mathematical Economics I (5)

Introduction to mathematics as an economic tool and an aid in the development of logical thought. Introduction to differential and integral calculus, as well as sets, se-

quences, and mappings with applications to economics. No credit given if MATH 124 has been taken.

ECON 411 Introduction to Mathematical Economics II (5)

Introduction to functions of several variables with appli-cations to economics. Partial derivatives, the implicit function theorem, theory of minima and maxima. Economic applications include the Slutsky equations of con-sumer theory and an elementary mathematical investiga-tion of neoclassical production theory. Prerequisite: 410 or MATH 124.

ECON 412 Introduction to Mathematical Economics III (5)

Theory and application of linear algebra and matrix methods with special emphasis on problems originating in economic theory. Prerequisite: 411 or MATH 124.

ECON 416 Urban Economics (5)

Application of economic analysis to urban trends, prob-lems, and prescriptions, such as changing urban form and function, urban public finance, housing and renewal, poverty and race, transportation, and environmental problems. Offered jointly with GEOG 416. Prerequisite: 201 or 400 or equivalent.

MONEY, BANKING, AND CYCLES

ECON 421 Money, Credit, and the Economy (5). Supply and the use of money, bank deposits, and bank reserves. Relationship of Treasury, Federal Reserve, and commercial bank policies, and the value of money. Fac-tors generating flows of money income. Prerequisites: 300 and 301 or B ECN 300 and 301; or equivalent.

ECON 422 Investment, Capital, and Finance (5) Accumulation and allocation of wealth by individuals; investment in producer and consumer durables by firms and households; separation of ownership from operating decisions via corporations; determination of market value; dividend policies and optimal investment criteria; introduction to financial decisions under uncertainty; elements of portfolio theory and the capital asset pricing model. Prerequisite: 300.

GOVERNMENT REGULATION AND INDUSTRIAL ORGANIZATION

ECON 330 Government and Business (5) AWSp Analysis of the economic effects of various governmentau regulatory agencies and policies. Emphasis placed upon the observed economic effects of policies intended to reg-ulate business practices, control prices, conserve re-sources, or promote competition. Examination of anti-trust legislation as a means of promoting desired market performance. Prerequisite: 201 or equivalent.

ECON 404 Industrial Organization and Price Analysis (5)

Study of the economic determinants and consequences of various industrial market structures. The relationship be-tween market structure and economic behavior is studied. Topics include the theory of the firm, oligopoly, imperfectly competitive markets. The empirical basis for theo-ries of market behavior also is studied. Prerequisite: 300 or equivalent. .

ECON 430 The Mixed Economy of Modern

America (5) Study of interrelated economic, social, political, legal, and demographic factors in contemporary America. Attempt to comprehend synthetically the nature of the modern conomy, with special attention given to govern-ments, large corporations, and socioeconomic problems. Prerequisites: 300 and 301, or permission of instructor.

ECON 435 Natural Resource Utilization and Public Policy (5) AWSp

Poincy (5) AWSp Special emphasis on elements of economic theory relating to resource-oriented industries. Case studies in the theory and practice of resource management dealing with both stock and flow resources. Benefit-cost analysis and the evaluation of multipurpose resource projects. Prerequisite: 201 or 400 or permission of instructor.

LABOR ECONOMICS

ECON 340 Labor Economics (5) AWSp

Analysis of labor markets with emphasis on factors deter-mining the size of the labor force, unemployment, distri-bution of income between labor income and other shares, and related problems. Analysis of public policies, trade union activity, and collective bargaining upon the effectiveness of labor markets and the performance of the economy. Some attention is paid to the noneconomic as-pects of trade union activity. Prerequisites: 200 and 201.

ECON 346 Economics of Health Care (3) Economic analysis of the health-care sector of economy: organization, demand and supply factors, pricing practices, financing mechanisms—public versus private, im-pact of third party, insurance and prepayment, health and economic development. Prerequisite: 200 or equivalent.

ECON 347 Introduction to Population and Economic Dynamics (5) Dynamic interrelations of population and economics. Analysis of the problems of modeling population and economic dynamics with a discussion of the major ap-Japan and Europe and upon developing countries in the post-World War II era. Consideration of the prospects for modern rapid population growth and control and of the possible consequences. Prerequisites: 200 and 201.

ECON 443 Labor Market Analysis (5)

Factors that determine wage rates and employment levels in the firm, industry, and economy. Emphasis on the union in the labor market. Prerequisite: 300 or equivalent.

ECON 445 Income Distribution and Public Policy

(5) Income distribution implications and economic effects of public policies toward unemployment, illness, industrial accidents, old age, poverty, and discrimination from age, sex, or race. Prerequisites: 200 and 201.

PUBLIC FINANCE

ECON 350 Public Finance (5) AWSp Elementary treatment of the theory of public finance; the-ory of nonmarket decisions, weifare and allocative ef-fects of txation, principles of fiscal policy, problems of the public debt. Prerequisites: 200 and 201 or equivalent.

ECON 450 Theory of Public Finance and Fiscal Choice (5)

Advanced treatment of the theory of taxation and public spending. Designed for undergraduates majoring in eco-nomics and for graduate students majoring in fields other than economics. Prerequisite: 300 or equivalent.

ECON 452 Economic Approaches to Political

Analysis (5) Application of economic theory and methodology to po-litical phenomenon. Emphasis on theory construction with application in the American context. Offered jointly with POL S 416. Prerequisite: 201 or 400 or equivalent.

ECONOMIC HISTORY

ECON 460 Economic History of Europe (5) Origins of the modern European economy; historical analysis of economic change and growth from medieval times that stresses the preconditions and consequences of industrialization. Offered jointly with HST 481. Recommended: 200, 201.

ECON 462 Economic History of the United States to the Civil War (5)

Systematic study of the changing pre-Civil War eco-nomic conditions and the consequences of these changes for the American society. Prerequisites: 200 and 201 or equivalent.

ECON 463 Economic History of the United States From the Civil War to the Present (5)

Systematic study of the changing economic conditions since the Civil War and the consequences of these changes for the American society. Prerequisites: 200 and 201 or equivalent.

ECON 465 Economic History of South Asia (5) Historical analysis of economic structure and the phe nomenon of economic stagnation in the region. Examines the impact of imperialism and the international economy on the area in the nineteenth and twentieth centuries. Focuses on problems of economic change and growth as they bear on current efforts at economic development. Recommended: 200, 201.

ECON 466 Economic History of China: 1840-1949 (5)

Study of the post-1840 Chinese economy, with a brief introduction to the social-economic background of the earlier period. Explanations of China's long economic stag-nation, and analyses of the impact of external factors and the role of the government in China's economic development before 1949. Recommended: 200, 201.

INTERNATIONAL TRADE

ECON 370 Introduction to International Economics

(5) AWSp International trade, commercial policy, and the balance of payments are studied in a theoretical context and used on payments are studied in a theoretical context and used to examine current problems such as international mone-tary reform, trade and less-developed countries, and re-gional economic cooperation. Prerequisites: 200 and 201. Highly recommended: 301.

ECON 471 International Economics (5)

Income and price theory applied to international trade and finance. Analysis of balance of payments adjustments and alternative international monetary and com-mercial policies. Role of foreign trade and investment in economic growth. Prerequisites: 300 and 301.

COMPARATIVE SYSTEM AND DEVELOPMENT

ECON 390 Comparative Economic Systems (5)

Study of resource allocation, growth, and income distribution in capitalist, market socialist, and centrally planned economies. The theoretical models of these sys-tems are developed and then illustrated by case studies of selected countries. Prerequisites: 200 and 201 or equivalent.

ECON 391. Economic Development (5)

Critical appraisal of theories and problems of growth with emphasis on the less-developed countries of the world today. Prerequisites: 200 and 201.

ECON 493 Economy of Modern China (5)

Analytical survey of economic development of modern China, with special emphasis on the objectives, perform-ance, and problems of the mainland Chinese economy under communism. Prerequisites: 200 and 201, or permission of instructor.

ECON 494 Economic Growth of Japan Since 1850 (5)

Analysis of the economic growth of Japan since *circa* 1850 to the present. The reasons for rapid industrializa-tion, various effects of sustained economic growth, and significant contemporary issues are investigated. Prereq-uisites: 200 and 201, or permission of instructor.

ECON 495 The Economy of Soviet Russia (5)

Analytical survey of techniques of planning and resource allocation in the Soviet economy. Criteria for evaluating economic performance, growth, and efficiency. Prereq-uisite: 300 or equivalent or permission of instructor.

STATISTICS AND ECONOMETRICS

ECON 281 Introduction to Economic Statistics (5) AWSpS

Basic statistical concepts; characteristics of economic data; statistical analysis of economic data. Prerequisites: 200 and 201.

ECON 480 Economic Statistical Analysis (5) Application of statistical techniques to economic prob-lems with emphasis on applications. Prerequisite: 281 (calculus at level of MATH 124 or ECON 410 may be incerf)

ECON 482 Introduction to Regression Analysis (5) Specification and estimation of economic problems by simple and multiple regression equation. Prerequisites: 201 and 480.

ECON 483 Econometric Modeling (5) Nelson, Rao

Availability of Washington State economic statistics. processing techniques, and econometric models. Build econometric models to meet stated assumptions to fore-cast regional economic variables. Prerequisites: 281, 482

GENERAL

ECON 496 Honors Seminar (5) W

Honors and other superior students are given opportunity to develop research techniques, to pursue topics in breadth and depth, and to apply their tools of economic analysis to selected topics in economic theory and to current issues of national and international economic policy. To be taken in the senior year. Prerequisite: permission of undergraduate adviser.

ECON 497 Honors Directed Study (5) Sp Students individually arrange for independent study of selected topics in economic theory and its application un-der the direction of a member of the economics faculty. The research paper, if accepted, is the student's senior thesis. Prerequisite: permission of undergraduate adviser.

ECON 499 Undergraduate Research (1-6) AWSpS May not be applied toward an advanced degree. Prereq-uisite: permission of undergraduate adviser.

Courses for Graduates Only

GRADUATE CORE PROGRAM

ECON 500 Microeconomic Analysis I (5) AW Elements of choice theory. Value and demand, cost and supply, and the implied resource allocation under different constraints of competition. Prerequisites: 300 and 301, and 410 or MATH 124, or permission of graduate adviser.

ECON 501 Microeconomic Analysis II (5) WSp Theory of marginal productivity and the implied wealth distribution. The theory of capital and the implied re-source allocation over time. Prerequisite: 500.

ECON 502 Macroeconomic Analysis I (5) W

Analysis of theories of income, employment, and output under static conditions; quantity theory of money; rela-tion of monetary and "real" theories; stability and instability of income over time; growth of the economy. Prerequisites: 300 and 301, and 410 or MATH 124, or permission of graduate adviser.

ECON 503 Macroeconomic Analysis II (5) Sp Recent developments. Prerequisite: 502.

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 basic code sequence in pile theory. Designed to extern the student's analytic and problem-solving abilities by working systematically through a programmed set of readings and problems. The material includes both for-mal analytical techniques and applications of economic theory. Prerequisite: 501.

ECONOMIC THEORY AND HISTORY OF ECONOMIC THOUGHT

ECON 507 History of Economic Thought (3) Classical and neoclassical economics with emphasis on the latter.

ECON 511 Advanced Microeconomic Theory: Selected Topics (3, max. 12)

Seminar in advanced microtheory. Selected topics of spe-cial interest and significance. Prerequisites: 500, 501, 502, and 503.

ECON 512 Advanced Macroeconomic Theory: Selected Topics (3, max. 12) Seminar in advanced macrotheory. Selected topics of

special interest and significance.

ECON 520 The Economics of Property Rights (3) Cheung Application of standard economic theory to analyze vari-

ous forms of property rights as constraints of competi-tion; the costs associated with delineation and enforcement of rights; the costs of negotiating and enforcing contracts for right transfers; resource allocation and in-come distribution implied by different property right and transaction cost constraints. Prerequisites: 500 and 501, or permission of instructor.

ECON 521 Property Rights and Economic Explanations (3) Cheung

Derivation and testing of refutable hypotheses to interpret observable behavior through the use of standard eco-nomic principles and explicit specifications of the con-straints of property rights and transaction costs. Prerequi-site: doctoral Candidate standing.

ECON 522 Evolution of Property Rights (3) W

Cheung, North Theoretical and historical analysis of nonmarket forms of resource allocation emphasizing the use of transactions cost analyses.

GOVERNMENT REGULATION AND INDUSTRIAL ORGANIZATION

ECON 530 Government Regulation of Business (3) Public policy in the United States with respect to indus-trial organization and business conduct. Recent issues in public control of business.

ECON 532 Economics of the Regulation of Technology (3) AWSp Zerbe

Zerbe General political-economy framework for analyzing reg-ulation and regulatory reform applied to guessions of regulating technology. Aspects of regulating transporta-tion, product safety, energy, and medicine are considered as specific examples of general propositions previously derived. Offered jointly with SMT 532. Prerequisite: 300 or 400 or 500. (Last time offered: Spring Quarter 1981.)

ECON 533 Price Policy and Industrial Organization (3)

Advanced analysis of market structures and industry per-formance; selected empirical studies; principles of con-servation and benefit-cost analysis; issues in public policy. Prerequisite: 500.

ECON 535 Economics of Natural Resources I (3) Pricing, allocation, and utilization of natural resources; externalities; public investment criteria; technological re-lationships; alternative strategies of public decision mak-ing; benefit-cost analysis; case studies. Prerequisite: 435 or 500 or permission of instructor.

ECON 536 Economics of Natural Resources II (3) ECON 530 Economics on Natural Resources in (5) The second of two-course sequence. One applied area se-lected for particular emphasis. Students are expected to complete a substantial paper. Team projects are an option. Prerequisites: 435, 500, 535, or permission of instructor

ECON 537 Economic Aspects of Marine Policy (3) w

Crutchfield, Stokes

Development of pertinent economic concepts and their application to selected topics in marine policy decision making. Offered jointly with IMS 508. Prerequisite: IMS 500 or permission of instructor.

ECON 538 Economic Aspects of Marine Policy II (3) Sp Crutchfield, Stokes

Development of pertinent economic concepts and their application to selected topics in marine policy. Offered jointly with IMS 538. Prerequisite: 537 or permission of instructor.

LABOR ECONOMICS

ECON 518 Seminar on the Economics of Social Welfare (3) W Page

Analysis of social welfare economics as affecting the environment of the business firm. Topics may include in-come maintenance, welfare, labor, the demand and sup-ply of social services, crime, and human capital. Offered jointly with B ECN 531 and SOC W 565. Prerequisite: 500 or B ECN 500 or permission of instructor.

ECON 541, 542 Labor Economics (3,3) Selected topics in labor economics.

ECON 543 'Population Economics (3) Sp Edlefsen

Beconomic determinants and consequences of population growth with emphasis on formal theoretical models and on empirical analysis. Topics include: introduction to formal geography; introduction to the welfare economics of population change, including analyses of population effects on consumption, savings, investment, and techni-cal change; and introduction to the determinants of mor-tality, fertility, and migration. Prerequisite: 300.

ECON 546 Economic Studies of Health Care (3) McCaffree, Watts Examination of topics related to the economics of health

care, including supply and demand factors, financing of care, efficiency and cost of delivery, and allied areas. Of-fered jointly with HSERV 550. Prerequisite: graduate standing in the School of Public Health and Community Medicine; others by permission of instructor.

ECON 547 Advanced Seminar in Health Economics (3) Sp Watts

Selected topics in health economics, including risk and insurance, medical malpractice, the market for physician services, and industry regulation. Offered jointly with HSERV 560. Prerequisites: 546 or HSERV 550, advanced-level microeconomic theory, or permission of instructor.

ECON 548 Economics of Labor and Human Resources (3) Sp Hashimoto

Economic analysis of policy-related topics in human re-sources. Topics include labor demand and supply, education and occupation, wage structures and income inequality, discrimination, and poverty. Offered jointly with PB PL 548. Prerequisite: equivalent of 400; not open to economics majors.

ECON 556 Seminar in Urban Economics (3)

Use of economic theory to explain land-use trends, transportation, housing and renewal, the ghetto, and the pub-lic economy in urban areas. Offered jointly with GEOG 556. Prerequisites: 300 and 301, or equivalent.

PUBLIC FINANCE AND TAXATION

ECON 550 Public Finance I (3)

ECON S50 FUDIC FINANCE 1 (5) Theory of collective action; welfare economics, with spe-cial emphasis on public goods and external effects; theory of property rights, constitutions, and nonmarket decisions. Prerequisite: 500.

ECON 551 Public Finance II (3)

Welfare, allocative, and stabilization effects of taxation and public spending: theory of shifting and incidence of taxation; analysis of fiscal policy; problems of the public debt; allocative and welfare consequences of inflationary finance. Prerequisites: 500, 502, and 550.

ECON 553 Economic Analysis and Government

Applications of economic analysis and Government Applications of economic analysis to public enterprises and programs. Prerequisites: 400 and 401, or equivalent.

ECON 554 Cost-Benefit Analysis and Economic Methodology (3) AWSp

Zerbe For students in social management of technology, economics, engineering, public affairs, environmental stud-ies, and other disciplines who wish to learn the technique of cost-benefit analysis and the strengths and limitations of economics in project evaluation. The theoretical foundation for cost-benefit analysis is examined, and suitable applied techniques are derived. These techniques are applied to alternative types of decision-making problems pertinent to both the private and public sectors. Offered jointly with SMT 554. Prerequisite: 300 or 400. (Last time offered: Spring Quarter 1981.)

ECONOMIC HISTORY

ECON 504 Economic History and Economic

Development (3) A Analysis of determinants of long-run development, em-phasizing institutional, demographic, and technological changes; consideration of both theoretical and empirical studies. Prerequisite: 300 or equivalent.

ECON 561 European Economic History (3) W Economic growth of the Western world since the decline of the Roman Empire. Prerequisite: 504.

ECON 562 American Economic History (3) Sp Analytical methods; sources and reliability of data; consideration of some major issues in current research. Pre-requisites: 500 and 504.

INTERNATIONAL TRADE

ECON 571 International Trade Theory I (3) Modern developments in general equilibrium theory and welfare economics, with relation to international trade.

ECON 572 International Trade Theory II (3) Problems of foreign trade and exchange controls, and international monetary policies.

ECONOMIC SYSTEMS AND DEVELOPMENT

ECON 504 Economic History and Economic

Development (3) A See under Economic History heading for course descrip-

ECON 590 Theory and Practice of Economic

Planning (3) Theoretical issues and success criteria; models, techniques, and applications of planning in the allocation of

economic resources. Prerequisite: permission of instructor. (Offered alternate years.)

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: 504.

ECON 595 Soviet Economics (3)

Analysis of problems of economic measurement, economic development, resource allocation, planning and decentralization in the Soviet Union. Prerequisite: permission of instructor. (Offered alternate years.)

MATHEMATICAL ECONOMICS

ECON 513 Mathematical Economics: Activity Analysis (3)

Linear programming. Theory of convex bodies. Input-output models. Competitive equilibrium and Pareto opti-mum. Linear activity analysis of production and applica-tions. Prerequisites: 412, 500.

ECON 514 General Equilibrium Analysis (3) Study of the existence, uniqueness, and stability of genequilibrium models under the assumptions of eral competition. Emphasis is on recent developments in the literature with consideration given to both positive and normative economics.

ECON 517 Foundations of Economic Analysis (3) Study of the sources of meaningful comparative statics theorems in economics, with special emphasis on extrenum problems, qualitative analysis, and dynamic stabi-ity. Mathematical concepts necessary for access to the current literature are developed.

STATISTICS AND ECONOMETRICS

ECON 580 Econometrics I (3) Study of empirical estimation techniques and related methodological problems.

ECON 581 Econometrics II (3) Advanced study of econometric methods and techniques. Prerequisites: 480, 482, and 580.

GENERAL

ECON 600 Independent Study or Research (*) AWSpS

ECON 700 Master's Thesis (*) AWSpS

ECON 800 Doctoral Dissertation (*) AWSpS

ENGLISH

Courses for Undergraduates

The lists of names under various literature courses indi-cate the kind of material covered, but are neither comprehensive nor exclusive of other significant figures. De-tailed descriptions of all courses are published by the Department of English prior to preregistration.

FRESHMAN ENGLISH

ENGL 104-105 Introductory Composition (5-5) AWSp,AWSp

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) Sp Instruction in writing essay examinations, reports, re-views, and research papers. For Educational Opportunity Program students only, upon recommendation by the Of-fice of Minority Affairs. Prerequisites: 104 and 105, or created parameters. special placement.

ENGL 111 Writing About Literature (5) AWSp Interpretive and critical writing, based upon selected works in fiction, drama, and poetry.

ENGL/121 Issues, Topics, and Modes (5) AWSp Argumentative and persuasive writing, based upon read-ing drawn from a variety of sources—ancient and mod-

ern, informative and imaginative literature-arranged by themes, to be announced in advance.

ENGL 122 Issues, Topics, and Modes (5) AWSp Content varies. See quarterly departmental descriptions.

ENGL 171 College Writing (3) AWSp Development of writing skills. Students are encouraged to develop their own resources and to acquire new techniques for more meaningful and effective expression. Related readings in expository prose.

ENGL 172 The Research Paper (3) AWSp Includes study of library resources, the analysis of read-ing materials, and writing preparatory papers as basic to writing a reference or research paper. Open to all under-graduates. Prerequisite: one of 111, 121, 122, 171, or 181.

ENGL 181 Expository Writing (5) AWSp Emphasis upon clear, coherent, correct writing. Not rec-ommended for students who have taken 171.

LOWER-DIVISION COURSES

VARIETIES OF LITERATURE FOR **GENERAL READERS** -

ENGL 211 Reading Fiction (5) AWSpS

Emphasis on American and European fiction of the nineteenth and twentieth centuries. Not a historical survey; bowever, students have an opportunity to consider the nature and forms of fiction, to engage in criticism, and to frame their own responses to fiction, the "lie which tells truths."

ENGL 212 Reading Poetry (5) AWSpS

Poems for study and enjoyment, chosen from all the eras and modes of English and American poetry, with some emphasis on contemporary poetry. Helps readers to find delight in poems and also to understand them as ways of seeing. Some attention paid to the poetic techniques by which ideas and moods are shaped.

ENGL 213 Reading Drama (5) AWSpS Introduction to the understanding and enjoyment of dra-matic literature. Not a course in the history of drama. Ex-plores ways of representing human experience from the ancient Greeks to the present. Plays range from tragedy to melodrama and from high comedy to farce, and each speaks to the human condition.

ENGL 221 Popular Literature (5) AWSpS Investigations of themes, conventions, and world views of imaginative works having wide audience appeal. Dis-cussion of their place in our shared cultural experience.

ENGL 222 The Writer as Social Critic (5) AWSp Envostigation of ways writers respond to social realities that seem to them unsatisfactory or unjust, and literary forms they adopt to embody their views and solutions, whether by analysis, satire, protest, propaganda, or dra-matic characterization.

ENGL 223 Children's Literature Reconsidered (5) AWSpS

An examination of books that form a part of the imaginathe experience of children, as well as a part of a larger literary heritage, viewed in the light of their social, psy-chological, political, and moral implications.

ENGL 231 Shakespeare (5) AWSp

Survey of Shakepeare's career as dramatist. Study of rep-resentative comedies, tragedies, romances, and history plays.

ENGL 241 The Bible as Literature (5) AWSp 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 251 Introduction to World Literature (5)

AWSp Introduction to literature from various ages, languages, and cultures, representing different genres, by writers of major literary and historical significance.

ENGL 261 The Medieval Tradition in Literature (5)

AWSp Introduction to literature of medieval England, from the fifth to the fifteenth centuries. Some works are read in modern English translation; others (especially later works) are read in Middle English.

ENGL 267 Introduction to American Literature (5) AWSD

Survey of the major writers, modes, and themes in Amer-Survey of the major writers, modes, and themes in Amer-ican literature, from the beginnings to the present. Spe-cific readings vary, but often included are: Taylor, Ed-wards, Franklin, Poe, Hawthorne, Melville, Emerson, Thoreau, Whitman, Dickinson, Twain, James, Eliot, Stevens, O'Neill, Faulkner, Hemingway, Ellison, and Pallace Bellow.

LANGUAGE COURSE

ENGL 270 Grammar of the English Sentence (5) AWSpS

Designed for students who wish to improve their writing of standard English sentences. Demonstrates and gives practice in combining the fundamental grammatical units that constitute a sentence. Includes attention to common errors in sentence structure and stresses ways of achieving variety and emphasis in the sentence, qualities found in a mature writing style.

WRITING COURSES

ENGL 271, 272 Advanced Expository Writing (5,5) AWSpS, AWSpS Practice in writing information and opinion papers to de-

velop accurate, easy, and effective expression. Recom-mended: sophomore standing, 271 for 272.

ENGL 274 Beginning Verse Writing (5) AWSpS Intensive study of the ways and means of making a poem. Recommended: sophomore standing.

ENGL 277 Beginning Short Story Writing (5)

AWSpS Introduction to the theory and practice of writing the short story. Recommended: sophomore standing.

ENGL 386, 387 Intermediate Verse Writing (5,5) AWSpS,AWSpS Intensive workshop study of the ways and means of mak-

ing a poem. Further development of fundamental skills. Emphasis on revision. Recommended: 274 for 386; 386 for 387; or permission of instructor.

ENGL 388 Intermediate Short Story Writing (5) AWSpS

AWSPS Exploring and developing continuity in the elements of fiction writing. Methods of extending and sustaining plot, setting, character, point of view, and tone. Recom-mended: 277 or permission of instructor.

ENGL 421 Special Studies in Expository Writing (5) AWSp

Individual projects in nonfiction, including short biogra-phy, historical narrative, and opinion writing. Recom-mended: 271 or 272.

ENGL 422, 423, 424 Advanced Verse Writing (5,5,5) AWSpS,AWSpS Intensive study of ways and means of making a poem. Prerequisite: 386 or 387 or permission of instructor.

ENGL 425, 426 Advanced Short Story Writing

(5,5) AWSp Experience with the theory and practice of writing the short story. Prerequisites: 388 or permission of instructor, 425 for 426.

ENGL 427, 428, 429 Novel Writing (5,5,5) AWSp,AWSp,AWSp Experience in planning, writing, and revising a work of long fiction, whether from the outset, in progress, or in already completed draft. Prerequisite: permission of instructor.

ENGL 430, 431 Playwriting (5,5) W,W Experience in planning, writing, and revising a play, whether from the outset, in progress, or in already com-pleted draft. Prerequisite: permission of instructor.

UPPER-DIVISION COURSES

Upper-division courses are open to all undergraduates. Most count for humanities distribution. Courses with no quarterly designation are usually offered once every year or two. See departmental advisers and course description booklets available in the department during registration neriods.

ENGL 301 English Literature: Chaucer to Dr. Johnson (5) AW

English literature from the end of the Middle Ages to the end of the eighteenth century. Lyric, narrative, and dramatic literature are included

ENGL 302 English Literature: Blake to Yeats (5) WSp

English literature from the end of the eighteenth century to the beginning of the twentieth century, with special emphasis on the Romantic tradition.

ENGL 311 Chaucer (5) ASp

Chaucer's Canterbury Tales and other poetry, with atten-tion to Chaucer's social, historical, and intellectual milieu.

ENGL 312 Medieval and Renaissance Drama,

Exclusive of Shakespeare (5) Works by such dramatists as Kyd, Marlowe, Jonson, Webster, Beaumont, Fletcher, and Ford, with some me-dieval liturgical plays, cycles, and moralities.

ENGL 313 Renaissance Literature (5)

Poetry and prose by such writers as Wyatt, Surrey, Spenser, Sidney, Marlowe, Shakespeare, with attention to the religious, intellectual, and literary contexts.

ENGL 314 Shakespeare to 1603 (5) AWSp Shakespeare's career as dramatist before 1603 (includ-ing *Hamlet*). Study of history plays, comedies, and tragedies.

ENGL 315 Shakespeare After 1603 (5) AWSp Shakespeare's career as dramatist after 1603. Study of comedies, tragedies, and romances.

ENGL 321 English Literature of the Seventeenth Century (5)

Poetry and prose by such writers as Donne, Jonson, Mar-vell, Herbert, Dryden, Bacon, Hobbes, and Bunyan, with attention to the religious, intellectual, and literary contexts.

ENGL 322 Milton (5) AWSp

Bilton's early poents and the prose; Paradise Lost, Para-dise Regained, and Samson Agonistes, with attention to the religious, intellectual, and literary contexts.

ENGL 325 Early Eighteenth-Century Literature (5)

AW Works by Swift and Pope and such other writers as De-foe, Addison, Steele, Gay, and Thomson.

ENGL 326 Later Eighteenth-Century Literature (5) Works by Johnson, Boswell, and representative dramatists, novelists, and poets.

ENGL 327 English Novel: Eighteenth Century (5) AWSp

Defoe, Richardson, Fielding, Smollett, Sterne, early, Austen, and representative minor novelists.

ENGL 331 Romantic Poetry (5) AW Blake, Wordsworth, Coleridge, and their contemporaries.

ENGL 332 Romantic Poetry (5) WSp-Byron, Shelley, Keats, and their contemporaries.

ENGL 333 English Novel: Early and Middle Nineteenth Century (5) AWSp Austen, the Brontes, Dickens, Thackeray, and other representative novelists.

ENGL 334 English Novel: Later Nineteenth Century (5) AWSp Eliot, Hardy, Conrad, and other representative novelists.

ENGL 335 Victorian Poetry (5) Tennyson, Browning, Arnold, Hopkins, and others.

ENGL 336 Nineteenth-Century English Prose (5) Nonfictional prose by such writers as Burke, Coleridge, Wordsworth, De Quincey, Carlyle, Mill, Arnold, Newman, and Ruskin.

ENGL 341 Modern British Poetry (5) Hardy, Yeats, Eliot, Auden, and such other poets as Lawrence, Muir, Owen, Graves, Empson, Thomas, Larkin, Hughes.

ENGL 342 English Literature 1900-1930 (5) AW Works by Joyce, Yeats, Eliot, Lawrence, Forster, Woolf, and others.

ENGL 343 English Literature Since 1930 (5) AW Works by such writers as Bowen, Orwell, Waugh, Cary, Murdoch, Auden, Thomas, Lessing, Pinter, Greene, Durrell, Beckett, and Drabble.

ENGL 351 American Literature: Beginnings to 1800 (5) W

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: Early Nineteenth Century (5) AWSp

Conflicting visions of the national destiny and the indi-vidual identity in the early years of America's nation-hood. Works by Emerson, Thoreau, Hawthome, Melville, and such other writers as Poe, Cooper, Irving, Whitman, Dickinson, and Douglass.

ENGL 353 American Literature: Later Nineteenth Century (5) AWSp

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: 1914-45 (5) AWSp 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 Since 1945 (5) AWSp

Works by such writers as Ellison, Warren, West, Wil-liams, Wright, O'Connor, Mailer, Vonnegut, Barth, Baldwin, Hawkes, Oates, Morrison, and Kesey.

ENGL 356 American Poetry: Beginnings to 1917 (5) Poetry by Taylor, Whitman, Dickinson, and such others as Poe, Bradstreet, Crane, Robinson. The lineage and characteristics of lyric and epic in America.

ENGL 357 American Poetry Since 1917 (5) Works by such poets as Frost, Stevens, Williams, Pound, Moore, Eliot, Cummings, Hart Crane, Roethke, Bishop, Lowell, and Rich.

ENGL 358 The Literature of Black America (5) Selected works by Afro-American writers, with emphasis on twentieth-century literature.

ENGL 360 Literary Modernism and the History of Ideas (5) W

Various modern authors, from Wordsworth to the presvarious induction admitted in workswork to the pres-ent, 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. Prerequisite: 302 or other 300-level course in nineteenth- or twentieth-century literature.

ENGL 361, 362, 363 Types of Contemporary Poetry (5,5,5)

ENGL 371 Modern European Literature in

ENGL 371 MODETI EUropean Encaute an Translation (5) ASp 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 372 Modern Jewish Literature in

Translation (5) Survey of Jewish experience and its expression during but voj di John dapartella ini viters studied are Sho lom Aleichem, Peretz, Reisen, Babel, Kafka, I. B. Singer, Wiesel, Grade, Halpern, and Agnon.

ENGL 374 Study Abroad Program (5) This course, for students in the Study Abroad program, relates major works of literature to the landscape and activities of its setting.

ENGL 375 Women and the Literary Imagination

(5, max. 15) AW Study of women writers or ways various writers have portrayed woman's image, social role, and psychology.

ENGL 376 Women Writers (5, max. 15) AWSp Study of the work of women writers in English and American literature.

ENGL 381 History of Literary Criticism (5) Survey of the classical sources (Plato, Aristotle, Lonsinus, Horace) and major writers of English criticism, such as Sidney, Jonson, Dryden, Pope, Johnson, Words-worth, Coleridge, Arnold, Wilde, Richards, Leavis, and Trilling.

LANGUAGE COURSES

ENGL 390 English Language Study (5) AWSp Wide-range introduction to the study of written and spo-ken English. The nature of language; ways of describing language; the use of language study as an approach to En-glish literature and the teaching of English.

ENGL 391 English Syntax (5) AWSp Description of sentence, phrase, and word structures in present-day English. Recommended: 390.

ENGL 392 Language Variation in Current English (5) A

Examination of geographical, social, and occupational varieties of American English. Relationship between societal attitudes and language use.

ENGL 393 History of the English Language (5) W Evolution of English sounds, forms, structures, and word meanings from Anglo-Saxon times to the present. Rec-ommended: 390.

ENGL 394 The Language of Literature (5) Sp 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 395 American Writers: Studies in Major Authors (5, max. 15)

Concentration on one writer or a special group of American writers.

ENGL 396 British Writers: Studies in Major Authors (5, max. 15) Concentration on one writer or a special group of British

writers.

ENGL 397 Topics in American Literature (5, max. 15)

Exploration of a theme or special topic in American literary expression.

ENGL 398 Topics in British Literature

(5, max. 15) Themes and topics of special meaning to British literature.

LITERARY HISTORY

ENGL 402 English Literature: 1500-1660 (5) Recommended preparation: 312, 313, 314, 315, 321, 322 (any two); or equivalent reading.

ENGL 406 Twentieth-Century British and American Literature (5) Recommended preparation: 341, 342, 343, 354, 355, 357 (any two, preferably one of 341, 342, 343, and one of 354, 355, 357); or equivalent reading.

LITERARY TYPES AND GENRES

ENGL 411 Types of Dramatic Literature: Comedy (5)

Analyses of dramatic structures. American, British, and European plays representing the kinds of comedy from classical to modern.

ENGL 412 Types of Dramatic Literature: Tragedy

(5) Analyses of dramatic structures. American, British, and European plays representing the nature of tragedy from classical to modern.

ENGL 413 Romances and Folk Literature (5) W Medieval romance in its cultural and historical setting, with concentration on the evolution of Arthurian romance. (Offered alternate years.)

ENGL 414 The Popular Ballad (5) The origin, development, and transmission of both texts and tunes of English and Scottish folk ballads in Great Britain and North America. (Offered alternate years.)

ENGL 415 Introduction to the Folktale Among Literate Peoples (3) Skeels

Techniques of classification, geographic-historical distri-bution, theories of origin and interpretations, and related areas of investigation of the oral prose folk narrative of literate peoples. Offered jointly with HSS 471.

ENGL 416 Introduction to American Folklore

(5) W Study of different kinds of folklore inherited from America's past and to be found in America today. The cultiva-tion of an awareness of authentic folklore and of how to collect it. Offered jointly with HSS 472.

ENGL 417 Utopias and Social Ideals (5) Reading of major works in the Utopian tradition of English and American literature (e.g., More, Utopia; Bellamy, Looking Backward; Mill, On Liberty; Huxley, Brave New World).

COURSES PRIMARILY FOR TEACHING CANDIDATES

ENGL 441 The Composition Process (5) A Consideration of psychological and formal elements ba-sic to writing and related forms of nonverbal expression and the critical principles that apply to evaluation.

ENGL 442 Language Learning (5) W Consideration of how an individual achieves psychological and esthetic grasp of reality through language; relates language development to reading skills, literary interpre-tation, grammar acquisition, oral fluency, discursive and imaginative writing.

ENGL 443 Current Developments in English Studies: Conference (5)

ENGL 444 Special Topics in English for Teachers (3-5, max. 10)

CONFERENCES AND SEMINARS

ENGL 490, 491 Major Conference (3,3)

AWSp,AWSp Individual study by arrangement with instructor. Prerequisite: permission of undergraduate chairperson.

ENGL 492 Major Conference for Honors (5) ASp Individual study (reading, papers) by arrangement with the instructor. Required of, and limited to, honors seniors in English. Prerequisite: permission of undergraduate chairperson.

ENGL 493, 494 Advanced Writing Conference (3-5, 3-5) AWSp, AWSp Tutorial arranged by prior mutual agreement between in-dividual student and instructor. Revision of manuscripts is emphasized but new work may also be undertaken. Prerequisite: permission of director of creative writing.

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. Prerequisite: permission of director of creative writing.

ENGL 499 Special Studies in Literature (5, max. 10) AWSp,AWSp Themes and topics offering special approaches to literature.

COURSES IN ENGLISH FOR '

(These courses are administered by the Committee on Language Learning.)

ENGL 150 Intermediate Oral English for Foreign Students (5) AWSp Intermediate course with concentration on the basic

ancenneurate course with concentration on the basic grammatical patterns of English, lecture comprehension, and reading skills in English. For students who need to review basic grammatical structures or whose oral En-glish is relatively hesitant. Prerequisite: placement exam-ination.

ENGL 151 Advanced Oral English for International Students (5) AWSp Advanced course in English as a second language, with

emphasis on lecture comprehension, note taking and oral class participation together with review of selected gram-

mar points. Increased work on reading comprehension and academic writing.

ENGL 160 English as a Second Language:

Intermediate (5-15, max. 15) S Intensive. Intended for nonnative speakers of English and designed to prepare them for college-level academic work by improving skills in oral and written American English. Students should register for 15 credits but, with permission of the English as a Second Language Center, may register for 5 or 10 credits to work on special problems in English.

ENGL 161 English as a Second Language: High Intermediate (5-15, max. 15) S Intensive. Intended for nonnative speakers of English and designed to prepare them for college-level academic work by improving skills in oral and written American English. Students should register for 15 credits but, with permission of the English as a Second Language Center, may register for 5 or 10 credits to work on special problems in English.

ENGL 162 English as a Second Language: Advanced (5-15, max, 15) S

Intensive. Intended for nonnative speakers of English and designed to prepare them for college-level academic work by improving skills in oral and written American English. Students should register for 15 credits but, with permission of the English as a Second Language Center, may register for 5 or 10 credits to work on special problems in English.

ENGL 303 Academic Writing for International Students (3, max. 9) AWSp

Emphasis on writing expository prose as found in re-search papers, technical reports, theses, and essay examinations

ENGL 304 Introduction to Scientific and Technical Communications for Foreign Students (4) A Trimble

Scientific and technical writing and reading for foreign students well grounded in oral English. Concentration on (1) application of rhetorical concepts most frequently used in scientific and technical writing, (2) grammatical analysis in areas traditionally difficult for foreign stu-dents, and (3) grammatical-rhetorical analysis of scien-tific and technical discourse. Offered jointly with HSS 304.

ENGL 305 Scientific and Technical Report Writing for Foreign Students (4) W Trimble

Application of the problem-solving approach to scientific and technical writing. Concentration on (1) undergradu-ate laboratory reports, (2) advanced grammatical analysis in areas traditionally difficult for foreign students, and (3) advanced grammatical-rhetorical analysis of scientific and technical discourse. Offered jointly with HSS 305. Prerequisite: 304 or HSS 304 or permission of instructor.

ENGL 307 Advanced English Grammar for Foreign Students (3) ASp Trimble

Advanced grammatical analysis for foreign students well grounded in oral English. Areas of English grammar that are usually difficult for advanced foreign students are selected for study in context. Offered jointly with HSS 307.

Courses for Graduates Only

ENGL 500 Reading Medieval Literature (5) A Special problems involved in the study and interpretation of medieval texts, selected examples drawn from the be-ginnings of English literature to 1500.

ENGL 501 The Renaissance and Literary Tradition (5) W

Examination of selected texts from 1500 to 1750, concentrating on specific problems of interpretation and scholarship characteristic of the study of works written before 1750.

ENGL 502 Backgrounds of Modern Literature (5) Sp

Intensive study of selected issues in modern literature, concentrating on a few influential English and American texts written after 1750.

ENGL 504 Approaches to Teaching Composition (5) ASp

Readings in composition theory and discussion of practi-

cal classroom applications. Prerequisite: previous experience or concurrent assignment in teaching writing.

ENGL 505 Graduate English Studies (5)

ENGL 506 Studies in Literary Genres (5, max. 15)

ENGL 507, 508 · Literary Criticism (5,5)

ENGL 509 Methods of Contemporary Criticism (5)

ENGL 510, 511, 512 The Renaissance and Spenser (5.5.5)

ENGL 513 Shakespeare's Dramatic Contemporaries (5)

ENGL 515, 516 Chaucer (5,5)

ENGL 517, 518, 519 Shakespeare (5,5,5)

ENGL 521, 522, 523 Seventeenth-Century Literature (5,5,5)

ENGL 524, 525, 526 American Literature (5, max. 10; 5, max. 10; 5, max. 10)

ENGL 527, 528 Studies in Medieval Literature (5,5)

ENGL 530 The English Language (5)

ENGL 531 Introductory Reading in Old English (5)

ENGL 532 Advanced Reading in Old English (5)

ENGL 533 Foundations of American English (5)

ENGL 534 American English Dialectology (5)

ENGL 535 Comparative Grammars (5) Prerequisite: teaching experience.

ENGL 538, 539, 540 Early Nineteenth-Century Literature (5,5,5)

ENGL 541, 542, 543 Victorian Literature (5, max. 10; 5, max. 10; 5, max. 10)

ENGL 544, 545, 546 Eighteenth-Century Literature (5,5,5)

ENGL 548, 549, 550 Twentieth Century Literature (5.5.5)

ENGL 553 Current Rhetorical Theory (5) Prerequisite: teaching experience.

ENGL 555 Colloquium in Teaching English as a Second Language (5, max. 10) Prerequisite: LING 445 or permission of instructor.

ENGL 556 Methods and Materials for Teaching English as a Second Language (5) Prerequisite: LING 445 or permission of instructor.

ENGL 557 Research Methods in Second-Language Acquisition (5) Prerequisite: 556, LING 449, or permission of instructor.

ENGL 580 Critical Approaches to Literary Texts (5)

ENGL 584 Advanced Fiction Workshop (5, max. 10) Prerequisite: graduate standing.

ENGL 585 Advanced Poetry Workshop (5, max. 10)

Prerequisite: graduate standing.

ENGL 586 Graduate Writing Conference (5)

ENGL 590-591 Master's Essay (5-6, max. 11) AWSpS

Two-quarter research and writing project under the close supervision of a faculty member expert in that field of study. Work is independent and varies; one quarter of the project used for background reading and research and the other quarter for presentation of an original thesis in written form.

ENGL 599 Special Studies in Literature (5, max. 15)

ENGL 600 Independent Study or Research (*)

ENGL 700 Master's Thesis (*)

ENGL 800 Doctoral Dissertation (*)

ENVIRONMENTAL STUDIES

Courses for Undergraduates

ENV S 101 Introduction to Environmental Studies

(5) ASp Survey of the history of environmental awareness in the United States and worldwide. Emphasis on development of the recognition of the complexities of relationships. among components of ecosystems and the dependence of human culture upon ecosystem services and resources.

ENV S 204 Natural Sciences and the Environment (5) A Boersma

Survey of climate, water, soil, geological processes, nat-ural selection, and dynamics of plant and animal popula-tions and the communities they form. For students wishing to obtain a broad picture of basic processes of ecosystems and their implications for human manipula-tions of environments. Not recommended for students who have had more than 15 credits of natural sciences.

ENV S 205 Social Sciences and the Environment (5)

Significance of psychology, sociology, political science, anthropology, and geography for development of aware-ness of our perception and interaction with our environment. Focuses on individual and group paradigms, within and between cultures, and how these affect environmental decision making.

ENV S 206 Laboratory in Ecosystem Processes (3) Sp Boersma

Laboratory and field exercises on the role of climate, soils, geological processes, and animal and plant popula-tion dynamics on the structure and functioning of ecosys-tems. Field trips to natural and human modified ecosys-tems; weekend field trips required. Prerequisite: 204.

ENV S 352 Environmental Assessment (5) W

History of concepts, methods, and practice of environ-mental assessments to provide a comprehensive under-standing of problems of environmental assessment. Em-phasis on integrating environmental assessment into planning processes. Prerequisites: 204, 205, 206, or per-mission of instructors mission of instructor.

ENV S 361 Environmental Values and Perceptions (5) W

Lecture and seminar with focus on the way individual and cultural values affect our perception of, and relation to, the environment. Explores role of individual charac-teristics in perceptual acuity and value formation, con-flicting values within and between societies, impingement of these conflicts on environmental problems, and possible methods of resolution with emphasis on American environmental experience. Prerequisite: 206 or equivalent.

ENV S 408 Geochemical Cycles (3) A

Baker, Charlson, Harrison Descriptive and quantitative aspects of the earth as a Descriptive and quantitative aspects of the earth as a biogeochemical system. Fundamental methods for study of equilibria, transport processes, chemical kinetics and biological processes and their application to the carbon, sulfur, nitrogen, phosphorus, and other elemental cycles. Emphasis on stability of biogeochemical systems and the nature of human perturbations of their dynamics. Offered jointly with GPHYS 408. Prerequisites: CHEM 150, 350, MATH 238.

ENV S 415 Environmental Toxicology (5) W Ento

Eaton Principles and experimental procedures used to assess the toxic effects of chemicals on human health and the envi-ronment. Biological effects and disposition of pesticides, heavy metals, and other environmental contaminants, methods used to identify environmentally damaging chemicals, validity and interpretation of such tests, and use of such data in regulatory decision making. Prerequi-sites: BIOL 212, CHEM 232; ZOOL 301 or equivalent.

ENV S 425 Ecology of Population and Food Production (5) A Boersma

Boersma Human population growth and food production from an international perspective, in relationship to climate and climatic change, development of new crop strains, cost and availability of supplemental energy sources, ecosys-tem functioning, and quality of human life. For students with background in one of the following areas: food, exclusion of an other production. instructor.

ENV S 441 Economics of Environmental Management (3) Sp Alternative economic policies for managing man's use of the environment. Economics of pollution and residual control, recreation, common pool resources, conserva-tion of renewable and nonrenewable resources. Prerequisite: ECON 201 or permission of instructor.

ENV S 453 Practicum in Environmental Assessment

(3-5) Sp Undertakes preparation of model environmental impact various departments form Undertakes preparation of model environmental impact assessment. Students from various departments form multidisiplinary teams to study in depth environmental problems and develop courses of action. Prerequisites: 352 or impact assessment course in another department, and permission of instructor.

ENV S 481 Environmental Law (5) W Legislative, administrative, and common law dealing with the environment. Introduces the student to the fundamental concepts and classic issues underlying the body of law and policy dealing with the environment. In-cludes: air and water quality, noise, energy policy and management, and land use. For nonlaw students. Prerequisite: permission of instructor.

ENV S 482 Special Topics in Environmental Law (3-5) Sp

Examination of current environmental law issues. Topics to be announced. Prerequisite: 481.

ENV S 498 Special Topics in Environmental Studies (1-5. max. 10)

Lecture, seminar, and/or team study of topics varying from quarter to quarter. Prerequisites: permission of instructor.

ENV S 499 Undergraduate Research (*, max. 20) Individual or team research of selected environmental topics. Prerequisite: permission of instructor.

ENV S 520 Seminar in Environmental Studies

(1-3, max. 12) (1-3, max. 12) Study and research in advanced topics of environmental studies, with focus on unpublished areas of research; conducted by visiting professors and institute or depart-ment faculty. Prerequisite: permission of instructor.

ENV S 530 Science and Environmental Policy: Theory (5) A

Lee Analysis of the contributions of scientists in the development and implementation of environmental policy. Emphasis on conceptualization of the policy process to understand ways in which scientists can/cannot enter into the formulation and application of public policy. Re-quirements: concurrent registration in 531 and ECON 435. (Last time offered: Autumn Quarter 1981.)

ENV S 531 Science and Environmental Policy: Case Histories (2) AW

Distortes (4) Av Orians, Staff Examples of development of scientific analyses and envi-ronmental policies. Prerequisite: concurrent registration in 530. (Last time offered: Autumn Quarter 1981.)

ENV S 532 Internship Seminar (3) AWSpS

Lee Postinternship seminar with focus on a detailed analytical paper concerning the role of science in analysis and deci-sion making in the agency or firm in which the student served as an intern. Prerequisites: 530, 531. (Last time offered: Spring Quarter 1981.)

ENV S 599 / Special Topics in Environmental Studies

Research-level lectures, seminars, or discussions of topics of current interest in the area of environmental stud-ies. Subject matter varies from guarter to quarter. Prereq-uisites: permission of the instructor and institute director.

ETHNICITY AND NATIONALITY

See International Studies.

GENERAL STUDIES

G ST 340-341 Community Fieldwork: Law (5-5) Ă,Ŵ

Iglitzin

Igitizin Interdisciplinary seminar-fieldwork course in the area of law, including work in the court system, probation and parole, and in penal institutions of the city, county, and state. A maximum of 20 credits in the 340-349 sequence together with 350 may be counted toward a degree in the College of Arts and Sciences. Prerequisite: permission of Director, Fieldwork Studies, C14 Padelford.

G ST 342-343 Community Fieldwork: Health (5-5) A,W Iglitzin

Interdisciplinary seminar-fieldwork course in health-care area, including work in hospitals, free clinics, mursing homes, etc. A maximum of 20 credits in the 340-349 sequence together with 350 may be counted toward a degree in the College of Arts and Sciences. Prerequisite: permission of Director, Fieldwork Studies, C14 Padelford.

G ST 344-345 Community Fieldwork: Social Services (5-5) W,Sp,

Iglitzin

Interdisciplinary seminar-fieldwork course in the social Interdisciplinary seminar-fieldwork course in the social service area. Students do counseling in mental health clinics, work with physically handicapped persons, youth centers, and other service agencies. A maximum of 20 credits in the 340-349 sequence together with 350 may be counted toward a degree in the College of Arts and Sci-ences. Prerequisite: permission of Director, Fieldwork Studies, C14 Padelford.

G ST 346-347 Community Fleldwork: Education (5-5) W,Sp Iglitzin

Interdisciplinary seminar-fieldwork course on education. Students work in alternative schools, day-care centers, tutoring and educational programs for the disadvantaged. A maximum of 20 credits in the 340-349 sequence to-Sether with 350 may be counted toward a degree in the College of Aris and Sciences. Prerequisite: permission of Director, Fieldwork Studies, C14 Padelford.

G ST 348-349 Community Fieldwork: Special Topics (5-5) A,W and/or W,Sp Iglizin

Interdisciplinary fieldwork-seminar course on issues of special topical importance. A maximum of 20 credits in the 340-349 sequence together with 350 may be counted toward a degree in the College of Arts and Sciences. Pre-requisite: permission of Director, Fieldwork Studies, C14 Padelford.

G ST 350 Independent Fieldwork (1-6, max. 18)

Off-campus independent fieldwork in community agen internships, as approved for Colcies, apprenticeships, internships, as apprenticeships, internships, as approach for Col-lege of Arts and Sciences credit. Faculty sponsor may be required. A maximum of 15 credits in 350, or a maximum of 20 credits in the 340-349 sequence together with 350, may be counted toward a degree in the College of Arts and Sciences. Prerequisite: permission of Office for Undergraduate Studies.

G ST 391 Supervised Study in Selected Fields (*, max. 15) AWSpS Special supervised study in a field represented in the Col-lege of Arts and Sciences. Prerequisites: permission of supervisor of study and Office for Undergraduate Stud-ice ies.

G ST 493 Senior Study (5) AWSpS For General Studies majors only. Prerequisites: permis-sion of supervisor of study and Office for Undergraduate Studies.

GENERAL AND INTERDISCIPLINARY STUDIES

Course numbers under this heading are reserved by the Division of General and Interdisciplinary Studies for cur-ricular innovations. Descriptions of GIS course offerings

are available during preregistration and in-person registration in the Office for Undergraduate Studies, C14 Padelford.

GENETICS

Courses for Undergraduates

GENET 351 Human Genetics: The Individual and Society (3) WSp Hartwell, Stadler

Principles of molecular Mendelian and population genet-ics in the context of human reproduction and disease. Role of DNA and proteins in heredity; genetic basis of sex determination, birth defects, heart disease, and cancer, risks to human population of radiation and envi-ronmental mutagens. Appropriate for nonscience majors, but not recommended as a substitute for 451 for majors in biological sciences. Open for credit to all upper-division students who have not taken 451 or the equivalent.

GENET 451 Genetics (4) AWSpS

General course recommended for majors in the biological sciences and for those other students who are interested in the role of genetics in modern biology. Prerequisite: 10 credits in the biological or physical sciences or mathematics.

GENET 453 Genetics of the Evolutionary Process (3) Felsenstein

Contributions of genetics to the understanding of evolu-tion. Processes of mutation, selection, and random genetic events as they affect the genetic architecture of generative verify as they affect the generative architecture of natural populations and the process of speciation. Em-phasis on experimental data and observation, rather than mathematical theory. Prerequisite: 451. (Offered alter-nate years; offered Winter Quarter 1981.)

GENET 455 Molecular Genetics (3) Sp Fangman

Use of genetic approaches to determine the molecular. structure of chromosomes and the molecular mechanisms of gene expression. First part of the course draws upon information obtained with viruses and bacterial cells and serves as background for a study of eukaryotic cells in the second part. Prerequisite: 451, CHEM 232, or permission of instructor.

GENET 456 Genetic Mutation (3) W

Stadler

Statier Measurement of mutation rates and dose-response rela-tionships; analysis of mutational lesions; molecular mechanisms of mutation and DNA repair; mutation method for measurement of genetic size; hazard of envi-ronmental mutagens. Prerequisite: 451 or equivalent. (Offered alternate years.)

GENET 457 The Genetic Analysis of Complex **Biological Systems (3)** Sandler

Formal genetic analysis designed to follow 451. Consid-ers, primarily in mammals (including humans) and Drosophila, the elucidation of three complex biological sys-tems—cell division, embryological development, and some aspect of behavior—by the discovery and analysis of mutations that cause these systems to function abnor-mally. Prerequisite: 451.

GENET 461 Genetics Laboratory (3) Sp Doermann

An unsolved problem in microbial genetics is investi-gated collaboratively by the whole laboratory section. Prerequisites: 451, which may be taken concurrently, and permission of instructor.

GENET 463 Statistics for Genetics Research (3) W Felsenstein

Statistical theory and applied statistics oriented toward applications in genetics. Discrete and continuous distri-butions, means, variances, transformation of variables, samples, regression and correlation, analysis of variance. Prerequisites: graduate standing and permission of in-structor. (Offered alternate years; offered Winter Quarter 1982.)

GENET 499 Undergraduate Research (*) AWSpS Prerequisite: permission of instructor.

Courses for Graduates Only

GENET 501 Introduction to Research Materials (3, max. 9) AWSp

The student is assigned to one of the several research areas of the department to work with a research group for a quarter at a time. Prerequisite: graduate standing in the Department of Genetics or permission of graduate program adviser.

GENET 520 Seminar (1, max. 15) AWSpS Prerequisite: permission of graduate program adviser.

GENET 531 Human Genetics (3) W Gartler, Motulsky, Ward

General course in human genetics for graduate students. Areas covered: cytogenetics, statistical problems includ-ing pedigree analysis, and biochemical analysis of human hereditary disease. Prerequisites: 451, BIOC 440, Q SCI 281, or equivalent.

GENET 551 Mutation and Recombination (3) A

First course in a three-quarter sequence in molecular genetics. Contributions of research with micro-organisms to an understanding of the molecular basis of mutation and recombination: life cycles, mutation rate, mutagenesis, structure of DNA molecules, fine-structure genetics, enzymology and genetics of recombination, DNA transformation. Prerequisite: 451 or permission of instructor.

GENET 552, 553 Structure and Function of Genetic

Material J, II (3,3) Chromosome structure and DNA replication; formal genetics of gene expression; physical analysis of DNA; gene expression in relation to DNA structure. Prerequi-site: 551 or permission of instructor.

GENET 554 Topics in Genetics (2, max. 6) AWSp Current problems and research methods. Prerequisite: permission of instructor.

GENET 560 Chromosomal Behavior (3) W Sandler

Properties of meiotic chromosomes with special emphasis on recombination and segregation. Prerequisite: per-mission of instructor. (Offered alternate years; offered Winter Quarter 1982.)

GENET 561 Cytogenetics (3) S Roman

Discussion of cytological investigations of normal and aberrant chromosomal behavior, with particular reference to the structure of the chromosome and its response to mutagenic agents. Prerequisite: permission of instructor. (Offered alternate years; offered Summer Quarter 1982.)

GENET 562 Population Genetics (3) A Felsenstein

Mathematical and experimental approaches to the genet-ics of natural populations, especially as they relate to ev-olution. Emphasis on theoretical population genetics. Prerequisite: permission of instructor.

GENET 564 Molecular Cytogenetics (3) Sp **B**vers

Cellular processes of gene transfer in mitosis, meiosis, and gametogenesis, with emphasis on ultrastructure and macromolecular mechanisms. Prerequisite: permission of instructor.

GENET 571 Immunogenetics (3) Sp Clark

CLIRK Genetic approaches to the biology of cells of the immune system. Using the immune system as a model system, genetic, developmental and biochemical concepts and techniques are examined as they apply to cukaryotic cells. Cell-cell interactions, histocompatibility, host re-sistance to infectious disease, and evolution of the im-mune system. (Offered alternate years; offered Spring Ouester: 1982.) Ouarter 1982.)

GENET 575 Mammalian Developmental Genetics (3) Sibley

Explores the genetic control of early mammalian devel-opment, emphasizing systems in which both cellular and molecular approaches have made significant contribu-tions to understanding. Prerequisite: permission of instructor. (Offered alternate years; offered Spring Quarter 1981.)

GENET 584 Genetic and Biochemical Analysis by **Electron Microscopy (1-5)** Byers

Practical application of electron microscopic methods for determining cellular and macromolecular structure, with emphasis on genetic systems. Prerequisite: permission of instructor.

GENET 590 Population Genetics Seminar (1) AWSpS Felsenstein

Weekly presentation by participants of current literature and ongoing research in evolutionary genetics of natural populations, human population genetics, and quantitative genetics applied to animal and plant breeding. May be re-peated for credit. Prerequisite: 562 or permission of instructor.

GENET 600 Independent Study or Research (*) AWSpS

GENET 700 Master's Thesis (*) AWSpS

GENET 800 Doctoral Dissertation (*)

GEOGRAPHY

Courses for Undergraduates

Prerequisites: In addition to specified prerequisites for rerequisites in dualiton to specific prerequisites for individual courses, students should meet the general course level requirements as indicated by the numbers, except where they may have special preparation or back-ground in geography or in related fields.

INTRODUCTION TO GEOGRAPHY

GEOG 100 Introduction to Geography (5) Basic patterns of human occupance of the earth; analysis of population, settlement, and resource-use problems; in-troduction to geographic theories pertaining to spatial organization, interaction, and environmental perception.

GEOG 200 Introduction to Human Geography (5) Velikonja

Noneconomic components of patterns and systems of human occupancy of the world. Emphasis on cultural processes, dynamic change, functional relations and networks.

INTRODUCTION TO FIELDS IN GEOGRAPHY

GEOG 205 Introduction to the Physical Environment (5)

ZumBrunnen

Major atmospheric, hydrologic, and geomorphic pro-cesses used to interpret the character, distribution, and human significance of different natural and human-altered environments. Includes laboratory exercises for science and nonscience majors, geography majors and nonmajors.

GEOG 207 Economic Geography (5)

Beyers, Krumme, Mayer, Thomas Spatial order and changing locational patterns of man and his economic activities. Emphasis on concepts and ms economic acuvities, Emphasis on concepts and theories pertaining to primary, secondary, and tertiary production, to transportation, and to the geography of consumption. Special attention given to cities and the distribution of activities within cities.

GEOG 226 Introduction to Geographic Research

(5) Approaches to geographic pattern solving. Topics in-clude defining geographic problems, methods of analy-sis, seeking, organizing, and analyzing spatial data, and modeling spatial processes.

GEOG 227 Geographic Perspectives on Minorities in the United States (5) Hodge, Morrill

Geographic aspects of race relations through analysis of past and present geographic distribution of minorities in the United States, and the processes of migration and segregation that created those patterns. Focus especially on the experiences of Asian, Black, Chicano, and native Americans.

GEOG 235 Geography of the Lesser-Developed World (5) Chang

Regional study of the underdeveloped world with special emphasis on the varying stages in, and major programs of, economic development in the well-populated areas of Asia, Africa, and Latin America and on the overriding problems confronting each.

GEOG 258 Maps and Map Reading (3)

Sherman, Youngman Categories of maps and aerial photographs and their spe-cial uses; map reading and interpretation.

GEOG 277 Geography of Cities (5)

Hodge, Mayer Spatial and functional orderliness of cities; their location, distribution, function, and spread. Particular emphasis on current urban problems-sprawl, city decline, and metropolitan transportation.

INTERMEDIATE AND ADVANCED COURSES

GEOG 300 Advanced Regional Geography (5) Kakiuchi

The region viewed as a major concept in geography. An intensive examination of major physical and biotic re-gions seen in the light of human occupance patterns.

GEOG 495 Special Topics (*, max. 10) Topics vary and are announced in the preceding quarter.

SYSTEMATIC FIELDS

GEOG 303 Nature and Culture (5)

Jackson

The main theses of man's relationship to nature as expressed in Western and Asian geographic thought; emphasizes the sources of man-environmental dualism and dialectic leading to contemporary ecological discussion in geography. Introduction to the history of geographic thought.

GEOG 315 Agricultural Geography (5) Physical, social, and economic elements comprising agriculture and their variation in time and space.

GEOG 325 Historical Geography of the United States (5) Morrill

Changing geography of the United States from the time of modern European contact to the early twentieth cen-tury. Emphasis on the evolving settlement, land use, landscape, and regional patterns.

GEOG 342 Geography and Inequality in the United States (3) Morrill

Morrial Geography of social and economic inequality. Spatial distribution of wealth and poverty and the possible causes. Geographic and other aspects of the alleviation of poverty. The geography of racial and ethnic discrimina-tion, from Indian reservations to ghettos, as well as religious and age discrimination.

GEOG 350 Urban and Regional Analysis (3) Kru

Spatial organization of the economy; methodology in the study of location of economic activities and their spatial interrelations; economic regionalization.

GEOG 370 Conservation of Natural Resources (5) ZumBrunnen

Principles and practices in effective utilization of re-sources; public policies relating to conservation.

GEOG 399 Future Patterns of Settlement (3) Morrill, Schneider

Possible future patterns of human use of the environment For apocalyptic to glorious. Review of landscape evolu-tion. Problems of long-range regional and national plan-ning. Offered jointly with URB P 399. Prerequisite: 207 or 277 or URB P 340, or permission of department adviser.

GEOG 415 Agricultural Systems and Regions (3) Operation of farms, their spatial variation, and the meth-ods of analysis of agricultural systems and regions. The student is expected to devote approximately twelve hours of time to supervised field work. Timing of field trips is arranged by the class. Prerequisite: 315 or permission of department adviser.

GEOG 416 Urban Economics (5)

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. Offered jointly with ECON 416. Prerequisite: ECON 201 or 400, or equivalent.

GEOG 436 Geographical Exploration (5) Chang

Comparative study of discoveries made by the world's great explorers and expeditions, their motivations, and the effect on geographical thought, relations between cul-tures, and the development of civilization.

GEOG 440 Regional Analysis (5) Beyers, Krumme

Regional industrial structures and economic change. Ap-Regional industrial statutes and contonic charge. Application of shift and share, cohort, multiplier, input-out-put, location-interaction, and programming models to the analysis and to the projection of urban and regional population patterns, and to income distributions, interur-ban and interregional growth differentials, regional and intermediate linkness out flows as such to urban and and interregional linkages and flows, as well as urban and re-gional impacts of government expenditures. Prerequisite: 207 or permission of department adviser.

GEOG 441 Geography and Industrial Change (5) Thomas

Changes in the spatial and structural components of industrial activity patterns. Understanding the nature and influences of dominant forces affecting industrial change. Examples drawn primarily from North America and Western Europe.

GEOG 442 Social Geography (5) Morrill, Velikonja Spatial patterns of population distribution and settlement; of migration and the spread of ideas; of social character-istics and social relations; social regions.

GEOG 443 Location and Movement Models (3) Morrill

Application of models of optimum location and alloca-tion; assignment, transportation; and spatial equilibrium; spatial interaction; geographic simulation; and spatial diffusion

GEOG 444 Geography of Water Resources (3) Marts

Analysis and appraisal of water resources in land and industrial development; problems and policies of river basin planning with emphasis on the Pacific Northwest.

GEOG 447 The Geography of Air Transportation (3) Fleming

Geographic analysis of world air routes, passenger and cargo flows, and airport activities; consideration of phys-ical, economic, political, and institutional determinants of routes and flows. 207 and 277 recommended; junior standing or above preferable.

GEOG 448 Geography of Transportation (5) Maver

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) Fleming

Geographic analysis of ocean trade routes, cargo and pas-senger flows, and port activities. Evaluation of the role of the transportation carrier in international trade. Prerequisite: 207 or permission of department adviser.

GEOG 450 Theories of Location (5) Krumm

Classical and neoclassical theories of location of agricultural, residential, industrial, and recreational activities, spatial equilibrium conditions for individuals, organizations, sets of activities, urban land-use and settlement patterns, and associated networks focusing on the effect of transportation and transport costs. Course represents, in part, the history of thought in theoretical economic ge-ography. Prerequisite: 207 or permission of department adviser. Sec. 15

GEOG 452 Location and Behavior (5)

Krumme Principles governing individual and organizational be-havior in space. Emphasis on the interdependence of economic and noneconomic goals, aspirations, and other stimuli and constraints as they affect economic location and interaction decisions in urban and industrial settings. Behavioral frameworks are investigated as to their explanatory power for the analysis of spatial decision-making processes. Prerequisite: 450 or permission of department adviser.

GEOG 466 Regional Planning and Development (5) Thomas

Process of implementing regional development policies in economically advanced and lesser-developed coun-tries. Resultant changes in the distribution and structure of economic activities and settlement patterns. Offered jointly with URB P 466.

GEOG 475 Geography of International Relations (5)

Jackson, Velikonja

Selected problems of spatial patterns and dynamic rela-tionships. Geographical problems of regional, national, and international organization. Prerequisite: 375 or permission of department adviser.

GEOG 476 Urban Political Geography (3)

Hodge Spatial organization of cities as related to political pro-Spatial organization of crites as remied to pointcal pro-cesses. Topics include political and administrative dis-tricting (causes and consequences), facility location conflicts, and spatial variation in voting behavior. Con-siderable emphasis on case studies within the Seattle met-ropolitan area. Prerequisite: 207 or 277 or permission of department adviser.

GEOG 477 Urban Location and Structure (3) Urban and other agglomerated settlements: nature, eco-

nomic base, site and situation, distribution, supporting areas, and new trends in metropolitan form and arrangements.

GEOG 478 Urban Spatial Patterns (3) Mayer

Intraurban land-use patterns and structure; particular at-tention to locational theories pertaining to population, land-use linkages, rents, gradients, and normative spatial relationships.

GEOG 479 Urban Social Geography (5) Hodge

Relationship between urban spatial form and social pro-Relationship between urban spatial form and social pro-cesses. Topics include urban population distributions, so-cial space, intraurban migration, neighborhood change, social interaction, and spatial symbolism. Emphasis on relating theory to field experience and observation. Field trips. Prerequisite: 277, an introductory course in urban analysis, or permission of department adviser.

GEOG 498 Undergraduate Seminar in Economic Geography and Regional Science (3) Krumm

Selected advanced topics and current problems in loca-tion theory and analysis as well as urban and regionaleconomic development, analysis and planning. A strong complasis on conceptual frameworks and analytical tools does not preclude a problem-oriented selection of pre-dominantly local and regional empirical research subjects. Seminar format. Prerequisite: permission of department adviser or instructor.

REGIONAL FIELDS

GEOG 302 The Pacific Northwest (3)

Beyers

Economy of the Pacific Northwest in the light of factors of location, resources, resource-oriented industries, and resource policies. An introduction to regional studies on a local scale

GEOG 304 Western Europe (5)

Fleming Physical and socioeconomic characteristics of western Europe. Contemporary political and economic integra-tion trends in their regional context.

GEOG 305 Eastern Europe (5)

Velikonja Physical, historical, and socioeconomic characteristics of Eastern Europe.

GEOG 308 Canada: A Geographic Interpretation (5) Jackson

Study of Canada; emergence of political-geographic and

cultural entity and identity in North America that presents significant contrasts to the United States. Components that have helped shape Canadian earth-space and landscape.

GEOG 313 East Asia (5)

Kakiuchi

Nature and geographic setting of Far Eastern civilization. Origins, development, and present outlines of settlement; cultures, resource use, and economic structures in China, Japan, and Korea.

GEOG 333 Russia's Changing Landscape (5) Inckson

Russian/Soviet landscape as it has been affected by mi-gration and settlement, urbanization, collectivization, industrialization, and the growth of a transport network.

GEOG 336 Regional Geography of China (5) Chang

Geographic foundations, the pattern of the cultural and economic developments, and the interrelationships among the major regions of China with special emphasis on the role of the key agricultural and manufacturing areas in the economic growth of the country.

GEOG 402 United States (5) Morrill, Velikonia

Spatial pattern of economic and social life in Americahow it evolved, the role of the environment and resources; problems of regional inequality in development.

GEOG 404 Problems in the Geography of Western Europe (5) Fleming

Problems stemming from contemporary political and so-cioeconomic changes under way in Europe. Topics in-clude urbanization, regional development, economic integration and patterns of trade.

GEOG 405 Problems of Eastern Europe (5)

Velikonja Selected geographical aspects of Eastern Europe. Natural and human resource base, social and political organiza-and human resource base, social and political organization. Their relationships and interdependence. Prerequisite: 305 or permission of instructor.

GEOG 433 Soviet Resource Use and Management (5) Jackson, ZumBrunnen

Implications of Soviet industrial growth for resources; use of resources and associated problems; conservation in theory and practice.

GEOG 434 Problems in the Geography of Southeast

Asia (5) Regional and political structures; resources, economic activities, and problems of development; overseas and internal relationships.

GEOG 435 Problems in the Geography of China (5) Chang

Origins and development of Chinese civilization in its geographic base and areal spread; political China and the Chinese sphere; physical base and resources; problems of agriculture, population, industrialization, urbanization, transportation, and contemporary development; communist China.

GEOG 437 Problems in the Geography of Japan (5) Kakiuchi

Regional structure of Japanese urban, industrial, and ag-ricultural geography. Analysis of contemporary patterns considering cultural and physical factors and selected as-pects of their historical development.

CARTOGRAPHY

GEOG 360 Principles of Cartography (5) Sherman, Youngmann

Map scales, grid systems, symbolism, and map reproduction. Laboratory experience in application of these principles to map design and construction.

GEOG 361 Experimental Cartography (5) Sherman

Application of, and experimentation with, cartographic techniques and materials. Problems of relief representation, mapping of quantitative data, and their relation to reproduction processes. Prerequisite: 360.

GEOG 363 Aerial Photographs as Source Materials (3)

Sherman, Youngmann

Training in the use of aerial photographs as source mate-rials in map compilation and other geographic purposes. Prerequisite: 360.

GEOG 365 Introduction to Computer Cartography (5) Youngmann

Origins, development, and methods of automated cartography. Experiments with a user-oriented package of computer mapping programs capable of performing most computer mapping programs capable of performing most thematic mapping operations. Requires normal use of the Computer Center with special emphasis on the Calcomp plotter, line-printer, and cathode-ray tube (CRT) display. Prerequisites: 360 and a computer programming course, or permission of instructor or department adviser.

GEOG 458 Map Intelligence (3)

Analysis and appraisal of United States and foreign maps and atlases; mapping agencies, coverage, organization, and indexing; symbolism, scales, projections, and military grids; map library problems and operation.

GEOG 462 Problems in Map Compilation and Design (5) Sherman

Application and analysis of map intelligence procedures as related to map compilation. Measurement and experi-mental study of psychophysiological factors in design of map elements. Prerequisite: 360.

GEOG 464 Problems in Map Reproduction (3)

Processes and photographic techniques applicable to car-tographic and geographic presentations. Prerequisite: 360.

GEOG 465 Computer Cartographics (5) Youngmann

Methods and techniques of programming used in com-puter graphics applications in cartography. Basic con-cepts and operating procedures for batch and interactive cepts and operating procedures for batch and interactive graphics, including simple and hierarchical data struc-tures. Development of skills in computer graphics programming. Students are encouraged to develop and implement computer cartographic applications pertinent to their own interests. Students use a variety of graphics devices including the Calcomp 936 plotter and the Tek-tronix 4010/4014 CRT terminal. Prerequisites: 365 or el-ementary FORTRAN programming ability or permission of instructor or denatument adviser. of instructor or department adviser.

GEOGRAPHY AND EDUCATION

GEOG 467 Geography in the Social Studies Curriculum (3)

Concepts and content of geography essential to effective social studies curricula. Offered jointly with EDC&I 467.

INTRODUCTORY RESEARCH TECHNIQUES

GEOG 426 Quantitative Analysis of Spatial Distributions (5)

Hodge, Morrill Application of statistics to spatially ordered data. De-scriptive and inferential statistics of spatial (bivariate) distributions. Theoretical spatial distributions. Problems of spatial autocorrelation and pattern analysis. Trend surface, factorial ecology, and regionalization. Prerequisite: basic statistics course.

GEOG 490 Field Research (6, max. 12) Development and application of skills essential to geo-graphic field investigations: (1) training in the use of field techniques and base materials; (2) evaluation of these in variety of research situations; (3) analysis and interpreta-tion of field data; and (4) presentation of results of field investigations.

GEOG 499 Special Studies (*, max. 15)

Supervised reading programs, undergraduate and graduate library and field research; special projects for undergraduate honors students. Prerequisites: senior class, graduate standing, or permission of instructor or department adviser.

Courses for Graduates Only

GEOG 500 Contemporary Geographic Thought (4, max. 8)

GEOG 501 Geographic Analysis (3)

GEOG 504 **Research Seminar: Western Europe** (3, max. 6) Fleming

GEOG 505 Research Seminar: China and Northeast Asia (3, max. 6) Chane

GEOG 506 Research Seminar: Southeast Asia (3, max. 6)

GEOG 509 Research Seminar: Japan (3, max. 6) Kakiuchi

GEOG 510 Research Seminar: Settlement and Urban Geography (3, max. 9) Mover

GEOG 520 Research Seminar: Cartography (3, max. 6) Sherman, Youngmann

GEOG 526 Research Seminar: Quantitative Methods in Geography (3, max. 6) Morrill

GEOG 527 Data Resources and Use Technology for Urban Analysis and Planning (3) Horwood

Data resources, structure, access, and use technology for urban geographic, planning, and transportation analysis. uroan geographic, planning, and transportation analysis. United States census geography, content and automated products. The urban region geographic base file, geocod-ing and geoprocessing. Data-base development in local agencies. Use of packaged computer programs, but not basic programming instruction. Offered jointly with CETC 527 and URB P 527.

GEOG 528 Automated Mapping and Graphing (3) Younemann

Computer applications to statistical and areal analysis. Laboratory problems adapted to specialized interests of students. Offered jointly with CETC 528 and with URB P 528. Prerequisite: basic statistics or permission of instructor or department adviser.

GEOG 529 Information Systems Applications to Urban and Regional Analysis (3) Horwood, Staff

Logical design of information systems for analysis, policy development, planning, and plan monitoring in the context of land-use planning, environmental studies, land-resource management, and general public agency planning purposes. Data confidentiality considerations, case studies, and critical analyses of current information systems programs. Offered jointly with CETC 529 and with URB P 529.

GEOG 533 Research Seminar: Soviet Union (3, max. 6) Jackson

GEOG 538 Research Seminar: Geography of Transportation (3, max. 6) Mayer

GEOG 539 Research Seminar: Utilization of Water Resources (3, max. 6) Marts

GEOG 540 Research Seminar: Industrial Geography (3, max. 6) Beyers

GEOG 542 Research Seminar: Social and Population Geography (3, max. 6) Morrill, Velikonja

GEOG 550 Research Seminar in Location Theory (3) Krumme

Selected research-oriented topics in classical, neoclassi-cal, and behavioral location theory. Theoretical problems of locational analysis. Relationships between location theory and regional development and planning concepts. Location concepts for urban analysis.

GEOG 556 Seminar in Urban Economics (3) Use of economic theory to explain land-use trends, transportation, housing and renewal, the ghetto, and the pub-lic economy in urban areas. Offered jointly with ECON 556. Prerequisites: ECON 300, 301, or equivalent.

GEOG 566 Regional Planning Seminar (3)

Thomas Regional planning and development theories and meth-odologies. Critical evaluation of regional planning in selected economically advanced and lesser-developed countries. Offered jointly with URB P 566. Prerequisite: 466 or URB P 466.

GEOG 567 Research Seminar: Geography and Development (3, max. 6) Thoma

Offered jointly with URB P 567.

GEOG 570 Research Seminar: Natural Resources Analysis (3, max. 6) ZumBrunnen

GEOG 575 **Research Seminar: Political Geography** (3, max. 6) Velikonja

GEOG 577 Research Seminar: Internal Spatial Structure of Cities (3, max. 9)

GEOG 600 Independent Study or Research (*)

GEOG 700 Master's Thesis (*)

GEOG 800 Doctoral Dissertation (*)

GEOLOGICAL SCIENCES

Courses for Undergraduates

GEOL 101 Physical Geology (5) AWSpS Hanson

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 under-standing of past events. A course with laboratory for non-science majors. Optional field trips.

GEOL 109 Geophysical Phenomena (4) Sp LaChapelle

Techniques of observation by the simplest possible means are developed and applied. Phenomena such as color of the sky, motion of a waterfall, shape of a snowflake, and the sound of wind are studied and exam-ised during fall accurates. ined during field excursions. Students use 8-mm. motion picture techniques, including time-lapse studies. Offered jointly with ATM S 109. Prerequisite: permission of in-

GEOL 205 Introduction to Geological Sciences (5) AWSp

Introduction to geology, with laboratory, for science ma-jors, with emphasis on the physics, the chemistry, and the history of the earth. Not open to students who have taken 101. Recommended: background in physics, chemistry, and mathematics.

GEOL 301 'Introduction to Field Geology (5) S Introduction to methods of geologic field study. Taught from off-campus field camp during September. Registra-tion is Summer Quarter. Prerequisites: major standing in geological sciences or geological oceanography, and permission of department.

GEOL 308 Geology of the Northwest (5) WSpS Geologic history of Washington, Oregon, and Idaho. Emphasis on use of geologic principles in interpreting ev-idence found in landscapes and rocks. Prerequisite: 101 or 205 or equivalent.

GEOL 311 The Earth's Surface (4) A

Dunne, Porter Dynamic role of physical geologic processes operating at the earth's surface in the development of surface features and environments. Climatic control of processes and the effect of climatic variations on landscape evolution. Pre-requisite: 101 or 205 or equivalent.

GEOL 312 Glaciers and Volcanoes of the Pacific Northwest (3) S Porter

Porter Character and origin of Pacific Northwest volcances, their eruptive history and potential hazards. Distribution and nature of present and former glaciers in Washington; evidence for reconstructing the history of the glacial ages and the chronology of recent glacier fluctuations in the Cascades. Interrelationships of glaciers and volcances. Two all-day Saturday field trips to Cascade volcances.

GEOL 313 Environmental Geology (4) W Dunne

Analysis of geologic constraints upon human activity and the environmental consequences of such activity. Topics include hillslope processes, fluvial processes, earthquake and volcanic hazard, and environmental aspects of the and volcanic nazaro, and environmental aspects of the development of water, energy, and mineral resources. The laboratory/discussion section often is replaced by an afternoon or weekend field trip. Prerequisites: 101, 205, or permission of department.

GEOL 320 Mineralogy (5) AW Christensen, Ghose, McCallum

Introduction to mineralogy, including elementary crystal-Introduction to initiatization, including technication (lattice types, external morphology, stereo-graphic projection), elementary crystal physics (relation-ship of physical properties, including tensor properties to crystal symmetry), and elementary crystal chemistry (structures, bonding, etc.), especially of the silicates. Prerequisite: CHEM 101 or 140.

GEOL 321 Principles of Petrology (5) WSp

Evans, McCallum, Vance, Whetten Description, classification, and origin of igneous, meta-morphic, and sedimentary rocks, with laboratory hand specimen study of rock specimens. Two one-day field excursions. Prerequisite: 320 or equivalent.

GEOL 340 Structural Geology (5) AWSp Cowart, Stewart

Interpretation or rock structures and their genesis. Prerequisite: 321 or equivalent.

GEOL 361 Surface Deposits and Fossils (5) WSp Principles of physical stratigraphy and biostratigraphy and the role of each in the interpretation of the rock and fossil record, by means of which the chronology of the earth's history has been established. Survey of the earth and its physical and biological systems, through time. Laboratory. Prior course work in geology and some knowledge of biological and botanical principles strongly recommended.

GEOL 401 Field Geology (6) S Off-campus field work in general geology, emphasizing geologic mapping and report writing. Prerequisites: 301, 320, 321, 340, 361, and permission of department.

GEOL 402 Field Geology and Mapping (15) Sp A full-quarter course recommended for students planning to continue on to graduate school or a career in geology. Entails mapping problems in several different geologic terrains and at different scales. Preparation of geological maps, cross-sections and written reports emphasized. Prerequisites: 205, 301, 311, 320, 321, 340, 361.

GEOL 405 The Earth's Interior (3) Sp

features.

Bostrom Geophysical evidence as to the earth's interior regionalization and workings; development of the major surface

GEOL 412 Fluvial Geomorphology (5) Sp

Dunne Hydraulic, sedimentologic, and morphological character-istics of streams and valley floors. Landscape evolution by stream erosion and deposition. Interpretation of fluvial sedimentary environments. Five field exercises emphascenario and exercises empha-size the quantitative analysis of fluvial processes and channel forms and the acquisition of various skills, such as mapping, topographic surveying, and report writing. Prerequisites: 311, MATH 125, PHYS 121. (Offered odd-numbered years.)

GEOL 413 Hillslope Geomorphology (5) Sp Dunne

Theoretical, laboratory, and field study of hillslope evo-Intoration, into a why, and next study of infinite to be of the ercises emphasize the quantitative analysis of geo-morphic processes and the acquisition of various skills, such as mapping, topographic surveying, and report writing. Prerequisites: 311, MATH 125, PHYS 121. (Of-fered even-numbered years.)

GEOL 414 Photogeology (3) AW

Hanson, Porter

Geologic interpretations of aerial photographs with em-phasis on solving field problems. Prerequisites: 311, 340, 361, or equivalent.

GEOL 415 Principles of Glaciology (4) A LaChapelle, Porter, Raymond, Stuiver

Structure and properties of snow and ice: snow metamor-phism, avalanches, heat and mass balance of valley glaciers, glacier structure and flow dynamics, continental ice sheets, sea, lake, and river ice, frozen ground, methods of paleoclimatology, and Ice Age theories. Offered jointly with GPHYS 415. Prerequisites: upper-division standing and permission of department.

GEOL 416 Glacial Geology (3) ASp

Porter

Interpretation of glacial history through study of sediments and landforms, with emphasis on climatic implications, chronology, and correlation. Prerequisite: senior standing or permission of department.

GEOL 417 The Late Cenozoic Glacial Ages (3) A Leopold, Porter Physical and biological evidence, both terrestrial and ma-

rine, for cyclic climatic change during the late Cenozoic, emphasizing regional stratigraphic patterns, dating, and correlation. Growth and dissipation of Quaternary ice sheets and alpine glaciers, as indicated by the geologic record. Use of this data to evaluate theories on causes of glacial ages and potential for predicting future climatic variations. Offered jointly with QUAT 417, Prerequisite: introductory course in earth science and biological science.

GEOL 418 Periglacial Processes and Environments (4)

Environmental processes in glacier-free areas, with emphasis on frost action and its effects:

GEOL 420 Advanced Mineralogy (3)

Ghose Symmetry and crystal structure, chemical bonding, mag-netic, electric, optical, and elastic properties of the common minerals. Detailed crystal chemistry of the rockforming silicates with respect to phase equilibria and natural occurrence. Prerequisites: 320, 321, PHYS 121, 122, 123, CHEM 140 or 145.

GEOL 423 Optical Mineralogy (4) A

Christensen, Vance

Petrographic microscope and recognition of common minerals in thin section. Prerequisite: 320 or equivalent.

GEOL 424 Petrography and Petrology of Igneous Rocks (5) W

McCallum, Vance Systematic study of igneous rocks and their origin, using the petrographic microscope. Prerequisite: 423 or equivalent

GEOL 425 Petrography and Petrology of Metamorphic Rocks (5) Sp Evans

Systematic study of metamorphic rocks and their origin, using the petrographic microscope. Prerequisite: 423 or equivalent.

GEOL 426 Sedimentary Petrology and Petrography

(5) AWSp Stewart, Whetten Occurrence, characteristics, and origin of sedimentary rocks, with emphasis on chemical and physical processes of formation. Petrographic analyses in laboratory. Pre-requisites: 320, 423, or equivalent.

GEOL 430 Macroscopic Invertebrate Fossils (5) A Mallory

Systematic study of invertebrate fossils and the principles of paleontology. Prerequisite: 101 or 205, or equivalent. (Offered even-numbered years.)

GEOL 435 Marine Palynology (4) A Survey of the organic-walled, calcareous, and siliceous phytoplankton, with emphasis on the dinoflagellates (or-ganic-walled): their morphology, classification, strati-graphic distribution, and paleoecology. Laboratory: in-struction in sample processing, microscopy, photography by light microscopy and SEM, darkroom techniques for printmaking and platemaking. One weekend field trip to the Friday Harbor Biological Laboratory. Prerequisites; 205 and introductory biology or equivalent.

GEOL 436 Micropaleontology (5) A Mallon

Principles of paleontology as applied to micropaleontol-ogy; the systematic study of foraminifera. Prerequisites: 361, 430, or permission of department. (Offered oddnumbered years.)

GEOL 437 Evolution of the Vertebrates (5) W Rensberger

Introduction to the osteology and evolution of the major groups of vertebrates. Prerequisite: BIOL 101- or BIOL 210. (Offered even-numbered years.)

GEOL 438 Evolution and Classification of the Mammals (5) W

Rensberger Evolutionary changes and classification of the major groups of mammals from the Mesozoic to the present. Prerequisite: 437 or equivalent. (Offered odd-numbered years.)

GEOL 443 Advanced Structural Geology (5) A Misch

Analysis in space and time; genetic interpretation; principles of geotectonics. Prerequisite: 340 or equivalent.

GEOL 449 Stress and Deformation of Geological Materials (3) Sp Introduction to Cartesian tensor analysis with applica-

tions to stress, infinitesimal strain, and finite strain of geological materials. Prerequisites: 340, a mechanics course, and one year of calculus. (Offered even-numbered years.)

GEOL 450 Techniques in Geophysics (3) A Bostron

Introduction to geophysics of the solid earth, outlining instruments, techniques, and interpretation. Prerequisite: senior standing in geology or permission of instructor.

GEOL 452 Physical Sedimentology (4) Introduction to theoretical and experimental techniques

used in studying erosion, transportation, and deposition of sediment. Analysis of sediment samples, initial motion of sediments, bed-load motion, suspension of sediment by turbulent flows, erosion and deposition of sediments, and applications of sediment transport theory to problems of geological interest. Offered jointly with OCEAN 452. Prerequisites: OCEAN 402 and permission of instructor.

GEOL 461 Stratigraphy (3) A Systematic study of spatial relations of surface-accumulated rocks and their space-time implications, Prerequi-sites: 321, 361, or equivalent.

GEOL 471 Rock and Mineral Analysis (5) Sp Gresens

Survey of analytical methods employed in geochemistry, emphasizing the theoretical basis for various techniques and their limitations. With laboratory. Prerequisites: 320, 321, CHEM 160, or equivalent. Recommended: GEOL 474

GEOL 472 Elements of Geochemistry (4) A Gresens

Introduction to the interpretation and understanding of geological processes from the chemical standpoint. Prerequisite: senior standing in geological sciences or per-mission of instructor.

GEOL 474 Introduction to X-Ray Crystallography (3) W Ghose

Ghose Point groups and space groups: Reciprocal lattice. The-ory of X-ray diffraction from single crystals. Powder dif-fraction; identification of unknowns and determination of precise cell dimensions. Single crystal camera (preces-sion and Weissenberg) techniques; determination of cell dimensions and space groups; study of exsolution and phase transformation in rock-forming silicates. Structure factor formula and the use of three dimensional Fourier and Patterson series in the determination of crystal struc-tures. Preconisities: 320 and PHYS 123 tures. Prerequisites: 320 and PHYS 123.

GEOL 476 Isotope Geology (3) Sp Stuiver

Stuiver Discussion of methods involving the application of radio-active isotopes in age dating (radiocarbon, ionium, po-tassium-argon dating, etc.), and of stable isotope variations in nature in determining the temperature his-tory of the earth and igneous rock formation. Applica-tions of global aspects of the hydrologic cycle, age dating

in archaeology, and geochemical cycling of elements. Prerequisite: background in introductory mathematics.

GEOL 481 Mineral Industry Economics (4) W Chenev

World mineral resources, their distribution, exploitation, and depletion, social economic and political effects, inand depiction, social ecohomic and pointear effects, in-ternational control and trade, industrial organization, government policies, taxation, tariffs, marketing, and pricing; elements of production costs. Offered jointly with MIN E 481. Prerequisite: 205 or MIN E 350 or permission of instructor.

GEOL 485 Principles of Economic Geology (5) A

Principles of economic geology as illustrated by selected types of metallic and nonmetallic ore deposits and fuels. Prerequisites: senior standing in geological sciences and 321, 340, 361.

GEOL 488 Economic Field Geology (3) Sp Chenev

Four-to-six-day trip to mining districts for field inspec-tion of ore deposits. Two or three weekend trips to map and describe mineralized areas. Prerequisites: 485 and concurrent enrollment in 489.

GEOL 489 Exploration Geology (3) Sp

Cheney Principles and techniques of geological and geochemical prospecting for mineral deposits. Prerequisites: senior standing in geological sciences and 485.

GEOL 490 Special Topics (2-5, max. 10) AWSpS

GEOL 498 Undergraduate Thesis (5) AWSp The thesis must be submitted at least one month before graduation. Prerequisite: permission of department.

GEOL 499 Undergraduate Research (*, max. 5) AWSp

Prerequisite: permission of department.

Courses for Graduates Only

GEOL 511. Seminar in Geomorphology and Hydrology (*) AWSp Dune, Porter

Prerequisite: permission of instructor.

GEOL 512 Seminar in Pleistocene Research (2) AWSp Porter

Prerequisite: permission of instructor.

GEOL 513 Quaternary Stratigraphy (3)

Advanced studies of Quaternary stratigraphic and chron-ologic problems. Topic(s) to be determined. Prerequisite: 417 or 416.

GEOL 516 Advanced Problems in Glacial Geology (3) Sp

Field and/or laboratory investigations of selected glacial geologic problems, with emphasis on the Pacific Northwest. Prerequisite: permission of instructor.

GEOL 518 Advanced Problems in Periglacial Processes (3)

Various cold-climate geomorphic processes and their results, especially those related to frost action. Prerequisite: 418 or equivalent.

GEOL 519 Geological Remote Sensing (4) Sp Adams

Critical examination of remote sensing methods that are used to determine chemistry, mineralogy, and structure of the earth's surface and the surfaces of solar system bodies: Photographic and digital multispectral imagery, reflectance spectroscopy, thermal infrared spectroscopy, gamma ray spectroscopy, radar imagery, and other tech-niques. Emphasis on the application of satellite and air-craft measurements to terrestrial geologic problems. Pre-requisitier (CEPC 565 requisite: CETC 565.

GEOL 521 Metamorphic Minerals (5) W Misch

Nature and paragenesis of metamorphic minerals; physical, chemical, and geological interpretation of para-genesis. Prerequisite: 425 or equivalent. (Offered odd-numbered years.)

GEOL 522 Metamorphic Processes (5) W Misch

Deformation and crystallization, migmatization, and mo-bilization. Prerequisite: 425 or equivalent. (Offered evennumbered years.)

GEOL 523 Advanced Optical Mineralogy (4) A Christensen

Universal stage, petrofabrics, advanced optical theory, feldspar determination.

GEOL 524 Petrography and Petrogenesis of Igneous Rocks (5) Sp

Igneous Rocks (5) Sp McCallum, Vance Classification and nomenclature of igneous rocks. Igne-ous rock associations," magma types, and petrographic provinces. Origin and differentiation of magmas. With laboratory. Prerequisite: 424 or equivalent.

GEOL 525 Theoretical Metamorphic Petrology (4) Evans

Theoretical treatment of metamorphic mineral assemblages and metamorphic processes. Prerequisites: 425, CHEM 456, or equivalent.

GEOL 526 Theoretical Igneous Petrology (4) WSp McCallum

Review of thermodynamics. Fundamentals of phase equilibria involving liquids, solids, and gases. Physical prop-erties of silicate melts. Crystal growth and nucleation. Diffusion in melts. Experimental studies on synthetic and natural systems. Prerequisite: 424 or equivalent.

GEOL 527 Rock-Forming Minerals (3) A McCallum

Structure, chemistry, physical properties, and determina-tive mineralogy of common rock-forming minerals. With laboratory. Coverage varies from year to year. Prerequi-sites: 424, 425, 472.

GEOL 531 Stratigraphic Paleontology (5) Sp

Mallory Principles of stratigraphic paleontology and chronologic biostratigraphy. Prerequisites: 430, 461, or equivalent. (Offered odd-numbered years.)

GEOL 532 Paleoecology of Invertebrates (5) Sp Mallory

Properties of fossil populations and interpretation of habit and habitat in the geologic past. Prerequisites: 321, 430, or permission. (Offered odd-numbered years.)

GEOL 533 Seminar in Vertebrate Paleontology (3, max. 9) AWSp Rensberger Advanced topics in vertebrate evolution, morphology, classification, function, ecology, and stratigraphy. Sub-ject to be chosen by class at beginning of quarter. Prereq-uisite: advanced standing in paleontology, vertebrate zoology, or physical anthropology.

GEOL 542 Seminar in Structural Geology and Tectonics (2) W

Cowan

Reading and discussion of important concepts in structural geology and tectonics; topic is one of current inter-est and varies from year to year. Prerequisite: 340 or equivalent.

GEOL 545 Structure of Europe (5) Sp

Misch

Structural evolution and geotectonics of Europe. (Offered odd-numbered years.)

GEOL 546 Structure of Asia and West Pacific Rim (5) Sp Misch

Structural evolution from Central Asia to West Pacific: geotectonic principles. (Offered even-numbered years.)

GEOL 547 Literature on Structural Geology (3 or 5) W Misch

Selected readings and seminars on Cordilleran structure.

GEOL 549 Structural Analysis of Tectonites (4) Sp Pundamentals of structural analysis of tectonites. Sym-metry principles applied to the determination of the movement picture of deformation; experimental deformation of rocks; applications to dynamic analysis of tectonites. Course content varies from year to year. Prerequi-site: 449. (Offered odd-numbered years.)

GEOL 556 Planetary Surfaces (3) Adams

Comparison of surface processes and conditions on Mer-cury, Venus, earth, moon; Mars, asteroids, and satellites of the great planets. Emphasis on understanding how and why planetary surfaces differ from one another and on the implicitly solutions of solar-system evolution. Analysis of data from earth-based telescopes and from manned and unmanned space missions. Offered jointly with ASTR 556 and GPHYS 556.

GEOL 557 Origin of the Solar System (3) Brownlee

Nebular and non-nebular 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 and GPHYS 557.

GEOL 560 Fluid Mechanics of Erosion and Sediment Transport (3)

Advanced study of the erosion, deposition, and transportation of sediments by turbulent flows. Emphasis on the use of theoretical fluid mechanics to formulate and solve problems of bed load and suspended load transport of sediments, erosion, and deposition of sediments, erodible boundary-wave problems, turbidity currents, beach ero-sion. Offered jointly with OCEAN 560. Prerequisites: OCEAN 452, 511, and permission of instructor.

GEOL 561 Seminar in Geological Fluid Mechanics

(3) Reading and discussion of topics of current interest in geological fluid mechanics. Course work includes a re-port on a specialized topic. Offered jointly with OCEAN 561. Prerequisite: permission of instructor.

GEOL 563 West Coast Cenozoic Stratigraphy (5) Sp Mallory

Lithologic and faunal studies of the West Coast Ce-nozoic. (Offered even-numbered years.)

GEOL 571 Engineering Geology (3) W Geologic principles as applied to large engineering proj-ects. Emphasis is on the physical properties of rocks and their relation to contemplated engineering structures.

GEOL 572 Solution Geochemistry (4) W Gresens

Principles of solution chemistry applied to interactions between solids (silicates) and aqueous fluids. Construc-tion of phase diagrams in terms of temperature, ion activ-ities, Eh, and pH. Applications of ionic equilibria to geologic situations ranging from weathering through hydrothermal ore solutions to open-system metamor-phism. Methods of calculating metasomatic gains and losses. Three lectures and one problem-solving session per week. Prerequisites: 472 or equivalent and CHEM 456 or equivalent.

GEOL 573 Application of Microprobe Techniques (4) W Evans

GEOL 574 Advanced X-Ray Crystallography (4) Sp Ghose

Theory of X-ray diffraction; determination of crystal structures with special emphasis on minerals and inor-ganic compounds, through the application of three di-mensional Patterson function, Fourier series, and direct methods; structure refinement; determination of cation distribution, exsolution, and antiphase domain structure through X-ray diffraction. Prerequisite: 474 or permission of instructor.

GEOL 576 Geochronometry (4) A

Stuiver Principles, methods, and applications of dating rocks and organic materials.

GEOL 582 Seminar in Sedimentology (2) W Stewart, Whetten Lectures, discussions, and readings on selected problems of current interest.

GEOL 586 Economic Geology of Sedimentary Rocks (5) W Chenev

Description and origin of metallic and nonmetallic ore

deposits indigenous to regoliths, sediments, and sedimentary rocks. Prerequisite: 485 or equivalent or permis-sion of instructor. (Offered even-numbered years.)

GEOL 587 Economic Geology of Igneous and Metamorphic Rocks (5) W Cheney

Description and origin of metallic and nonmetallic ore deposits formed in igneous and metamorphic rocks or by igneous and metamorphic processes. Prerequisite: 485 or equivalent or permission of instructor. (Offered oddnumbered years.)

GEOL 590 Special Topics (2-5, max. 10) AWSp5

GEOL 600 Independent Study or Research (*) AWSp

GEOL 700 Master's Thesis (*) AWSp

GEOL 800 Doctoral Dissertation (*)

GEOPHYSICS

GPHYS 403 Geophysics: The Earth (3) A Description of the earth and its interior, including knowledge derived from study of the earth's gravity, magne-tism, and heat flow as well as from the field of seismology. Discussion of the unifying concepts of plate tectonic theory toward understanding of the earth's outer structure. Quantitative approaches to problems using the techniques of potential theory. Eigenfunction expan-sions, spherical harmonic analysis, and Laplace transform theory are applied to problems related to the earth's gravity field, earth tides, and heat flow in the earth. Pre-requisite: MATH 238 or equivalent.

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GPHYS 404 Geophysics: The Ocean (3) A

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 dynamical oceanography. Prerequisite: MATH 238 or equivalent.

GPHYS 405 Geophysical Continuum Mechanics (3)

Analysis of stress. Finite and infinitesimal strain. Mea-Analysis of stress, Finite and infinitesimal strain, Mea-surement and interpretation of strain in geological materi-als. Elasticity applied to determine stress in the earth's crust. Creep of solids and flow of geological materials. Prerequisite: MATH 238 or equivalent.

GPHYS 406 Geophysics: The Atmosphere (3) W Structure and composition of the atmosphere, atmo-spheric radiation, use of meteorological data, humidity and cloud processes, structure and dynamics of large-scale weather systems. Offered jointly with ATM S 406. Prerequisite: 404 or permission of instructor.

GPHYS 407 Geophysics: Space (3) Sp Survey of various phenomena occurring in the outer re-gions of the earth's atmosphere, the ionosphere, the mag-netosphere, and the Van Allen radiation belts. Behavior of charged particles in the geomagnetic field and simple concepts of plasma and magnetohydromagnetic waves. Prerequisite: PHYS 323 or equivalent.

GPHYS 408 Geochemical Cycles (3) A Baker, Charlson, Harrison

Baker, Charlson, Harrison Descriptive and quantitative aspects of the earth as a bio-geochemical system. Fundamental methods for study of equilibria, transport processes, chemical kinetics and bio-logical processes and their application to the carbon, sul-fur, nitrogen, phosphorus, and other elemental cycles. Emphasis on stability of biogeochemical systems and the nature of human perturbations of their dynamics. Offered jointly with ENV S 408. Prerequisites: CHEM 150, 350, MATH 238.

GPHYS 415 Principles of Glaciology (4) A LaChapelle, Porter, Raymond, Stuiver, Untersteiner, Washburn

Structure and properties of snow and ice: snow metamorphism, avalanches, heat and mass balance of valley gla-ciers, glacier structure and flow dynamics, continental ice sheets, sea, lake, and river ice, frozen ground, meth-ods of paleoclimatology and Ice Age theories. Offered jointly with GEOL 415. Prerequisite: permission of instructor.

GPHYS 431 Seismology and Earthquake Engineering (3) A

Evans, Hartz, Merchant, Smith Presents an overview of earthquake processes and details of the characteristics of destructive ground motion; illustrates the effects of such motion on engineering struc-tures; reviews current practice in estimating earthquake hazards for important structures such as nuclear power plants. Offered jointly with CESM 431. Prerequisite: MATH 238 or permission of instructor.

GPHYS 499 Independent Study for Undergraduates (1-5, max. 10) AWSp

Prerequisite: permission of instructor.

GPHYS 501 Earth Potential Fields (3) A

Booker, Lister Application of potential theory to the interpretations of magnetic and gravity anomalies. Heat flow and interpre-tations. Global tectonics. Prerequisite: 403.

GPHYS 502 Geophysics of Solids (3) W Merrill

Introduction to the applications of solid-state physics to geophysics. The origin and the properties of remnant magnetization in rocks. Equations of state and the com-position of the mantle. Defects in solids and their roles in tectonophysics. Prerequisite: permission of instructor.

GPHYS 503 Elements of Seismology (3) Sp S. Smith

Propagation of elastic waves and techniques of determin-ing the properties of the deep interior of the earth. The nature of earthquakes and their relation to geologic processes. Prerequisite: 405.

GPHYS 504 Geophysical Data Collection and Analysis (3) W .

Crosson Theory and practical application of data collection and analysis applied to geophysical problems. Digital pro-cessing of signals; filtering and spectral analysis. Two-hour laboratory session includes problem solving on computer-based processing system. Prerequisite: permis-tion of superstantiants.

sion of instructor. GPHYS 505 Geophysical Inverse Theory (3) W

Booker

Introduction to the mathematical techniques for estimat-ing 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. Prerequisites: 504 and permission of instructor.

GPHYS 510 Physics of Ice (3) A

Hobbs

Structure of the water molecule. Crystallographic structures of ice. Electrical, optical, thermal, and mechanical properties of ice. Growth of ice from the vapor and liquid phases. Physical properties of snow. Offered jointly with ATM S 510. Prerequisite: permission of instructor.

GPHYS 511 Glaciology I: Formation of Snow and Ice Masses (3) W Raymond, Untersteiner

Snow climatology. Transport of snow by wind. Transfer of radiative, sensible, and latent heat at the surface of snow and ice. Freezing of natural water bodies. Heat and mass budget of ice masses. Theories of ice ages. Offered jointly with ATM S 511. Prerequisite: 510 or permission of instructor.

GPHYS 512 Glaciology II: Dynamic Glaciology (3)

Sp Raymond, Untersteiner

Raymond, Ortersteiner Rheology of ice. Internal deformation and sliding of gla-ciers. Thermal regime of glaciers. Steady flow, dynamic response to changing climate, and surges. Deformation and drift of sea ice. Snow and avalanche dynamics. Of-fered jointly with ATM S 512. Prerequisites: 510, 511, or permission of instructor.

GPHYS 513 Glaciology III: Structural Glaciology (3) A

Raymond, Untersteiner Snow metamorphism and primary layering. Dynamic metamorphism, flow structures, and relation to ice defor-mation. Structure of river, lake, and sea ice. The role and behavior of foreign matter. Physical processes of struc-ment shows and built tural change and relationship between structures and bulk

physical properties. Offered jointly with ATM S 513. Prerequisites: 510, 511, 512, or permission of instructor.

GPHYS 514 Field Glaciology (6) Sp LaChapelle, Raymond, Untersteiner

Structure and metamorphism of snow cover. Energy exchange at melting snow and ice surfaces. Deformation and flow of glaciers. Climatology and mass budgets. Glacier features. Emphasis on instrumentation, field techniques, and data analysis. Offered jointly with ATM S 514. Prerequisite: 511 or 512 or permission of instrument

instructor.

GPHYS 520 Seminar (1-2) AWSp

Review of cuirent literature in geophysics and graduate student research with faculty participation.

GPHYS 531 Structure of the Upper Atmosphere (3)

Leovy

Structure of atmosphere above the tropopause. Roles of photochemistry, diffusion, and escape in determining composition. Absorption and emission of radiation, and thermal structure. Formation and properties of the iono-sphere. Offered jointly with ATM S 531.

GPHYS 537 Magnetosphere I (3) A Parks

Formation by interaction of solar wind with geomagnetic field. Trapped particles. Electromagnetic waves in anisotropic plasma. Dynamic disturbances and plasma insta-bilities. Prerequisite: 535 or permission of instructor.

GPHYS 538 Magnetosphere II (3) A

Parks Plasma waves. Propagation of very low frequency and hydromagnetic waves in the magnetosphere. Interactions between plasma waves and particles. Prerequisite: 537.

GPHYS 552 Theoretical Seismology (3) W

Crosson Wave motion in uniform and layered elastic solids, dispersion, surface waves, modal analysis; inhomogeneous and anisotropic media; effects of anelasticity, gravity, and curvature, eigenvibrations of the earth. Prerequisite: A A 567.

GPHYS 554 Earth Rotation and Tidal Forces (2) W Bostrom

Causes and consequences of changes in the rotation of the earth.

GPHYS 555 Planetary Atmospheres (3) A Leow

Problems of origin, evolution, and structure of planetary atmospheres, emphasizing elements common to all plan-etary atmospheres; 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. For students interested in atmospheric processes or those specifically interested in planets. Offered jointly with ASTR 555 and ATM S 555.

GPHYS 556 Planetary Surfaces (3) Adams

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 why pranctary surfaces differ from one another and the implied course of solar-system evolution. Analysis of data from earth-based telescopes and from manned and unmanned space missions. Offered jointly with ASTR 556 and GEOL 556.

GPHYS 557 Origin of the Solar System (3) Brownlee

Nebular and non-nebular theories of the origin of the so-lar system; collapse from the interstellar medium, grain growth in the solar nebula, formation of planetesimals and planets, early evolution of the planets and other pos-sible 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 and GEOL 557.

GPHYS 570 Geophysical Exploration for Petroleum (3) W Bostrom

Introduction to the geological principles of hydrocarbon accumulation and the geophysical techniques of explora-tion. Term project includes work-up of exploration pro-

gram for a specimen geophysic region. Prerequisites: GEOL 340, MATH 303, or equivalent.

GPHYS 571 Gravity and Geomagnetic Interpretation (3) W Lewis

Fundamental concepts; the earth's magnetic field; instrurentation and reduction of magnetic measurements, in-terpretation of gravity observations; interpretation of gravity anomalies. Offered jointly with OCEAN 571. Pre-requisite: PHYS 323 or equivalent or permission of instructor.

GPHYS 572 Geodynamics (3) A Lister

Qualitative discussion of the processes that cause crustal movement, viewed on a global scale, and the techniques used to investigate these processes. Prerequisite: permission of instructor.

GPHYS 573 Terrestrial Magnetism (3) Sp Merrill

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. Offered jointly with OCEAN 573. Prerequisite: permission of instructor.

GPHYS 574 Tectonophysics (3) A The physics of rock deformation, theory of brittle and ductile behavior, techniques of experimental rock deformation at high temperature, and pressure with applica-tions to flow processes in the mantle and crust. Prerequi-site: 502 or permission of instructor.

GPHYS 575 Structure and Constitution of the Oceanic Crust (4) Sp Christensen

Seismic structure of oceanic crust. Composition and physical properties of oceanic rocks. Upper mantle seis-mic anisotropy. Ophiolites and their relationship to crus-tal structure. Current models for creation of oceanic lithosphere. Crustal subduction and orogenic-type vol-canism. Prerequisite: permission of instructor. (Offered even-numbered years.)

GPHYS 576 Structure and Constitution of the Continental Crust (4) Sp Christensen

Seismic structure of continental crust. Seismic proper ties, electrical properties, and heat generation of possible lower crustal rocks. High-pressure experimental studies on lower crustal constitution. Review of current literature on geophysical and petrological crustal models. Nature of of instructor. (Offered odd-numbered years.)

GPHYS 580 Special Topics in Geophysics (2-6, max. 12) AWSp Intensive treatment of a selected topic in geophysics pre-sented by lectures or seminars for students in geophysics and related special fields. Subject is selected from all oracin combusics and under the unser here to be a set of the second set of the set of areas in geophysics and varies from year to year. Prereq-uisite: permission of instructor.

GPHYS 594 Waves in Geophysics and Engineering (3) Sp Crosson, Evans, Fyfe

Crosson, Evans, Fyge Examination of the fundamental concepts and mathemati-cal descriptions of wave propagation; group and phase velocity, dispersion, effects of boundaries, normal mode and progressive wave descriptions; waves in elastic sol-ids, acoustic waves, electromagnetic waves; sources of waves; waves in inhomogeneous media; applications to acoustics, seismology, and earthquake engineering. Of-fered jointly with CESM 594 and A A 594.

GPHYS 600 Independent Study or Research (*) AWSD

GPHYS 700 Master's Thesis (*) AWSp

GPHYS 800 Doctoral Dissertation (*)

GERMANICS

Lists of names under various literature courses indicate the kind of material covered, but are neither comprehensive nor exclusive of other significant figures. Detailed

descriptions of courses are published by the Department of Germanics prior to preregistration.

Courses for Undergraduates

GERM 101, 102, 103 First-Year German (5,5,5) AWS,AWSpS,AWSpS The methods and objectives are primarily audiolingual.

with emphasis on speaking and listening. Secondary objectives are reading and writing.

GERM 104 Individualized First-Year German (1-15) AWSpS

Individualized approach to elementary German instruction. Students progress at their own pace. Credits vary, depending upon amount of material mastered, from 1 to 15, and any number of credits up to 15 may be earned per quarter. Students must register initially for 5 credits and must pay for 5 credits regardless of number of credits earned.

GERM 111, 112, 113 First-Year German (5,5,5) AW,WSp,ASp

Primary emphasis is placed on an accelerated acquisition of the reading skill. A foundation for proficiency in writ-ing, speaking, and listening is the secondary objective of the course. A structural and grammatical approach rather than an audiolingual approach is used.

The following courses are considered to be basically equivalent and may not all be taken for credit: 101, 111, and the first 5 credits of 104; 102, 112, and the second 5 credits of 104; 103, 113, and the last 5 credits of 104. However, students are free to take other combinations for credit (e.g., the first 5 credits of 104 followed by 102 and then 113).

GERM 121, 122 First-Year Reading German (5,5) AS,WS

Special beginning course devoted exclusively to the read-ing objective; 122 continuation of 121. For graduate students only.

GERM 150 Conversational German Through Films (2, max. 6) AWSp

(2, max. 0) Awop Conversational practice in small groups based on films. Because series progresses through the year, beginners may enroll only Autumn Quarter: May be taken concur-rently with other Germanics courses.

GERM 181, 182, 183 First-Year Yiddish (5.5.5)

A,W,Sp Introductory course in Yiddish language. Prerequisites: 181 for 182; 182 for 183.

GERM 201 Basic Second-Year German (5) AWSpS Readings and oral practice in German, plus grammar re-view. The student may not receive credit for both 201 and 211. Prerequisite: 103' or equivalent.

GERM 202 Intermediate Second-Year German (5)

AWSpS Continuation of 201. The student may not receive credit for both 202 and 212. Prerequisite: 201 or equivalent.

GERM 203 Introduction to German Literature and Thought (3) AWSp

Introduction to classics of German literature. Majors and minors take concurrently with 207. Prerequisite: 202 or equivalent.

GERM 207 Advanced Second-Year Conversation (2) AWSp

Discussion of general topics to develop oral fluency. Prerequisite: 202 or equivalent.

GERM 211 Basic Second-Year Reading (5)

Primary emphasis is placed on the reading skill. The ac-tive reproduction of German is de-emphasized. The stu-dent may not receive credit for both 201 and 211. Prerequisite: 113 or equivalent.

GERM 212 Intermediate Second-Year Reading (5) Readings in German history and culture. Student may do supervised work in readings relating to his own discipline. The student may not receive credit for both 202 and 212. Prerequisite: 211 or equivalent.

GERM 213 Advanced Second-Year Reading (3) Readings in contemporary German history and culture. Student may do readings relating to his own discipline. Prerequisite: 212 or equivalent.

GERM 220 Conversational German for German

House Students (1, max. 6) AWSp Intensive conversational German for participants of Ger-man House only. Prerequisites: 103 or equivalent and permission of department.

GERM 230 Conversational German (5) S Intensive conversational German. Prerequisite: 103 or equivalent.

GERM 250 Advanced Conversational German Through Films (2, max. 6) AWSp Conversational practice in small groups based on films. May be taken concurrently with other Germanics COURSES

GERM 260 Lower-Division Scientific German (5) Students in the sciences may substitute 260 for 212. Prerequisite: 211 or equivalent.

GERM 281, 282, 283 Second-Year Yiddish (5,5,5)

A,W,Sp Readings from Yiddish literature and advanced grammar. Prerequisites: 183 or equivalent for 281; 281 or equiva-lent for 282; 282 or equivalent for 283.

GERM 290, 291, 292 Survey of German Tradition (3,3,3) A,W,Sp Interrelations of political, social, and economic develop-ments in literature and the arts, Middle Ages through the twentieth century. In English.

GERM 299 Supervised Study (1-5, max. 10) AWSpS

Prerequisite: permission of department adviser.

GERM 300 Studies in Germanics (3 or 5). Topics or figures of German literature or language. Ger-man texts. Prerequisite: 15 credits in second-year German or equivalent.

GERM 301, 302, 303 Grammar and Conversation (3,3,3) AW,WSp,Sp

Materials used aim not merely at an increase in ability to speak, write, and understand German, but also at broad-ening the student's understanding of the culture of Ger-man-speaking countries. 301: emphasizes phonetics and vocabulary building. 302 and 303: stress conversation and composition. Prerequisite: 15 credits in second-year German or equivalent.

GERM 307 Third-Year Composition (5) S For participants in special summer programs only.

GERM 310 Introduction to Twentieth-Century Critical analysis, interpretation, and comparison of indi-

vidual works by twentieth-century writers. Short stories, poems, and one play by authors such as Kafka, Zweig, Walser, Borchert, Boll, Aichinger, Trakl, Rilke, Heym, Brecht, and Frisch. Prerequisite: 15 credits in secondyear German or equivalent or permission of instructor.

GERM 311 Introduction to the German Novella (3) WS

Critical analysis, interpretation, and comparison of German novellas, and consideration of the theory and devel-opment of the German novella in the nineteenth century. Prerequisite: 15 credits in second-year German or equivalent or permission of instructor.

GERM 312 Introduction to Goethe (3) Sp Critical analysis and interpretation of Goethe's Faust, Part I, with consideration of the literary and historical background of the work, and critical analysis and interpretation of selected poems by Goethe. Prerequisite: 15 credits in second-year German or equivalent or permission of instructor.

GERM 330 Conversational German (5) S For participants in special summer programs only.

GERM 393 Proctoring of First-Year German Film Course (1-2, max. 6) AWSp Restricted to upper-division students of German who have demonstrated sufficient proficiency in speaking German to lead discussion groups of participants in 150. Discussion group leaders (proctors) may participate in this program one or two hours per week and receive one credit for each hour in class. A total of 6 credits may be earmed by proctors for naticipation in three quarters of earned by proctors for participating in three quarters of 150, which runs the entire year under a different format each quarter.

GERM 394 Proctoring of Second-Year German

GERM 394 Proctoring of Second-Year German Film Course (1-2, max. 6) AWSp Restricted to upper-division students of German who have demonstrated sufficient proficiency in speaking German to lead discussion groups of participants in 250. Discussion group leaders (proctors) may participate in this program one or two hours per week and receive one credit for each hour in class. A total of 6 credits may be earned by proctors for participating in three quarters of 250, which runs the entire year under a different format each quarter.

GERM 401, 402 Grammar and Composition (3,3) A,W

Prerequisites: 301, 302, and 303, or permission of instructor.

GERM 403 Applied Linguistics (3) Sp

Linguistics in its ramifications and applications to teach-ing. Prerequisite: third-year German or permission of in-structor.

GERM 404 History of the German Language (3) From early Germanic to the present. Prerequisite: third-year German or permission of instructor.

GERM 405 Linguistic Analysis of German (3) Prerequisite: third-year German or permission of instructor.

GERM 407 Advanced Composition (5, max. 10) S For participants in special summer programs only. Not open for credit to those who have had 401, 402, 403.

GERM 410, 411, 412 Survey of Modern German Literature and Culture (3,3,3) A,W,Sp 410: German Romanticism; literature from 1800 to 1830 410: German Romanticism; literature from 1800 to 1830 with esthetic and historical consideration of works by Novalis, Brentano, Eichendorff, Heine, Kleist, Büchner, E. T. A. Hoffmann, Grillparzer, and others. 411: Nine-teenth Century Realism: literature from 1830 to 1890, with esthetic and historical consideration of works by Keller, Hebbel, Meyer, Süffer, Fontane, and others. 412: The Twartisth Century literature from 1800 to 1945. Keller, Hebbel, Meyer, Sutter, Fontane, and onners. 412: The Twentieth Century: literature from 1890 to 1945, with esthetic and historical consideration of works by Hauptmann, Kaiser, Brecht, Kafka, Mann, Rilke, Trakl, Stadler, Stramm, van Hoddis, and others. Prerequisite: for either 410, 411, or 412, 15 credits in third-year German, or permission of instructor.

GERM 413, 414, 415 Survey of Older German Literature and Culture (5,5,5) A,W,Sp 413: Medieval Literature: German literature from 750 to

1400, with esthetic and historical consideration of works from the Carolingian and Cluniac Periods, the Court Epic, the Heroic Epic, the Spielmannsepik, the Min-nesang, the poetry of the epigones who followed the Age of High Chivalry, and the German Mystics. 414: Litera-ture of the Sixteenth, Seventeenth, and Early Eighteenth Centuries: esthetic and historical consideration of works by the Ackermann aus Böhmen, Erasmus, Luther, Hans Sachs, the Historia von Dr. Faustus, Baroque poetry and the literature of the early Enlightenment. 415: Literature of the Eighteenth Century: esthetic and historical coasid-eration of works by Lessing, Schiller, and Goethe, with attention to the historical background and development of German Classicism. Prerequisite: for either 413, 414, or 415, 15 credits in third-year German, or permission of from the Carolingian and Cluniac Periods, the Court 415, 15 credits in third-year German, or permission of instructor.

GERM 430 Advanced Conversational German (5, max. 10) S For participants in special summer programs only. Not open for credit to those who have had 401, 402, 403.

GERM 473 Teaching of College-Level German (1, max. 9) AWSp

For teaching assistants only.

GERM 479 Special Topics in the Teaching of Foreign Languages (3, max. 9) S Intensive workshop for inservice and preservice teachers

of all foreign languages on some aspect of foreign-lan-guage teaching methodology. Prerequisite: foreign-lan-guage teaching experience or participation in a previous foreign-language methods course.

GERM 490 Contemporary German Literature (3) Interpretation of selected works by contemporary German authors.

GERM 491 Studies in German Poetry (3) Introduction to various methods of interpretation and to their practical application.

GERM 492 History of Germanic Philology (3) Introduction to the works of outstanding scholars in the field of Germanics.

GERM 495 Proseminar in German Literature (3, max. 15)

Special topics, the subject matter and depth of which are not included in other literature courses in the program, and which are to be arranged through cooperative consultation between students and faculty. Prerequisite: 15 credits in third-year German or permission of instructor.

GERM 497 Studies in German Literature (1-6, max. 15)

GERM 498 Studies in the German Language (1-6, max. 15)

COURSES IN ENGLISH

GERM 240 German Civilization and Literature (5) Introduction to the development of German civilization, stressing major periods, emphasizing their respective par-adoxical nature by a discussion of historical, social, and philosophical aspects as represented in contrasting trends of written work of that period. Texts, lectures, discussions are in English.

GERM 340 Friedrich Nietzsche in English (5)

Concerned with the analysis of Friedrich Nietzsche's chief works and the discussion of his position within modern German literature and thought.

GERM 341 Franz Kafka in English (5) Intensive study of the short stories and novels of Franz Kafka; emphasis on philosophical relevance and esthetic significance.

GERM 342 Thomas Mann in English (5) Intensive study of some of Thomas Mann's theoretical writings, short stories, and novels, interpreted within the wider context of German literature and philosophy at the turn of the century.

GERM 343 The Theme of God's Death in German Thought in English (5) Course devoted to the discussion of the great controver-sies about the traditional concept of God, pantheism, atheism, and nihilism, which mark German thoughi and literature since the late eighteenth century and throughout the nineteeth conver the nineteenth century.

GERM 344 The Late Hesse in English (5)

Offers an in-depth study of the major novels of Hermann Hesse. Hesse's works are discussed within the frame-work of the European intellectual tradition and with re-gard to their present popularity in the United States. The crisis of human individuality in a technological world is the major philosophical focus.

GERM 345 Bertolt Brecht in English (5) 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.

GERM 346 The Contemporary German Novel in English (5)

Major novels of the postwar period (1945 to present), discussed in their historical context. Contrasts between West and East German writers, such as Mann, Frisch, Grass, Böll, Lenz, Wolf, and Plenzdorf.

GERM 347 German Mysticism in English (3)

Historical survey of the quest for the mystical in German literature and philosophy from the Middle Ages to the twentieth century.

GERM 348 Love and Adventure in German Courtly Literature in English (3) Study of medieval literary, social, and intellectual trends from 1150 to 1250 as reflected in representative works of that period, such as poetry of the Minnesänger and courtly epics.

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GERM 349 Goethe in English (5) Study and interpretation of selected major works (espe-cially Faust) of Goethe, whose literary, philosophical, and scientific achievements are examined as integral parts of his quest for meaning, wholeness, and univer-sality, and whose impact on Western thinking is traced up to Thomas Mann and C. G. Jung.

GERM 350 The German Drama in English (3) Survey of the German drama from the eighteenth to the twentieth centuries.

GERM 352 Inside Hitler Germany in English (3) Critical analysis of German literature and culture from 1933 to 1945.

GERM 353 German Democratic Republic— Literary and Cultural Development (3) Comprehensive survey of the traditions leading to the founding of the German Democratic Republic (GDR), which follows its history and examines the cultural development since 1945. Films, tapes, slides, translated liter-ary materials, and articles devoted to aspects of GDR culture and everyday life are used.

GERM 354 Great German Humanists of

Major literary works by German humanist and Baroque authors in English translation are analyzed and serve as points of departure for discussion of cultural, historical, religious, and socioeconomic aspects of the period 1492-1700. Renaissance and Reformation authors include: Erasmus von Rotterdam, Martin Luther, Murner, Hutten, Kaisersberg, and the Meistersinger school. For the Ba-roque, discussion focuses on selected texts from Grim-melshausen, Opitz, and others.

GERM 360 The Image of Woman in German Literature in English (3) The image of woman as a reflection of the prevailing social attitudes in various periods of German literature.

GERM 370 Man's Quest for Meaning in Contemporary Thought in English (3) Search for meaningful existence in contemporary thought. The main goal is to present this aspect of mod-ern life to a broader community of students and to discuss with them problems that constitute a challenge to an understanding of ourselves.

GERM 390 Germanic Studies in English (3 or 5) Topics or figures of German literature or language. English texts.

Courses for Graduates Only

GERM 500 Literary Theory and Methodology (3)

GERM 501 Bibliography and Methods of Research (3)

GERM 502 Stylistics, Literary Terminology, and Interpretation (3)

Introduction to stylistic aspects of German composition combined with the clarification of essential terms used in literary criticism and with exercises in various methods of interpreting poetry, drama, and prose.

GERM 503 Contemporary German Literature (3) Seminar analyzing the esthetic movements and thought of contemporary West, as well as East German literature, the social and political problems dealt with in the works of representative authors, and major experimental con-cepts. Some previous exposure to the German literature and civilization after 1945 is expected.

GERM 510 Medieval Literature and Civilization (5) A۰

German literature and civilization from 750 to 1400, with certain inclusive and civilization from 150 to 400, with esthetic and historical consideration of works from the Carolingian and Cluniac periods, the Court Epic, the He-roic Epic, the Spielmannsepik, the Minnesang, the poetry of the epigones who followed the Age of High Chivalry, and the German Mystics. Prerequisite: permission of de-partment or departmental adviser.

GERM 511 Literature and Civilization From 1400 to 1700 (5) W Survey of fifteenth, sixteenth, and seventeenth century

culture and literature for students with no previous in-struction in this period. Discussion of works by Tepl, Brant, Erasmus, Luther, Sachs, Grimmelshausen, Opitz, Gryphius, and other poets of German Renaissance, humanism, and baroque. Prerequisite: permission of depart-ment or departmental adviser.

GERM 512 Literature and Civilization of the Eighteenth Century (5) A Survey of German literature of the eighteenth century,

presented within the context of European civilization dur-

ing that period. Prerequisite: permission of department or departmental adviser.

GERM 513 Proseminar in German Literature of

the Eighteenth Century (3) A Discussion and critical evaluation of representative topics selected from the German literature of the eighteenth cen-tury. Prerequisite: permission of department or departmental adviser.

GERM 514 Literature and Civilization of the

GERM 514 Literature and Civilization of the Nineteenth Century (5) W Survey of nineteenth-century German literature. Major contributions from German-speaking countries such as Austria and Switzerland, within the context of European civilization during that period. Prerequisite: permission of department or departmental adviser.

GERM 515 Proseminar in German Literature of the Nineteenth Century (3) W Discussion and critical evaluation of representative topics

selected from the German literature of the nineteenth cen-tury. Prerequisite: permission of department or depart-mental adviser.

GERM 516 Literature and Civilization of the Twentieth Century (5) Sp Survey of modern German literature from the turn of the century to our own time. Major contributions from German-speaking countries such as Austria and Switzerland, within the context of European civilization during that period. Prerequisite: permission of department or departmental adviser.

GERM 517 Proseminar in German Literature of the Twentieth Century (3) Sp Discussion and critical evaluation of representative topics

selected from the German literature of the twentieth cen-tury. Prerequisite: permission of department or depart-mental adviser.

GERM 521 Seminar in the Literature of the Reformation and Renaissance (3)

GERM 522 Seminar in Baroque (3)

GERM 525 Seminar in Romanticism (3)

GERM 526 Seminar in Nineteenth-Century Drama (3)

GERM 527 Seminar in Nineteenth-Century Prose (3)

GERM 528 Nineteenth-Century Poetry (3) Representative selections from Hölderlin, the late Goethe, and from prevalent trends in nineteenth-century poetry such as romanticism, "Young Germany," poetic realism, and the experimental poetry of naturalism.

GERM 533 Seminar in Eighteenth-Century Literature (3)

Study of one or more of the literary movements: Enlight-enment, sentimentalism, anacreontics, storm and stress, connent, schumequaism, 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.

GERM 534 Storm and Stress (3)

Extensive investigation of poetological and esthetic con-cepts advanced by initiators and exponents of German storm and stress. Analyses of narrative and dramatic works of storm and stress reveal reflections and imple-mentations of the new theoretical concepts.

- GERM 535 Classicism: Goethe, Schiller (3)

GERM 540 Twentieth-Century Poetry (3 Development of German poetry from Rilke, Hof-mannsthal, and George through Trakl, Benn, the Ex-pressionists and the Dadists, Brecht, and Enzensberger, to such contemporaries as Eich, Heissenbüttel, the concrete poets, Celan, and Bachmann.

GERM 541 Twentieth-Century German Drama (3) Selection from modern German drama representative of the concern with the human condition, of social criticism, and of experimentation with the new dramatic forms.

GERM 542 Twentieth-Century Prose (3) 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 indi-vidual problems of existence and identity.

GERM 550 Gothic (3)

GERM 551 Seminar in Germanic Philology and

Linguistics (3) Topics vary. Prerequisites: basic knowledge of German and at least one elementary linguistics course.

- GERM 552 Old High German (3)
- GERM 555 Old Saxon (3)

GERM 556 Middle High German (3)

GERM 558 Middle High German Literature II (3)

GERM 560 Modern Dialects (3)

GERM 564 Early Middle High German Literature

(3) Comprehensive presentation of early Middle High German literature in the original.

GERM 565 Seminar in Courtly Epic (3) Aspects and methods of literary analysis pertaining to the study of medieval courtly epics.

GERM 566 Late Middle High German Narrative

Study of the evolution of the late Middle High German novelistic narrative.

GERM 567 Minnesang (3) In-depth study of medieval German lyrics in the context of German and European literary and intellectual devel-opment. Poems of the period from Kurenberger through Walther are analyzed with stress on grammatical, formal, stylistic, and ideological interpretation. Prerequisite: ade-quate knowledge of Middle High German.

GERM 568 Seminar in Heroic Epic (3) Literary and historic problems of the German heroic epic, with special emphasis on the Nibelungenlied and the Dietrichsepik.

GERM 575 Teaching of German Literature and Civilization (3) Teaching of German language and literature on the ad-vanced level in secondary schools and colleges.

GERM 576 Modern Methods and Materials in Teaching German (3)

The audiolingual method and its application; current de-velopments in foreign-language teaching; evaluation of teaching materials.

GERM 577 Principles of Second-Language

Learning (3) Examination of the roles of aptitude, attitude, and motivation as factors affecting second-language learning in general, and German specifically. Recent developments (e.g., individualized instruction) are examined and dem-onstrated. Prerequisite: foreign-language teaching methods course.

GERM 580 Seminar in German Literature (3, max. 12)

Open topics seminar with varying content.

GERM 581 Seminar in Poetry (3, max. 12) Open topics seminar with varying content.

GERM 582 Seminar in Drama (3, max. 12) Open topics seminar with varying content.

GERM 583 Seminar in Prose (3, max. 12) Open topics seminar with varying content.

GERM 590 German Mysticism of the Late Middle Ages (1-5)

GERM 591 German Idealism and Materialism (3)

GERM 592 German Existentialism and Neomarxism (3)

GERM 600 Independent Study or Research (*) AWSpS

GERM 700 Master's Thesis (*) AWSpS

GERM 800 Doctoral Dissertation (*) AWSpS

HEALTH EDUCATION

Courses for Undergraduates

H ED 250 Contemporary Health Concepts (3) Investigation of contemporary health problems and the scientific concepts and the knowledge essential to the comprehension and the solution of these problems within society.

H ED 251 Introduction to Health Education (3) Examines the relationship between human behavior and health outcomes, the knowledge base for health educa-tion practice, and the historical context of the health education field. .

H ED 321 Psychosocial Determinants of Health-Related Behavior (5) Psychosocial and cultural determinants of change in

health-related behavior in the individual.

H ED 322 Planned Change in Health-Related Behavior (5)

Determinants of planned change in health-related behav-ior of the individual, group, institution, and community. Prerequisite: 321.

H ED 421 The Group as a Medium of Change in Health-Related Behavior (4) Groups as motivational forces and media for change in health-related behavior.

H ED 422 Concepts of Intervention in Health Education (5)

Examines the scientific and empirical basis of intervention in health education. Prerequisites: 321, 322, 421.

H ED 471 School Health Education (3) Health needs of the school-age child with emphasis on Incluin factors of the schools between whith emphasis of health-related behavior change through the school envi-ronment, health instruction, and health services in ele-mentary and secondary schools. Prerequisite: 20 credits in health education core courses.

H ED 472 Community Health Education (3) Study of community health services, health manpower, and consumer health needs and responses to health prob-lems, with emphasis on the role of health education in community health promotion. Prerequisite: 20 credits in health education core courses or permission of instructor.

H ED 473 Patient Education in Health Care (3) H ED 47.3 Patient Education in Health Care (3) Examines patients of patient education in health-care sys-tems, patient and health professional roles, and health ed-ucation needs of patients and health-care consumers. Pre-requisite: 20 credits in health education core courses or permission of instructor.

H ED 481 Human Sexuality and Education (3) Exploration of physiological, psychological, and cultural aspects of sexual development. Expression, problems, and adjustment of youth and adults. Basic concepts un-derlying sex education.

H ED 498 Special Studies in Health Education (1-12, max. 15)

Prerequisite: permission of instructor.

H ED 499 Undergraduate Research (3-12, max. 15) Prerequisite: permission of instructor.

Courses for Graduates Only

H ED 501 History of Health Education (3) Origins and impact of significant movements, events, and research that contributed to the development of mod-ern health education in the world, including contempo-nary trends and predictions.

H ED 502 Correlates of Variability in Health-Related Behavior (4) Psychobiological and sociocultural correlates of patterns

of variability in health-related behavior.

H ED 503 Seminar in Health Education (3, max. 9) Prerequisite: permission of instructor.

HED 505 Program Development and Evaluation (3) Conceptual models, program determinants, organiza-tional variability and reciprocal effects of evaluative tech-niques in health-related behavior change.

H ED 508 Administrative Relationships in the Health Education Program (3) Decision making, management theory, and interagency programs.

H ED 590 Research Analysis and Design (3) Research on health-related behavior and behavior change, research design, procedures. Prerequisites: 502, 505

H ED 600 Independent Study or Research (*)

H ED 700 Master's Thesis (*)

HISTORY

Upper-division courses (300 and 400 level) in the De-partment of History do not generally require prerequi-sites. Most 400-level courses deal with a single nation during a limited period. The 300-level courses deal with auring a united period. In 500-tevel courses add 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.

GENERAL HISTORY

Courses for Undergraduates

HST 111 The Ancient World (5) A

Bridgman, Ferrill, C. Thomas History of the origins of Western civilization to the fall of Rome.

HST 112 The Medieval World (5)

HST 112 The Medieval World (5) Bacharach, Boba, Bridgman, Lytle Survey of the political, economic, social, and intellectual history of the Middle Ages. Not open to students who have taken HSTAM 331 or 332 or 333.

HST 113 The Modern World (5) Sp

Bridgman, Pinkney, Sugar Survey of the political, economic, social, and intellectual history of modern Europe. Not open to students who have taken 302 or 303.

HST 207 Introduction to Intellectual History (5) Survey of the history of the idea of *eros* in the context of Western intellectual history from Plato to the twentieth century. Includes Plato's *Symposium*, the Bible, Ovid, St. Autustine, courtly love, Dante, Diderot, Marquis de Sade, Goethe, D. H. Lawrence, Freud, and contempo-rary movies and music. Equal attention is paid to the idea of *eros* and to fundamental changes in the assumptions of Western thought. Required for all majors in the compara-tive history of ideas. HST 207 Introduction to Intellectual History (5)

HST 215 The History of the Atomic Bomb (3) Hankins

History of the atomic bomb from the beginning of nu-clear physics to the security hearing of J. Robert Oppenheimer. The course includes a study of the scien-tific achievements that made the bomb possible, the orga-nization of a community of scientists in the United States, the history of the Manhattan Project, the decision to deploy the bomb, the moral misgivings of the scien-tists involved, and the problem of espionage and secu-rity, ending with the security hearing of Oppenheimer. In addition to readings in the voluminous literature on the subject, the course includes documentary films, and dis-cussions with faculty members who were actively en-gaged in the research of the Manhattan Project.

HST 216 The United States in Eastern Asia, 1784-1945 (5) Rutmo

Role played by the United States in Eastern Asia from the arrival of the first American vessel at Canton to the end of the war in the Pacific, with emphasis on the Far East-ern policy of the United States during the first four decades of the twentieth century. Offered jointly with SISEA 216.

HST 261 Survey of the Muslim Near East (5) Bacharach

Survey of the history of the Near East (the Arab coun-tries, Turkey, Iran, and Afghanistan) from the emergence of Islam in A.D. 622 to the present. The various aspects of history (culture, economics, politics, etc.) are discussed.

HST 294 Honors Historiography (5)

Levy Readings in the great historians, from the earliest time to the beginning of the twentieth century. Investigates how perception of the human past has altered our times. Recommended for students in the department's honors program, but also open to nonhonors students.

HST 299 Honors Colloquium (3-5)

Introduction to historical method. Through the use of well-known tales, the student examines historical evi-dence and studies the difference between mythology and legend and the nature of history.

HST 301 Early Modern European History:

1450-1648 (5)

Bridgman, Emerson, Griffiths, Levy Political, social, economic, and cultural history from the late Renaissance to the Peace of Westphalia.

HST 302 Modern European History: 1648-1815 (5) Bridgman, Emerson, Hankins, Lytle, Sugar Political, social, economic, and cultural history from the Peace of Westphalia to the fall of Napoleon.

HST 303 Contemporary European History Since 1815 (5)

Bridgman, Ellison, Emerson, Pinkney, Sugar Political, social, economic, and cultural history from the fall of Napoleon to the present.

HST 304 European Expansion Overseas Since 1650 (5) Bell

Survey of the expanding northern European empires Survey of the expanding northern European empires (England, Holland, France) of the seventeenth and eigh-teenth centuries; British naval and economic pre-emi-nence in the early ninetcenth century; height of European expansion and conflict overseas from 1870 to 1920; im-perial disintegration and collapse in the mid-twentieth century; legacy of empires and imperialism. Survey course in modern European history recommended.

HST 307 History of Christianity (5) Treadgold

Introduction to the history of the Christian religion, including doctrine, practice, church organization, and cul-ture, from the time of Jesus Christ to the present. No at-tempt to avoid the controversial aspects of the topic is made, but the necessity of founding argument on knowledge is stressed.

HST 310 Science and Religion in Historical Perspective (5)

Hankins

Scientific and religious ideas have been two of the major forces shaping our modern view of the world. Often re-garded as being in conflict, they can equally well be seen as complementary and interdependent. Study of the rela-tionship between scientific and religious ideas with focus or product a children of history form expirate to modern on particular episodes of history from ancient to modern times.

HST 311 Science in Civilization: Antiquity to 1600 (5) Hankins

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.

HST 312 Science in Civilization: Science in Modern Society (5) Hankins

Growth of modern science since the Renaissance, emphasizing the scientific revolution of the sevencenth cen-tury, the development of methodology, and the emer-gence of new fields of interest and new modes of thought.

HST 345 War and Society (5) Bridgman

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.

HST 351 History of Africa to 1800 (5) Griffeth

History of sub-Saharan Africa from antiquity to 1800. The peopling of the continent; the Iron Age in Africa; growth of centralized political institutions; stateless soci-eties; Islamic penetration; the African slave trade.

HST 352 History of Africa Since 1800 (5) Griffeth

History of sub-Saharan Africa from 1800 to the present. The nineteenth-century African revolutionary move-ments; European expansion and African resistance; colonial rule and the rise of modern nationalism; cross-currents of social, economic, and religious change; independent Africa and the guerrilla struggle.

HST 361 Slavery in History: A Comparative Study (5)

Bacharach

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 sur-veyed: the ancient Near East, Greece, Rome, Islam, Africa, Latin America, and North America.

HST 362 The Ending of Slavery in History: A Comparative Study (5) Pressly

Focus is on many of the societies in which chattel slavery was formally abolished, beginning in the late eighteenth century and continuing in the nineteenth and twentieth centuries: the northern United States, Haiti, Jamaica, Canada, Russia, the southern United States, Cuba, Bra-zil, Zaria (northern Nigeria), and some mid-Eastern and Far Eastern countries. In particular, two aspects of those societies are investigated: the circumstances and the manner in which slavery was abolished; and the condition and situation, after emancipation, of the former slaves and the former masters, and the descendants of each group.

HST 363 Wars in the Modern Near East (3) Bacharach

The Middle East, scene of some of the most significant military events in modern world history, with focus on the repercussions for participants in terms of political and psychological changes. Resident military specialists sup-plement the historical approach by analyzing the battles and wars on these terms.

HST 391-392 Honors Colloquium in the History of Ideas (5-5)

Discussion of selected topics in the history of ideas; writing of an interpretive essay.

HST 395 Modern Historical Writing, Honors Seminar (5)

Levy Introduction to new types of problems examined by his-torians and to the new techniques that have evolved for which bistories solution of those problems. Opens with a brief historio-graphical 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.

HST 411 Origins of Modern Science: The Physical Sciences (5) Hankins

History of the physical sciences seen through an intensive study of key periods in their development. Emphasis on the nature of scientific revolutions and the role of individual scientists. Prerequisite: one introductory course in a physical science.

HST 412 Science and the Enlightenment (5) Hankins

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.

HST 425 History of the British Empire and Commonwealth Since 1783 (5) Rell

Britain in the Caribbean, Africa, India, Southeast Asia, and the Pacific: and the settlement, economic develop-ment, and political evolution of Canada, Australia, New Zealand, and South Africa.

HST 443 The United States and Japan: From Perry to MacArthur (5) Butow

History of Japanese-American relations from the arrival of Perry's "black ships" in 1853 to the surrender of Japan in 1945. Prerequisite: history of modern Japan or equivalent.

HST 447 Historical Case Studies in Strategy and Policy (4) Fowler

Study of the precepts of Clausewitz and Mahan in several wars or diplomatic situations, chosen from the nineteenth and twentieth centuries. Designed for upper-division and graduate students. Enrollment limited to twenty. Prerequisite: permission of instructor.

HST 448 Franklin D. Roosevelt and His World, 1882-1945 (3) Sp Butow

Life and times of the thirty-second President of the United States, with emphasis on American foreign relations—especially the role he played in the emergence of the United States as a world power. Offered jointly with SIS 448.

HST 450 History of West Africa From A.D. 1000 to the Present (5) Griffeth

States of the Western Sudan to 1600; the trans-Atlantic slave trade; the Fulbe *jihads*; the coastal peoples and European penetration; colonial rule and the West African nationalist response; political independence and economic dependency in the contemporary period.

HST 451 History of East and Central Africa From Antiquity to the Present (5)

Griffeth Nilotic Africa and Ethiopia from the Kingdom of Axum to modern times; Bantu, Nilotic, and the Cushitic migra-to subditional to subditional the Supplitionant. tions and the growth of state systems; the Swahili coast, its Arab and Portuguese invaders; European conquest and the African response; modern nationalist developments to the present.

HST 452 Southern Africa From 1500 to the Present (5) Griffeth

Development of political, social, and economic institu-tions in Africa south of the Zambezi River from the Portuguese arival to the present; the Cape Colony, Afrikaaner, and British interactions with African peoples from 1652 to 1870; political, social, and economic devel-opments in the white settler states of southern Africa from 1870 to the present.

HST 461 History of the Near East: 622-1300 (5) Bacharach

The Arab countries from the emergence of Islam.

HST 462 History of the Near East: 1300-1789 (5) Bacharach

The Arab countries to the accession of Sultan Selim III.

HST 463 History of the Near East Since 1789 (5) Bacharach

The Arab countries from the westernizing reform movements to the present.

HST 464 History of North Africa (5) North Africa (Libya, Tunisia, Algeria, and Morocco) from the time of the Muslim conquest to the establish-ment of Independence from European colonial rule. Eco-nomic, social, and cultural developments are emphasized, as is the process by which separate states came into being. Relations with the rest of the Muslim world, with Africa to the south, and with Europe are examined.

HST 465 Numismatics Seminar (3)

Bacharach

Introduction to the use of numismatic evidence for political, economic, and cultural history. Prerequisite: permission of instructor.

HST 467 Nations and States in the Modern World (5) Treadgold

Development of national consciousness in the "old na-tions" of Europe before the French Revolution. Replace-ment by new nationalism, spreading into East Central Europe, Russia, Ibero-America, Asia, and Africa.

HST 469 Introduction to Modern Jewish History

(3 or 5) Selective problems in modern Jewish history, 1789-

HST 470 Medleval Jewish History (5) 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 Cruisades and their legacy; intellectual achievements; conflict and coopera-

HST 471 History of the Jews in Eastern Europe (5) Jews in Eastern Europe, from the Khazars to the Holocaust •

HST 481 Economic History of Europe (5) Morris

Origins of the modern European economy; historical analysis of economic change and growth from medieval times that stresses the preconditions and consequences of industrialization. Offered jointly with ECON 460. Rec-ommended: ECON 200, 201.

HST 491-492 Honors Historical Method (5-5) W;Sp The purposes, materials, and techniques of historical scholarship. Theory, practice, and criticism.

HST 498 Senior Seminar (3-5, max. 15)

Each seminar examines a different subject or problem. A list of the seminars and their instructors is available in the Department of History office. Students must have the permission of the instructor of the seminar in which they plan to enroll.

HST 499 Undergraduate Research (1-5, max. 15) AWSp

Courses for Graduates Only

HST 511 History of Science (3-6) Hankins

HST 512-513-514 Seminar in the History of Science (3-6)-(3-6)-(3-6) A,W,Sp Hankins

HST 524 British Empire History (3-6) Bell

HST 543 American Diplomacy and the World Crisis, 1931-41 (3-6)

Butow Field course in the diplomacy of the decade preceding American entry into the Second World War, with emphasis on the Far Eastern crisis. Prerequisite: permission of instructor.

HST 544-545 Seminar in American Diplomacy and the World Crists, 1931-41

(3-6, max. 12)-(3-6, max. 12)

Rutow

Diplomacy of the decade preceding American entry into the Second World War, with emphasis on the Far Eastern crisis. Prerequisite: permission of instructor.

HST 551 Field Course in African History (3-6) Griffeth

Systematic examination of key historical writings and interpretive controversies in African history, with special attention to the growth of multidisciplinary approaches to historical reconstruction and the evaluation and use of oral historical data. Prerequisites: reading knowledge of one of the following: French, German, Portuguese, Ara-bic, or other African language.

HST 561 Islamic History (3-6)

Bacharach

Field course. Introduction to advanced study in the major periods and problems of Islam. Bibliographical guidance is stressed.

HST 562 Ottoman History (3-6) Sugar

Field course. Introduction to the major periods and prob-lems 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).

HST 563 Modern Near East (3-6)

Bacharach

Field course introducing the student to the major periods and problems of Near Eastern history, 1798 to the pres-ent. Prerequisite: permission of instructor.

HST 571 History in the College (0) Optional noncredit course for prospective college and university history instructors, preparing them for their duties. Prerequisite: M.A. degree in history.

HST 591 Historiography: Ancient and Medieval European (3) A

HST 592 Historiography: Early Modern European (3) W

HST 593 Historiography: Early Modern European and American (3) Sp

HST 598 Methods of Historical Research (5)

Practical instruction in the scholarly techniques employed in historical research. A professional level of competence is inculcated through written exercises involving the actual searching out of historical sources, the critical evaluation of documents, the utilization of historical evidence in writing papers and theses, and the proper forms of doc-umentation. Field trips to various archival establishments supplement the lectures and written exercises.

HST 600 Independent Study or Research (*) AWSpS

HST 700 Master's Thesis (*) AWSpS

HST 800 Doctoral Dissertation (*) AWSpS

HISTORY OF THE AMERICAS

Courses for Undergraduates

HSTAA 135 The American People and Their Culture in the Modern Era: A History of the United States Since 1940 (5) Pease

Investigation of the principal forces in the history of the United States during the recent era of worldwide social changes. Primarily through study of documents, personal testimony, and other source materials, through written re-ports on historical problems, and through group tutorials, lectures, and audiovisual presentations, students are en-couraged to examine evidence and to think "historically" about persons, events, and movements within the mem-ory and era of their own generation and that immediately preceding theirs. Primarily for first-year students.

HSTAA 150 Afro-American History (5)

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.

HSTAA 180 History of the Chicano People to 1848 (5) Gil

Historical survey of the Chicano people from pre-His-panic times to the war between the United States and Mexico.

HSTAA 181 History of the Chicano People Since 1848 (5) Gil

Historical survey of the Chicano people since the war be-tween the United States and Mexico. Recommended: 180

HSTAA 201 Survey of the History of the United States (5) AWSp

Supplies the knowledge of American history that any in-

telligent and educated American citizen should have. Objective is to make the student aware of his heritage of the past and more intelligently conscious of the present.

HSTAA 202 Makers of American Foreign Policy, 1776 to the Present (5)

W. Fowler

Survey of the history of American foreign relations. Focus on the individuals responsible for initiating new foreign policies or for realigning old ones.

HSTAA 281 Introduction to Latin American History: From Columbus to Castro (5) Solberg

Survey of political, economic, and social history of Latin America from the Iberian conquest to the present. Lec-tures, 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 301 Foundations of American Civilization (5) Johnson

Founding of Anglo-Saxon society in the western hemi-sphere, with attention to the earliest colonial establish-ments, the growth of a new culture, independence, and the organization of the American Union.

HSTAA 311 American Civilization: The First Century of Independence (5)

Pease, Pressly, Saum

Establishment of the constitutional system; national ex-pansion; intellectual and cultural development; internal conflicts, the Civil War, and Reconstruction.

HSTAA 331 Modern American Civilization From 1877 (5)

Burke, Pease, Pressly Emergence of modern America, after the Civil War; interrelationships of economic, social, political, and intellectual developments.

HSTAA 333 The American South Since the 1920s (5) Fowler

Political, social, and economic developments in the eleven states of the former Confederacy. Special atten-tion to the questions of race relations, civil rights, and cultural distinctiveness. Recommended: 201.

HSTAA 351 Formation of the American Constitution to 1840 (3)

English constitutionalism and its meaning for the colo-nies; the American Revolution; constitution making in the states; the Articles of Confederation and the Constituadoption of 1787; inauguration of the new government and adoption of the Bill of Rights; constitutional decisions of John Marshall; Jacksonian democracy and its constitutional implications.

HSTAA 377 History of Canada (5)

Solberg General survey and analysis of political, economic, so-cial, 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.

HSTAA 381 Latin America: The Early Colonial Period (5)

Alden, Solberg Discovery and founding of Spanish and Portuguese em-pires in the New World and their development until the eighteenth-century reorganizations.

HSTAA 382 Latin America: Late Colonial and Early National Periods (5)

Alden, Solberg Imperial reforms, the struggle for independence; the founding of new nations.

HSTAA 383 Modern Latin America (5)

Solberg Analysis of economic problems, political and social changes, and intellectual trends in major Latin American

HSTAA 384 History of Inter-American Relations (5) Gil

Inter-American relations, focusing on the diplomatic and military responses of the United States to the problems of

Latin America since 1776, are surveyed historically with commensurate emphasis on the activities of regional or-ganizations. Recommended: 381, 382, 383.

HSTAA 401 American Revolution and Confederation (5)

Inhnson

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) Inhason

New England from the time of the first contacts between white settlers and the aboriginal inhabitants 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 405 The South From 1600 to 1830 (5) Johnson

The South from the founding of the plantation society to its emergence as a self-conscious section in the early nineteenth century. Emphasis on patterns of settlement, labor systems, the influences of trade and empire, regional politics, a provincial culture, and the South's role in the Revolution and the new nation, together with the personalities through which these themes were expressed.

HSTAA 407 Andrew Jackson's United States (5)

Rorabaugh United States from 1820 to 1850, a period of unprecedented change in politics, society, and culture. Cities grew, factories were built, more people voted, and re-formers advocated abolition, temperance, and women's rights. A basic knowledge of United States history is assumed.

HSTAA 409 American Social History: The Early Years (5)

Rorabaugh

Survey of American society and institutions from the co-lonial 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)

Rorabaugh

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Survey of American society and institutions from Recon-struction 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) Pressly

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)

Anglo-American advance into interior of continental United States culminating in occupation of Far West. Ri-valry 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 im-plementation; 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)

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. Recommended: 412.

HSTAA 415 History of Indian-White Relations in Anglo-America (5)

Indian-White contact, conflict, and accommodation from the Atlantic colonies in the seventeenth century to the

American nation in the twentieth: Indian cultural groups and their varying adjustments to European civilization; economic exchanges and cultural borrowing; Anglo per-ceptions of, and approaches to, natives; effects of colo-nial wars and American Revolution; evolution and implementation of federal Indian policies; impact of westering frontiersmen; disintegration of Indian societies in the ninetcenth century; Indian resistance to acculturation; condition and changing role of native Americans in modem society.

HSTAA 420 The American Disinherited (3)

Survey of major groups that have not shared in the Amer-ican dream, and the clash of that dream with reality. Spe-cial emphasis is given poverty, alienation, discrim-ination, and other forces that produced the disinherited. The course analyzes reactions, specific periods, and is-sues when the disinherited became objects of local and national concern. Prerequisite: any course in the history of the United States since 1865.

HSTAA 425 American Urban History Before 1870 (3 or 5)

Survey of urban development in America from the seventeenth century examining the origins of cities, bases of growth, patterns of development, and the complexities and impact of problems that resulted from the cities' internal growth pattern. Students taking this course for 3 credits attend three weekly lectures. Those receiving 5 credits attend the same three weekly lectures plus two ad-ditional class hours devoted to discussion and special research projects. For history majors and students with ur-ban specialties.

HSTAA 426 American Urban History Since 1870 (3 or 5) Survey of the growth and transformation of American

cities in the nineteenth and twentieth centuries, examincines in the nineteenth and twentieth centuries, examin-ing problems of the metropolis, the impact of industrial-ization and technological change, immigration, migra-tion, ethnicity, and class; relationship between the changing physical city and the factors that gave the de-sign its substantive form. Students taking this course for 3 credits attend three weekly lectures. Those receiving 5 credits attend the same three weekly lectures plus two ad-ditional least hours devuted to discretion and credit at ditional class hours devoted to discussion and special research projects. For history majors and students with urban specialties.

HSTAA 431 American Politics and Society Since 1920 (5)

Burke, Pease 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) Saum

Exploration and settlement; economic development; growth of government and social institutions; statehood.

HSTAA 436 American Jewish History Since 1885 (5)

Political, social, economic, and religious history of the American Jewish community from the period of the great eastern European migration until the present. The inteeastern European migration until the present. The integration of the immigrant community into the general American community; the rise of nativism; the develop-ment of American socialism; World War I and World War II; and the reactions of the American Jews to these events.

HSTAA 443 Black Americans, 1619-1877 (5) General survey and critical examination of the forces that have shaped the history of Black Americans from the co-lonial period to the end of Reconstruction, with special emphasis on community, institutional, and social development.

HSTAA 444 Black Americans, 1877 to the Present

(5) General survey and critical examination of the forces that have shaped the history of Black Americans since the end of Reconstruction, with special emphasis on community, institutional, and social development.

HSTAA 451 Constitution Making in America, 1776-89 (5)

Intensive study of the framing of the Articles of Confederation, the state constitutions, the territorial ordinances, the U.S. Constitution of 1787, and the Bill of Rights. Class discussions and term paper, in addition to required attendance at lectures offered in 351, which cover the English and colonial backgrounds and develop-ments to 1840. Credit cannot be received for both 351 and 451.

HSTAA 454 The Intellectual History of the United States (5) Saum

Lectures and discussions devoted to the development of the American mind, from historical beginnings to the

HSTAA 455 History of American Liberalism Since 1789 (5)

Burke, Pease, Pressly, Saum Comparative study of aims and accomplishments of four major reform movements in the United States: Jeffersonian democracy, Jacksonian democracy, Progressivism, the New Deal.

HSTAA 456 The American Character (5) Pease

Examines the ways that, throughout American history, persons in a position to compare at least two nations or societies, one of which was the United States, perceived in the American people distinctive traits of character; ex-plores prevailing explanations for the American character and tries to assess its historical consequences. Lectures, discussion, reading, reports. Prerequisite: two college-level courses in history, including study of the American people and of the people of at least one other modern nation or society.

HSTAA 458 History of American Education to 1865 (5)

Development of American education in cultural context: colonial period, influence of enlightenment, and common school movement. Offered jointly with EDEPS 494.

HSTAA 459 History of American Education Since 1865 (5) Burges

Development of American education in cultural context: progressive education, recent criticism, continuing issues and trends. Offered jointly with EDEPS 495.

HSTAA 461 Diplomatic History of the United States, 1776-1901 (5) Fowler

Foreign policy of the United States government prior to the twentieth century. Emphasis on international wars, territorial expansion, and the peculiarities of the Ameri-can position in world politics. Prerequisite: 202 or graduate standing.

HSTAA 462 Diplomatic History of the United States, 1901-Present (5) Fowler

Foreign policy of the United States government during the twentieth century. International wars and the other major episodes in diplomacy are emphasized. Prerequi-site: 202 or graduate standing.

HSTAA 482 The History of Brazil: Colonial Period to the Present (5) Alden

Colonial foundations; the first and second empires; the old and new republics; current problems; prospects for the future.

HSTAA 483 The River Plate Republics and Chile: **Colonial Period to the Present (5)** Solberg

Analyzes political history, economic development, social change, and intellectual trends in Argentina, Uruguay, Paraguay, and Chile; it also considers the relations of these countries with the United States and Europe, and with each other.

HSTAA 485 Social Revolution in Twentieth-Century Latin America: A Comparative Approach (3) Solberg

Analyzes and compares twentieth-century Latin Amer-ica's three major social revolutions: Mexico (1910-20), Bolivia (1952-64), and Cuba (since 1959). Lectures, dis-Boinva (15)2-04), and claud (anice 15)2). Declarates, use cussions, and readings examine the backgrounds and causes of these revolutions, as well as the political, so-cial, economic, and cultural changes they produced. Re-lationships between the United States and revolutionary and post-revolutionary governments are carefully considered.

HSTAA 486 History of Mexico: Colonial Origins to 1822 (5) Alden, Gil, Solberg

Political, social, and economic history of Mexico from its discovery by the Spanish to its independence from Spain.

HSTAA 487 History of Mexico: 1822 to the Present (5)

Alden, Gil, Solberg Alden, Gi, Souvery Political, social, and economic history of Mexico from its independence from Spain to the present. Recommended: 486.

HSTAA 488 History of the Caribbean and Central America (5) Gil

Political, social, and economic history of principal countries in the Caribbean and Central America from their discovery to the present.

Courses for Graduates Only

HSTAA 501 American History: Early (3-6) Johnson

HSTAA 503-504 Seminar in American History: Early (3-6, max. 12)-(3-6, max. 12) Johnson

HSTAA 509-510 Seminar in American Urban History (3-6, max. 12)-(3-6, max. 12) Concentration on bibliography and research problems in urban history. Research project chosen in consultation with the instructor. Readings in various areas of urban history and development.

HSTAA 511 American History: Civil War (3-6) , Pressly

HSTAA 512 American History: Western (3-6)

HSTAA 513-514-515 Seminar in American History: Western (3-6, max. 12)-(3-6, max. 12)-(3-6, max. 12)-

HSTAA 521 American History: Writings and Interpretations, 1770-1870 (4-6) A Burke, Fowler, Pease, Pressly

HSTAA 522 American History: Writings and Interpretations Since 1870 (4-6) W Burke, Fowler, Pease, Pressly

HSTAA 524 American Social History Before 1860 ദ്രഹ

Field course. Survey of major problems and literature in American social history before 1860.

HSTAA 525 American Social History After 1860

(3-6) Field course. Survey of major problems and literature in American social history after 1860.

HSTAA 531 ' American History: Twentieth Century (3-6) Burke

HSTAA 532-533-534 Seminar in American History: Recent Period (3-6, max. 12)-(3-6, max. 12)-(3-6, max. 12) A,W,Sp Burke, Pease

HSTAA 554 American History: Intellectual (3-6) Saum

HSTAA 555-556 Seminar: American Intellectual History (3-6)-(3-6) Saum

Develops research and writing competence in American intellectual history. Prerequisite: permission of instructor or graduate program adviser.

HSTAA 561 History of American Foreign Policy (3-6) Fowler

HSTAA 562-563 Seminar in American Diplomatic History (3-6)-(3-6) Fowler

HSTAA 577 History of Canada (3-6)

Solberg Canadian historiography and bibliography from the foun-dation of New France to the present.

HSTAA 581 Latin American History: Colonial Period (3-6) Alden

HSTAA 582 Latin American History: National Period (3-6) Alden, Solberg

HSTAA 583-584-585 Seminar in Latin American History (3-6, max. 12)-(3-6, max. 12)-(3-6, max. 12) Alden, Solberg

Problems of historical research in the history of Latin America from colonial beginnings to the present.

HSTAA 586-587 Seminar in Comparative Colonial History (3-6)-(3-6) Alden

ANCIENT AND MEDIEVAL HISTORY, INCLUDING BYZANTINE

Courses for Undergraduates

HSTAM 201 Ancient History (5)

Ferrill, Thomas

Development and characteristics of ancient Greek civllization from the Bronze Age to the Roman conquest. Greek origins are placed in the context of the develop-ment of the ancient Near East.

HSTAM 202 Ancient History (5) Ferrill, Thomas

Political, social, economic, and cultural development of Rome from the beginnings in the eighth century B.C. to the beginning of the Middle Ages.

HSTAM 203 Introduction to the Middle Ages: Medicval People (5) Bynum

Inroduction 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) Ferrill

Military history from prehistoric times to the fall of the Roman Empire, with special emphasis on the Graeco-Roman period and the campaigns of Alexander the Great, Hannibal, Scipio Africanus, and Julius Caesar.

HSTAM 331 Early Middle Ages (5) The Dark Ages, feudalism, emergence of the medieval order of civilization, and the development of Romanesque culture.

HSTAM 332 Central Middle Ages (5)

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)

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 336 The Humanist Ideal: From the Greeks to the Renaissance (3) Ferrill, Griffiths, C. Thomas

Students read certain ancient, medieval, and Renaissance texts, selected to show the continuity and the trans-formations of the humanistic tradition, and write periodic essays on their reading as well as a term paper. Intended to supplement courses on the history of the respective periods.

HSTAM 351 Medieval Italy (5) Italy, from the barbarian invasions to the Renaissance, considered in the framework of European and Mediterranean cultures.

HSTAM 401 Early Greece (5)

Ferrill, Thomas Study of the political, institutional, and cultural history of early Greece, with emphasis on the origins of Greek civilization.

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HSTAM 402 Classical Greece (5)

Ferrill, Thomas 1.41 Study of the political, institutional, and cultural history of classical Greece, with special emphasis on the legacy of Greece to Western civilization.

HSTAM 403 Alexander the Great and the Hellenistic Age (5)

Ferrill, Thomas

Political, social, economic, and cultural history of the Greco-Oriental world from Alexander to the Roman con-quest, with special emphasis on the change from citystate to world-state and the fusion of Greek and Oriental cultures.

HSTAM 405 Topics in Ancient History (3, max. 6) Ferrill. Thomas

An umbrella course that makes it possible to treat a special topic in the history of the ancient world during the period from the Bronze Age to the fall of the Roman Empire. One topic is studied in depth during the quarter. Prerequisite: permission of instructor.

HSTAM 411 The Early Roman Republic (3) Ferrill

Political, social, economic, and cultural history, with emphasis on the development of the constitution and territorial expansions.

HSTAM 412 The Late Roman Republic (3) Ferrill

Political, social, and cultural history, with special em-phasis on the period of Cicero and Caesar.

HSTAM 413 The Early Roman Empire (3) Ferrill

Political, social, economic, and cultural history, with emphasis on the Julio-Claudians.

HSTAM 414 The Late Roman Empire (3)

Ferrill Political, social, economic, and cultural history, with emphasis on the decline of ancient civilization.

HSTAM 421 The Byzantine Empire (5) Boba, Miller

Political, institutional, and cultural history of the Eastern Roman Empire from the fourth to the fiftcenth centuries, with emphasis on its relations with the Latin West and the Slavic and Moslem areas. 1.12

HSTAM 426 Origins of European States (5) Boba

From tribe to nation. Analysis of political, social, and cultural developments leading to the formation of territo-rial states in Europe. Prerequisite: some courses in medieval history or permission of instructor.

HSTAM 431 Topics in Medieval History, 500-1000 (5) Boba, Bynum

Study in depth of one or more topics in the history of Eu-rope during the early Middle Ages. Prerequisite: a course in medieval history.

HSTAM 432 Topics in Medieval History, 1000-1250 (5)

Boba

Study in depth of one or more topics in the history of Europe during the High Middle Ages. Prerequisite: a course in medieval history.

HSTAM 433 Topics in Medieval History, 1250-1500

(5) Study in depth of one or more topics in the history of Europe during the Later Middle Ages. Prerequisite: a course in medieval history. - 93

HSTAM 441 Church and State in the Middle Ages (5)

Boba Changing theories and realities of relationship between religious and secular elements of medieval civilization.

HSTAM 442 Central Europe in the Middle Ages (5)

Boba Origins and medieval history of Germany, Austria, Bo-hemia, and Poland, considered as a region within the sphere of Western European civilization.

HSTAM 452 The Early Renaissance (1300-1450) (3) Griffiths

Growth of a humanist culture in the Italian city-state in contrast with the Gothic values of the waning Middle Ages.

HSTAM 453 The High Renaissance (1450-1560) (3) Griffiths

Climax of the humanist tradition and the expansion of European culture.

HSTAM 470 Intellectual and Religious History of the Later Roman Empire and Early Middle Ages (5) A

Bvnum

Selected topics in intellectual and religious history A.D. 200 to A.D. 1000: the Apologists; Christian Platonism; neo-Platonism; the spread and triumph of Christianity; doctrinal disputes of the fourth and fifth centuries; the de-velopment of Biblical exegesis; the Latin Fathers with special attention to Augustine, Boethius, and Gregory the Great; the development of monasticism; saints' lives and the writing of history in the early Middle Ages; the Caro-lingian and Ottonian revivals with special attention to Carolingian theology and education; the monastic reforms of the tenth century. Most of the reading in original sources in translation. Prerequisite: appropriate back-ground in medieval history or intellectual history.

HSTAM 471 Intellectual and Religious History of the High Middle Ages (5) W Bynum

Selected topics in intellectual and religious history A.D. 1000 to A.D. 1300: the Investiture controversy; the religious revival of the eleventh and twelfth centuries; the revival of logic; early scholasticism with special attention to Anselm's "ontological argument," theories of the Atonement, and Abelard's ethics; the revival of interest in the classics; sacred and secular theories of love; the writing of history and autobiography; views of nature in the twelfth and thirteenth centuries; heresy and popular religion; the friars, the women's religious movement of the thirteenth century, and mysticism; high scholasticism with special attention to Thomas Aquinas, Bonaventure, and the condemnations of 1277. Most of the reading in original sources in translation. Prerequisite: appropriate background in medieval history or intellectual history.

HSTAM 472 Intellectual and Religious History of the Later Middle Ages (5) Sp Βνπωπ

Selected topics in intellectual and religious history A.D. 1250 to A.D. 1550. Concentration on Europe north of the Alps and on philosophical and theological issues rather than on "humanism" and the history of scholarship. Topics include: early fourteenth-century religious move-ments; the Avignonese papacy; mysticism in the four-teenth, fifteenth, and sixteenth centuries, with special attention to Eckhart, Cusanus, and Teresa of Avila; nom-inalist philosophy and theology; the *devotio moderna*; Wyclif and the Lollards; conciliarism; northern humanism with special attention to Erasmus; radical religious Is movements of the sixteenth century; Luther against his movements of the sixteenth century; Luther against his medieval background; Calvin; Catholic spirituality in the sixteenth century with special attention to Ignatius Loy-ola; witchcraft, magic and popular religion in the six-teenth century. Most of the reading in original sources in translation. Prerequisite: appropriate background in me-dieval history or intellectual history.

Courses for Graduates Only

HSTAM 501 Greek History (3-6) Thomas

Problems in the history of the Athenian constitution.

HSTAM 511 Roman History (3-6) Ferrill

Roman history, 31 B.C.-A.D. 37.

HSTAM 512-513 Seminar in Ancient History (3-6)-(3-6)

Ferrill. Thomas

Detailed study of special topics in ancient history. Pre-requisite: permission of instructor or graduate program adviser.

HSTAM 521 Byzantine History (3-6) Boba ·

HSTAM 530 Early Middle Ages (3-6) Boba

Field course. Survey of early European history through the times of tribal migrations and invasions from Asia. Problems and methods of research. Prerequisite: permission of instructor or graduate adviser.

HSTAM 531 Medieval European History (3-6)

HSTAM 532, 533, 534 Medieval European Seminar

(3-6, 3-6, 3-6) AWSp Prerequisites: a reading knowledge of French or German and Latin.

HSTAM 591, 592, 593 Advanced Medieval and

Renaissance Seminar (3-6, 3-6, 3-6) Bacharach, Boba, Bynum, Griffiths, Levy A continuing seminar, running three quarters of every year. Provides a forum in which all students of medieval and Renaissance history who are writing their theses, dis-sertations, or any research projects may submit their work in progress to peer and faculty evaluation.

HISTORY OF ASIA

Courses for Undergraduates

HSTAS 201 Ancient Indian Civilization (5) Conlon

Introductory course dealing with the religions, literature, philosophy, politics, arts, and history of India from earli-est times to the Muslim invasion.

HSTAS 202 Modern Indian Civilization (5) Conlon

Introductory course dealing with the Islamic impact, Brit-ish conquest, and contemporary India. Emphasis on the rise of nationalism, social organization, and contemporary life and history.

HSTAS 211 History of Chinese Civilization (5) Dull

intensive survey of Chinese civilization from earliest times to today. Course designed to introduce all students, including East Asian history majors, to the general sweep of Chinese history. The focus is on social, cultural, and intellectual developments.

HSTAS 212 History of Korean Civilization (5) Palais

Survey of Korean civilization from earliest times to the present. Course explores various aspects of the development of Korean society and culture in terms of government organization, social and economic change, literature, and art.

HSTAS 213 History of Japanese Civilization (5)

Hanley, Palais, Pyle Introduction to Japanese civilization from prehistory to modern times. Course explores traditions of Japane literature and art, Japan's unique political culture, and her economic and social patterns.

HSTAS 401 History of Ancient India (5) Conlon

India in ancient times; emphasis on forms of political or-ganizations and economic life, social organizations, and cultural developments. Prerequisite: 201 or permission of instructor.

HSTAS 402 History of Medieval and Mughal India (5) Conlon

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) Conion

Modern India; emphasis on forms of political organizations and economic life, social organizations, and cultural developments. Prerequisite: 202 or permission of instructor.

HSTAS 404 History of Twentieth-Century India (5) Conlon

Analysis of the problems in the fields of social life, international and domestic politics, education, economics, and other areas that confront India today and may determine her future.

HSTAS 405 Maharashtra in Indian History (5) Conlon

Regional approach to medieval and modern Indian history through examination of the history of Maharashtra in western India. The rise of the Marathas; British rule; political and economic modernization; religious and social life; problems of contemporary society. Prerequisite: 403 or permission of instructor.

HSTAS 421 History of Early Japan (5)

Hanley, Pyle Political, social, economic, and cultural development of Japan to the beginning of the Tokugawa. period

(seventeenth century).

HSTAS 422 History of Tokugawa Japan (5)

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HSTAS 423 History of Modern Japan (5)

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.

HSTAS 431 Tibetan History (3)

Wylie Survey of the history of Tibet from earliest times to the present, with emphasis on the status and relations of Ti-bet in Asian affairs and on the evolution of the political institutions of a lama-ruler state. Recommended background: 211 or equivalent. (Offered alternate years.)

HSTAS 451 Chinese History: Earliest Times to 221 B.C. (5)

Dull Preimperial China.

HSTAS 452 Chinese History: 221 B.C. to A.D. 906 (5) Dull

Development of the imperial Chinese state.

HSTAS 453 Chinese History: A.D. 906 to A.D. 1840 (5) Chan, Dull

The Wu, Tai, Sung, Yuan, Ming, and early Ch'ing periods.

HSTAS 454 History of Modern China (5)

Kapp China from approximately 1800 to the present, with major emphasis on political and intellectual history since 1895. The focus is on the processes of modernization and revolution, and on the relationship between them.

HSTAS 476 Western Influences in Russian and Chinese Intellectual History (4) Treadgold

Comparative analysis of stages of Western impact on Russian (1462-1917) and Chinese (1582-1949) thought previous to the proclamation of Marxism-Leninism as the official ideology.

HSTAS 481 History of Traditional Korea: Earliest Times to the Nineteenth Century (5) Palais

Survey of Korean history from earliest times to the modern period.

HSTAS 482 History of Modern Korea: 1860 to the Present (5) Palais

Traditional institutions and society, Japanese colonial rule, liberation and the Korean War, early Korean com-munist movement, and North Korea and South Korea since 1945.

See also HST 443.

Courses for Graduates Only

HSTAS 501 Indian History (3-6) Conlon

Prerequisite: permission of instructor.

HSTAS 502, 503 Seminar: History of India (3-6, max. 12; 3-6, max. 12) Conlon

Seminar on selected topics and problems in the history of

medieval and modern India. Prerequisites: 501 and permission of instructor.

HSTAS 521 Modern Japanese History (3-6)

Pyle Field course. Prerequisites: 422, 423, or permission of instructor.

HSTAS 522 Japan as a World Power, 1905-45 (3-6) **Rutow**

Field course in the diplomacy of the Japanese empire from the beginning of the Russo-Japanese War to the end of the Second World War.

HSTAS 523, 524 Seminar in Modern Japanese History (3-6, 3-6) Pyle

Prerequisite: permission of instructor.

HSTAS 525 Japan in the Twentieth Century (3-6) Beckmann

Problems in the political, economic, and social history of Japan, 1890-1952.

HSTAS 551 Field Course in Chinese History: Pre-Sung Period (3-6) וויית

Introduces Western language materials on traditional China in order to give the students bibliographical and other assistance in preparing for examinations in this field of history.

HSTAS 552-553-554 Seminar in Chinese History: Pre-Sung Period (3-6, max. 12)-(3-6, max. 12)-(3-6, max. 12) A,W,Sp Ďull

Prerequisite: reading knowledge of Chinese.

HSTAS 561 Field Course in Chinese History: Sung to Modern (3-6) Chan

Introduces Western language materials on Chinese his-tory from the Sung dynasty to the modern period in order to give students bibliographical and other assistance in preparing for examinations in this field of history.

HSTAS 562-563-564 Seminar in Chinese History: Sung to Modern (3-6)-(3-6)-(3-6) A,W,Sp Chan

Professional writing seminar in Chinese history from Sung to modern times. Prerequisite: reading knowledge of Chinese.

HSTAS 571-572 Chinese History: Modern Period (3-6)-(3-6) W,Sp

Kapp Field course in modern Chinese history, emphasizing extensive reading in the secondary literature on modern China. Course provides firm foundations for preparation of graduate field examinations and for future research and teaching. Readings are organized around major problems of interpretation in Chinese history since 1800. A portion of 572 is devoted to preparation of seminar pa-pers on significant topics. Prerequisite: 454 or permission of instructor.

HSTAS 573-574-575 Seminar in Chinese History: Modern Period (3-6, max. 12)-(3-6, max. 12)-(3-6, max. 12) A,W,Sp

Kapp Research seminar in modern Chinese history. Training in the materials and methods of research, and preparation of extended research papers, Prerequisites: 571-572 or per-mission of instructor and reading knowledge of Chinese.

HSTAS 581 Modern Korean History (3-6) Sp Palais

Field course. Prerequisite: permission of instructor.

HSTAS 582-583-584 Seminar in Korean History (3-6)-(3-6)-(3-6) A,W,Sp Palais

Selected topics in Korean history and historiography.

HSTAS 585 Research Seminar: Modern Korea (3-6) Palais

Advanced instruction in problems and methods of re-search in Korean history. No foreign language required. Prerequisite: permission of instructor.

See also HST 543, 544-545.

MODERN EUROPEAN HISTORY

Courses for Undergraduates

HSTEU 271, 272, 273 English Political and Social History (5,5,5) A,W,Sp Bell

England from the earliest times to the present, stressing the origins of American institutions and social patterns.

HSTEU 369 The Destruction of European Jewry, 1932-45 (3 or 5) W

Examines the history of anti-Semitism; the dimensions of Examines the insoly of all seminarity, the dimensions of the holocaust; the holocaust organization and the victims' responses; the reaction of the world to the events in Eu-rope, Allied policies, refugee policy, and American ac-tions. The numerous legal, historical, and sociological questions raised by these events are examined.

HSTEU 370 The Vikings (3) Study of 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.

HSTEU 371 Intellectual, History of Modern England (3)

Levy Relates the changes in political theory, philosophy, sci-ence, and literature to the historical events of the period 1500 to the present.

HSTEU 378 The Making of Contemporary France (3) Nostrand, Pinkney

Study of the historical origins and subsequent developof the international of the second second and the second s

HSTEU 380 History of Scandinavia to 1521 (3) Survey of Scandinavian history from the Viking Age to 1521, with emphasis on the efforts at unification between Iceland, Denmark, Norway, and Sweden, and their relationship to the European continent. Offered jointly with SCAND 380.

HSTEU 381 History of Scandinavia to 1809 (3) Survey of Scandinavian history from 1521 to 1809, with special emphasis on the Lutheran Reformation, the Thirty Years War, and the Napoleonic Wars. Offered jointly with SCAND 381.

HSTEU 382 History of Scandinavia From 1809 to

the Present (3) Survey of Scandinavian history from 1809 to the present, with major emphasis on the political, social, cultural, and economic development of the Scandinavian countries. Offered jointly with SCAND 382.

HSTEU 401 The Reformation (3)

Griffiths Origins of the disunity of Europe in the crisis of the six-teenth century with special emphasis on the relations between religion and politics.

HSTEU 402 History of the French Renaissance (5)

Sixteenth-century French history: the political and reli-gious conflicts of the Renaissance and Reformation seen through the eyes of contemporary writers and statesmen.

HSTEU 405 European Intellectual History: Eighteenth Century (5) Toews

Development of the social sciences, moral theory, politi-cal theory, and religious thought in eighteenth-century Europe. Rationalism, empiricism, utilitarianism, and the sources of idealism. Prerequisite: at least one course in the history of modern Europe.

HSTEU 406 European Intellectual History: Nineteenth Century (5)

Toews Toews 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, utilitari-anism in decline, liberalism as philosophy, the early Marx, Prerequisite: at least one course in the history of modern Furme. modern Europe.

HSTEU 407 European Intellectual History: Twentieth Century (5) Toews

Toews Selected topics in the intellectual history of the late nine-teenth and early twentieth centuries. The aftermath of Darwinism, the problems of methodology in modern so-cial science, historicism and moral relativism, irrational-ism in philosophy and social theory, revisionism in secu-lar and orthodox religions. Prerequisite: at least one course in the history of modern Europe.

HSTEU 411 Europe: 1814-70 (5)

Bridgman, Emerson, Lytle, Pinkhey, Sugar Development of Europe during the age of Metternich, the revolutions of 1848, and the emergence of new national states.

HSTEU 412 Europe: 1870-1914 (5)

Bridgman, Emerson, Sugar Impact of population increase and technological change on European society; stresses and strains in European life and outlook.

HSTEU 413 Europe: 1914-45 (5)

Bridgman, Emerson Politics and society of Europe in the age of the concentration camp.

HSTEU 414 Europe Since 1945 (5)

Ullman Political, economic, and military developments in Europe under the impact of the Cold War.

HSTEU 415 Europe in the Six Years' War (1939-45) (5)

Emerson

Inquiry to discover what the war of 1939-45 was about and what it did to the more than five hundred million Europeans.

HSTEU 421 France: 1429-1789 (5) Lytle, Pinkney

Political and cultural history, from Joan of Arc to the eve of the French Revolution. (Villon, Rabelais, Montaigne, Moliere, Voltaire, Rousseau, de Tocqueville.)

HSTEU 422 The French Revolution and Napoleon: 1789-1815 (5)

Lytle, Pinkney

Transformation of France under the Revolution of 1789; the Reign of Terror and Napoleon; the impact of the revolution and Napoleon upon Europe.

HSTEU 423 France Since 1815 (5)

Political, economic, and social history since the Congress of Vienna. Special emphasis laid upon the continuity of the revolutionary tradition.

HSTEU 431. Germany: 1648-1914 (5) Bridgman, Emerson

Survey of the society, economy, and political problems of central Europe from the Thirty Years War to World War I, with particular emphasis on the nineteenth century.

HSTEU 432 Germany: 1914-45 (5)

Bridgman, Emerson Politics and society from the collapse of the Bismarckian empire to the collapse of Hitler's empire.

HSTEU 435 World War I (5)

Bridgman, Emerson Political, institutional, cultural, and military history of World War I, with special emphasis on the impact of the war on European society.

HSTEU 438 Modern Russian Intellectual History (5)

Ellison, Treadgold

Development of Russian social and political thought and philosophy from the seventeenth century to the Revolu-tion of 1917.

HSTEU 439 Soviet Union Since World War II (5) Ellison

Covers both domestic and foreign policy and includes po-litical, economic, social, and cultural developments.

HSTEU 440 History of Communism (5) Ellison

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. Offered jointly with SISRE 440. Prerequisites: two courses in modern Euro-pean history or politics.

HSTEU 441 Medieval Russian Chronicles (5) Waugh

Introduction to the history of Russian chronicle writing, and to the study of the chronicles as literature and as his-torical sources, with emphasis on the latter. Prerequisites: reading knowledge of Russian and permission. Recom-mended: 443.

HSTEU 442 Russian Culture to the Era of Peter the Great (5)

Waueh

"high" culture (to the beginning of the eighteenth century): religion, political ideas, the arts in a broad sense; questions of cultural influences. Extensive use of audiovisual materials. Prerequisite: 443 or permission of instructor.

HSTEU 443 Kievan and Muscovite Russia: 850-1700 (5) Waugh

Development of Russia from earliest times to the reign of Peter the Great. Prerequisites: HST 111 and 112, or per-

mission of instructor. HSTEU 444 Imperial Russia: 1700-1900 (5)

Treadgold, Waugh

Development of Russia from Peter the Great to Nicholas II. Prerequisites: 443 or HST 111 and 112, or permission of instructor.

HSTEU 445 Twentieth-Century Russia (5) Ellison, Treadgold

Russia and the USSR from Nicholas II to the present. Prerequisites: 444 or HST 111, 112, and 113, or permission of instructor.

HSTEU 446 Russian Historiography (5) Prerequisites: 441 or 442 or HST 111 and 112, or permis-sion of instructor.

HSTEU 447 Russian and East European **Bibliography (5)**

Boba

Analysis of bibliographical problems in the social sci-ences and the humanities. For seniors and graduate stu-dents. Prerequisite: one East European language or German.

HSTEU 450 Ethnic History of Russia and East Europe (5)

Boba

Survey of races and ethnic groups in stages of acquiring national identity and political consciousness. Emphasis on processes of assimilation and alienation.

HSTEU 451 East-Central Europe Since 1342 (5) Sugar

Focus on the lands of today's Poland, Czechoslovakia, Hungary, and East Germany from the time when they were great powers to the present. Traces the major changes in the fortunes of these lands in both the local and international settings.

HSTEU 452 Eastern Europe Since 1918 (5)

Sugar Poland, Czechoslovakia, Hungary, Rumania, Yugosla-via, Bulgaria, and Albania, from the end of World War I to the present. Prerequisite: 451 or permission of instructor.

HSTEU 453 History of the Balkans, 1400 to the Present (5)

Sugar Deals with the centuries of Ottoman rule that produced a new basis for the re-emergence of independent states in the ninetcenth and twentieth centuries and with these new states until the present.

HSTEU 461 Formation of the Spanish Nation: to 1700 (5) Ullman

Study of the major political, economic, and cultural events leading to the creation of the Spanish nation under Ferdinand and Isabel.

HSTEU 462 Spain: 1700 to the Present (5) Uliman

Study of the political, economic, and cultural attempts of Spain to adjust to capitalism, liberalism, and secularism.

HSTEU 463 Portugal in the Age of Exploration (5) Alden

The pivotal role of Portugal in the expansion of Europe from the eleventh to the seventeenth centuries.

HSTEU 464 The Jews in Spanish History (3 or 5) Ullman

Role of the Sephardic Jews in Spanish politics, economy, and culture, emphasizing the medieval Golden Age and the Inquisition.

HSTEU 470 The Jacobethan Age: England, 1580-1630 (5)

Levy 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 wil-derness. 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 his-torical subjects. Not open for credit to students who have taken 471 or 472.

HSTEU 471 England in the Sixteenth Century (5) Levv

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 Eng-land. Not open to students who have taken 470.

HSTEU 472 England in the Seventeenth Century (5)

Levy Political, administrative, and social history from the ac-cession of James I to the Glorious Revolution. Not open to students who have taken 470.

HSTEU 473 England in the Eighteenth Century (5) Study of political, social, economic, and cultural devel-opments. Parliamentary government; rise of the British Empire; aristocratic culture.

HSTEU 474 England in the Nineteenth Century (5) Behimer, Bell

Political, social, and cultural development; the agrarian, industrial, and French revolutions; the rise of parliamen-tary democracy; the Victorian age; political thought from Utilitarianism to Fabianism; Irish home rule.

HSTEU 475 England in the Twentieth Century (5) Behlmer, Bell

From the Boer War to the present; conservatism, liberal-ism, and socialism; England in two world wars; the decline of British imperialism.

HSTEU 476 Modern Irish History (5) 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.

Courses for Graduates Only

HSTEU 501 Renaissance and Reformation (3-6) Griffiths

HSTEU 502-503-504 Seminar in the Renaissance and Reformation (3-6, max. 12)-(3-6, max. 12)-(3-6, max. 12) A,W,Sp Griffiths

HSTEU 515 Modern European Intellectual History (3-6)

Readings and discussions on selected problems in eigh-teenth—and nineteenth-century intellectual history. Pre-requisites: reading knowledge of French and permission of instructor or graduate program adviser.

HSTEU 516-517 Seminar: European Intellectual History (3-6)-(3-6)

Seminar on modern European intellectual history, chiefly in the eighteenth century. Prerequisites: permission and a reading knowledge of French, Italian, or German.

HSTEU 521 Modern European History: France (3-6) Lytle, Pinkney

HSTEU 522-523-524 Seminar in French History (3-6)-(3-6)-(3-6) A,₩,Sp Lytle, Pinkney

HSTEU 531 Modern European History: Germany (3-6)

Bridgman, Emerson

HSTEU 532-533-534 Seminar in Modern European History: Germany (3-6)-(3-6)-(3-6) A,W,Sp

Bridgman, Emerson

HSTEU 540 Medieval Russian Documents (3-6) Waugh

Introduction to the study of documentary sources for medieval Russian history; the methods and application of diplomatics, with an introduction to paleography and codicology. Prerequisites: reading knowledge of Russian and 443 or permission of instructor. Recommended: 441.

HSTEU 541 Medieval Russian History (3-6)

Waugh Prerequisites: 443 or permission of instructor and reading knowledge of Russian.

HSTEU 543 Seminar in Medieval Russian History (3-6, max. 12) Waugh

Prerequisite: reading knowledge of Russian.

HSTEU 544 Modern Russian History (3-6) Treadgold

HSTEU 545-546-547 Seminar in Modern Russian History (3-6)-(3-6)-(3-6) A,W,Sp Ellison, Treadgold

seminar in modern Russian history. Prerequisite: reading knowledge of Russian and either French or German.

HSTEU 548 Field Course in Soviet History (3-6) Ellison

Edison Specialized course for graduate history students in the scholarly literature of Russian history since 1917. In-tended for graduate students preparing for M.A. or Ph.D. field examination in Russian history of the Soviet period.

HSTEU 551 History of Eastern Europe: 1772-1939 (5) Sugar

Study of the East-central European region: Poland, Czechoslovakia, Hungary, Rumania, 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)

Sugar Prerequisite: reading knowledge of one major European or one East European language.

HSTEU 553-554-555 Seminar in Modern East European History (3-6)-(3-6)-(3-6) A,W,Sp Sugar

Study and research involving special methods dealing with the histories of the East European countries in the modern period.

HSTEU 562 Early Spanish History (3-6) Ullman

Problems in the history of Spain, antiquity through the Middle Ages.

HSTEU 563 Modern Spanish History (3-6) Ullman

Problems in the history of Spain, 1500 to the present.

HSTEU 571 English History: Tudor and Stuart (3-6) Levy

HSTEU 572 English History (3-6) Bell

HSTEU 573-574 Seminar in Modern English History (3-6)-(3-6) Bell /

HSTEU 575-576 Seminar in Tudor-Stuart History (3-6)-(3-6) Levy

Seminar in the history of England under the Tudors and the Stuarts. Prerequisite: 571 or permission of instructor.

HONORS-ARTS AND SCIENCES

H A&S 200-201 Humanistic Understanding and Human Culture (3-3) A or W, W or Sp Study of a topic related to linguistic, artistic, or other hu-manistic activities as ways of knowing, methods of inquiry, and systems of cultural association and exchange. For honors students only. (Last time offered: Spring Quarter 1981.)

H A&S 202-203 Empirical Thought and Human

Culture (3-3) A or W, W or Sp Study of a topic involving scientific modes of thought and inquiry as they are related to human culture. For honors students only. (Last time offered: Spring Quarter 1981.)

H A&S 300 Introduction to the Professions

(2-5, max. 15) Studies oriented toward professional work (law, medi-cine, public affairs, etc.). For honors students. Prerequisites: 200-201 or 202-203.

H A&S 350 Honors Seminar (2, max. 20) Discussion of selected topics in a variety of subject-mat-ter fields. Topics and reading material vary from year to year. For honors students only. Prerequisite: permission of Honors Office.

H A&S 398 Interdisciplinary Special Topics

(2-5, max. 15) Special interdisciplinary course for honors students. Subjects vary. Prerequisites: 200-201 or 202-203.

HUMANITIES

Courses for Undergraduates

HUM 212 Literature of the Medieval and

Renalssance Periods (5) Thematic and topical approach to literary masterpieces of the barbarian, Christian, Jewish, and Islamic traditions from late antiquity into the sixteenth century.

HUM 213 Literature of the Western Tradition: Modern (5)

Comparative thematic approach to European and American literature from the late sixteenth century to the pres-ent. Content and readings vary; emphasis on fundamental preoccupations of modern writers as a response to the times and societies in which they live.

HUM 233 Ideas in the Western Tradition: Modern (5) AWSp

Introduction to cultural issues and ways of thinking in the European traditions since the Renaissance. Topics and themes include writings in philosophy, literature, science, and other areas.

HUM 235 Ideas in Africa, Oceania, and the Americas (5)

Interaction between tribal value systems and new visions of man and society as modern nations emerge and define themselves in relation to old traditions. Emphasis on the conflict of ideas as a creative force in the contemporary world. Content and readings vary. (Last time offered: Winter Quarter 1981.)

HUM 291 Performing Arts-Early Traditions (5) A Conlon, Wolcott

Origins and development of the major forms of drama. music, and dance in the Western traditions from antiquity into the seventeenth century, including the social, technical, and theoretical aspects of performance.

HUM 292 Music in the Western Tradition: Modern

(5) Introduction to the major styles and forms of European and American music from 1650 to the present, designed to develop informed listening ability and an understanding of musical concepts and trends as they relate to the mainstream of Western civilization in the modern period.

INTERNATIONAL STUDIES

GENERAL

SIS 301 War (5) Sp

Chirat

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 SOC 301.

SIS 420 Energy Politics in International Perspective (5)

Relationship of energy, the economy, and political process. Focus on comparing policy response to energy cri-sis made by a number of nations, and an exploration of the prospects for domestic and international cooperation and conflict that problems of energy interdependence raise.

SIS 448 Franklin D. Roosevelt and His World, 1882-1945 (3) Sp Rutow

Life and times of the thirty-second President of the United States, with emphasis on American foreign relations—especially the role he played in the emergence of the United States as a world power. Offered jointly with HST 448.

AFRICAN STUDIES

Courses for Undergraduates

SISAF 265 Introduction to African Civilizations (5)

Introductory survey of African societies and cultures, de-veloped through both thematic and specific case-study treatments. Historical framework outlined within which African social, economic, and political systems are discussed and compared. Special attention given to the art, musical, and religious traditions. Geographical focus on Africa south of the Sahara Desert.

SISAF 300, 301, 302 Basic Swahili (5,5,5) A,W,Sp

Eastman

Introduction to the structure of spoken and written Swahili. Concentration on the acquisition of elemental conversational skill and an introduction to written texts of graded difficulty. Prerequisites: 300 for 301; 302 for 303.

SISAF 303, 304, 305 Basic Krio (5.5.5) A.W.Sp Williams

Elementary structures of Krio with emphasis on the acquisition of basic conversational and reading skills. Pre-requisites: 303 for 304; 304 for 305.

SISAF 306, 307, 308 Practicum in African Languages (3,3,3) A,W,Sp Eastman, Williams

Introduction to specific African languages with an emphasis on teaching skills that can be acquired in a lan-guage laboratory setting. One language is taught every time the course sequence is offered. Languages offered are Hausa, Yoruba, Twi, Duala, and Shona. Students are encouraged to converse with each other, using skills learned by means of tapes and explanations supplied by the instructor. Prerequisites: 306 for 307; 307 for 308, or permission of instructor.

SISAF 400, 401, 402 Intermediate Swahili (3,3,3) A,W,Sp Eastman

Reading of relatively complicated material from prose to traditional poetry. Emphasis on acquiring an ability to manipulate ideas in Swahili orally and written. Review of structure. Prerequisites: 300, 301, 302, or equivalent for 400; 401 for 402; 402 for 403.

SISAF 406, 407, 408 Intermediate Krio (3,3,3) A,W,Sp Williams

Advanced structures of Krio with further emphasis placed upon conversational skills and reading. Prerequisites: 305; 406 for 407; 407 for 408.

SISAF 410 Bantu Linguistics (3) Eastma

General survey of the development of Bantu linguistics with special emphasis on comparative Bantu hinguistics morphology, and syntax. Prerequisite: permission of instructor.

SISAF 444 African Studies Seminar (3, max, 9) W or Sp

Interdisciplinary seminar focusing upon one particular aspect of the African continent. Emphasis may be humanis-tic, social scientific, or historical. African Studies faculty and visiting scholars lecture on areas of their own expertise.

SISAF 450 African Oral Tradition (3) Eastman, Williams

Examines the range of oral tradition used in Africa from South African heroic poetry through Yoruba divinations to Berber music. Demonstrates the use of oral tradition as both historical method and expressive culture in its geographical, cultural, and religious context. Guest lecturers and audiovisual materials. Prerequisites: 300, 301, 302, or 303, 304, 305, or equivalents and either 265 or ANTH 202

SISAF 490 Special Toples (1-5, max. 15) AWSp Course content varies. Prerequisites: three courses in the

SISAF 499 Undergraduate Research (3-5, max. 15) AWSp Eastman, Spain, Williams Prerequisite: permission of instructor.

CHINA REGIONAL STUDIES

Courses for Undergraduates

SISEA 101 Contemporary China (5) Townsend, Staff

Introductory survey of contemporary China concentrating on the post-1949 evolution of Chinese government, economy, society, and culture.

SISEA 210 The Far East in the Modern World (5) Social, economic, and political problems of China, Ja-pan, Korea, and Southeast Asia. Includes development of Russia as an Asiatic power as well as the role of Western routing in the See Fort powers in the Far East.

SISEA 216 The United States in Eastern Asia, 1784-1945 (5) A Butow

Role played by the United States in Eastern Asia from the arrival of the first American vessel at Canton to the end of the war in the Pacific, with emphasis on the Far East-ern policy of the United States during the first four decades of the twentieth century. Offered jointly with HST 216.

SISEA 234 Man, Morality, and the State in Chinese History (5)

Introduction to perennial themes in the thought of South and East Asia. Content and emphasis vary (for example, China or India, classical or modern, political or cosmological thought).

SISEA 240 Chinese Civilization (5) ASp Dull

China's material civilization-including fine arts, literature, religion, and thought-in relation to general development of Chinese society.

SISEA 417 Asian Marxist Thought (3)

Introduction to the theory and, where appropriate, the practice of Marxist-Leninism in Asia from 1920 to the present. Readings, in translation, of Mao Tse-tung, Ho Chih Minh, Kim Il Song, D. P. Aidit, M. N. Roy, and Sanzo Nosaka. Emphasizes the relation of Asian Marxist thought to the specific domestic and international conditions of the time and to the classical ideas of Marx and Lenin. Offered jointly with POL S 417. Prerequisite: one course from either the nineteenth- or twentieth-century Marxism series or a course in modern Asian politics or history.

SISEA 424 Perspectives on East Asia for Teachers (3; max. 6) W Pyle, Townsend

Examination and evaluation of substantive concepts, resources, and materials employed in teaching about East Asia. Course requirements may vary in relation to the particular background of participants.

SISEA 443 Traditional Chinese Society (5) A Harrell

General survey of traditional institutions and their changes in modern times. Offered jointly with ANTH 403.

SISEA 444 Contemporary Chinese Society (5) W Harrell

Analysis of society in the People's Republic of China as a product of traditional Chinese society and the changes wrought upon it by the impact of the West and by the revolutionary policies and practices of the Chinese Com-munist Party. Offered jointly with ANTH 444. Prerequi-site: SISEA 443 or ANTH 403 or another acceptable course on Chinese society, or permission of instructor.

SISEA 445 Religion in China (5) Sp Harrell

The place of religion in Chinese society, examining the All place of religion in Chinese social consequences of the eclectic folk religion, the elite Confucian, Taoist, and Buddhist traditions, syncretistic sects, and imported Christianity. Offered jointly with ANTH 447. Prerequi-sites: one course in Chinese society, politics, or history, or permission of instructor.

SISEA 446 Political Development in East Asia (5) Sp Perry

Comparative examination of political development in Japan and China from the nineteenth century to the pres-ent. Emphasis on theories of development and their ap-plicability to the East Asian context. Prerequisite: one course in Chinese or Japanese history or in political development, or permission of instructor.

SISEA 455 Undergraduate Colloquium on China (5)

Palais, Townsend

Interdisciplinary study of China, with emphasis on the modern period. Prerequisite: permission of instructor.

SISEA 490 Special Topics (1-5, max. 15) AWSp Course content varies. Prerequisites: three courses in the area.

SISEA 499 Undergraduate Research (3-5, max. 15) AWSp

COURSES ON CHINA IN VARIOUS DISCIPLINES

ART H 311 Chinese Art (5)

ART H 411 Early Chinese Painting: T'ang to Yuan (3)

ART H 412 Later Chinese Painting: Yuan Through Ch'ing (3)

ART H 413 Selected Topics in Chinese Art (3, max. 9)

ART H 417 Buddhist Painting of China and Japan (3)

- ART H 418 Buddhist Sculpture of China and Japan
- ART H 419 Chinese and Japanese Architecture (3)

CHIN 293 Introduction to Literature and Ideas in China (5)

CHIN 361 Ideas and Literature in China, Early Period, in English (5)

CHIN 362 Ideas and Literature in China, Middle Period, in English (5)

CHIN 363 Ideas and Literature in China, Modern Period, in English (5)

CHIN 407 Chinese Reference Works and Bibliography (3)

C LIT 302 Comparative Literature: Themes (5)

C LIT 410 Literary Motifs (3-5, max. 10)

C LIT 496 Special Studies in Comparative Literature (3-5, max. 15)

ECON 466 Economic History of China: 1840-1949 (5)

ECON 493 Economy of Modern China (5)

GEOG 313 East Asia (5)

GEOG 336 Regional Geography of China (5)

GEOG 435 Problems in the Geography of China (5)

HST 498 Senior Seminar (3-5, max. 15)

HSTAS 211 History of Chinese Civilization (5)

HSTAS 451 Chinese History: Earliest Times to 221 B.C. (5)

HSTAS 452 Chinese History: 221 B.C. to A.D. 906 (5)

HSTAS 453 Chinese History: A.D. 906 to A.D. 1840 (5)

HSTAS 454 History of Modern China (5)

HSTAS 476 Western Influences in Russian and **Chinese Intellectual History (4)**

MUSIC 497 Music of China (3)

PHIL 415 Chinese Philosophy (5)

PHIL 416 Neo-Confucianism (5)

POL S 414 Chinese Political Thought (5)

POL S 432 American Foreign Policy in the Far East (5)

POL S 442 Government and Politics of China (5)

Courses for Graduates Only

SISEA 521-522 Seminar: Introduction to the Interdisciplinary Study of China (5-5) WSp Harrell, Townsend

SISEA 530 Seminar on China (3, max. 6) WSp Chan, Dull, Harrell Problems of Chinese history. Prerequisite: permission of instructor.

SISEA 531 Chinese History: Research Methods and Bibliographic Guides (3, max. 6) Chan

Introductory research seminar dealing with the methodological and bibliographical problems concerning all peri-ods and aspects of Chinese history from the earliest times to the nineteenth century. Prerequisite: two years of classical or modern Chinese.

SISEA 590 Special Topics (5, max. 10) AWSp Seminar. Course content varies. Offered occasionally by visitors or resident faculty

SISEA 600 Independent Study or Research (*) AWSp

SISEA 700 Master's Thesis (*) AWSp

COURSES ON CHINA IN VARIOUS DISCIPLINES

ART H 511 Seminar in Chinese Art (3, max. 9)

GEOG 505 Research Seminar: China and Northeast Asia (3. max. 6)

HSTAS 551 Field Course in Chinese History, Pre-Sung Period (3-6)

HSTAS 552-553-554 Seminar in Chinese History, Pre-Sung Period (3-6, max. 12)-(3-6, max. 12)-(3-6, max. 12)

HSTAS 561 Field Course in Chinese History, Sung to Modern (3-6)

HSTAS 562-563-564 Seminar in Chinese History: Sung to Modern (3-6)-(3-6)-(3-6)

HSTAS 571-572 Chinese History: Modern Period (3-6)-(3-6)

HSTAS 573-574-575 Seminar in Chinese History: Modern Period (3-6, max. 12)-(3-6, max. 12)-(3-6, max. 12)

POL S 532 The Chinese Political System (3) A

POL S 533 Seminar on Contemporary Chinese Politics (3) W

POL S 535 International Relations of Modern China (3-5) Sp

COMPARATIVE RELIGION

Courses for Undergraduates

RELIG 201 Introduction to World Religions: Western Traditions (5) AW Webb, Williams

Introductory course in the history of religions, concen-trating 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) W Conlon

Introductory course in the history of religions, concentrating on religions that have developed in South Asia and East Asia. Primary attention to Hinduism and Bud-dhism; other important Asian religions are discussed in relation to them, with emphasis on basic conceptual and symbolic structures.

RELIG 210 Introduction to Judaism (5) W Stanislawski -

Stanistawsa 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 220 Introduction to the New Testament (5) Williams

Modern scholarly methods of research and analysis in dealing with New Testament books and their interpretation. Attention is given to the genres of various books (gospel, epistle, sacred history, apocalypse), to problems of the relationships among author, material, and intended -audience, and to relationships between theme and image.

RELIG 301 Religious Thought Since the Middle Ages (5) W Webb

Survey of the development of religious thought in the West from the Middle Ages to the twentieth century. His-tory 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: 201.

RELIG 311 Classical Judaism (3 or 5) Sp

Benin

Benin Evolution of Judaism from the destruction of the Second Temple (70 B.C.) to the Middle Ages. Jewish concepts and doctrines by priests, political leaders, sages, and phi-losophers. Emphasis on the evolution and consolidation of the Talmud along with examination of Hellenistic Judaism, Rabbinic Judaism, and Jewish life in the Is-lamic world. Works studied are Philo, Hillel, Akibah, Saadya, Judah Ha-Levi, and Moses Maimonides. Rec-ommended: 210. ommended: 210.

RELIG 313 Jewish Mystical Traditions: Kabbalah and Its Influence (5) W Benin

Study of Jewish esoteric thought from Rabbi Moses Cor-Such of Jewish escence in ought from Rabby Moses Cor-dovero. Emergence of Safed as a center of this thought. Systematic presentation of 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: 201 or 210

RELIG 315 Modern Judaism (5) Sp Stanislawski

Development of Jewish religious thought since the mideighteenth century, focusing on development of Jewish Enlightenment, Reform, Conservative, Neo-Orthodox, and Reconstructionist movements. Evaluation of religious responses to the Holocaust and the rise of the state of Israel. Recommended: 201 or 210.

RELIG 320 The World of the Early Church (5) W or Sp Williams

Development of the early Christian church within the context of the Greco-Roman sociopolitical, philosophicontext of the Greec-Koman sociopolitical, philosophi-cal, and religious environment. Covers the period from the Apostolic Fathers to the Council of Nicaea (A.D. 325). Christian thinkers include Ignatius, Polycarp, Clement of Alexandria, Origen, and Irenaeus. Recom-mended background: 201 or 220, or HST 307.

RELIG 321 The Age of St. Augustine (5) Sp Williams

Development of the Christian church in the fourth and fifth centuries as a major institution in the Roman Em-pire, with special attention to the great figures of patristic theology, such as Gregory Nazianzus, Gregory of Nyssa, Cyril of Alexandria, and Augustine. Recommended background: 201 or 320, or HST 307.

RELIG 322 The Gospels and Jesus of Nazareth (5) William

in-depth study of gospel material from early Christianity, including both canonical and noncanonical gospels. At-tention to theme, form, and questions of historicity. Relation of gospels to analogous literature from the Hellenistic-Roman period. Recommended: 220 or ENGL 241.

RELIG 325 American Religious Thought (5) Sp Simonso

Main theological ideas and the notable events in American church history with focus on selected historically important religious movements and themes in America from the time of the Puritans to the twentieth century. Pertinent American social, political, and cultural concerns are included: Recommended: a course in Western religious traditions, American history, or American literature.

RELIG 326 Gnosticism and Early Christianity (5) W or Sp Williams

Study of a form of religion that swept the Mediterranean world during the period of earliest Christianity and which had a major impact on the development of Christianity and several other religious groups of that period. Read-ings are primarily from Gnostic apocalypses, gospels, treatises, and other forms of literature, dating from the first through the third centuries A.D. Recommended background: 201 or 220, or HST 307.

RELIG 350 Buddhism and Society: The Theravada Buddhist Tradition in South and Southeast Asia (5) A Keyes

Introduction to the religious tradition of Theravada Bud-Introduction to the religious tradition of Theravada Bud-dhism (as practiced in Sri Lanka, Burma, Thailand, Laos, and Cambodia) and examination of the variations in ethical orientations developed through Theravada Bud-dhist ideas. Offered jointly with ANTH 352. Recom-mended background: 202 or knowledge of one Eastern religious tradition.

RELIG 352 Hinduism (3) Sp

Hawley

Hawley Survey of the varieties of Hindu religious practice; em-phasis on the diverse patterns of religious thought and ac-tion among contemporary Hindus; topics include ritual behavior, village Hinduism, tantrism, sadhus, yoga, sects, the major gods and their mythologies, religious art, and the adjustments of Hinduism to modernity. Recom-mended preparation: 202 or other study of South Asian culture culture

RELIG 354. Buddhism (3) A

Ruegg Buddhism as a religious way and as a way of thinking; the forms of Buddhism known in South Asia (India, Sri Lanka, etc.) and on those introduced from there to Tibet and other parts of Central Asia. Buddhism is traditionally articulated around the "Three Jewels" (i.e., the Buddha or Awakened Person, the Teaching [Dharma], and Com-munity [Sangha]). Course is organized into these three parts. Recommended preparation: 202 or other study of Asian externa Asian culture.

International Studies

RELIG 380 The Nature of Religion and Its Study (5) Sp Webb

Webb Introduction to the study of religion as a general human phenomenon. Special attention is given to the manner in which different methods of inquiry (phenomenology, an-thropology, sociology, psychology, literary criticism, ar-chaeology, philosophy, theology, etc.) illuminate differ-ent aspects of religion and help to shape our conceptions of its nature. Recommended: 201 or 202 or other course in the history of miliciant medition: in the history of religious traditions.

RELIG 410 Religion and Personality (5) Sp Willeford

Such fundamental religious concepts as "soul" and "spirit" describe elements of the personality felt to be psychologically real, whatever their objective status. Scholars have tried to establish a phenomenology of the personal experiences named by such concepts and have maintained that these experiences reflect fundamental properties of the human mind. Religion plays an impor-tant role in the development of the personality, in its dealing with the major events of life in its search for meaning and value. The course discusses modern at-tempts to understand and describe this. Recommended: 201 or 202 and 380.

RELIG 450 Tibetan Buddhism (3) W Wylie

Survey of the development of Buddhist philosophy and Survey of the development of buddinst philosophy and its amalgamation with the teaching of Bon, the pre-Bud-dhism shamanism in Tibet. The resulting doctrines and phenomenology of Tibetan Buddhism are examined in depth. Perequisite: 202 or equivalent. (Offered alternate years.)

RELIG 490 Special Topics (1-5, max. 15) Special topics in which students and faculty have devel-oped an interest as a result of work done in other classes. Topics vary with each offering. Prerequisite: 380.

RELIG 491 Seminar: Topics and Issues in Judaism (3-5, max. 15) A Benin

Topics include: free will, women, death, mysticism, communal structure, civil law, religious law, prophecy, Jewish medical ethics, etc. Emphasis on how the topic is dealt with in the Bible (e.g., Mishna, Gemara, Rabbinic Responsa). Recommended: 210 or 311.

RELIG 492 Seminar: Topics in Early Christianity (1-5, max. 15) A Williams

Williams Relates to the development of Christian religious thought during its classical formative period. Possible topics in-clude Apocalypticism, Gnosticism, the figure of the "wise man" or "divine man," the relation between Chris-tian thought and Hellenistic-Roman philosophy. Recom-mended: at least one course in early Christian thought or literature.

RELIG 499 Undergraduate Research

(1-5, max. 15) AWSp Primarily for comparative religion majors and majors in the School of International Studies. Prerequisite: permission of instructor.

Course for Graduates Only

RELIG 600 Independent Study or Research (1-3) Reading in the field of the comparative study of religions. Emphasis may be historical or theoretical, or both. Specific content determined in consultation with the instructor and/or a faculty committee.

ETHNICITY AND NATIONALITY

Seminar in Comparative Studies in Ethnicity and Nation-ality is open to graduate students in the program for 3 credits. Register for ANTH 600, POL S 600, or SOC 600 by arrangement with participating faculty.

COURSES IN ETHNICITY AND NATIONALITY IN VARIOUS DISCIPLINES

ANTH 428 Anthropological Perspectives on Ethnicity (3)

ANTH 437 Political Anthropology and Social Change (5)

ANTH 464 Language Policy and Cultural Identity

ANTH 600 Independent Study or Research (*)

AAS 205, 405 Asian American Culture (5,5)

AAS 490 Asian American Studies-Special Topics (3, max. 9)

GEOG 479 Urban Social Geography (5)

HST 467 Nations and States in the Modern World (5)

HST 469 Introduction to Modern Jewish History (3 or 5)

HST 498 Senior Seminar (3-5, max. 15)

HSTAA 420 The American Disinherited (3)

HSTAA 426 American Urban History Since 1870 (3 or 5)

HSTAA 436 American Jewish History Since 1885 (5)

HSTEU 450 Ethnic History of Russia and East Europe (5)

HSTEU 464 The Jews in Spanish History (3 or 5)

LING 433 Language Policy and Cultural Identity

LING 530 Dialectology (3)

LING 580 Problems in Linguistics (3, max. 12)

POL S 436 Ethnic Politics and Nationalism in Multi-Ethnic Societies (5)

POL S 493 Language and Politics (5)

POL S 536 Ethnic Politics and Nationality-Formation (3)

POL S 600 Independent Study or Research (*)

PSYCH 250 Racism and Minority Groups (4)

SISSA 460 Sociolinguistics of South Asia (3)

SOC 362 Comparative Race and Ethnic-Relations (5)

SOC 454 Social Change in Preindustrial Societies (5)

SOC. 455 Social Change in Industrial Societies (5)

SOC 462 Race and Ethnic Relations (3)

SOC 562 Seminar in Comparative Race Relations

SOC 600 Independent Study or Research (*)

JAPAN REGIONAL STUDIES

Courses for Undergraduates

SISEA 210 The Far East in the Modern World (5) Social, economic, and political problems of China, Ia-pan, Korea, and Southeast Asia. Includes development of Russia as an Asiatic power as well as the role of Western powers in the Far East.

SISEA 216 The United States in Eastern Asia, 1784-1945 (5) A **Butow**

Role played by the United States in Eastern Asia from the arrival of the first American vessel at Canton to the end of the war in the Pacific, with emphasis on the Far East-ern policy of the United States during the first four dec-ades of the twentieth century. Offered jointly with HST 216

SISEA 417 Asian Marxist Thought (3)

Introduction to the theory and, where appropriate, the practice of Marxist-Leninism in Asia from 1920 to the present. Readings, in translation, of Mao Tse-tung, Ho Chih Minh, Kim II Song, D. P. Aidit, M. N. Roy, and Sanzo Nosaka. Emphasizes the relation of Asian Marxist thought to the specific domestic and international conditions of the time and to the classical ideas of Marx and Lenin. Offered jointly with POL S 417. Prerequisite: one course from either the nineteenth- or twentieth-century Marxism series or a course in modern Asian politics or history.

SISEA 424 Perspectives on East Asia for Teachers (3, max. 6) W Examination and evaluation of substantive concepts, re-sources, and materials employed in teaching about East Asia. Course requirements may vary in relation to the particular background of participants.

SISEA 440 The Emergence of Postwar Japan (5) A Hellmann, Pyle, Yamamura

The making of modern Japan; World War II and surren-der; American occupation; postoccupation rebuilding; emergence as an industrial power.

SISEA 441 Economic and Social History of Japan to 1900 (5) A Hanley, Yamamura

Hanley, Yamamura Lecturer-seminar on Japanese economic and social his-tory from 700 to 1900. Includes analyses of the rise and disintegration of the shoen system, the rise of commerce, the development of the monetary system, changes in the living standard, demographic changes, and the early phases of industrialization. Political and cultural develop-ments as related to economic and social change. (Taught with 641 with 541.)

SISEA 442 Political Economy of Postwar Japan (5) Political and economic problems of Japan since 1945. Evaluates utility of competing theoretical approaches to analysis of government and economy of Japan. Focuses on policy-making processes and effects of policies adopted. Some knowledge of postwar Japan desirable; 440 recommended.

SISEA 446 Political Development in East Asia (5) Sp Perry

Comparative examination of political development in Ja-pan and China from the nineteenth century to the present. Emphasis on theories of development and their applicability to the East Asian context. Prerequisite: one course in Chinese or Japanese history or in political develop-ment, or permission of instructor.

SISEA 451 Undergraduate Colloquium on Japan (5) Interdisciplinary study of Japan with emphasis on the modern period.

SISEA 490 Special Topics (1-5, max. 15) AWSp Course content varies. Prerequisite: three courses in the

SISEA 499 Undergraduate Research (3-5, max. 15) AWSp

COURSES ON JAPAN IN VARIOUS DISCIPLINES

•					
ART	H	316	Japanese	Painting	(5)

ART H 417 (3)	Buddhist Painting of China and Japan
ART H 418 (3)	Buddhist Sculpture of China and Japan
ART H 419	Chinese and Japanese Architecture (3)
ART H 420	Art of the Japanese Print (3)
ART H 421	The Yamato-e Tradition (3)
ART H 422	The Kan-ga Tradition (3)
ART H 423	Japanese Genre Painting (3)
ART H 424	The Nanga Tradition (3)
ART H 425	Modern Japanese Painting (3)
ART H 428	East Asian Calligraphy (3, max, 9)

ECON 494 Economic Growth of Japan Since 1850 (5)

GEOG 313 East Asia (5)

GEOG 437 Problems in the Geography of Japan (5)

HST 443 The United States and Japan: From Perry to MacArthur (5)

HSTAS 213 History of Japanese Civilization (5)

HSTAS 423 History of Modern Japan (5)

I BUS 490 Special Topics (5)

JAPAN 321 Japan in Literature and Film I (5)

JAPAN 322 Japan in Literature and Film II (5)

JAPAN 323 Japan in Literature and Film III (5)

JAPAN 405, 406 History of the Japanese Language (3.3)

JAPAN 425 The Japanese Novel in English (5)

JAPAN 426 Japanese Poetry in English (5)

JAPAN 427 Japanese Drama in English (5)

MUSIC 494, 495 Music of Japan (3,3)

POL S 429 / International Relations in the Far East (5)

POL S 432 American Foreign Policy in the Far East (5)

POL S 435 Japanese Government and Politics (5)

Courses for Graduates Only

SISEA 541 Economic and Social History of Japan to 1900 (5) A Hanley, Yamamura

Japanese economic and social history from 700 to 1900. Analyses of the rise and disintegration of the shoen landholding system, the rise of commerce, the development of the monetary system, changes in the living standard, demographic changes, urbanization, and the early phases of industrialization. Economic and social change through empirical examination and social science techniques. Prerequisite: previous course work in Japanese history or economic history, or permission of instructor. Not open to students who have taken 441.

SISEA 555 Introduction to Modern Japanese Studies (5) A Hanley

Interdisciplinary study of Japan, with emphasis on the modern period.

SISEA 559 Interdisciplinary Seminar on Japan (5) w

Yamamura Research seminar, with emphasis on Japan's modern development and contemporary problems.

SISEA 590 Special Topics (5, max. 10) AWSp Seminar. Course content varies. Offered occasionally by visitors or resident faculty.

SISEA 600 Independent Study or Research (*) AWSp

SISEA 700 Master's Thesis (*) AWSp

COURSES ON JAPAN IN VARIOUS DISCIPLINES

ART H 515 Seminar in Japanese Art (3, max. 9)

GEOG 509 Research Seminar: Japan (3, max. 6)

HST 543 American Diplomacy and the World Crisis: 1931-41 (3-6)

HST 544-545 Seminar in American Diplomacy and the World Crisis: 1931-41 (3-6, max. 12)-(3-6, max. 12)

HSTAS 521 Modern Japanese History (3-6)

HSTAS 522 Japan as a World Power, 1905-1945 (3-6)

HSTAS 523, 524 Seminar in Modern Japanese History (3-6, 3-6)

HSTAS 525 Japan in the Twentleth Century (3-6)

I BUS 599 Doctoral Seminar in International **Business** (5)

LAW B 540 Law in East Asia-Japan (3)

LAW B 545 United States-Japanese Contract and Sales Problems (4)

AW B 546 United States-Japanese Corporate Relations (4)

LAW B 547 United States-Japanese Tax Problems (4)

LAW B 548 Japanese Administrative Law (3)

LAW B 551 Comparative Law Seminar (2-6, max. 6)

LAW B 552 Tutorial'in Japanese Law (1-4, max. 4)

POL S 545 Seminar on Japanese Government and Diplomacy (3, max. 6)

KOREA REGIONAL STUDIES

Courses for Undergraduates

SISEA 210 The Far East in the Modern World (5) Social, economic, and political problems of China, Ja-pan, Korea, and Southeast Asia. Includes development of Russia as an Asiatic power as well as the role of Western Powers in the Far East.

SISEA 216 The United States in Eastern Asia, 1784-1945 (5) A Butow

Role played by the United States in Eastern Asia from the arrival of the first American vessel at Canton to the end of the war in the Pacific, with emphasis on the Far East-ern policy of the United States during the first four dec-ades of the twentieth century.

SISEA 417 Asian Marxist Thought (3)

Introduction to the theory and, where appropriate, the practice of Marxism-Leninism in Asia from 1920 to the present. Réadings, in translation, of Mao Tse-tung, Ho Chih Minh, Kim II Song, D. P. Aidit, M. N. Roy, and Sanzo Nosaka. Emphasizes the relation of Asian Marxist thought to the specific domestic and international condi-tions of the time and to the classical ideas of Marx and Lenin. Offered jointly with POL S 417. Prerequisite: one course from either nineteenth- or twentieth-century Marxism series of courses in modern Asian politics or history.

SISEA 424 Perspectives on East Asia for Teachers (3, max, 6) W Examination and evaluation of substantive concepts, re-

sources, and materials employed in teaching about East Asia. Course requirements may vary in relation to the particular background of participants.

SISEA 446 Political Development in East Asia (5) Sp Perry

Comparative examination of political development in Ja-Comparative examination of pointeen development in ra-pan and China from the ninetcenth century to the present. Emphasis on theories of development and their applica-bility to the East Asian context. Prerequisite: one course in Chinese or Japanese history or in political develop-ment, or permission of instructor.

SISEA 490 Special Topics (1-5, max. 15) Course content varies. Prerequisites: three courses in the area.

SISEA 499 Undergraduate Research (3-5, max. 15)

COURSES ON KOREA IN VARIOUS DISCIPLINES

HSTAS 212 History of Korean Civilization (5)

HSTAS 481 History of Traditional Korea to the Nineteenth Century (5)

HSTAS 482 History of Modern Korea, 1860 to the Present (5)

MUSIC 426 Music of Korea (3)

KOR 320 Korean Literature in English (5)

Courses for Graduates Only

SISEA 590 Special Topics (5, max. 10) AWSp

SISEA 600 Independent Study or Research (*) AWSp

SISEA 700 Master's Thesis (*) AWSp

COURSES ON KOREA IN VARIOUS DISCIPLINES

HSTAS 581 Modern Korean History (3-6)

HSTAS 582-583-584 Seminar in Korean History (3-6)-(3-6)-(3-6)

HSTAS 585 Research Seminar: Modern Korea (3-6)

LATIN AMERICAN STUDIES

Courses for Undergraduates

SISLA 490 Special Topics (1-5, max. 15) Course content varies. Prerequisites: three courses in the area.

SISLA 492 Latin American Studies Seminar (5) Training in basic bibliographic and research techniques for the study of Latin American affairs. Included are choice and design of a research plan, preparation of an outline and bibliography, writing of a preliminary draft, and the fundamentals of textual criticism.

SISLA 493 Senior Thesis (5)

Research and writing of an original thesis on a specialized topic in Latin American Studies. Prerequisite: 492.

SISLA 499 Undergraduate Research (3-5, max. 15)

Prerequisite: permission of instructor.

RUSSIAN AND EAST EUROPEAN **REGIONAL STUDIES**

RUSSIAN PROGRAM

Courses for Undergraduates

SISRE 243 Russian Civilization (5) ASp

Waugh Russia's material civilization, including fine arts, litera-ture, religion, and history; political, social, and legal in-stitutions and thought in relation to the general develop-ment of Russian society.

SISRE 244 Soviet Dissent: Yesterday, Today, and Tomorrow (5) A Ellison, Konick

Survival of dissent in tsarist and modern Russia. Emphasis on scientific knowledge, religion, history, ethnic destiny, and other beliefs as bases for dissent in the Soviet Union.

SISRE 248 Multiethnic States in the Soviet Union and Eastern Europe (5) Sp Velikonja, Waugh

Nationality and multiethnic problems in the Soviet Union and East European states. Relevance and irrelevance of Marxist theory as applied to this problem.
International Studies

SISRE 324 Soviet Society (5) AW Ellison

Survey of the political, economic, and social institutions, and the literature and fine arts of the Soviet Union.

SISRE 343 Interdisciplinary Undergraduate

Seminar on Russia (5) AWSp Thornton, Waugh, West Designed as a bridge between the two basic requirements of the Russian Regional Studies baccalaureate program. After introductory lectures, two short periods in Russian history are studied in some depth by way of closely su-pervised undergraduate research and discussions. Prerequisites: 243, two years of Russian language, and permission of Russian and East European undergraduate adviser.

SISRE 360 Communism, Literature, and the Movies (5) A Paul

Film and literature as media of social and political com-mentary in Communist societies. The role of the cultural intellectual under conditions of political constraint. Em-phasis on materials from Eastern Europe, although in some years attention is given to selected Soviet works. Feature films by such directors as Wajda, Schorm, Jancso, Kadar, Eisenstein, and Pudovkin are shown and discussed. Readings may include works by Kundera, An-drzejewski, Havel, and Solzhenitsyn. Offered jointly with POL S 349. Film and literature as media of social and political com-

SISRE 378 Russia and Asia (3)

Waugh Russian expansion into Central Asia. Russian and Soviet policies toward nationalities. Tsarist and Soviet relations with adjacent Muslim countries.

SISRE 401, 402 Marxism-Leninism in Modern Intellectual History (5,5) A,W Legters

401: teachings of Marx and Engels in the nineteenth century. Analysis of Marxism as a doctrine; 402: Marxism-Leninism in the twentieth century. References to Lenin and Stalin. Prerequisites: modern European, German, or Russian history or political thought, or permission of instructor.

SISRE 403 Marxism in Modern Intellectual History (5) Sp Legiers

Deals with developments in Marxist thought since 1917, with emphasis on neo-Marxist theory in Europe. Prerequisite: permission of instructor.

SISRE 440 History of Communism (5) WSp Ellison

Communism from its origins in the Bolshevik faction of Russian social democracy to the present, treating the de-velopment of the ideology, the various communist par-ties, and the communist states. Offered jointly with HSTEU 440. Prerequisites: two courses in modern European history or politics.

SISRE 450 Survey of the Cultures of the Turkic Peoples of the Soviet Union (3) A Ciriantas

The normadic and sedentary cultures of the Turkic peo-ples in the past and in the present: their cultural life (lan-guage, literature, adherence to traditional modes of life) under Soviet Russia's dominance.

SISRE 457 Undergraduate Colloquium on Russia

(5) Sp Interdisciplinary study of Russia, with emphasis through the historical period. Required of all undergraduate Rus-sia area studies majors. Prerequisite: permission of instructor.

SISRE 490 Special Topics (1-5, max. 15) AWSp Course content varies. Prerequisites: three courses in the area.

SISRE 499 Undergraduate Research (3-5, max. 15) AWSp

COURSES ON RUSSIA IN VARIOUS DISCIPLINES

ECON 495 The Economy of Soviet Russia (5)

GEOG 333 Russia's Changing Landscape (5)

GEOG 433 Soviet Resource Use and Management (5)

	HSTEU 438 Modern Russian Intellectual History (5)
	HSTEU 439 Soviet Union Since World War II (5)
	HSTEU 441 Medieval Russian Chronicles (5)
	HSTEU 442 Russian Culture to the Era of Peter the Great (5)
	HSTEU 443 Kievan and Muscovite Russia, 850-1700 (5)
	HSTEU 444 Imperial Russia, 1700-1900 (5)
	HSTEU 445 Twentieth-Century Russia (5)
	HSTEU 446 Russian Historiography (5)
	HSTEU 447 Russian and East European Bibliography (5)
	HSTEU 450 Ethnic History of Russia and East Europe (5)
	POL S 420 Foreign Relations of the Soviet Union (5)
	POL S 441 Government and Politics of the Soviet Union (5)
•	RUSS 224 Russian Folk Literature in English (3)
	RUSS 341 Growing Up Russian: Childhood and Adolescence in Russian Fiction (5)
	RUSS 342 Holy Fools and Madmen: Madness in Russian Literature (5)
. '	RUSS 421 Russian Literature of the Soviet Period (5)
	RUSS 423 Russian Film and Fiction (5)
	RUSS 426 Pushkin, Gogol, Turgenev (5)
	RUSS 427 Tolstoy (5)
•	RUSS 428 Dostoyevsky (5)
	RUSS 429 Chekhov (5)
	RUSS 430 Solzhenitsyn: Artist and Social Critic (5)

Courses for Graduates Only

SISRE 500 Interdisciplinary Research Seminar (*) AWSp Jackson, Thornton

Jackson, Thornton Contemporary problems in the societal, political, and economic development of Russia and East Europe. Semi-nars are devoted to specific topics, such as comparative cultures and ethnic minorities; economic development and environmental degradation; comparative commu-nism; and problems of a similar interdisciplinary nature. Prerequisite: permission of instructor.

SISRE 508 Seminar: Problems in the Study of Marxism (3-5, max. 15) AWSp Legters

Investigation of the deeper and more complex historical and philosophical problems encountered in understanding Marxist thought of the ninetcenth and twentieth centu-ries. Prerequisites: 401, 402, 403, or equivalent in other departments.

SISRE 590 Special Topics (5, max. 10) AWSp Course content varies. Offered occasionally by visitors or resident faculty.

SISRE 600 Independent Study or Research (*) AWS

SISRE 700 Master's Thesis (*) AWSp

COURSES ON RUSSIA IN VARIOUS DISCIPLINES

C LIT 580 Literature and Other Disciplines (3-5, max. 15)

ECON 595	Soviet Economics (3)	

Research Seminar: Soviet Union GEOG 533 (3, max. 6)

HSTEU 540 Medieval Russian Documents (3-6)

HSTEU 541 Medieval Russian History (3-6)

HSTEU 543 Seminar in Medieval Russian History (3-6)

HSTEU 544 Modern Russian History (3-6)

HSTEU 545-546-547 Seminar on Modern Russian History (3-6)-(3-6)-(3-6)

HSTEU 548 Field Course in Soviet History (3-6)

POL S 520 Seminar on the Foreign Policy of the Soviet Union (3)

POL S 541 The Soviet Political System (4)

POL S 546 Seminar in Problems of Soviet Politics (3)

EAST EUROPEAN PROGRAM

Courses for Undergraduates

SISRE 246 Assent and Dissent in Eastern Europe (5) W

Carpenter, Sugar

Art and literature of assent and dissent as used to analyze political problems in Bulgaria, Czechoslovakia, Hun-gary, Poland, Romania, and Yugoslavia.

SISRE 248 Multiethnic States in the Soviet Union and Eastern Europe (5) Sp

Velikonja, Waugh Nationality and multiethnic problems in the Soviet Union and East European states. Relevance and irrelevance of Marxist theory as applied to this problem.

SISRE 344 Interdisciplinary Undergraduate Seminar on Eastern Europe (5)

Kapetanic, Paul, Sugar

Designed as a bridge between the two basic requirements of the East European Regional Studies baccalaureate pro-gram. The initial topic is "Heretics and Conformists in Iron-Curtain Europe." Prerequisite: permission of Rus-sian and East European undergraduate adviser.

SISRE 360 Communism, Literature, and the Movies (5) A Paul

Film and literature as media of social and political com-mentary in communist societies. Role of the cultural inmentary in community societies. Role of the cultural in-tellectual under conditions of political constraint. Empha-sis on materials from Eastern Europe and in some years on selected Soviet works. Feature films by such directors as Wajda, Schorm, Jancso, Kadar, Eisenstein, and Pudovkin. Readings may include works by Kundera, An-drzejewski, Havel, and Solzhenitsyn. Offered jointly with POL S 349.

SISRE 419 Communist States of North-Central Europe (5)

Legiers

Contemporary history (since 1945) of the countries of North Central Europe: Poland, Czechoslovakia, and East Germany. Emphasizes comparative developments in Russian countries in relation to the whole of the Soviet orbit. Prerequisite: East European history or politics, or permission of instructor.

SISRE 458 Undergraduate Colloquium on East Europe (5) Sp Boba, Sugar

Interdisciplinary study of Eastern Europe with emphasis on the historical period. Prerequisite: permission.

SISRE 490 Special Topics (1-5, max. 15) Course content varies. Prerequisites: three courses in the

SISRE 499 Undergraduate Research (3-5, max. 15) AWSp

COURSES ON EASTERN EUROPE IN VARIOUS DISCIPLINES

CZECH 420 Modern Czech Literature in English (5)

⁹ GEOG 305 Eastern Europe (5)

GEOG 405 Problems of Eastern Europe (5)

HSTAM 426 Origins of European States (5) HSTEU 447 Russian and East European

Bibliography (5)

HSTEU 450 Ethnic History of Russia and East Europe (5)

HSTEU 451 East-Central Europe Since 1342 (5)

HSTEU 452 Eastern Europe Since 1918 (5)

HSTEU 453 History of the Balkans, 1400-Present (5)

MUSIC 318 Music Cultures of the World (5)

POL S 347 Governments of Eastern Europe (5)

POLSH 420 Modern Polish Literature in English (5)

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SER C 420 Yugoslav Literature in English (5)

Courses for Graduates Only

SISRE 500 Interdisciplinary Research Seminar (*) AWSp Jackson, Thornton

Contemporary problems in the societal, political, and economic development of Russia and East Europe. Seminars are devoted to specific topics, such as comparative cultures and ethnic minorities; economic development and environmental degradation; comparative communism; and problems of a similar interdisciplinary nature. Prerequisite: permission of instructor.

SISRE 504 Approaches to East European Politics (3-5) W Paul

Selected concepts and methodologies useful for the analysis of politics and social structure in the socialist countries of East-Central and Southeastern Europe. Offered jointly with POL S 537. Prerequisite: permission of instructor.

SISRE 505 Seminar: Problems of Social and Political Development in Eastern Europe (3-6) Paul

Research seminar dealing with selected problems of continuity and change in Eastern Europe. Prerequisite; some previous course work on Eastern Europe.

SISRE 600 Independent Study or Research (*) AWSp

SISRE 700 Master's Thesis (*) AWSp

COURSES ON EASTERN EUROPE IN VARIOUS DISCIPLINES

C LIT 580 Literature and Other Disciplines (3-5, max. 15)

GEOG 503 Research Seminar: Eastern Europe (3, max. 6)

HSTAM 530 Early Middle Ages (3-6)

HSTEU 551 History of Eastern Europe, 1772-1939 (5)

HSTEU 552 History of Eastern Europe, 1939 to the Present (5)

HSTEU 553-554-555 Seminar in Modern East European History (3-6)-(3-6)

SOUTH ASIA

Courses for Undergraduates

SISSA 210 Introduction to Indian Thought (5) Hawley

Three major themes in Indian thought—time, truth, and temptation—as expressed in classical Hindu and Buddhist texts, and in traditional and modern art and drama. Field trips, films.

SISSA 490 Special Topics (1-5, max. 15) AWSp Course content varies. Prerequisites: three courses in the area.

SISSA 498 Undergraduate Colloquium on South Asia (5)

Emphasized are topics involving the interelationship of the various social science disciplines in the study of South Asian history and culture. Prerequisite: permission of instructor.

SISSA 499 Undergraduate Research (3-5, max. 15) AWSp

COURSES ON SOUTH ASIA IN VARIOUS DISCIPLINES

ANTH 316 South Asia (3)

ANTH 412 South Asian Social Structure (5)

ARCH 458 South Asian Architecture (3)

ECON 465 Economic History of South Asia (5)

HSTAS 201 Ancient Indian Civilization (5)

HSTAS 202 Modern Indian Civilization (5)

HSTAS 401 History of Ancient India (5)

HSTAS 402 History of Medieval and Mughal India (5)

HSTAS 403 History of Modern India to 1900 (5)

HSTAS 404 History of Twentleth-Century India (5)

HSTAS 405 Maharashtra in Indian History (5)

INDN 420 . Classical Indian Literature in English (5)

INDN 421 Modern Indian Literature in English (5)

LING 404, 405, 406 Indic and Indo-European. (3,3,3)

MUSIC 428 Music of India (3)

PHIL 286 Introduction to India's Philosophies (5)

PHIL 412 Indian Philosophy (5)

PHIL 413 Studies in Indian Philosophy (3, max. 9)

POL S 434 International Relations of South Asia (5)

POL S 440 Government and Politics of South Asia (5)

Courses for Graduates Only

SISSA 510 Introduction to Interdisciplinary Study of South Asia (5) Introduction to work done in the various disciplines

Introduction to work done in the various disciplines focusing on South Asia.

SISSA 511 Seminar on South Asia (5) Interdisciplinary seminar for graduate students in which research and writing on individual research topics is critically developed. Designed to provide each student with an opportunity to synthesize his or her studies on South Asia. Prerequisite: 510 or permission of graduate adviser.

SISSA 590 Special Topics (5, max. 10) AWSp Seminar. Course content varies. Offered occasionally by visitors or resident faculty.

SISSA 600 Independent Study or Research (*) AWSp SISSA 700 Master's Thesis (*) AWSp

COURSES ON SOUTH ASIA IN VARIOUS DISCIPLINES

ANTH 517 Seminar on South Asia (3)

ART H 521 Seminar on Indian Art (3, max. 9)

HSTAS 501 Indian History (3-6)

PHIL 586 Seminar on Indian Philosophy (3, max. 12)

POL S 540 Problems in South Asian Politics (3)

SOUTHEAST ASIA

Courses for Undergraduates

ANTH 317 Southeast Asia (3)

ANTH 404 Mainland Southeast Asian Societies (5)

GEOG 434 Problems in the Geography of Southeast Asia (5)

LING 478 Introduction to Southeast Asian Linguistics (3)

POL S 343 Government and Politics of Southeast Asia (5)

POL S 433 International Relations in Southeast Asia (5)

Courses for Graduates Only

ANTH 516	Seminar on Southeast Asia (3, max. 9)
GEOG 506 (3, max. 6)	Research Seminar: Southeast Asia
LING 578 (3. max. 9)	Seminar on Southeast Asian Linguistics

POL S 531 Problems of Southeast Asian Politics (3)

KINESIOLOGY

Courses for Undergraduates

KINESIOLOGY

KIN 200 Foundations of Physical Fitness (3) Concepts, theories, principles, and practices of physical conditioning. Evaluation of contemporary physical conditioning programs and development of a personal fitness regimen. Previous completion of courses in biological science desirable. For nonmajors only.

KIN 301 Physical Activity and Sport: A Social Psychological Perspective (4) Passer

Passer Introduction to the social psychology of sport and motorperformance with emphasis upon the reciprocal effects of interpersonal and group influence processes. Topics include social facilitation, social reinforcement, observational learning, individual versus group performance, group cohesion, leadership, and group conflict.

KIN 302 Sport in American Society: Socialization Processes (4) Ingham

Socialization into and via play, games, and sport. Focus on the family, school, peer group, etc., as milieux of social influence. The differential effects of socioeconomic status, race, and gender upon the process of sport role acquisition is examined in sociohistorical and contemporary analytic contexts.

KIN 303 Sport in American Education: A Socio-Historical Perspective (4) Berryman

velopment of sport and physical activity in the larger so-

Installation of sport and physical culture in the American schools and colleges in the sociohistorical perspective. Ideas, trends, and societal factors that influenced the deciety and led to the inclusion of these forms in schools and colleges. Origins and subsequent development of physical educators as an occupational group.

KIN 325 Growth and Motor Development (4) Smoll

Analysis of physical growth and motor development from infancy through adolescence. Emphasis on relationships between motor development and psychosocial development of children.

KIN 330 Laboratory in Kincoenergetics (2, max. 4) Hutton

Laboratory experiments on selected problems concerning the physiological, kinesiological, and biomechanical basis of movement behavior. May be taken concurrently with 331 on an optional basis; must be taken concurrently with 332.

KIN 331, 332 Human Kineoenergetics (5,5) Doolittle, Hutton, Miller, Sembrowich

Energetics and biomechanics of neuromuscular performance; factors underlying acute and chronic systemic adaptations to exercise; exercise prescription; nutritional envi-ronmental effects of work capacity. Prerequisites: ZOOL 118 or 208 and B STR 301 for 331; 331 and concurrent enrollment in 330 for 332.

KIN 350 Learning and Movement Performance (5) Кетт

Study, from a behavioral perspective, of the factors that influence human learning and performance. Emphasis on motor skills. Prerequisite: PSYCH 101 or 102.

KIN 412 Sport in American Society: An Institutional Analysis (3)

Ingham

Sport as a social institution and its connection with other institutions in American society. Changes within the so-cial institution of sport (e.g., commercialization, admin-istrative centralization, the influx of technical ration-ality). Prerequisite: 302 or permission of instructor.

KIN 413 Athletics in the Ancient World (3)

Hardy Role and significance of games and physical activities in ancient societies, with special emphasis on Greek athletics and Roman spectacles.

KIN 414 Rise of Modern Sport (3) Berryman

Analysis of the institution of sport from a historical perspective, taking into consideration forces and factors contributing to its emergence and its impact upon other facets of human experience. Begins with eighteenth-century England, continues to the "Anglo-American Con-nection," and concludes with the period of American co-lonial beginnings through approximately the "Age of the Great Depression."

KIN 420 Field Analysis of Motor Development (4) Smoll

Interrelationships among physical growth, motor devel-opment, and psychosocial development of children; in-cludes laboratory experience in observing, analyzing, and interpreting behavior of children. Prerequisite: 325.

KIN 426 Motor Control and Memory (3) Kerr

Survey of current theory and research in human performance, attention, and motor-control processes, as viewed from a cognitive perspective. Topics include short-term-motor memory; motor program operation, attention de-mands during movement, coordination of internal codes, spatial systems, and hemispheric specialization. Not open for credit to students who have taken PSYCH 468. Prerequisite: 350 or equivalent.

KIN 438 Developmental Motor Activities for the Exceptional Child (3) Principles of developmental motor activities and their ap-

plication in the education of the exceptional child. Pre-requisites: 325 and 332, or permission of instructor.

KIN 470 Social Psychology of Sport (4) Passer

Examination of current issues in the social psychology of sport. Topics include anxiety and arousal, competition, motivation, attitudes, and individual differences in athletic performance. Prerequisite: 301 or equivalent.

KIN 480 Biomechanics of Sport (5) Miller

Kinematic and kinetic analysis of human locomotion (specifically running), jumping, throwing, and kicking; appropriate mechanical concepts and instrumentation; practical experience in the measurement of mechanical parameters related to human motion. Prerequisite: 332 or permission of instructor.

KIN 485 Philosophical Perspectives of Human Movement (3)

The mind-body dichotomy and selected philosophical po-sitions in human movement study, including investigation of contemporary issues in sport, athletics, and physical education.

KIN 490 Contemporary Perspectives in the Study of Human Movement (3) Consideration of ways in which inquiry in the arts and sciences of human movement can be approached.

KIN 496 Research Seminar in Human Performance and Motor Control (3, max. 6) Selected current research topics. Perequisites: appropri-

ate background course work and permission of instructor.

KIN 497 Research Seminar in Sport Studies

(3, max. 6) Selected current research topics. Prerequisites: appropri-ate background course work and permission of instructor.

KIN 498 Special Studies in Kinesiology (2-3, max. 6)

Prerequisite: permission of instructor:

KIN 499 Undergraduate Research (2-3, max. 6) Prerequisite: permission of instructor.

KINESIOLOGY-PHYSICAL EDUCATION .

KINPE 203 Tension Control and Stress

Management (3) Recognition and management of residual muscular ten-sion through relaxation; theories, implications, techniques, laboratory, and discussion.

KINPE 204 Individualized Physical Fitness (2)

Effects of exercise on weight, contour, and condition; postural adjustments for efficiency in the movement skills of daily living. Laboratory, lecture, and discussion.

KINPE 205 Basic Biomechanics for Nursing (2) Mechanical analysis of movement tasks, with emphasis on conservation of energy and prevention of muscular strain and injury. Laboratory sessions include manipula-tion of patients. Prerequisites: CONJ 317-318.

KINPE 216 SCUBA Diving (2) Scientific principles and techniques of SCUBA (Self-Contained Underwater Breathing Apparatus) diving, based on marine physics, physiology, and medical requi-sites to a safe exposure in an underwater environment. Fee charged. Prerequisites: swim underwater (no fins) one pool length (twenty-five yards); tread water for ten minutes; medical examination.

KINPE 220 Creative Dance (2)

Understanding of fundamental rhythm concepts and their application in the development of technique and style in contemporary dance forms. Prerequisite: permission of instructor.

KINPE 221 Performance Laboratory-Racket Sports (2)

Development of personal skill in racket sports with spe-cial emphasis on badminton and tennis. Open to majors only.

KINPE 222 Performance Laboratory-Outdoor Team Sports (2)

Development of personal skill in selected outdoor team sports. Separate sections emphasize different combina-tions of sports according to season (soccer-field hockey; Lacrosse-team handball; softball-baseball). Open to majors only.

KINPE 223 Performance Laboratory-Indoor

Team Sports (2) Development of personal skill in basketball and volley-ball. Open to majors only.

KINPE 224 Performance Laboratory-Individual Sports (2)

Development of personal skill in individual sports with emphasis on golf, bowling, and archery. Open to majors only.

KINPE 225 Survey of American Folk Dance (2) Folk dance forms characteristic of the United States; tra-ditional dances and emergence of modified forms; performance, analysis, and interpretation.

KINPE 226 Performance Laboratory-Combative Sports (2)

Development of personal skill in wrestling or judo. Open to majors only.

KINPE 227 Performance Laboratory—Track and Field (2)

Development of personal skill in track or field events. Open to majors only.

KINPE 228 Performance Laboratory-Gymnastics (2)

Development of personal skill in gymnastic events. Separate sections emphasize men's and women's events. Open to majors only.

KINPE 229 Performance Laboratory-Swimming

(2) Development of personal skill in aquatics. Emphasis on swimming with introduction to water polo and spring-board diving. Open to majors only.

KINPE 292 First Aid and Emergency Care (3) Hughes

Develops functional first-aid capabilities for the general student population. American Red Cross certification may be obtained.

KINPE 294 Life Saving (2)

Prerequisite: ability to swim 440 yards (American Red Cross certification possible).

KINPE 295 Water Safety Instructor (2) (WSI certification) Designed to prepare students for em-ployment as teachers or administrators in aquatic pro-grams. Prerequisites: current Red Cross advanced lifesaving certificate.

KINPE 304 Officiating (2, max. 4)

Techniques of officiating, opportunity for national and local ratings. Prerequisite: completion of appropriate 200-level performance laboratory or permission of instructor.

KINPE 311 Rhythmic Activities for Small Children

(2) Activities suited to the kindergarten and primary child. Educational value, significance in child growth and development, and methods of presentation.

KINPE 312 Physical Fitness Activities for Children (2½) S

(22) S Movement activity that contributes to physical fitness and motor efficiency; performance standards as related to physical growth and development levels; criteria and techniques for evaluation of physical performance of children.

KINPE 314 Movement Exploration for Children (3) Theory and techniques of movement exploration, utilizing time, space, force, and flow variables as elements of movement organization.

KINPE 316 Structure of Movement Activities for Children (3)

Analysis of movement activities—early childhood to ad-olescence. Emphasis on variability and patterning in movement and perceptual skills, activity structure, and factors affecting performance. Prerequisite: KIN 325.

KINPE 320 Conditioning and Physical Fitness (2) Doolittle

Critical analysis of conditioning techniques and pro-grams, considering elements of fitness, biomechanical principles of exercise, and specificity of movement per-formance requirements. Prerequisite: KIN 332.

KINPE 336 Athletic Training and Conditioning (4) Athletic training techniques and procedures for the pre-vention and care of athletic injuries. Designed for the physical education major or students planning a coaching career. Prerequisites: KIN 331, KIN 332, and certifica-tion in feature and the majority of instances. tion in first aid, or permission of instructor.

KINPE 359 Workshop in Gymnastics (1-3, max. 3) Hughes

Lectures, practice, and supervised teaching in gymnastics. Prerequisite: permission of instructor.

KINPE 365 Applied Movement Learning (4) Fox

Relationships among goals, content, and process in the teaching of movement skills. Prerequisite: KIN 350.

KINPE 366 Practicum (1-2, max. 4)

Fox, Hughes Prerequisites: physical education majors only and permission of instructor.

KINPE 368 Performance Analysis and Coaching (3, max. 12)

Analysis of performance and game strategies in the coaching of selected sports. Prerequisites: appropriate 200-level performance course and permission of instructor.

KINPE 434 Exercise and Cardiopulmonary Irregularities (3)

Doolittle Problems, limitations, and benefits of exercise in the alleviation of cardiopulmonary handicaps, with particular Attention to the middle-aged population. Prerequisite: KIN 331 or human anatomy, physiology, and physiology of exercise, or permission of instructor.

KINPE 437 Advanced Athletic Training (5) Advanced procedures in athletic training and injury rehabilitation. Consideration for safety factors in athletic contests, sports equipment, and facilities. Theory and practice in the use of therapeutic modalities for injury rehabilitation. Prerequisites: 336, KIN 331, KIN 332.

KINPE 455 Measurement and Evaluation in Physical Education (4) Consideration of evaluative tools available in the physical

education setting, including criteria for tool selection and development and application and uses of resulting data. Prerequisite: EDPSY 308 or permission of instructor.

KINPE 460 Perspectives in Physical Education (3) Purdy

Traditional views of physical education examined with reference to research findings and dynamics of program change. Prerequisites: KIN 301, KIN 302, KIN 325, KIN 350.

KINPE 493 Problems in Athletics (3)

Administrative and organizational procedures and prob-lems surrounding sport and athletic programs, including ethical, legal, economic, social, and political issues. Pre-requisites: KIN 302, KIN 303, KIN 412, or permission of instructor.

Courses for Graduates Only

KINESIOLOGY

KIN 501 Seminar in Human Movement Studies

(3, max, 9) Selected topics in human movement studies. Specific content variable with current developments in the field and with interests of the instructor. Prerequisite: permission of instructor.

KIN 510 The Structure and Strategies of Sports and Games (4)

Definitions, classification systems, characteristics, and theories of games and sports; particular emphasis on structural and strategical theories in lieu of social, psy-chological, and cultural theories.

KIN 512 Sport in a Liberal Democracy (U.S.A.) (5) Ingham

Critical analysis of the recent transformations in sport within the broader context of industrial capitalism's mat-uration and ideologies. Specific attention is paid to the United States. Prerequisite: 302 or permission of instruc-tor. Recommended: SOC 410 or 451. (Offered alternate years.)

KIN 514 Seminar in American Sport History (5) Berryman

Familiarization with data resources and research programs in American sport history. Major emphasis upon the relationship between sport and other social institutions (e.g., religion, politics, economics, law, and mass media). Focuses on the use of sport in the formulation of a response to social concerns related to immigration, urban industrialism, crime, inequality, juvenile de-linquency, and health. Prerequisite: 303 or permission of instructor.

KIN 515 Key Figures in American Sport and Physical Culture: A Sociohistorical Perspective (4) Berryman

Contributions of selected men and women who shaped and/or reflected American sporting traditions or physical culture beliefs. Accomplishments of each individual are examined within a topical theme and treated in a manner whereby ideas, trends, dominant beliefs, customs, and general societal concerns emerge. Prerequisite: 303 or permission of instructor.

KIN 520 Advanced Growth and Motor Development (4)

Smoll

Developmental kinesiology, focused on analysis of phys-ical growth, motor development, and interrelationships among modifying variables. Prerequisite: 325 or permis-sion of instructor.

KIN 522 Career Patterns and Career Contingencies in Sport (4) Ingham

Ingham Lecture-seminar course. Role progression in sport. His-torical, sociological, ethnographic, and biographical materials are used in discussions of mobility through, and socialization within, the career stages of organized sport. Occupational characteristics of the sport roles. Interface between spectators, athletes, and formal organization. Heartive.work and immession management. Organization Identity-work and impression management. Organization. Identity-work and impression management. Organiza-tional charters and occupational ethics. Occupational character in relation to making respect, courage, compo-sure. Failure. Prerequisite: 302 or permission of instructor. Recommended: SOC 419.

KIN 540 Physiological Bases of Physical Conditioning (3)

Doolittle

Principles of overload, specificity and progression, to-gether with the underlying physiological mechanisms as they relate to physical condition of the organism for movement stress. Prerequisite: 332 or permission of instructor.

KIN 541 Exercise and Metabolism (3)

Sembrowich Carbohydrate, fat, and protein metabolism and the effects on metabolism of physical exercise training, diet, and disease. Prerequisite: 332 or permission of instructor.

KIN 552 Neural Control Systems of Movement (5) Hutton

Huiron Neuroanatomical and neurophysiological mechanism governing skeletal muscle and patterning of movement, including consideration of plasticity and modification of motor control systems. Prerequisite: 332 or permission of instructor.

KIN 553 Neurophysiological and Behavioral Correlates of Movement (3) Hutton

Cross-disciplinary approach to selected topics pertinent to the study of movement behavior (e.g., volitional movement, visuomotor interrelations and perception, drugs and motor performance, proprioceptions, and feed-back). Prerequisites: 332, 552, ZOOL 118 or 208, or per-mission of instructor.

KIN 562 Advanced Learning and Movement Performance (3) Purdy

Puray Interrelationships among situational and conditional vari-ables as related to learning and performance of move-ment skills, emphasis on practice factors. Prerequisite: 350 or permission of instructor.

KIN 570 Seminar in Sport Psychology (4) Passer

Psychology of sport and physical activity. In-depth anal-ysis of two or three topics through reading, presentation, and discussion of research findings. Variable content and industry of research infantige. Variable content may include: organized competitive sports for children, women in sports, applied behavior analysis, leadership and group behavior, and motivation. Prerequisite: 301 or permission of instructor. (Last time offered: Winter Quarter 1983.)

KIN 580 Selected Topics in Biomechanics of Human Movement (3, max. 9) Miller

Seminar-project course focusing upon a selected topic in the biomechanics of human movement such as models of the body, free-fall conditions in sport, locomotion, body segment parameters or take-off force-time characteris-tics. Emphasis placed upon retrieval, reading, and dis-cussion of relevant research as well as individual projects and term assignments in conjunction with the topic under considential and distinct to the statistic project. consideration and adapted to the student's special interests. Prerequisite: 480 or permission of instructor.

KIN 590 Research in Human Movement (3)

Research procedures appropriate to the solution of human movement problems. Prerequisite: statistics or per-mission of instructor.

KIN 591 Research Seminar (3, max. 9)

Problems and procedures in research unique to specific areas of specialization in human movement study and ki-nesiology. Content variable: physical education pro-grams, kinecenergetics, learning and movement performance, sociocultural correlates of movement, movement experience, and esthetics. No more than 3 credits in any one area. Prerequisites: 590 and permission of instructor.

KIN 600 Independent Study or Research (*)

KIN 700 Master's Thesis (*)

KINESIOLOGY—PHYSICAL EDUCATION

KINPE 502 Issues in Physical Education

(3-5, max. 10) Issues, problems, and trends in physical education and other movement-centered programs: relationship of changes in direction or focus to emergent knowledge; social, political, or other factors. Prerequisite: graduate standing or permission of instructor.

KINPE 503 Seminar in Sport Administration

(1, max. 3) Issues and problems in the management of sport pro-grams and facilities. Prerequisite: permission of instructor.

KINPE 504 Seminar in Exercise Science (1, max. 3) Current practice methods in athletic training and/or exercise prescription for cardiopulmonary conditioning. Prerequisite: permission of instructor.

KINPE 506 The Curriculum in Physical Education -

(3) Selection and organization of program content in relation to characteristics and needs of pupils and local con-ditions. Prerequisite: 460 or permission of instructor.

KINPE 595 Internship in Sport Administration (3-6, max. 12)

Supervised field experience. Nine hours minimum, eighteen hours maximum per week. Open to graduate stu-dents in M.S. Physical Education Sport Administration option only. Preguisites: concurrent registration in 503 and permission of instructor.

KINPE 596 Internship in Exercise Science

(3-6, max. 12) Supervised field/clinical experience. Nine hours minisupervised notes that it is a supervised to the second state of the second state students in M.S. Physical Education Exercise Science option only. Prerequisites: concurrent registration in 504 and permission of instructor.

KOREA REGIONAL STUDIES

See International Studies

LATIN AMERICAN STUDIES

See International Studies.

LINGUISTICS

For courses in English for foreign students, see ENGL 150, 151, 160, 303, 304, 305, and SPCH 111.

LING 200 Introduction to Linguistics (5) AWSpS Brame, Contreras, Emonds, Ioup, Kaisse, Newmeyer, Saporta, Williams

Introduction to the scientific study of language; language and writing; phonological and grammatical analysis; lan-guage change; related disciplines.

LING 201 Language and Human Behavior (5) Sp Elements of the biological basis of human language, the differences between animal and human communication, and the function of language in society. Prerequisite: 200. (Offered alternate years.)

LING 333 Linguistics and Society (3) A

Newmeyer, Saporta, Williams Interaction of language, culture, and society, and the re-lationship of linguistic theory to societal problems. Ethi-cal and political considerations involved in the application of linguistic theory also are discussed.

LING 400 Survey of Linguistic Method and Theory (3) AWSpS

(3) Avops Brame, Contreras, Ioup, Kaisse, Newmeyer, Saporta Background and scope of modern linguistics; syntax, phonology; languages of the world; language analysis; re-lation to other disciplines. Not open to students who have had 200.

LING 401 Linguistics and Related Disciplines (3) Saporta

Provides an exposure to the relation of current work in linguistic theory by Noam Chomsky to his philosophical, psychological, political, and educational thought.

LING 402 Survey of the History of Linguistics (3) Shapiro

Survey of the main trends in linguistic theory from ancient times until the advent of transformational-generative grammar. Includes Greek and Roman grammar, non-Western theories of grammar, ninetcenth-century comparative and historical grammar, Prague School grammar, and American structuralist grammar. Prerequisite: 400 or equivalent or permission of instructor.

LING 404, 405, 406 Indic and Indo-European (3,3,3) Voyles

Reading of simple Sanskrit texts with emphasis on struc-ture of Sanskrit and its comparison with other Indo-Euro-pean languages. Introduction to principles of comparative linguistics.

LING 433 Language Policy and Cultural Identity (3) A

Eastman, Schiffman

Examines linguistic policies of the modern national state and their impact on cultural identity, especially on lin-guistic minorities. In the United States, for example, de-mands for non-English medium schools and other use of mands for non-English medium schools and other use of non-English are compared with language policy in other societies (Europe, Africa, Asia). Attention is paid to at-titudes underlying second-language instruction, bi-lingualism, and language loyalty among Americans of non-English language background. The persistence of language minorities in some societies is examined in terms of special cultural factors underlying language loy-alty, such as religion, ethnic pride, literacy, etc. Offered jointly with ANTH 464. Prerequisite: 200 or 400 or ANTH 450.

LING 441 Linguistics and Poetic Language (3) W Relationship between linguistic structures, linguistic uni-versals, and the poetic uses of language; linguistic de-scription in the analysis of literature. Prerequisite: 400 or permission of instructor,

LING 443 Philosophy and Linguistics (3) A Study of some of the connections between recent linguistics and philosophy, primarily philosophical problems that arise in the attempt to understand current linguistic theories and the implications of linguistics for philoso-phy. Offered jointly with PHIL 443. Prerequisite: permission of instructor.

LING 445 Theoretical Aspects of Teaching English as a Foreign Language (3) W

loup Linguistic analysis as a basis for the teaching of English as a foreign language; language as rule-governed behav-ior. Prerequisites: 400 and permission of instructor.

LING 447 Language Development (4) ASp Dale

First-language acquisition and use by children. Emphasis on theoretical issues and research techniques. Offered jointly with PSYCH 457. Prerequisites: 400 or PSYCH 306, and senior or graduate standing.

LING 449 Second-Language Learning (3) Sp loup

Survey of issues related to second-language learning: learning to read in a second language, learning the lin-guistic aspect, and learning the subject matter. Prerequi-sites: 200 or 400 and permission of instructor.

LING 451, 452, 453 Phonology (3,3,3) A,W,Sp Brame, Contreras, Kaisse

Speech sounds, mechanism of their production, and structuring of sounds in languages; generative view of phonology. Offered jointly with ANTH 451, 452, 453. Prerequisite: 200 or 400, either of which may be taken concurrently.

LING 454 Methods in Comparative Linguistics (3) W

Voyles Method and theory of comparative linguistics in relation to anthropological research. Prerequisite: 400 or permis-

LING 455 Areal Linguistics (3, max. 6) Linguistic analyses of the languages of a selected area. Offered jointly with ANTH 455.

LING 461, 462, 463 Syntax (3,3,3) W,Sp,A

Brame, Contreras, Newmeyer Brane, Contreas, Newmeyer Study of the structural properties of language; introduc-tion to generative transformational syntax. Offered jointly with ANTH 461, 462, 463. Prerequisite: 200 or 400, which may be taken concurrently.

LING 464 Articulatory Phonetics (2½) S Function of speech mechanisms, and dimensions of speech sounds. Practice in the transcription and production of sounds from a wide variety of languages.

LING 465 Problem Solving in Phonology (5) S Training in practical solutions to phonological problems from a variety of languages.

LING 466 Problem Solving in Grammar: Theory and Practice (5) S

Training in practical solutions to grammatical problems from a variety of language structures against a back-ground of constituent structure theory. To be taken concurrently with 467.

LING 467 Grammatical Exercises (2½) S Practice in eliciting, recording, and analyzing grammati-cal data of a non-indo-European language. Prerequisite: 466, which may be taken concurrently. (Offered Summer Quarter only.)

LING 471 Survey of Linguistic Theories (5) S

LING 472 Advanced Linguistic Analysis (5) S

LING 473 Field Methods (5) S

Guided practice in gathering and analyzing data from a non-Indo-European language. Prerequisite: 472, which may be taken concurrently, or the equivalent.

LING 478 Introduction to Southeast Asian Linguistics (3) Sp Cooke

Survey of language families of Southeast Asia. Typology and relationships. Research needs and problems. Prereq-uisites: 452, 462.

LING 499 Undergraduate Research (1-5) AWSpS

Courses for Graduates Only

LING 500 Proseminar (3) A Introduction to bibliography and research in linguistics.

LING 501, 502, 503 Linguistic Analysis Laboratory

(3,3,3) Guided analysis of a language unfamiliar to all students of the class; construction of a grammar based on material elicited from native informant. Prerequisites: 453, 463, or permission of instructor.

LING 504 Indo-European Comparative Phonology (2) A Kaisse

Sound systems of the principal families of Indo-European and the relation of these to a hypothetical parent tongue. Prerequisite: 406 or permission of instructor. (Offered alternate vears.)

LING 505 Indo-European Comparative Grammar (2) W

Systematic treatment, with extensive surveys of individual language groups. Prerequisite: 504.

LING 514, 515, 516 Seminar in Comparative Linguistics (3,2,2) A,W,Sp Kaisse

Advanced problems emphasizing work with languages having few or no written records. Prerequisite: 406 or permission of instructor.

LING 519 Mathematical Models of Grammar (3) Sp Brame

Study of some mathematical models of language recogni-tion, emphasizing context-free and context-sensitive grammars. Prerequisite: graduate standing in mathemat-ics, linguistics, or psychology, or permission of instructor

LING 524 Seminar in Descriptive Linguistics

(3, max. 6) Individual and joint research on selected topics in descriptive linguistics. Topics change each quarter. Typical topics are semantics, generative grammar, phonological theories. Prerequisites: 453, 463.

LING 530 Dialectology (3) Sp

Schiffman, Williams

The principles of dialect deviation as related to linguistic structure and usage. Prerequisite: 452 or permission of instructor.

LING 550, 551, 552 Advanced Phonology (3,3,3) A,W,Sp Brame, Kaisse

Problems in phonological theory, generative phonology, phonological change. History of phonological analysis. Prerequisites: 451, 452, 453.

LING 553 **Analysis of Linguistic Structures**

(3, max. 6) Sp Syntactic and/or phonological analysis. Language varies. Offered jointly with ANTH 553. Prerequisite: permission of instructor.

LING 561, 562, 563 Advanced Syntax (3.3.3) A,W,Sp Brame, Newmeyer

Intensive investigation of the historical background of, and recent developments in, transformational syntax... Prerequisites: 461, 462, 463.

LING 565 Contrastive Linguistics (3) Sp

The attempt to look across linguistic systems for compa-rable and contrastive classes and subclasses. Problems of subcategorization and universal grammar. Three conceptually distinct models: structural, transfer grammar, generative. Prerequisites: 452, 463.

LING 567 Syntactic and Semantic Development (3) W

Dale Advanced study of the patterns of child language, lin-guistic approaches to characterizing them, and psycho-logical approaches to understanding the nature of de-velopment. Includes cross-linguistic comparisons, the fe-lationship of comprehension to production, the cognitive basis for syntax, early semantic systems, and others. Of-fered jointly with PSYCH 567. Prerequisites: one course

LING 578 Seminar in Southeast Asian Linguistics (3, max. 9) Sp Cooke

in child language development and permission of instruc-

Advanced consideration of specialized problems in Southeast Asian linguistics. Reports on individual research.

LING 579 Comparative Altaic Linguistics (3) W Comparative phonology and morphology of Mongolian, Turkic, and other Altaic languages. Offered jointly with ALTAI 579. Prerequisite: permission of instructor.

LING 580 Problems in Linguistics (3, max. 12) AWSp

Brame, Contreras, Ioup, Kaisse, Newmeyer, Saporta, Williams

For advanced students of linguistics, dealing with signifi-

cant movements, techniques, skills, and theories in the field. Prerequisite: permission of instructor.

LING 599 Linguistics Colloquium (1, max, 6) AWSp

Biweekly seminar attended by faculty and graduate students to discuss research in progress and topics of general interest. Attendance is required for a minimum of three quarters during the student's residence. Prerequisite: permission of instructor.

LING 600 Independent Study or Research (*) AWSpS

LING 700 Master's Thesis (*) AWSpS

LING 800 Doctoral Dissertation (*) AWSpS

MATHEMATICS

Courses for Undergraduates

MATHEMATICS

MATH 100, 102 Algebra (5,5) AW, WSp Similar to the first three terms of high school algebra. As-sumes no previous experience in algebra. Open only to specially admitted students (i.e., (1) Educational Oppor-tunity Program students, or (2) students admitted with an entrance deficiency in entrance deficiency. entrance deficiency in mathematics). (Not open to regularly admissible students.)

MATH 103 Introduction to Elementary Functions

(3) AWSp Continues the study of algebra begun in 100 and 102 with emphasis on functions (polynomial, rational, logarith-mic, exponential, and trigonometric). Open only to spe-cially admitted students (see definition under 100) who have completed 102.

MATH 105 Elementary Functions (5) AWSp Elementary functions with emphasis on the general na-ture of function, polynomial and rational functions, expo-nential and logarithmic functions and trigonometric functions. Not open for credit to students who have taken 156. Prerequisites: 1½ years of high school algebra and qualifying test, or equivalent.

MATH 106 Introduction to Finite Mathematics (3) AWSp

Brief introduction to logic, set theory, and probability theory. Intended primarily for students in the biological and social sciences and in business administration. Ordinarily, credit may not apply toward a major in mathemat-ics. Prerequisite: 1½ years of high school algebra, or X101 or equivalent.

MATH 124, 125, 126 Calculus With Analytic Geometry (5,5,5) AWSpS,AWSpS,AWSpS Plane analytic geometry, differentiation of algebraic and transcendental functions, definite and indefinite intetranscendeniar functions, definite and indefinite inde-grals, technique of integration, vectors, vector-valued functions, infinite series. Applications. Credit not al-lowed for both 124 and 134, or 125 and 135, or 126 and 136. Prerequisites: 105 or qualifying test, and trigonome-try for 124; 124 or 134 for 125; 125 or 135 for 126.

MATH 134, 135, 136 Honors Calculus With Analytic Geometry (5,5,5) A,W,Sp Honors sections of 124, 125, 126. See credit restrictions under 124, 125, 126 above. Prerequisites: four years of high school mathematics including one year of calculus, and permission of departmental adviser.

MATH 157 Elements of Calculus (5) AWSp Rate of change, tangent, derivative, accumulation, area, integral mainly in the context of economic variables and physical processes. Credit does not apply toward a mathematics major. Prerequisite: 1½ years of high school algebra or equivalent.

MATH 170, 171 Mathematics for Elementary School Teachers (3,3) AWSpS,Sp

Development of the systems of whole numbers, integers, and rational numbers; measurement; basic geometric con-cepts; functions; elementary probability and statistics. Ordinarily, credit may not apply toward a major in math-ematics. Prospective elementary education students are required to take 170. Prerequisites: one year of high school algebra, and one year of geometry for 170; 170 for 171

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MATH 205 Elementary Linear Algebra (3) AWSp Systems of equations, vector spaces, matrices, linear transformations, characteristic vectors. Not open for credit to students who have taken 302. Prerequisite: 124 or 157.

MATH 234, 235, 236 Honors Advanced Calculus (3,3,3) A,W,Sp Honors courses covering the material of 327, 328, 329 from a more advanced standpoint. Also cover material from 238 and selected other topics. Prerequisites: 136 or permission for 234; 234 for 235; 235 for 236.

MATH 238 Elements of Differential Equations (3) AWSp

Elementary methods of solution of first-order equations, linear equations of second and higher order, power series solutions. Prerequisite: 126 or 136.

MATH 239 Elements of Differential Equations (3) AWSp

Continuation of 238. Laplace transforms, linear systems, stability theory. Prerequisites: 238 and either 205 or 303.

MATH 301 Elementary Number Theory (3) AW Brief introduction to some of the fundamental ideas of elementary number theory. Prerequisite: 126 or 136.

MATH 302, 303 Linear Algebra (4.3)

AWSp,AWSp Vector spaces; linear transformations; systems of linear equations; equivalence and similarity of matrices; guadratic forms. Prerequisites: 126 or 136 for 302; 302 for 303.

MATH 304 Linear Algebra (3) Sp Continuation of 302, 303. Factorization of polynomials, g.c.d. Primary decomposition theorem. Rational and Jor-dan forms. Operators on inner product spaces. Bilinear forms. Prerequisite: 303.

MATH 305 Introduction to Mathematical Logic (3)

WSp Formal principles of inference and definition. Proposi-formal principles of inference involving quantifiers. Aptional inference and inference involving quantifiers. Ap-plications to elementary mathematical theories and to the axiomatic method are stressed. Prerequisites: 126; or 105 and PHIL 120.

MATH 327 Advanced Calculus (3) AWSp Functions of several variables, partial derivatives, the gradient, extremal problems, line integrals, double integrals, Green's theorem. Prerequisite: 126 or 136.

MATH 328 Advanced Calculus (3) AWSp Implicit function theorem, Lagrange multipliers, surfaces and surface integrals, vector analysis in three dimensions, theorems of Gauss and Stokes. Prerequisite: 327.

MATH 329 Advanced Calculus (3) AWSp Infinite series, uniform convergence, power series, im-proper integrals. Prerequisite: 328.

MATH 400 Elementary Set Theory (3) Sp Basic axioms of set theory, algebra of sets, Peano ax-ioms, axiom of choice and Zom's Lemma, transfinite recursion, cardinal numbers and arithmetic. Prerequisite: 236 or 328, or permission of departmental adviser.

MATH 402, 403, 404 Introduction to Modern Algebra (3,3,3) A,W,Sp Algebraic systems; elementary theory of groups, rings, and fields; polynomials; topics in linear algebra; reduc-tions of forms. Prerequisites: 236 or 302 for 402; 402 for 403; 403 for.404.

MATH 405 Introduction to Metamathematics (3) Sp MATH 405 Introduction to Metamatinematics (3) Sp Formal systems; propositional calculus and predicate cal-culus of first order. The concepts of consistency, com-pleteness, and decidability are introduced and applied to these systems. Prerequisite: 305 or permission of departmental adviser.

MATH 407, 408 Mathematical Optimization Theory (3,3) W,Sp Theory of linear programs and its applications: systems of linear inequalities, duality, the simplex algorithm, matrix games. Nonlinear programs and Lagrange multi-pliers. Assignment problems and various combinational extremum problems involving directed graphs. Prerequi-sites: 302 for 407; 407 for 408.

MATH 411, 412 Introduction to Modern Algebra for Teachers (3,3) A,W

Development of the number systems of elementary algebra; groups, rings, integral domains and fields; polyno-mials. Designed for teaching majors; not open for credit to students who have taken 402, 403. Prerequisites: 205 or 302 for 411; 411 for 412.

MATH 414, 415 Number Theory (3,3) W,Sp Congruences, arithmetic of quadratic fields, binary quadratic forms. Dirichtet's theorem on primes in an arithmetic progression. Chebyshev's theorem on distribu-tion of primes, the partition function, equations over fi-nite fields. Prerequisites: 301 for 414; 414 for 415.

MATH 420 History of Mathematics (3) S Survey of the development of mathematics from its earliest beginnings through the first half of the twentieth century. Prerequisite: 402 or 412.

MATH 424, 425, 426 Fundamental Concepts of Analysis (3,3,3) A,W,Sp Sets, real numbers, topology of metric spaces, normed linear spaces, multivariate calculus from an advanced viewpoint. Introduction to Lebesgue measure and intefor 424; 424 for 425; 425 for 426.

MATH 427 Topics in Applied Analysis (3) AW Some elementary, functions of a complex variable, Cau-chy integral formula and applications, Taylor and Lau-rent series, conformal mapping. Prerequisite: 234 or 327.

MATH 428, 429 Topics in Applied Analysis (3,3) WSp,Sp

Fourier series, orthogonal functions and boundary value problems, calculus of variations. Prerequisites: 234 or 327, and 238 for 428; 428 for 429.

MATH 438 Principles of Differential Equations (3) AWSp

Linear systems, existence of solutions, solution by series, special functions. Prerequisites: 236 or 126 and 302. Recommended: 238.

MATH 441, 442, 443 Advanced Geometry (3,3,3) A,W,Sp Selected topics from among: projective geometry, differ-

ential geometry, advanced analytic geometry, algebraic geometry, algebraic topology, and the geometry of con-vex bodies. Prerequisites: 327 or 234, and 302 or permis-sion of departmental adviser for 441; 441 for 442; 442 for 443

MATH 444, 445 Foundations of Geometry (3,3) A,W

Axiomatic treatment of the foundations of Euclidean ge-ometry. Introduction to non-Euclidean geometry. De-signed for teaching majors. Prerequisites: 126 or 136 for 444: 444 for 445.

MATH 464 Numerical Analysis I (3) A

Basic principles of numerical analysis, classical interpo-lation and approximation formulas, finite differences and difference equations. Prerequisites: 238, ENGR 141, and/or C SCI 241 or equivalent programming experience

MATH 465 Numerical Analysis II (3) W Numerical methods in algebra. Systems of linear equa-tions, matrix inversion, successive approximations, itera-tive and relaxation methods. Prerequisites: 303 and 464.

MATH 466 Numerical Analysis III (3) Sp Numerical differentiation and integration. Solution of differential equations and systems of such equations. Prerequisite: 465.

MATH 496 Honors Seminar (*, max. 9) AWSp Problem seminar for senior honors students and first-year graduate students. Prerequisite: permission of instructor.

MATH 497 Special Topics in Mathematics for

Teachers (2-5, mar. 15) 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

(2-5, max. 15) AWSp Reading and lecture course intended for special needs of advanced students. Prerequisite: permission of instructor. (Offered when demand is sufficient.)

PROBABILITY AND STATISTICS

MATH 394 Probability I (3) AW

Sample spaces; basic axioms of probability; combinato-rial probability; conditional probability and indepen-dence; binomial, Poisson and normal distributions. Offered jointly with STAT 394. Prerequisite: 327 or 236.

MATH 395 Probability II (3) WSp Random variables; expectation and variance; laws of large numbers; normal approximation and other limit the orems; multidimensional distributions and transforma-tions. Offered jointly with STAT 395. Prerequisite: 394.

MATH 396 Probability III (3) Sp

Characteristic functions and generating functions; recur-rent events and renewal theory; random walk. Offered jointly with STAT 396. Prerequisite: 395 or STAT 511.

MATH 491, 492 Introduction to Stochastic Processes (3,3) A,W

Random walks, Markov chains, branching processes, Poisson process, point processes, birth and death pro-cesses, queuing theory, stationary processes. Offered jointly with STAT 491, 492. Prerequisites: 396 for 491; 491 for 492.

Courses for Graduates Only

Every year additional courses are offered, and some of the courses listed are not offered every year. Inquiries about the currently offered courses should be addressed to the Graduate Secretary, Department of Mathematics.

MATHEMATICS

MATH 501, 502, 503 Mathematical Logic (3,3,3) A,W,Sp

Theory of formal systems. Formal development of num-ber theory. Completeness and incompleteness, decidability, and underdability. The theorems of Godel, Henkin, Church, Rosser, and Tarski. Selected topics from ax-iomatic set theory, recursive function theory, theory of models, or, advanced theory of formal systems. Prerequi-sites: 405 or equivalent for 501; 501 for 502; 502 for 503.

MATH 504, 505, 506 Modern Algebra (3,3,3) A,W,Sp

Theory of groups, rings, integral domains, and fields; polynomials; vector spaces, Galois theory, and theory of ideals. Prerequisites: 404 or equivalent for 504; 504 for 505: 505 for 506.

MATH 507, 508 Proseminars in Analysis and Applications of Mathematics (3, max. 9; 3, max. 9) S.S

Seminar-type classes designed to be taken concurrently. Under supervision of instructor, students read papers on calculus and applications of mathematics to physical and social sciences. Material is developed and designed to help students organize courses in undergraduate mathe-matics. Intended for teachers of secondary- or collegelevel mathematics. Prerequisite: 36 credits of undergraduate mathematics or permission of instructor.

MATH 510 Seminar in Algebra (*, max. 5) AWSp Prerequisite: permission of graduate program adviser.

MATH 511, 512, 513 Special Topics in Algebra (2-3, max. 9; 2-3, max. 9; 2-3, max. 9) A,W,Sp In recent years the following subjects have been covered: Abelian groups, algebraic function fields, algebraic num-ber theory, classical groups, game theory, group ex-tensions, lattice theory, Lie algebras, number theory, and structure of rings.

MATH 524, 525, 526 Real Variable (3,3,3)

AW, 52, 525, 520 Keil Variatie (3,5,5) Metric spaces; general measures and integration; differ-entiation of set functions; real valued functions on the line; Banach spaces. Prerequisities: 426 or equivalent for 524; 524 for 525; 525 for 526.

MATH 527 Elements of Real Variables for Scientists (3) A

Compactness theorems, Lebesgue integration and limit theorems, Fubini theorem, Lp spaces, L2 Fourier trans-form theory. Prerequisites: 427, 428, 429, or permission of instructor.

MATH 528, 529 Hilbert Space Operators (3,3) W,Sp

Spectral theorem for bounded Hermitian operators, stateand partial differential operators, application to ordinary and partial differential operators with Fourier transforms, construction of Green's functions, contour integral repre-sentation. Prerequisites: 527 for 528; 528 for 529.

MATH 530 Seminar in Analysis (*, max. 5) AWSp Prerequisite: permission of graduate program adviser.

MATH 531, 532, 533 Special Topics in Analysis (2-3, max. 9; 2-3, max. 9; 2-3, max. 9) A,W,Sp In recent years the following subjects have been covered: functional analysis, abstract harmonic analysis, linear operations in Hilbert space, group representations, Fourier series and integrals, topological linear spaces, potential theory, and numerical analysis.

MATH 534, 535, 536 Complex Variable (3,3,3) A,W,Sp Complex numbers; analytic functions; contour integra

tion; power series; analytic continuation; sequences of analytic functions; conformal mapping of simply con-nected regions. Prerequisites: 426 for 534; 534 for 535; 535 for 536.

MATH 537 Applications of Operator Theory (3) A Schrodinger equations; eigenvalue distributions; pertur-bation theory; special functions. Prerequisite: 529.

MATH 538, 539 Nonlinear Ordinary Differential Equations (3,3) W,Sp Phase plane; analysis of critical points (nodes, saddle points, foci); theory of oscillations, limit cycles, Poincare-Bendixon theory; topological methods, fixed-point theorems. Prerequisites: 327 (or 236) and 438 for 538; 538 for 539. (Offered alternately with 578, 579.)

MATH 541, 542, 543 Special Topics in Applied Mathematics (3, max. 9; 3, max 9; 3, max. 9) A,W,Sp

Such topics as mathematical quantum theory, fluid me-chanics, optimization and operations research, and control theory are covered.

MATH 544, 545, 546 Differential Geometry (3,3,3) A,W,Sp

544: differential analysis in Rn, inverse function theorem, vector fields. Stoke's theorem, existence theorems concerning differential equations. Prerequisite: graduate standing or permission of instructor. 545, 546: differenti-able manifolds, differential forms, differential geometry in the large. Prerequisites: 544 for 545; 545 for 546.

MATH 547, 548, 549 Functional Analysis (3,3,3)

A,W,Sp Review of Banach, Hilbert, and Lp spaces. Locally con-vex spaces (duality and separation theory, distributions, and function spaces). Operators on locally convex spaces (adjoints, closed graph/open mapping and Banach-Stein-haus 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 topol-ogy, and complex variables is assumed.

MATH 550 Seminar in Geometry (*, max. 5) AWSD

Prerequisite: permission of graduate program adviser.

MATH 551, 552, 553 Special Topics in Geometry (2-3, max. 9; 2-3, max. 9; 2-3, max. 9) A,W,Sp

In recent years the following subjects have been covered: Riemannian geometry, differentiable manifolds, complex manifolds, geometry of convex bodies.

MATH 557, 558, 559 Special Topics in Numerical Analysis (3, max. 9; 3, max. 9; 3, max. 9) A,W,Sp Such topics as linear systems, approximation theory, or the numerical solution of differential equations are covered.

MATH 561, 562, 563 General Topology (3,3,3)

A,W,Sp Theory of sets; metric spaces; topological spaces; compactness and other covering properties; function spaces; polyhedra; dimension theory. Prerequisites: 400, which may be taken concurrently, and 426 for 561; 561 for 562; 562 for 563.

MATH 564, 565, 566 Algebraic Topology (3,3,3)

A,W,Sp Classical and modern approaches; complexes and their Cressical and mouth approaches; complexes and their homology theory; applications. Fixed points, primary ob-struction; products and Poincare duality; axiomatic ap-proach, covering spaces. Prerequisites: 506 for 564; 564 for 565; 565 for 566.

MATH 569 Partial Differential Equations (3) Sp Pearson

Properties of diffusion, wave, and Laplace-type equations. Initial and boundary value problems. Series expansions, transform methods. Singularities, Green's functions. Classification of second-order equations; theory and applications of method of characteristics. Nu-merical techniques. Offered jointly with A A 569 and AMATH 569. Prerequisite: 428 or A A 568.

MATH 570 Seminar in Topology (*, max. 5) AWSp

Prerequisite: permission of graduate program adviser.

MATH 571, 572, 573 Special Topics in Topology (2-3, max. 9; 2-3, max. 9; 2-3, max. 9) A,W,Sp Special topics from general and algebraic topology.

MATH 574, 575, 576 Advanced Partial Differential Equations (3,3,3) A,W,Sp Classification, existence, uniqueness, and boundary value problems for partial differential equations. Green's function and associated integral equations. Prerequisite: 426 or 527.

MATH 578, 579 Special Functions (3,3) W,Sp Special functions arising from eigenvalue problems, asymptotic developments by contour integration, analytic continuation, complex variable aspects of Fourier inte-grals. Prerequisite: 427. (Offered alternately with 538, 539.)

MATH 585 Numerical Mathematics (3)

Numerical solution of linear algebraic systems, algebraic eigenvalue problems, ordinary and partial differential equations. Offered jointly with C SCI 585. Prerequisites: 239, 303, and programming with a procedure-oriented language.

MATH 586 Numerical Mathematics (3) Continuation of 585. Selected topics in numerical mathe-matics. Offered jointly with C SCI 586. Prerequisite: 585 or permission of instructor.

MATH 600 Independent Study or Research (*) AWSpS

MATH 700 Master's Thesis (*) AWSpS

MATH 800 Doctoral Dissertation (*)

PROBABILITY AND STATISTICS

MATH 521, 522, 523 Probability (3,3,3) A,W,Sp Measure theory and integration, independence, laws of large numbers, Fourier analysis of distributions, central limit problem and infinitely divisible laws, conditional expectations, martingales. Offered jointly with STAT 521, 522, 523. Prerequisite: 426.

MATH 590 Seminar in Probability (*, max. 5) AWSD

Prerequisite: permission of instructor.

MATH 591, 592, 593 Special Topics in Probability (3, max. 9; 3, max. 9; 3, max. 9) A,W,Sp In recent years, the following subjects have been covered: advanced probability theory, stochastic processes, distribution-free inference, game and decision theory, ad-vanced theory of estimation (including sequential estimation).

MATH 600	Independent Study	or Research	(*)
AWSpS			• •

MATH 700 Master's Thesis (*) AWSpS

MATH 800 Doctoral Dissertation (*)

MICROBIOLOGY AND IMMUNOLOGY

See School of Medicine.

MUSIC

ETHNOMUSICOLOGY

Courses for Undergraduates

COURSES FOR BOTH MAJORS AND NONMAJORS

MUSIC 160 Anglo-American Folk Music (5) Sp Lieherman

Genres and styles from earliest roots to the 1960s; Anglo-American ballads, dance music, French and other European immigrant groups.

MUSIC 300 Music of Greater Mexico (3) Discussion of various regional styles of Mexico and a consideration of pre-Hispanic Indian origins and the music of Chicanos in the American Southwest.

MUSIC 316, 317, 318 Music Cultures of the World (5,5,5) A,W,Sp 316: Near East, Central Asia, Far East, South and South-east Asia, Indonesia, and the Philippines. 317: Music of sub-Saharan Africa, Americas, and Oceania. 318: Folk and popular music in Western Europe, Eastern Europe, and the Americas.

MUSIC 319 Afro-American Music (5)

Survey course centering on Black music in the United States, but also clarifying the relationship of this music to the musics of other Afro-American cultures as well as to their African roots.

MUSIC 426 Music of Korea (3) Classical instrumental and vocal genres of Korea. Ex-amines both court and folk traditions. Open to students in music and East Asian Area Studies. Prerequisites: 316, 317. 318.

MUSIC 427 Music of Africa (3) Music cultures of sub-Saharan Africa. Traditional styles and more recent developments. Open to all students with an interest in the area. Prerequisites: 316, 317, 318.

MUSIC 428 Music of India (3) Hindustani and Karnatic classical traditions, with empha-sis on traditional Indian music theory and present per-formance practices. Open to students in music and South Asian Area Studies. Prerequisites: 316, 317, 318.

MUSIC 429 Introduction to Ethnomusicology (3) A Major writings in the field; an overview of ethnomusico-logical problems, theory, and methods. Prerequisite: permission of instructor.

MUSIC 430 Organology (3) W Systematic study of musical instruments, involving the history, acoustical phenomena, and physical typologies of instruments from around the world, with emphasis on non-Western music. Prerequisite: 429.

MUSIC 433 Music of Latin America (3) The Indian, African, and European music of the Span-ish-, French-, and Portuguese-speaking New World countries. Prerequisites: 316, 317, 318.

MUSIC 439 Music of Indonesia and the Philippines

(3) Includes the gong culture 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. Prerequisites: 316, 317, 318.

MUSIC 444 Music of the Near East (3) Sp Sakata

Classical and folk musical traditions of Iran, Turkey, and the Arab world. Prerequisites: 316, 317, 318.

MUSIC 445 Selected Topics in Ethnomusicology (3) AWSp

Deals with topics not covered by regular courses in eth-nomusicology. Frequently taught by visiting lecturers. Course content varies with different instructors. Prerequisite: permission of instructor.

MUSIC 494 Music of Japan Until 1700 (3) Gagaku, Biwa, shakuhachi, koto, and Noh genres. Open to students in music and East Asian Area Studies. Prereq-uisites: 316, 317, 318.

MUSIC 495 Music of Japan After 1700 (3) Shamisen, Bunraku, Kabuki, and Sankyoku traditions.

Open to students in music and East Asian Area Studies. Prerequisites: 316, 317, 318.

MUSIC 497 Music of China (3) Lieberman

Instrumental and vocal music of China. Some attention to Insummental and vocal music of China. Some attention to traditional Chinese music theory, historical sources, and dramatic forms. Open to students in music and Chinese languages and literature or area studies. Prerequisites: 316, 317, 318.

MUSIC 498 Music of Spain (3)

MUSIC 438 Music of Spain (3) The major stylistic period of the music of Spain, with a consideration of the social and historical contexts that formed the music; the music of Islam in terms of its influ-ence in Spain and the vestiges of early Spanish music in the folk and popular music of Spain and Latin America.

MUSAP 459 World Music (2-3, max. 18) AWSpS World music traditions taught by visiting native artists. Consult ethnomusicology staff for current offerings. Primarily for majors; nonmajors on a space-available basis.

Courses for Graduates Only

MUSIC 511 Seminar in Field and Laboratory Methods (3) Study of the methodology of research in ethnomusicol-

ogy along with practical experience in recording and pro-cessing field and laboratory materials. Prerequisites: 429 and permission of instructor.

MUSIC 512 Seminar in Ethnomusicology (3) Study of methodological procedures in ethnomusicology applied to specific research problems.

MUSIC 533, 534, 535 Preceptorial Reading in Ethnomusicology (5,5,5) A,W,Sp Significant ethnomusicological literature on the major music cultures

MUSIC 536 Transcription and Analysis (3) Study of practice in different notational analytical systems used in non-Western music. Prerequisite: 429.

MUSIČ

Courses for Undergraduates

COURSES PRIMARILY FOR NONMAJORS

Most ensembles-listed under courses primarily for music majors in the following section—are open to nonmu-sic majors with permission of the undergraduate adviser.

MUSIC 100 University Singers (2, max. 24) AWSp Kanlan

MUSIC 116, 117, 118 Elementary Music Theory (2,2,2) AW, WSp,Sp Prerequisites: 116 for 117; 117 for 118.

MUSIC 120 Survey of Music (5) ASp Trov

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) AWSp Sokol

Development of the orchestra and its literature.

MUSIC 122 Orchestral Music: Seventeenth and Eighteenth Centuries (2) A Sokol

MUSIC 123 Symphonic Music: Nineteenth Century (2) WSp Sokol

MUSIC 124 Symphonic Music: Contemporary (2) Sp Sokol

MUSIC 128 The Concerto (2) A Sökol

MUSIC 130, 131, 132 Basic Musicianship (3,3,3) A,W,Sp Lundquist

Examination of the processes of music from cross-cul-

tural vantage point, primarily African, Latin American, and Afro-American. Development of improvisatory tech-niques, performance, use of musical notation, develop-ment of analytical and score-writing techniques, development of aural perception ability. Prerequisite: permission of instructor.

MUSIC 161 American Musical Theater (5) W 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. Recommended: 160.

MUSIC 162 American Popular Song (5) Sp

Historical, social, and stylistic study of popular idioms from the late nineteenth century to the present. Most at-tention to contemporary idioms (rock, country-western, soul, disco). Influences of music industry on taste and style. Does not include jazz, blues, or folk music. Rec-ommended: 160, 161.

MUSIC 176 Congress of Strings (5) S Eight-week course for the sixty winners of the American Eight-week course for the sixty winners of the American Federation of Musicians' Congress of Strings national au-ditions. The course is an amalgam of applied music (Strings—MUSAP 161, 163, and 164—3 credits each), chamber music (MUSIC 103—1 credit) and orchestra (MUSIC 101—2 credits). Intensive instruction in each of the three areas is provided by five string faculty mem-bers, who are involved equally in each of the three areas of study. Enrollment limited to Congress of Strings audi-tion winners. tion winners

MUSIC 185 The Concert Season (4) W Beresma

Sampling of different musical events on campus, which may include orchestra, chamber music, opera, non-Western music, mixed media, other. Analysis of selected works; when possible, preview with performers. Atten-dance required at one evening concert weekly.

MUSIC 200 Mosic and the Child (3) Introductory orientation to music designed to acquaint the student with the structural and esthetic elements in music and those music-related processes of self-expression and communication basic to a child's education. Prerequisite to the course in instructional methodology.

MUSIC 257 Recording and Reproduction of Music (3) W White

Evolution of recorded music with emphasis upon equipment, processes, and techniques used.

MUSIC 311 Tonal Counterpoint (3) W Beale, Benshoof, Rahn, Thome

Basic techniques of baroque counterpoint, and writing in baroque forms, such as invention, fugue, and others. Prerequisites: 212 and 215.

MUSIC 312 Twentieth Century Techniques (3) Sp Beale, Bergsma, Thome

Practical writing and analytical study of twentieth century composition techniques from Debussy to the present. Prerequisites: 212 and 215.

MUSIC 321 The Role of the Music Critic (2) A Sokol

The critic's relationship to composer, performer, and listener from writings of ancient Greece to present-day journalistic criticism. Prerequisite: 121 or 122 or 123.

MUSIC 322 Great Conductors (2) A Sokol

Evolution of conducting leading to the rise of the virtuoso conductor in the nineteenth and twentieth centuries; prominent personalities from Berlioz to Osawa. Prerequi-site: 122 or 123 or 124.

MUSIC 329 Chamber Music (2) W McInnes Survey of literature for ensembles.

MUSIC 330 Music in the United States (3) W Contribution of music to the development of American culture.

MUSIC 331 History of Jazz (3) AWSp Smith, Stewart

Development of jazz in the United States, from its beginnings to its present trends.

MUSIC 339 Opera (5) W Troy

Contributions of music, text, and staging; study of repre-sentative works concentrating on problems of combining these elements into a composite work of art.

MUSIC 385 Music in Theatre (3) Bergsma

Survey of the interaction between musical form and function in relation to various kinds of theatre, from liturgical drama to film and multimedia.

MUSIC 386 Multimedia Music (3) A Dempster

Survey tracing the development of multimedia music since 1950 (experimental combinations of music with other art forms in unfamiliar circumstances).

MUSIC 456 Musical Acoustics (3) Sp White

How musical instruments function and interact with acoustics of rooms, with particular emphasis upon musi-cal aspects of acoustics. Prerequisites: PHYS 207 and permission of instructor.

MUSIC 457 Research Laboratory Instrumentation (3) A White

Theory and operation of laboratory instruments used in systematic musicology such as signal generators, volt meters, attenuators, filters, oscilloscopes, tuning de-vices, and melograph-type. Prerequisite: permission of instructor.

COURSES PRIMARILY FOR MUSIC MAJORS

Permission of undergraduate adviser required for all courses except 100.

MUSIC 100 University Singers (2, max. 24) AWSp

MUSIC 101 University Symphony Orchestra (2, max. 30) AWSp

MUSIC 102 University Band (2, max. 24) WSp Rissell

MUSIC 103 Chamber Music (1, max. 12) AWSp

MUSIC 104 Piano Ensemble (1, max. 12) AWSp O'Doan

MUSIC 105 Brass Ensemble (1, max. 12) WSp Bissell

MUSIC 106 Woodwind Ensemble (1, max. 12) AWSp

Grossman, McColl, Skowronek, Storch

MUSIC 107 Opera Workshop (1, max. 12) AWSp Rosinbum

MUSIC 108 Fundamentals of Electronic Music (2) AWSp White

Development of proficiency in the use of tape recorders for original recordings, dubbing, and mixing; experience in the setting up and use of the electronic music synthesizer for the composition of electronic music. Each student produces tape-recorded examples of electronic music.

MUSIC 110, 111, 112 First-Year Theory (3,3,3)

A,W,Sp Study of basic musical concepts and terminology through a program of listening, analysis, and keyboard practice. To be taken concurrently with 113, 114, 115.

MUSIC 113, 114, 115 Ear Training (1,1,1) A,W,Sp To be taken concurrently with 110, 111, 112.

MUSIC 119 Music Fundamentals (2) AWSp For prospective students in elementary education.

MUSIC 136 Basic Keyboard (1, max. 6) AWSp For music majors only.

MUSIC 137, 138, 139 . Class Instruction: Voice (1,1,1) A,W,Sp For music majors only.

MUSIC 140 Vocal Jazz Ensemble (2, max. 12) AWSp

MUSIC 144, 145, 146 Diction for Singers (2,2,2) A,W,Sp

Application of rules of diction, enunciation, and articula-tion in typical vocal repertoire in Italian and English (144), German and English (145), French and English (146). Individual performance of required and optional prepared repertoire, with piano accompaniment. Drill of recurrent textual vocabulary. Recommended: additional study of grammar, vocabulary, and literature in the sev-eral language departments. Required for voice majors; elective for others if space available.

MUSIC 147 Opera Chorus (1, max. 12) AWSp

MUSIC 167 Oboe Reed-making Techniques (1, max. 3) AWSp Storch

Group instruction in the elements of oboe reed-making, starting with the raw material, Arundo Donax. Prerequi-site; permission of instructor.

MUSIC 168 Clarinet Reed-making Techniques (1, max. 3) AWSp *McColl*

Group instruction in the elements of clarinet reed-making, starting with the raw material, Arundo Donax. Prerequisite: permission of instructor.

MUSIC 169 Bassoon Reed-making Techniques (1, max. 3) AWSp

Grossman

Group instruction in the elements of bassoon reedmaking, starting with the raw material, Arundo Donax. Prerequisite: permission of instructor.

MUSIC 191 Composition (3, max. 9) AWSp Beale, Benshoof, Bergsma, Kechley, Rahn, Smith, Thome. Tufts

One-hour private lesson and one-hour laboratory session each week. Intended to develop skill in creative musical expression.

MUSIC 201 Wind Sinfonietta (1, max. 12) AWSp Bissell

MUSIC 202 Jazz Improvisation (1, max. 6) WSp Smith

Improvisational techniques in the jazz style for instru-mentalists, with priority given to woodwind performers.

MUSIC 203 Marching Band (2, max. 10) A Bissell

MUSIC 204 Percussion Ensemble (1, max. 12) AWSp Dunba

MUSIC 206 Jazz Workshop (1, max. 12) AWSp Stewart

MUSIC 207 University Oratorio Chorus (2, max. 24) AWSp Conlon

Choral ensemble that performs major works with orchestra.

MUSIC 208 Studio Jazz Ensemble (2, max. 24) AWSp Cummings

Large ensemble performance practices in the jazz idiom.

MUSIC 209 Recorder Ensemble (1) Sp Prerequisite: 241.

MUSIC 210, 211, 212 Second-Year Theory (3,3,3)

A,W,Sp Beale, Kechley, Rahn, Thome, Tufts Practical writing and analytic experience in diatonic and chromatic harmony as it was used during the eighteenth and nineteenth centuries. To be taken concurrently with 213, 214, 215. Prerequisites: 112 and 115.

MUSIC 213, 214, 215 Music After 1750 (3,3,3)

A,W,Sp Starr, Troy To be taken concurrently with 210, 211, 212. For nonmajors. Prerequisites: 120 and ability to follow a printed score.

MUSIC 216, 217, 218 Introductory Composition (2,2,2) A,W,Sp

Benshoof For students not majoring in composition. Prerequisite: 112.

MUSIC 220, 221, 222 String Techniques and Pedagogy (2,2,2) A,W,Sp Jussila

Violin, viola, cello, string bass.

MUSIC 226, 227, 228 Woodwind Techniques and Pedagogy (2,2,2) A,W,Sp 226: clarinet. 227: flute. 228: double reeds.

MUSIC 229, 230, 231 Brass Techniques and Pedagogy (2,2,2) A,W,Sp Bissell

229: trumpet. 230, 231: lower brass.

MUSIC 232 Percussion Techniques and Pedagogy (1) A Dunbar

MUSIC 233 Music Theatre Technique (1) A Rosinbum

Stage deportment and dramatic movement for singers.

MUSIC 236 Secondary Piano (2, max. 6) AWSp For music majors only.

MUSIC 237 Class Instruction: Voice (2, max. 6) AWSp For music majors only.

MUSIC 240 Guitar Techniques I (1) AWSp

MUSIC 241 Recorder Techniques (1) W

MUSIC 250 Guitar Techniques II (1) Sp Prerequisite: 240 or permission of instructor.

MUSIC 280 Basic Principles of Conducting (1) Sp Prerequisite: 212, which may be taken concurrently.

MUSIC 291 Composition (3, max. 9) AWSp Beale, Benshoof, Bergsma, Kechley, Rahn, Smith, Thome, Tufts

One-hour private lesson and one-hour laboratory session per week. Prerequisite: 191.

MUSIC 307 Advanced Opera Workshop (1) AWSp Desimon

Preparation and public performance of one-act chamber operas and/or scenes from the standard opera repertoire. Intended for the mature student with a secure vocal technique. Prerequisite: permission of instructor. Recom-mended: three guarters of 107.

MUSIC 309 Advanced Music Theatre Technique (1) w

Rosinbum

Dramatic interpretation of musical style as represented by the major opera composers since Mozart. Prerequisite: 233.

MUSIC 310 Modal Counterpoint (3) A Bergsma, Rahn, Thome Sixteenth-century style. To be taken concurrently with 313. Prerequisites: 212 and 215.

MUSIC 311 Tonal Counterpoint (3) W Beale, Benshoff, Rahn, Thome

Basic techniques of Baroque counterpoint and introduc-tion to the fugue. To be taken concurrently with 314. Prerequisites: 212 and 215.

MUSIC 312 Twentieth-Century Techniques (3) Sp Beale, Bergsma, Thome

Practical writing and analytical study of twentieth-cen-tury composition techniques from Debussy to the present.

MUSIC 313, 314 Music Before 1750 (3,3) A,W

Starr, Troy 313: before 1600. 314: 1600-1750. To be taken concurrently with 310, 311. Prerequisites: 212, 215 for 313; 313 for 314.

MUSIC 323, 324, 325 Accompanying (2,2,2) AW,W,Sp O'Doan

Study and performance of music of different types and periods for voice or instruments in combination with the piano.

MUSIC 326, 327, 328 Repertoire (2,2,2) A,W,Sp Hokanson, Zsigmondy For applied music majors.

MUSIC 334 Band Arranging (2) W Prerequisite: 212.

MUSIC 336 Jazz Arranging (2) A Smith

Writing in jazz style for various instrumental combinations.

MUSIC 337 History of Chamber Music (3) A

MUSIC 338 Baroque Ornamentation (2)

Terry Musical ornamentation in France, Spain, England, Italy, and Germany from 1608 to 1800, with special reference to the harpsichord.

MUSIC 340 Music in General Education (3) AW An orientation to the broad scope of music in schools (K-12), including identification of 'musical concepts and skills and the development of strategies and evaluation techniques. Prerequisites: EDUC 302, EDPSY 304, and piano and voice competencies.

MUSIC 379 Junior Recital (1) AWSp For participants in the Bachelor of Music program only.

MUSIC 380, 381, 382 Conducting (1,1,1) A,W,Sp Kaplan, Sokol Prerequisite: 280.

MUSIC 391 Composition (3, max. 9) AWSp Beale, Benshoof, Bergsma, Kechley, Rahn, Smith, Thome. Tufts

One-hour private lesson and one-hour laboratory session each week. Prerequisite: 291.

Courses 400 through 423: Prerequisite: 314.

MUSIC 400 Medieval Music: To 1400 (3) A Gregorian chant through Machaut and Landini.

MUSIC 401 Early Renaissance Music: 1400-1525 (3) W Dunstable through Josquin.

MUSIC 402 Late Renaissance Secular Music: **1525-1630 (3) A** The matrigal in Italy, England, and Germany. The Chanson, Jannequin through Lassus.

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MUSIC 403 Late Renaissance Sacred and Instrumental Music: 1525-1630 (3) W Starr

Latin church music. Willaert through G. Gabrieli; early Reformation church music, Walther through Gibbons; in-strumental music, Cabezon, the English virginal school, and Sweelinck.

MUSIC 404 Keyboard Music: 1630-1770 (3) A Forms and styles: Frescobaldi through J. S. Bach and C. P. E. Bach.

MUSIC 405 Keyboard Music: 1770-1850 (3) W Haydn through Schumann.

MUSIC 406 Keyboard Music: 1850-1920 (3) Sp Liszt through Debussy.

MUSIC 407 Baroque Solo Song (3) Monody and cantata, Caccini through Handel.

MUSIC 408 The German Lied (3) A Schubert through Strauss.

MUSIC 409 French Art-Song: 1850 to the Present

Faure through Poulenc.

(3)

MUSIC 410 Chamber Music: 1660-1770 (3) W Frescobaldi through Bach.

MUSIC 411 Chamber Music: 1770-1830 (3) Haydn through Schubert.

MUSIC 412 Chamber Music: 1830-1920 (3) Schumann through Ravel.

MUSIC 413 Orchestral Music: 1620-1760 (3) W Corelli through the Mannheim School.

MUSIC 414 Orchestral Music: 1760-1850 (3) A Haydn through Berlioz.

MUSIC 415 Orchestral Music: 1850-1920 (3) W Liszt through Elgar; the National Schools and the Impressionists

MUSIC 416 Choral Music: 1600-1770 (3) Sp Monteverdi through Handel.

MUSIC 417 Choral Music of Bach (3) Sp The cantatas and larger works. Choral compositions of Bach's immediate predecessors.

MUSIC 418 Choral Music: 1770-1850 (3) A Large works for chorus and orchestra. Haydn through Berlioz.

MUSIC 419 Choral Music: 1850 to the Present (3)

Selected choral masterpieces: Brahms through Britten.

MUSIC 420 Opera: 1600-1750 (3)

MUSIC 421 Opera: 1750-1850 (3)

Troy Gluck through Bellini.

MUSIC 422 Opera: 1850-1920 (3)

Troy Wagner through Puccini.

MUSIC 423 Music Since 1920 (3) Emphasis on living composers and the multitude of styles and esthetic approaches characterizing contemporary music.

MUSIC 424 Conspectus of the History of Music to 1760 (5) W Trov

Concentrated course in Renaissance, Baroque, and pre-classical music. Intended primarily for senior transfers and graduates.

MUSIC 425 Conspectus of the History of Music From 1760 (5) Sp Troy

Concentrated course in classical, nineteenth- and twentieth-century music. Intended primarily for senior transfers and graduates.

MUSIC 431 The Curriculum in Music Education (3, max. 6) WS *Cooper*

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. Prerequisite: music teaching, student teaching, or permission of instructor.

MUSIC 432 The General Music Class (3) Sp

Lundquist The teaching of music and its literature in nonperforming classes on the junior and senior high school level. Prerequisite: 340.

MUSIC 434, 435, 436 Pedagogy (2,2,2) A,W,Sp Hokanson, Moore, O'Doan Principles of effective studio teaching; survey and evalu-

ation of teaching materials.

MUSIC 437 Harmonic Analysis (3)

MUSIC 438 Psychology of Music (3) A or W Carlsen

Study of human response to musical phenomena, with particular emphasis on perception, learning, measurement, and functional applications.

MUSIC 440 Music in Early Childhood (3) A Identification and selection of appropriate objectives, materials, teaching strategies and evaluation techniques used in music teaching from nursery school through grade 3, with consideration of various methods (e.g., Kodaly, Orff) for early childhood development in music. Prerequisite: 340.

MUSIC 441 Music in Later Childhood (3) Sp The identification and selection of appropriate objectives, materials, teaching strategies, and evaluation techniques used in music teaching in grades 4 through 6, with con-sideration of various methods (e.g., Kodaly, Orff) for la-ter childhood development in music. Prerequisite: 340. MUSIC 442 Instrumental Curriculum: Methods and Materials (3) Jussila

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. Prerequisites: 340 and permission of instructor.

MUSIC 443 Choral Curriculum: Methods and Materials (3) W

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. Prerequisites: 340 and permission of instructor.

MUSIC 450 University Chorale (2, max. 24) AWSp Kaplan

MUSIC 451 Madrigal Singers (2, max. 24) AWSp Kechley

MUSIC 455 Choral Arranging (3) Sp

Kechley Primarily for choral conductors who need to modify or arrange material to suit the capabilities of specific choral groups and performance situations. Prerequisite: senior standing or permission of instructor.

MUSIC 460 Advanced Plano Repertoire (3, max. 9) AWSpS

Hokanson

For piano majors. Examination in depth of more difficult works, by genres and by individual composers. Prerequi-sites: 326, 327, 328, and permission of instructor.

MUSIC 461 Advanced Piano Ensemble (1, max. 3) AWSp O'Doan

In-depth study and performance of the great works for four hands at one or two pianos. Designed for upper-level piano majors or students with equivalent ability. Prerequisite; permission of instructor.

MUSIC 464 Pitch and Rhythmic Perceptions for Conductors (2) W

Tuning methods currently in use; mechanical frequency measurement devices and their use; rhythmic and metric problems relating to phrasing; balance, relating to per-ception of pitch and frequency; problems specific to cho-ral or instrumental conductors; rehearsal efficiency. Par-dimensional transformation of the problem specific to cho-rel or instrumental conductors; rehearsal efficiency. Participation in laboratory performing situations expected.

MUSIC 470 Contemporary Theories I: Tonal Music (3) Rahn

Recent tonal theories including introduction to the various developments of the theories of Heinrich Schenker; not restricted to music written before 1900. Prerequisites: 215 and 312, or permission of instructor.

MUSIC 471 Contemporary Theories II: Non-Tonal Music, 1900-1950 (3) Rahn

Continuation of 470. Includes both "free atonal" and "classical series" music. Systematic analysis of works of Schoenberg, Webern, Berg, and others, written both be-fore 1923 (free atonal) and after (classical serial). Prereq-uisites: 215 and 312, or permission of instructor.

MUSIC 472 Contemporary Theories III: Music Since 1950 (3)

Rahn

Continuation of 471. Emphasis on the many organiza-Contribution of the set of the se

MUSIC 479 Senior Recital (1) AWSp

MUSIC 480 Sinfonietta (1, max. 6) AWSp

MUSIC 481 Chamber Music (1, max. 6) AWSp Prerequisite: graduate standing.

MUSIC 482 Opera Theatre (2, max. 6) AWSp Desimone, Rosinbum

Preparation for participation in public performance of roles in opera.

MUSIC 483 Collegium Musicum (1, max. 6) AWSp

MUSIC 484 Contemporary Group (2, max. 12) AWSD

Bergsma, Smith

Exploration of notation and performance problems in today's music; preparation for public performance.

MUSIC 486 Modal Counterpoint (3) W Prerequisite: 310.

MUSIC 487 Tonal Counterpoint (3) Sp Evaluation of fugal practice from the Baroque era to the present. Prerequisite: 311.

MUSIC 488 Contemporary Idioms (3) W

MUSIC 489 Musical Forms (3) Sp

MUSIC 490 Orchestration (3) Sp

MUSIC 491 Composition (3, max. 18) AWSp Beale, Benshoof, Bergsma, Kechley, Rahn, Smith, Thome, Tufts

One-hour private lesson and one-hour laboratory session each week. Prerequisite: 391.

MUSIC 492, 493 Opera Direction and Production (4,4) A,W Rosinbum

Practical experience with problems of the theater. Prerequisite: 492 for 493. .

MUSIC 496 Special Topics in Music Education (1-3, max. 10) S

Special studies designed to reflect contemporary emphases and concerns in the music education profession.

MUSIC 499 Undergraduate Research (*, max. 6) AWSp

Courses for Graduates Only

MUSIC 500 Methods of Musical Research (3) AW This is a prerequisite course for all graduate history courses except 515, 516, 519.

MUSIC 501, 502, 503 Advanced Analysis (3,3,3)

A,W,Sp Beale, Bergsma, Kechley, Rahn 501: chant to middle Baroque. 502: high Baroque through nineteenth century. 503: impressionists to present

MUSIC 504 Seminar in Medieval Music (3, max. 6) Prerequisite: 400.

MUSIC 505 Seminar in Renaissance Music (3, max. 6) Prerequisite: one or more courses from 401, 402, and 403.

MUSIC 506 Seminar in Baroque Music (3, max. 6) Prerequisite: one or more courses from 404, 407, 410, 413, 416, 417, or 420.

MUSIC 507 Seminar in Rococo and Pre-Classical Music: 1700-1760 (3, max. 6) Prerequisite: one or more courses from 404, 410, 413,

MUSIC 508 Seminar in the Viennese Classical Period: 1760-1830 (3, max. 6) Prerequisite: one or more courses from 405, 411, 414, 418, or 421.

MUSIC 509 Seminar in Nineteenth-Century Music: 1830-90 (3, max. 6) Prerequisite: one or more courses from 406, 408, 409, 412, 415, 419, or 422.

MUSIC 510 Seminar in Music Since 1890 (3. max. 6)

Prerequisite: one or more courses from 406, 408, 409, 412, 415, 419, 422, or 423.

MUSIC 513 Historiography (3) Prerequisite: 500.

MUSIC 514 Systematic Musicology (3) A Carlsen

Examination of the principal research literature in the areas of systematic musicology.

MUSIC 515 Medieval Notation: To 1400 (3) Gregorian chant through the Mannered School.

MUSIC 516 Renaissance Notation: 1400-1600 (3) Dunstable through De Rore; lute and keyboard tablatures. Prerequisite: 401.

MUSIC 517 Seminar in Musical Styles (3, max, 6) Investigations into the stylistic criteria for specific composers and groups of composers.

MUSIC 518 Esthetics (3) Esthetic theories; practical aspects of esthetics in relation to music criticism, composition, and performance.

MUSIC 519 Modern Editorial Procedures (3, max. 6)

Study of modern procedures for preparing critical edi-tions. Related areas of study may include analaysis of musical style and historical and performance problems inherent in works being edited.

MUSIC 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.

MUSIC 521 Selected Topics in Musical Perception (3) Carlsen

Specialized problems in the aural perception of musical sounds in context. May be repeated for credit. Prerequisite: 438.

MUSIC 522 Contemporary Contrapuntal Technique (3)

Kechley, Rahn Study of the art of invention, canon, and fugue in the twentieth century, from both analytic and practical viewpoints.

MUSIC 524 Seminar in Music Education (3) Coope

Special problems in the teaching and supervision of mu-sic in the elementary grades. Prerequisite: one year of teaching experience.

MUSIC 525 Seminar in Music Education (3) Jussila

Special problems in the teaching and administration of music in the secondary school and community college. Prerequisite: one year of teaching experience.

MUSIC 526, 527, 528 History of Theory (3,3,3) 526: ancient, medieval, early Renaissance. 527: Renaissance, Baroque, early classic. 528: classic, romantic, twentieth century.

MUSIC 530 Seminar in Musical Learning (3, max. 6)

Carlsen

Study of learning research as it relates to nonverbal musical learning. Prerequisite: 438.

MUSIC 532 Opera Direction and Production (4 or 6, max. 12) AWSp Rosinbum

Practical experience with problems of the opera theatre.

MUSIC 537 Seminar on Opera (3, max. 6)

Seminar in music history, providing a complement to his-tory of opera series (420, 421, and 422). Prerequisite: one or more courses from 420, 421, or 422, or permis-

MUSIC 540 History of Music Education (3) A Jussila

Chronological examination of contributions, events, philosophies, and people that characterize the development of music education in the schools of the United States.

MUSIC 541 Music and Society (3)

Examination of human needs and prototypes of trends in current society and the potential of music to satisfy those needs.

MUSIC 542 Comparative Music Education (3) Cooper

Comparative examination of the philosophy and practice of music education in the United States and in other countries.

MUSIC 551 Practicum in Music Instruction (3, max. 9) AWSp

Provides experienced teachers with an in-depth experirevenues experience treaters with an in-depin experi-ence in curriculum, instructional procedures, and assess-ment, with the supervision of a faculty member, permit-ting the student to apply and validate results of investigation in music teaching and learning, perform-ance, and theoretical studies. Prerequisites: teaching experience and permission of instructor.

MUSIC 555 Systematic Methods of Musical Research (3) A

Carlsen.

Introduction to problem identification and definition, hypothesis construction, research design, use of controls, data analysis, and interpretation.

MUSIC 559 Master's Recital (2, max. 4) AWSp Public performance for students in the Master of Music program. ί.

MUSIC 561 Problems in Music Teaching (3) Sp Carlsen

Study of current problems in music teaching, particularly those relating to curriculum, instructional procedures, and assessment of learning; derivation of potential theories; the development of strategies for research or solu-tion. Prerequisite: 555 or permission of instructor.

MUSIC 575 Seminar in Theory (3, max. 18) Rahn

Development and discussion of current student and faculty research in composition/analytical theory and metatheory

MUSIC 580, 581, 582 Advanced Conducting (2,2,2) A,W,Sp

MUSIC 583 Advanced Choral Conducting (3, max. 27) AWSp Kaplan

MUSIC 590 Doctoral Recital (2-6, max. 18) AWSp Public performance for students in the Doctor of Musical Arts program.

MUSIC 591 Graduate Composition (*) AWSp Beale, Benshoof, Bergsma, Kechley, Rahn, Smith, Thome, Tufts

MUSIC 595, 596, 597 Practicum in Systematic Musicology (2,2,2) A,W,Sp Carlsen

Direct systematic research experience under the tutelage of a faculty member on a current faculty research project. The practicum is intended to complement courses in sys-The practicum is intended to complement courses in sys-tematic research methodology by permitting the student to participate in actual systematic research activity. Re-quired of all doctoral students in systematic musicology; open to all second-year graduate students in music. May be repeated for credit. Prerequisite: 555, which may be taken concurrently.

MUSIC 600 Independent Study or Research (*) AWSp

MUSIC 700 Master's Thesis (*) AWSp

MUSIC 800 Doctoral Dissertation (*) AWSp

MUSIC APPLIED

Courses for Undergraduates and Graduates

Admission by Audition

Courses 140-158, 240-258, 340-358, and 440-459 are private instruction primarily for majors not specializing in performance. Also available to qualified nonmajors. Prerequisites: audition and permission of instructor. Courses 540-558 are for graduate performance majors who have not yet been formally admitted by jury exami-nation for the 560-578 series.

MUSAP 140, 240, 340, 440, 540 Private Instruction: Plano (2-3 each, max. 9 each for 140, 240, 340; max. 18 for 440; 3, max. 9 for 540) AWSp Hokanson, Moore, O'Doan, Rafols

MUSAP 141, 241, 341, 441, 541 Private Instruction: Violin-Viola (2-3 each, max. 9 each for 141, 241, 341; max. 18 for 441; 3, max. 9 for 541) AWSpS Sokol, Zsigmondy

MUSAP 142, 242, 342, 442, 542 Private Instruction: Voice (2-3 each, max. 9 each for 142, 242, 342; max. 18 for 442; 3, max. 9 for 542) AWSpS Alavedra. Curtis-Verna, Guarrera, Paglialunga

MUSAP 143; 243, 343, 443, 543 Private Instruction: Violoncello (2-3 each, max. 9 each for 143, 243, 343; max. 18 for 443; 3, max. 9 for 543) AWSp Sake

MUSAP 144, 244, 344, 444, 544 Private Instruction: Contrabass (2-3 each, max. 9 each for 144, 244, 344; max. 18 for 444; 3, max. 9 for 544) AWSpS Harnett

MUSAP 145, 245, 345, 445, 545 Private Instruction: Organ (2-3 each, max. 9 each for 145, 245, 345; max. 18 for 445; 3, max. 9 for 545) AWSpS *Terry*

MUSAP 146, 246, 346, 446, 546 Private Instruction: Flute (2-3 each, max. 9 each for 146, 246, 346; max. 18 for 446; 3, max. 9 for 546) AWSpS Skowronek

MUSAP 147, 247, 347, 447, 547 Private Instruction: Oboe (2-3 each, max. 9 each for 147, 247, 347; max. 18 for 447; 3, max. 9 for 547) AWSpS Storch

MUSAP 148, 248, 348, 448, 548 Private Instruction: Clarinet (2-3 each, max. 9 each for 148, 248, 348; max. 18 for 448; 3, max. 9 for 548) AWSpS *McColl*

MUSAP 149, 249, 349, 449, 549 Private Instruction: Bassoon (2-3 each, max. 9 each for 149 249, 349; max. 18 for 449; 3, max. 9 for 549) AWSpS Grossman

MUSAP 150, 250; 350, 450 Private Instruction: Saxophone (2-3 each, max. 9 each for 150, 250, 350; max. 18 for 450) AWSpS Jessen

MUSAP 151, 251, 351, 451, 551 Private Instruction: Horn (2-3 each, max. 9 each for 151, 251, 351; max. 18 for 451; 3, max. 9 for 551) AWSpS

MUSAP 152, 252, 352, 452, 552 Private Instruction: Trumpet (2-3 each, max. 9 each for 152, 252, 352; max. 18 for 452; 3, max. 9 for 552) AWSpS Cummings

MUSAP 153, 253, 353, 453, 553 Private Instruction: Trombone (2-3 each, max. 9 each for 153, 253, 353; max. 18 for 453; 3, max. 9 for 553) AWSpS Demoster

MUSAP 154, 254, 354, 454, 554 Private Instruction: Tuba (2-3 each, max. 9 each for 154, 254, 354; max. 18 for 454; 3, max. 9 for 554) AWSpS Byrnes

MUSAP 155, 255, 355, 455, 555 Private Instruction: Harp (2-3 each, max. 9 each for 155, 255, 355; max. 18 for 455; 3, max. 9 for 555) AWSpS Vokolek

MUSAP 156, 256, 356, 456, 556 Private Instruction: Percussion (2-3 each, max. 9 each for 156, 256, 356; max. 18 for 456; 3, max. 9 for 556) AWSpS Dunbar

MUSAP 157, 257, 357, 457, 557 Private Instruction: Harpsichord (2-3 each, max. 9 each for 157, 257, 357; max. 18 for 457; 3, max. 9 for 557) AWSpS Terry Courses 160-178, 260-278, 360-378, and 460-478 are for music majors specializing in performance. Courses 560-578 are primarily for graduate performance majors in the M.Mus. degree program.

MUSAP 160, 260, 360, 460, 560 Private Instruction: Plano (3-4 each, max. 12 each for 160, 260, 360; max. 18 for 460; 3, max. 12 for 560) AWSpS Hokanson, Moore, O'Doan, Rafols, Siki

MUSAP 161, 261, 361, 461, 561 Private Instruction: Violin-Viola (3-4 each, max. 12 each for 161, 261, 361; max. 18 for 461; 3, max. 12 for 561) AWSpS Sokol, Zsigmondy

MUSAP 162, 262, 362, 462, 562 Private Instruction: Voice (3-4, each, max. 12 each for 162, 262, 362; max. 18 for 462; 3, max. 12 for 562) AWSpS Alavedra, Curtis-Verna, Guarrera, Paglialunga

MUSAP 163, 263, 363, 463, 563 Private Instruction: Violoncello (3-4 each, max. 12 each for 163, 263, 363; max. 18 for 463; 3, max. 12 for 563) AWSpS Sake

MUSAP 164, 264, 364, 464, 564 Private Instruction: Double Bass (3-4 each, max. 12 each for 164, 264, 364; max. 18 for 464; 3, max. 12 for 564) AWSpS Harnett

MUSAP 165, 265, 365, 465, 565 Private Instruction: Organ (3-4 each, max. 12 each for 165, 265, 365; max. 18 for 465; 3, max. 12 for 565) AWSpS Terry

MUSAP 166, 266, 366, 466, 566 Private Instruction: Flute (3-4 each, max. 12 each for 166, 266, 366; max. 18 for 466; 3, max. 12 for 566) AWSpS Skowronek

MUSAP 167, 267, 367, 467, 567 Private Instruction: Oboe (3-4 each, max. 12 each for 167, 267, 367; max. 18 for 467; 3, max. 12 for 567) AWSpS Storch

MUSAP 168, 268, 368, 468, 568 Private Instruction: Clarinet (3-4 each, max. 12 each for 168, 268, 368; max. 18 for 468; 3, max. 12 for 568) AWSpS *McColl*

MUSAP 169, 269, 369, 469, 569 Private Instruction: Bassoon (3-4 each, max. 12 each for 169, 269, 369; max. 18 for 469; 3, max. 12 for 569) AWSpS Grossman

MUSAP 170, 270, 370, 470 Private Instruction: Saxophone (3-4 each, max. 12 each for 170, 270, 370; max. 18 for 470) AWSpS Jessen

MUSAP 171, 271, 371, 471, 571 Private Instruction: Horn (3-4 each, max. 12 each for 171, 271, 371; max. 18 for 471; 3, max. 12 for 571) AWSpS

MUSAP 172, 272, 372, 472, 572 Private Instruction: Trumpet (3-4 each; max. 12 each for 172, 272, 372; max. 18 for 472; 3, max. 12 for 572) AWSpS *Cummings*

MUSAP 173, 273, 373, 473, 573 Private Instruction: Trombone (3-4 each, max. 12 each for 173, 273, 373; max. 18 for 473; 3, max. 12 for 573) AWSpS Demoster

MUSAP 174, 274, 374, 474, 574 Private Instruction: Tuba (3-4 each, max. 12 each for 174, 274, 374; max. 18 for 474; 3, max. 12 for 574) AWSpS *Byrnes*

MUSAP 175, 275, 375, 475, 575 Private Instruction: Harp (3-4 each, max. 12 each for 175, 275, 375; max. 18 for 475; 3, max. 12 for 575) AWSpS Vokolek

MUSAP 176, 276, 376, 476, 576 Private Instruction: Percussion (3-4 each, max. 12 each for 176, 276, 376; max. 18 for 476; 3, max. 12 for 576) AWSpS Dunbar MUSAP 177, 277, 377, 477, 577 Private Instruction: Harpsichord (3-4 each, max. 12 each for 177, 277, 377; max. 18 for 477; 3, max. 12 for 577) AWSpS Terry

Courses for Graduates Only

Courses 580 through 598 are for graduate performance majors who have been formally admitted by jury examination to the D.M.A. degree program.

MUSAP 580 Private Instruction: Plano (3, max. 27) AWSpS Hokanson, Moore, O'Doan, Rafols, Siki

MUSAP 581 Private Instruction: Violin-Viola (3, max. 27) AWSpS Sokol, Zsigmondy

MUSAP 582 Private Instruction: Voice (3, max. 27) AWSpS Alavedra, Curtis-Verna, Guarrera, Paglialunga

MUSAP 583 Private Instruction: Violoncello (3, max. 27) AWSpS

MUSAP 584 Private Instruction: Double Bass (3, max. 27)

MUSAP 585 Private Instruction: Organ (3, max. 27) AWSpS Terry

MUSAP 586 Private Instruction: Flute (3, max. 27) Skowranek

MUSAP 587 Private Instruction: Oboe (3, max. 27) AWSpS

MUSAP 588 Private Instruction: Clarinet (3, max. 27) AWSpS McColl

MUSAP 589 Private Instruction: Bassoon (3, max. 27) AWSpS Grossman

MUSAP 591 Private Instruction: Horn (3, max. 27) AWSpS

MUSAP 592 Private Instruction: Trumpet (3, max. 27) AWSpS Cummings

MUSAP 593 Private Instruction: Trombone (3, max. 27) AWSpS Dempster

MUSAP 594 Private Instruction: Tuba (3, max. 27) AWSpS Byrnes

MUSAP 595 Private Instruction: Harp (3, max. 27) AWSpS Vokolek

MUSAP 596 Private Instruction: Percussion (3, max. 27) AWSpS Dunhar

MUSAP 597 Private Instruction: Harpsichord (3, max. 27) AWSpS Terry

NEAR EASTERN LANGUAGES AND LITERATURE

Courses for Undergraduates

AKKADIAN

AKKAD 401, 402, 403 Elementary Akkadian (3,3,3) A,W,Sp Clear

Introduction to the Akkadian language (Assyrian and

Babylonian). Graded readings in Latin characters from historical, legal, and literary texts. Prerequisites: HEBR or ARAB 203 or equivalent for 401; 401 for 402; 402 for 403. (Offered every third year.)

AKKAD 421, 422, 423 Intermediate Akkadian (3,3,3) A,W,Sp Clear

Readings in Akkadian Gilgamesh and Creation epics. historical descriptions. Introduction to the cuneiform script. Prerequisites: 403 for 421; 421 for 422; 422 for 423. (Offered every third year.)

ARABIC

ARAB 101-102, 103 Elementary Arabic (5-5, 5)

A,W,Sp Heer, Sadiq, Ziadeh Intensive study of grammar, with oral and written drill and reading of simple texts.

ARAB 111-112, 113 Eastern Arabic: The Spoken Arabic of Palestine, Syria, Lebanon, and Egypt (5-5, 5) A,W,Sp

(3-5, 5) A, W, 5D Introduces the student to the colloquial language used in the Arab countries of the Eastern Mediterranean region, emphasizing the language of everyday conversation of the educated city dweller. Transliteration into Latin characters used throughout the course.

ARAB 201, 202, 203 Intermediate Arabic (5,5,5) A,W,Sp

A, W, Sp Heer, Şadiq, Ziadeh Reading of selected texts in literary Arabic, with continu-ing emphasis on grammar and syntax. Prerequisites: 103 for 201; 201 for 202; 202 for 203.

ARAB 300 Arabic Composition and Syntax

(3, max. 9) AWSp Designed to impart to the student an active knowledge of Arabic structure and syntax and to increase his or her vo-cabulary power through supervised composition, transla-tion into Arabic, and précis of expository writings. Particular emphasis is placed on journalistic articlès and editorials. Prerequisite: 203 or equivalent.

ARAB 401 Adab Prose: Jahiz (3) A

Heer, MacKay, Ziadeh Readings in early Arabic prose, especially the writings of Jahiz. Prerequisite: 203 or equivalent. (Offered alternate vears.)

ARAB 402 Maqamat (Assemblies): Hamadhani, Hariri (3) W

MacKay, Ziadeh

Reading of several maqamat (essays in rhymed prose) of al-Hamadhani and al-Hariri. Examination of the maqamat genre as a whole. Prerequisite: 203 or equivalent. (Offered alternate years.)

ARAB 403 Historians: Tabari (3) Sp

Heer, MacKay, Ziadeh

Readings in Arab historians with particular reference to al-Tabari and his school of historical writing. Prerequi-site: 203 or equivalent. (Offered alternate years.)

ARAB 404 Qur'an and Tafsir (3) A

Ziadeh Reading of various sections from the Qur'an with the relevant exceptical writings on religious, philological, and grammatical points. Prerequisite: 203 or equivalent. (Offered alternate years.)

ARAB 405 Hadith and Law (3) W Ziadeh

Selected readings from the traditions (*hadith*) of Muham-mad, and from works on jurisprudence and law based on the holy texts. Prerequisite: 203 or equivalent. (Offered alternate years.)

ARAB 406 Islamic Political Theorists (3) Sp

7iadeh Readings from the main political theorists: al-Baghdadi, al-Mawardi, and Ibn Khaldun. Prerequisite: 203 or equivalent. (Offered alternate years.)

ARAB 411 Desert Poetry: Pre-Islamic and

AKAB 411 DESErt Poerry: Pre-Islamic and Umayyad (3) A Heer, MacKay, Zladeh Reading and analysis of selected poems from pre-Islamic and Umayyad times/Prerequisite: 203 or equivalent. (Offered alternate years.)

ARAB 412 Urban Poetry: The New 'Abbasid Poetry (3) W

Heer, MacKay, Ziadeh

Reading of the new poetry of the 'Abbasid period and studying of the social and political factors that gave rise to it; al-Mutanabbi and al-Ma'arri. Prerequisite: 203 or equivalent. (Offered alternate years.)

ARAB 413 Modern Poetry (3) Sp

Heer, Ziadeh

Neoclassical poetry of the nineteenth and twentieth centuries, and the development of modern verse. Prerequi-site: 203 or equivalent. (Offered alternate years.)

ARAB 414 Islamic Philosophical Literature (3) A Heer

Reading of selected texts by representative Islamic phi-losophers. Prerequisite: 203 or equivalent. (Offered alternate years.)

ARAB 415 Islamic Theological and Mystical Literature (3) W Heer

Reading of selected texts representative of Islamic theo-logical and mystical schools. Prerequisite: 203 or equivalent. (Offered alternate years.)

ARAB 416 Modern Prose (3) Sp Heer, Ziadeh

Modern essays, fiction, and ideological writings. Prerequisite: 203 or equivalent. (Offered alternate years.)

ARAB 490 Supervised Study (1-6, max. 18) AWSp Special work in literary texts for graduates and undergraduates. Prerequisite: 203 or equivalent.

ARAB 499 Undergraduate Research (1-6, max. 18) AWSD

ARAMAIC

ARAM 401 Biblical Aramaic (3) A Clear

Introduction to biblical Aramaic (Ezra, Daniel). Selections from Targunim. Prerequisite: HEBR 203 or equivalent. (Offered alternate years.)

ARAM 411 Aramaic Epigraphy (3) Sp Clear

Readings in the Aramaic Inscriptions and the Elephantine Papyri. Prerequisite: HEBR 203 or equivalent. (Offered alternate years.)

HEBREW

HEBR 101-102, 103 Elementary Hebrew (5-5,5) A,W,Sp

Jacobi Introduction to Hebrew, emphasizing elements of gram-mar and reading of various styles found in the Hebrew Bible, post-Biblical and modern works, with some oral practice.

HEBR 111-112, 113 Conversational Hebrew (5-5,5) A,W,Sp

Colloquia language used in Israel, with emphasis on the everyday conversation of the educated city dweller. Combined oral-aural and media approach.

HEBR 201, 202, 203 Intermediate Hebrew (5,5,5) A,W,Sp Jacobi

Biblical prose, Rabbinical texts, medieval and modern prose and poetry with some oral practice. Prerequisites: 103 for 201; 201 for 202; 202 for 203.

HEBR 311, 312, 313 Modern Hebrew Literature (3,3,3) A,W,Sp Jacobi

Based on 111-112, 113, these courses extend into the areas of modern spoken and written Hebrew, newspaper reading, and modern poetry and prose. Prerequisites: 111-112, 113, or permission of instructor.

HEBR 401, 402, 403 Hebrew Prophecy (3,3,3) A,W,Sp Clear

Readings in the Hebrew prophets. Prerequisites: 203 or permission for 401; 401 for 402; 402 for 403. (Offered alternate years.)

HEBR 404, 405, 406 Hebrew Historiography (3,3,3) AWSp Clear

Readings of classical Hebrew prose selected from the his-torical books of the Bible: Joshua, Judges, Samuel, Kings, Chronicles. Prerequisite: 203 or permission of in-

HEBR 411, 412, 413 Classical Hebrew Poetry (3,3,3) A,W,Sp Clear

Readings in classical Hebrew poetry: Psalms and Wis-dom literature. Prerequisites: 203 or permission of in-structor for 411; 411 for 412; 412 for 413. (Offered alternate years.)

HEBR 414, 415, 416 Pentateuch (3.3.3) A.W.Sp Clear

Readings in classical Hebrew selected from the books of the Pentateuch/Torah: Genesis, Exodus, Leviticus, Numbers, Deuteronomy. Prerequisite: 203 or permission of instructor.

HEBR 423 Advanced Post-Biblical Hebrew: Modern Narrative (3) Sp

Jacobi

Advanced readings in modern Hebrew narrative, with emphasis on the short narratives of Chaim Nachman Bialik. Oral practice is included. Prerequisite: 203 or equivalent.

HEBR 425 Hebrew Literature of Spain (3) W Jacobi

Jacobi Readings in classical Hebrew selected from the writings of Jewish scholars in Spain during the years 1000-1500, with emphasis on the background of the period and the literary philosophy of the time. Selected readings from Jehudah Halevi and Ibn Gabirol are used along with sec-ondary sources. Prerequisite: 203 or permission of in-structor structor.

HEBR 426 Golden Age of Hebrew Poetry (3) W Incohi

Reading and analysis of selected poems from the golden age of Spanish Jewish literature with particular reference to Ibn Gabirol. Prerequisite: 203 or permission of instruc-tor. (Offered alternate years; offered Winter Quarter 1978.)

HEBR 427 Bialik's Sefer Aggadah (3) Sp Jacobi

Readings in the Sefer Aggadah, a collection of the literary and legendary elements from the Talmud that has been translated from the original Aramic into modern Hebrew by Chaim Nachman Bialik. Prerequisite: 203 or permission of instructor.

HEBR 431 Canaanite and Hebrew Inscriptions (3) Sp Clear

Readings in the Canaanite (Phoenician) and Hebrew inscriptions in facsimile. Studies of the development of the Canaanite script and dialects. Prerequisite: 203 or equivalent. (Offered alternate years.)

HEBR 441, 442, 443 Septuagint Studies (3,3,3) A,W,Sp Clear

Textual studies in the Greek version of the Bible in com-parison with the Hebrew. Prerequisites: ability to read Greek and Hebrew for 441; 441 for 442; 442 for 443. (Offered on demand.)

HEBR 461, 462 Mishnah and Talmud (3.3) Jacobi

From the literatures of the Mishnah and Talmud is de-rived a corpus of Jewish philosophical and literary work principally in law, history, and ethics. 461 (Autumn Quarter): the Mishnah. 462 (Winter Quarter): the Tal-mud. Prerequisite for both courses: 203 or permission of instructor.

HEBR 490 Supervised Study (1-6, max. 18) AWSp Special work in literary texts for graduates and under-graduates. Prerequisite: 203 or equivalent.

HEBR 499 Undergraduate Research (1-6, max. 18) AWSp

PERSIAN

PRSAN 101-102, 103 Elementary Persian (5-5,5) A,W,Sp Loraine

Beginning course in pronunciation, conversation, grammar, and graded reading.

PRSAN 201, 202, 203 Intermediate Persian (5,5,5) A,W,Sp

Loraine Introduction to Persian literature, with continuing emphasis on grammar and syntax. Prosody taught, using the numerous short verses in various metres in the Gulistan as models. Prerequisites: 103 for 201; 201 for 202; 202 for 203.

PRSAN 401 Sa'di (3) A

Loraine

Selected readings from the Gulistan, Bustan, and Diwan, which represent a high point in classical Persian verse and prose and give great insight into Persian manners and ways of thought. Prerequisite: 203 or equivalent. (Of-fered alternate years.)

PRSAN 402 Lyric Poetry (3) W

Loraine

Loraine Selections from various authors, chiefly up to Hafiz. This course introduces examples of the *ghazal*, mainly as an important literary type; it also gives an outline of the de-velopment of the type and introduces the chief writers of it in the context of literary history. Prerequisite: 203 or equivalent. (Offered alternate years.)

PRSAN 403 Firdawsi (3) Sp

Loraine

Selected readings from the Shahnama. The course introduces the particular style and vocabulary of the epic and illustrates the legendary careers of certain well-known heroes. Prerequisite: 203 or equivalent. (Offered alternate years.)

PRSAN 411 Siyasat-nama (3) A

Loraine

vears.)

The "Book of Government" of Nizam al-Mulk draws on the full range of traditional Persian wisdom and thus links itself to the *Qabusnama* and the works of Sa'di. Prerequisite: 203 or equivalent. (Offered alternate years.)

PRSAN 412 Rumi (3) W

Loraine Selected readings from the Mathnawi and poems from the Diwan-i Shams-i Tabriz. Students are introduced to Rumi's unique style of anecdote, illustration, and didactic. Prerequisite: 203 or equivalent. (Offered alternate

PRSAN 413 Hafiz (3) Sp

Loraine Selected poems from the Diwan. Prerequisite: 203 or equivalent. (Offered alternate years.)

PRSAN 490 Supervised Study (1-6, max. 18) AWSp Special work in literary texts for graduates and under-graduates. Prerequisite: 203 or equivalent.

PRSAN 499 Undergraduate Research (1-6, max. 18) AWSp

TURKISH

TKISH 101-102, 103 Elementary Turkish (5-5,5) A,W,Sp

Andrews Introduction to modern Turkish. Pronunciation and conversation, grammar and composition, graded reading. Latin characters used throughout.

TKISH 201, 202, 203 Intermediate Turkish (5,5,5) A,W,Sp Andrews

Introduction to modern Turkish literature. Prerequisites: 103 for 201; 201 for 202; 202 for 203.

TKISH 400 Introduction to Ottoman Turkish (3) A Andrews Introduction to Turkish in Arabic characters to cover the

peculiar grammatical and syntactical problems of Otto-man. Prerequisite: 203, ARAB 103, or PRSAN 103.

TKISH 401 Tanzimat Poetry and Prose (3) A Andrews

'eadings from the poetry and prose of the Tanzimat pe-

riod. Prerequisite: 400 or permission of instructor. (Offered alternate years.)

TKISH 402 Early Ottoman Historians (3) W

Andrews Readings in the early Tevarih-i Al-i Osman. Prerequisite: 400. (Offered alternate years.)

TKISH 403 Ottoman Travelers and Geography (3) Sp MacKay

Introduction to the geographic literature of Ottoman Turkish: readings from traditional cosmographies, travel journals, sailing instructions (portulans), ambassadorial and secret service reports, etc. Prerequisite: 400. (Offered alternate years.)

TKISH 411 Classical Ottoman Historians (3) A

Andrews Readings in the high classical narrative histories of Kemal Pasazado, Hoca Sa'duddin and other sixteenth-and seventeenth-century historians. Prerequisite: 400. (Offered alternate years.)

TKISH 412 Ottoman Lyric Poetry (3) W Andrews

Introduction to classical Ottoman poetry, including rhyme, meter, and rhetoric, through readings in Ottoman lyrics. Prerequisite: 400. (Offered alternate years.)

TKISH 413 Ottoman Epic and Narrative Poetry (3) Sp

Andrews Readings in major Ottoman epic and narrative poetry. Prerequisite: 400. (Offered alternate years.)

TKISH 490 Supervised Study (1-6, max. 18) AWSp Andrews

Special work in literary texts for graduates and under-graduates. Prerequisite: 203 or equivalent.

TKISH 499 Undergraduate Research (1-6, max. 18) AWSp

UGARITIC

UGAR 401, 402, 403 Ugaritic Language and Literature (3,3,3) A,W,Sp Clear

Readings in the Ugaritic texts from Ras Shamra, Epic, Nythological, and other texts. Prerequisite: intermediate knowledge of a cognate language (Akkadian, Arabic, Ar-amaic, Hebrew), (Offered every third year.)

NEAR EASTERN COURSES IN ENGLISH

N E 210 Studies in Islamic Culture (5) A

Andrews

Fundamentals of Islamic culture presented in translation with the intention of surveying the culture through a close examination of representative problems.

N E 220 Religion, Art, and Life in the Ancient Near East (5) W Clear

Ancient Near Eastern Civilization as seen in the art and literature of Sumer, Babylon, Assyria, and the other cit-ies and states of the northwest Semitic area.

N E 230 Themes in Near Eastern Literature (5) Sp Significant and interesting aspects of Near Eastern cul-ture 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 by quarter.

N.E 240 Introduction to the Bible (Old Testament) (5) Sp Clear

Introduction to the Hebrew Bible in English. Presenting the results of modern critical studies on the Bible and the ancient Near East and concentrating in particular on the meaning of the Biblical records in their own time and environment.

N E 320 Muhammad and the Qur'an (3) Sp Ziadeh

Religious and cultural milieu of Arabia before Muham-Religious and chuthan initial of Austral deficient with the mad; the nature of the Qur'an's revelation to Mu-hammad; the Qur'anic content and style; the literary his-tory of the text and its various "readings"; the main ideas emphasized by the Qur'an and the place of the Qur'an in the religious and intellectual life of Muslims. In English. Prerequisites: 210, HST 261, RELIG 201, ANTH 318, or permission of instructor.

N E 420 Islamic Religious Literature in English (3) Heer \

Readings in Islamic theology and mysticism.

N E 422 Islamic Philosophical and Scientific Literature in English (3)

Heer

Readings in philosophy, the physical sciences, and medicine

N E 425 Current Trends in Modern Near Eastern Literature and Criticism (3)

Sadiq

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. Prerequisite: 203 or the equivalent in the language of the country whose literature is dealt with in a particular quarter, or permission of instructor.

N E 432 Islamic Literature on Jurisprudence and Law in English (3) Sp Ziadeh

The origins of the *shari'ah*, its development throughout the Islamic period, and the modern reform of this law. Offered jointly with LAW B 543.

N E 434 Islamic Literary Genres in English (5) Andrews, Loraine, Ziadeh

Liferary genres; literary theory; principal literary authors of Arabic, of Persian, and of Turkish and their works. From the beginnings to the modern period.

N E 450 The City of Cairo: History, Topography, and Monuments (3) MacKay

Physical development and economic and social organization of an Islamic city, as exemplified in the history of Cairo from the first establishment at Fustat to the present day. Consideration of the major styles of Islamic archi-tecture, as represented in existing monuments of Cairo.

N E 490 Supervised Study (1-6, max. 18) AWSp Special work in Near Eastern studies for graduates and undergraduates.

N E 499 Undergraduate Research (1-6, max. 18) AWSp

Courses for Graduates Only

ARABIC

ARAB 471, 472, 473 Arabic as a Second Near Eastern Language (3,3,3) A,W,Sp Heer, Sadiq, Ziadeh Designed for graduate students with some proficiency in

Designed for graduate students with some proticiency in a Near Eastern language who plan to embark upon a sec-ond Near Eastern language, Arabic. The student is ex-pected to participate fully in the elementary Arabic course; however, the student's work, wherever possible, is supervised by his or her major language instructor who, in consultation with the instructor of elementary Arabic assigns sumementary und designed to acceler. Arabic, assigns supplementary work designed to acceler-ate the student's ability to use Arabic in conjunction with ate the student's ability to use Arabic in conjunction with his or her major language. The major language instructor also participates in determining a grade for the course. Prerequisites: above elementary knowledge of one Near Eastern language (not Arabic), permission of major lan-guage instructor, and graduate standing.

ARAB 474 Arabic as a Second Near Eastern Language: Second Year (3, max. 9) Heer, Sadiq, Ziadeh

Heer, Saaq, Zaaen Designed for graduate students with some proficiency in a Near Eastern Language who plan to take a second year of Arabic as a second Near Eastern language. Students are expected to participate fully in the intermediate Ara-bic course; however, their work, wherever possible, is supervised by their major language instructors who, in consultation with the instructor of Arabic, assign supple-mentary work designed to accelerate the students' ability to use Arabic in conjunction with their major language. to use Arabic in conjunction with their major language. The major language instructor also participates in assign-ing a grade for the course. Prerequisites: above elemen-tary knowledge of one Near Eastern language (not Arabic), elementary knowledge of Arabic, and graduate standing.

ARAB 600 Independent Study or Research (*) AWSp

HEBREW

HEBR 471, 472, 473 Hebrew as a Second Near Eastern Language (3,3,3) A,W,Sp Incohi

For graduate students embarking upon the study of He-brew as their second Near Eastern language. Organized in the same manner as ARAB 471, 472, and 473. Prerequisites are analogous.

HEBR 474 Hebrew as a Second Near Eastern Language: Second Year (3, max. 9) Jacobi

See ARAB 474 for course description. Prerequisites: above elementary knowledge of one Near Eastern lan-guage (not Hebrew), elementary knowledge of Hebrew, and graduate standing.

HEBR 600 Independent Study or Research (*) AWSp

NEAR EAST

N E 520 Seminar on Near Eastern Civilization and Thought (3, max. 27)

N E 530 Seminar on Near Eastern Literature (3, max. 27)

Prerequisite: reading knowledge of Arabic, Persian, or Turkish.

N E 600 Independent Study or Research (*) AWSp

PERSIAN

PRSAN 471, 472, 473 Persian as a Second Near Eastern Language (3,3,3) A,W,Sp Loraine

For graduate students embarking upon the study of Per-sian as their second Near Eastern language. Organized in the same manner as ARAB 471, 472, and 473. Prerequisites are analogous.

PRSAN 474 Persian as a Second Near Eastern Language: Second Year (3, max. 9) Inraine

See ARAB 474 for course description. Prerequisites: above elementary knowledge of one Near Eastern lan-guage (not Persian), elementary knowledge of Persian, and graduate standing.

PRSAN 600 Independent Study or Research (*) AWSp

TURKISH

TKISH 471, 472, 473 Turkish as a Second Near Eastern Language (3,3,3) A,W,Sp Andrews

For graduate students embarking upon the study of Turk-ish as their second Near Eastern language. Organized in the same manner as ARAB 471, 472, and 473. Prerequisites are analogous.

TKISH 474 Turkish as a Second Near Eastern Language: Second Year (3, max. 9) Andrews

See ARAB 474 for course description. Prerequisites: above elementary knowledge of one Near Eastern lan-guage (not Turkish), elementary knowledge of Turkish, and graduate standing.

TKISH 600 Independent Study or Research (*) AWSD

NUTRITIONAL SCIENCES AND TEXTILES

HUMAN NUTRITION, DIETETICS, AND FOODS

Courses for Undergraduates

NUTR 110 Food and Nutrition (5) Meal management and food preparation with emphasis on nutritive and economic values. For nonmajors. Not open to students who have had 300.

NUTR 300 Nutrition for Today (3)

Importance of food to the maintenance of health; nutri-tive values and human needs; ways of meeting requirements. For nonmajors. Not open to students who have taken 110.

NUTR 301 Nutrition and Nursing (3) Basic principles of nutrition and their relationship to health problems. Chemistry and metabolism of the nutrients essential for maintenance of health; normal nutri-tion needs of individuals at various age levels; environmental influences on nutrition; assessment of nutritional status; nutritional values of foods; dietary modifications as appropriate in the nutritional component of medical treatment. Prerequisites: CONJ 317-318 and organic chemistry.

NUTR 302 Nutrition and Dental Health (4)

Chemistry and metabolism of essential nutrients and their. relationship to dental health; effects of age on nutritional needs; nutritional values of foods; influence of the envi-ronment on nutrition; dietary courseling of dental pa-tients. Prerequisites: CONJ 317-318 and organic chemistry.

NUTR 321 Nutrition (5) Chemistry and human metabolism of protein, car-bohydrate, fat, vitamins, and minerals. Appraisal of enbonyorate, rat, vitamins, and minerats. Appraisa of ele-ergy balance. Assessment of human nutrient require-ments and nutritive value of foods. Current problems in the field of nutrition. Prerequisites: general and organic chemistry and human physiology.

NUTR 340 Foods I (5)

Composition, structure, and interactions of the constitu-ents of foods, with emphasis on the principles underlying the preparation of foods of standard quality. Prerequisite: organic chemistry.

NUTR 341 Foods II (3)

NULK 541 FOODS II (5) Study of new food products, food additives, and convenience food items. Food laws, label information, food buymanship, and characteristics of certain wines and spirits. Prerequisite: 340.

NUTR 342 Demonstration Techniques (3) Principles and techniques of food and equipment demon-strations; television and radio programs; food photogra-phy; recipe development. Prerequisite: 340.

NUTR 360 Methods of Nutrition Education (3) Selected supervised community teaching experiences. Taken concurrently with 463. Prerequisites: 321 and junior standing.

NUTR 400 Food and People (3) Economic, cultural, and social determinants of food pat-Economic, cultural, and social determinants of 1000 pai-terns. Problems of population and food supply. Meaning of food to different peoples. An ecological approach to malnutrition as a major world problem. Programs of na-tional and international scope designed to combat malnutrition. Prerequisites: 321 or 15 credits of social science and upper-division standing.

NUTR 406 Recent Developments in Nutrition (3) Review of nutrition in the light of recent development ints: interpretation of current research; special needs of various age groups. Prerequisite: 321 or equivalent.

NUTR 414 Laboratory Methods of Analysis (5) Qualitative and quantitative methods of analysis appro-priate to the evaluation of foods and to the study of animal and human nutrition. Application of these meth-ods. Prerequisites: 321, 340, inorganic and organic charmiter chemistry.

NUTR 421 Advanced Nutrition (3)

In-depth consideration of metabolic pathways, with em-phasis on participation of major nutrients. Consideration of recent research in nutrition and methods of utilizing knowledge in public health work, teaching, and research. Prerequisites: 321 and organic chemistry.

NUTR 422 Maternal and Child Nutrition (3) Role of nutrition in human growth and development with emphasis on prenatal, infancy, preschool, school age, and adolescence. Demonstration of the development of subjects. Prerequisite: 300 or 301 or 321.

NUTR 439 Special Problems in Nutrition (*) Individual study and research in nutrition.

NUTR 440 Experimental Foods (3) Illustrating scientific principles by subjective and objec-tive testing of foods. Individual research problems. Pre-requisite: 414.

NUTR 441 Food Safety and Quality in Food Processing and Handling (4) Study of food science as it relates to food quality, food

Study of food science as it relates to food quality, food safety, and food laws; the microbiological aspects of food spoilage, food-borne illnesses, and food processing; effects of food handling on nutrient retention. Offered jointly with FD SC 441. Prerequisite: senior standing in coordinated undergraduate program in clinical dietetics.

NUTR 442 Laboratory for Food Safety and Quality in Food Processing and Handling (1) Laboratory experiences emphasizing the microbiological aspects of food-spoilage and food-processing techniques. Field trips to food-service establishments and food-pro-cessing plants. Offered jointly with FD SC 442. Prereq-uisite: concurrent or previous registration in 441 or FD SC 441.

NUTR 459 Special Problems in Foods (*) Individual study and research in foods.

NUTR 460-461 Clinical Diet Therapy (3-3) Nutrition as a factor in the etiology and treatment of dis-ease and the maintenance of health. Students earolled in the clinical dietetic program actively participate in the de-velopment and implementation of nutritional care plans for individuals with selected medical and surgical conditions. This is implemented by concurrently taking 466 and 467. Prerequisites: senior standing in clinical dietet-ics or 421, and BIOC 405, 406.

NUTR 462 Field Experience in Nutrition (1-5, max. 10)

Nutrition majors observe and participate in the nutritional assessment and clinical management of selected individuals whose medical management includes modification in diet. A minimum of twelve hours of supervised clinical experience per quarter in a designated health-care facil-ity. Prerequisite: concurrent enrollment in 460-461.

NUTR 463 Clinical Dietetic Experience (2) Opportunity for student in clinical dietetics to apply educational principles and techniques to selected individ-ual and group teaching situations. Taken concurrently with 360. Six hours of supervised clinical experience each week for ten weeks. Prerequisite: enrollment in clin-ical district program ical dietetic program.

NUTR 464 Clinical Dietetic Experience (2) Opportunity for student in clinical dietetics to participate Opportunity for student in clinical meagement of in nutritional assessment and clinical management of pregnant women, infants, children, and adolescents. Taken concurrently with 422. Six hours of supervised clinical experience each week for ten weeks. Prerequi-sites: 463 and enrollment in clinical dietetic program.

NUTR 465 Clinical Dietetic Experience (4) Opportunity for student in clinical dietetics to participate in nutritional assessment and clinical management of individuals who are at nutritional risk. Taken concurrently with 421. Twelve hours of supervised clinical experience each week for ten weeks. Prerequisites: 464 and enroll-ment in clinical dietetic program.

NUTR 466, 467 Clinical Dietetic Experience (5,5) Opportunity for the student in clinical dietetics to participate in nutritional assessment and clinical management of selected individuals whose medical management includes modification in diet. Taken concurrently with 460-461. Eighteen hours of supervised clinical experi-ence each week for ten weeks. Prerequisites: 465 and en-rollment in clinical dietetic program.

NUTR 468 Food Service Systems Management I (3) Organization and management of food service systems. Organization of institutions, management tools, and lead-ership styles. Primarily for students in the clinical dietetics program.

NUTR 469 Food Service Systems Management II (8)

Opportunity for senior students in clinical dietetics to Spin a background in food service systems management. The activities are a direct application of the didactic com-ponent to the practical setting. Experiences are gained in various management functions related to the food service various management functions related to the food service organization. A total of sixteen hours supervised clinical experience and four hours of class work per week. Pro-requisites: senior standing in clinical dietetic program and completion of sequential course work.

NUTR 476 Advanced Field Work in Clinical Dietetics (15)

Opportunity for the senior student in clinical dietetics to Opportunity for the senior student in clinical dietetics to apply and extend clinical skills. Under the direction of a clinical instructor, student is responsible for planning, di-recting, implementing, and evaluating the delivery of nu-tritional care to individuals, and/or groups in a commu-nity health-care facility. The clinical facilities are selected to meet the interests of the individual student. Forty hours of supervised clinical experience each week for meanable. Densemicing ensight ending in the clinical student for the student student. for ten weeks. Prerequisites: senior standing in the clinical dietetic program and completion of 469.

NUTR 479 Special Problems in Dietetics (*) Individual study and research in dietetics.

Courses for Graduates Only

NUTR 500 Current Topics in Human Nutrition, Dietetics, and Foods (1, max. 3)

Current literature and recent symposiums in the field of human nutrition, dietetics, and foods.

NUTR 520 Protein Nutrition (3)

Basic structural, metabolic, and physiological concepts related to proteins and amino acids as a basis for protein composition of foods, protein requirements through the life cycle of mammals, protein quality and vegetarian-ism, mammalian responses to protein deficiency and ex-cess, inborn errors in amino acid metabolism, and diet therapy involving protein manipulation.

NUTR 521 Lipid Nutrition (3)

Normal lipid components of animal fluids and tissues, with review of their metabolism and physiological func-tions. Effect of diet and the normal development during the life span on these lipids. Changes of lipids with vari-ous types of disease states and means of nutritional modification of these changes.

NUTR 522 Nutrition of the Biologically Essential Minerals (3)

Special emphasis on trace minerals, including the microminerals whose essentiality is proposed or recently es-tablished, as well as those minerals whose essentiality is well established; consideration of the intestinal absorption of metals, their transport, function, storage, and excretion; mineral competition and imbalance; dietary sources, including foods, food additives, and medica-tions; dietary implications drawn and clinical application made

NUTR 523 Vitamin Nutrition (3)

bietary compounds presently considered to be essential for humans and called vitamins. General topics are whether the vitamin is fat soluble or water soluble; reviewing basic material and seeking increasing depth of understanding; relation of vitamins to other nutrients and to varying physiological conditions.

NUTR 524 Effects of Nutrition and Environment on Mental and Physical Development (3)

Consideration of various independent factors influencing the growth, development, and behavior of experimental animals and humans. Specifically, the effects of nutri-tional and environmental depivation and enrichment states are reviewed, with emphasis on the biochemical, structural, and psychological alterations made by these parameters. Prerequisites: 414, BIOC 406 or equivalent, and P BIO 403 or equivalent.

NUTR 525 Evaluation of Nutritional Status (3)

Dietary, clinical, and biochemical-biophysical compo-nents in the assessment of nutritional status. Interrelationships of nutrients and effects of varying levels of nutrient intake. Critical appraisal of nutritional status surveys. Experimental design and dietary methodology. Prerequi-sites: 421, 460-461, and BIOC 405, 406, or equivalent.

NUTR 530 Clinical Nutrition in Normal and

Handicapping Conditions of Children (6) In an interdisciplinary clinical setting application of prin-ciples of advanced nutrition to nutritional needs of norciples of advanced nutrition to nutritional needs of nor-mal infants, children, adolescents, and pregnant women and the nutrition and feeding problems of mentally re-tarded and multihandicapped children. Participation in clinics conducted by interdisciplinary teams, in preclinic and postclinic conferences in clinical and developmental feeding assessment. Under supervision each student is as-signed responsibility for nutrition care of selected pa-cipate Development product the second selected pa-cipate Development product the second selected pa-tients. Deventicities reducts of the selected pa-tients. Deventicities reducts of the selected parts of tients. Prerequisite: graduate standing in human nutrition, dietetics, and foods.

NUTR 531 Community Nutrition (3)

Survey of nutrition programs in communities, including surveillance, nutrition programs in communities, including program planning, nutrition education, grantsmanship, surveillance, nutrition problems of all risk groups. Labo-ratory experience in selected community agencies pro-vided. Prerequisites: 422, 525, or equivalent.

NUTR 532 Field Work in Public Health Nutrition

(2-12, max. 12) Observation and participation in community agency nutrition programs.

NUTR 539 Seminar in Nutrition (1-3, max. 9) Library research and seminar on selected topics in recent developments in the field of nutrition. Prerequisite: 421 or equivalent.

NUTR 540 Seminar in Foods (1-3, max. 9) Library research and seminar on selected topics in recent developments in food chemistry, selection, processing, and preparation. Prerequisite: 340 or equivalent.

NUTR 541 Sensory Evaluation of Foods (4) Sensory analysis for quality-control standardization and development of foods and food products. Emphasis on the influences of environment, human variability, sam-pling errors, color, form, flavor, and texture. Techniques in development of experimental design, application of methods, statistical evaluation of data, and interpretation of results.

NUTR 560 Practicum in Dietetic Education (1-5) AWSpS

Supervised instructional experiences for dietetic educa-tion in both classroom and clinical situations.

NUTR 600 Independent Study or Research (*)

NUTR 700 Master's Thesis (*)

TEXTILE SCIENCE AND **COSTUME STUDIES**

Courses for Undergraduates

TSCS 233 Apparel Technique (2)

Basic techniques of clothing construction and fitting.

TSCS 321 Applied Design (2) Functional and decorative phases in the development of needlework and their application to contemporary design and textile art. Illustrated by a unique collection of his-toric lace. Prerequisite: ART 109 or 129 or equivalent.

TSCS 322 Applied Design (2)

History of European national costume and embroidery as source material for modern design. Illustrated by rich collection of authentic folk costumes. Prerequisite: ART 109 or 129 or equivalent.

TSCS 325 Textile Science (5) Man-made and natural textile fibers. Fiber formation, physical properties, chemical properties, structural and end-use characteristics. Current and proposed textile legislation. Standards development.

TSCS 326 Textile Analysis (3)

Emphasis on physical characteristics and properties of textile fibers; relationships to performance, selection, and care; use of test equipment and evaluation of data with reference to consumer use. Prerequisites: 325 and 10 credits in science.

TSCS 329 Weaving: Structural Weaves (3)

Experimental problems in loom-controlled weaves and basic structural design; fundamentals of drafting, loom design and operation.

TSCS 334 Costume Design (5) Design achieved through draping and drafting. Problems involved in production of apparel using fabrics that re-quire special handling. Historic and ethnic influences for design inspiration. Prerequisite: 233 or equivalent.

TSCS 351 Textile Economics (3) Economic factors affecting worldwide production and distribution of textile products. Economic factors affect-ing the growth, development, and structure of the textile industry in the United States. The effects of federal and state legislation on textile products and prices and on consumer satisfaction consumer satisfaction.

TSCS 417 Textile Dyestuffs (4)

TSCS 417 Textile Dyestuffs (4) Introduction to dyeing of textiles; theory and principles of dyeing with natural dyes and synthetic dyestuffs. Chemical constitution of each major commercial dye class, and an understanding of compatibilities between specific dyes and various natural and synthetic fibers. Laboratory experiences on application procedures for each classification of dyestuff. Prerequisite: 325 or 428. Percommended, arganic chemistry Recommended: organic chemistry.

TSCS 418 Advanced Textile Dyeing (4) Theory of dyeing. Classification systems for the specifi-cation of color. Commercial and economic aspects of dyeing. Instrumental analysis of color, Spectrophotometric and colorimetric analysis of dye solutions and dyed fabrics. Interrelationships between dye affinity and diffusion and polymer structure.

TSCS 425 Advanced Textile Science (3) In-depth examination of the chemical and physical prop-erties of natural and man-made fibers and the fabrics made from them. Emphasis on the improvement of intrinsic fiber properties through application of durable fin-ishes. Prerequisite: 325.

TSCS 426 Analytical Methods for Textile Evaluation (3) Qualitative and quantitative procedures specifically de-

veloped for analysis of textiles. Application of these methods to fiber content, dyes, finishes, and performance characteristics of fabrics. Prerequisites: 325, 326, and in-organic chemistry.

TSCS 428 Interior Textiles (3) Study of the textile fibers used for interior environments. Fiber properties and total fabric geometry examined to determine appropriate end use. Textile legislation and textile performance testing.

TSCS 429 Weaving: Weaver-Controlled Structures

(3) Creative techniques in decorative textiles; experimental problems in weaver-controlled structures and development of original textile forms. Prerequisite: 329.

TSCS 430 Fiber Processes (3) Exploration of one- and two-element fiber techniques. Development of original textile forms based on structures studied

TSCS 432 History of Costume and Textiles (4) Fabrics and costumes of ancient civilizations and medi-

eval European countries with consideration of their respective cultural origins.

TSCS 433 History of Costume and Textiles (4) Continuation of 432 from the Renaissance to the present. Prerequisite; 432.

TSCS 434 Costume Design (5) Grading of basic patterns, adapting basic drafted patterns into tailored blocks; drafting and fitting men's and chil-dren's garments. Apparel industry and the fashion world. Prerequisite: 233.

TSCS 436 Fashion Illustration (3, max. 9) Visualization of ideas so that design concepts are transmitted and understood in renderings: drawing human figure; representing and differentiating fabrics; under-standing techniques and media of representation. Pre-requisites: ART 105, 106.

TSCS 437 Socio-Psychological Aspects of Clothing

(3) Clothing as a reflection of culture and societal value con-cepts. Emphasis on theory, motivation, behavioral pat-

TSCS 439 History of Textile Design (3) Chronological development of design in Western textiles. Includes study of motifs, production techniques and materials, and sociocultural influences on development and changes in design.

TSCS 444 Clothing for the Handicapped (3) Exploration of clothing needs of persons with mental, physical, and emotional impairments, with solutions to physical, and emotional impairments, with solutions to some of the problems. Includes psychological aspects of clothing; analysis of specially designed clothing; sources of supply and adaptation of ready-made garments; exami-nation of recent research in the field; and a review of selected professional organizations and community agen-cies concerned with the handicapped. Prerequisite: upper-division standing.

TSCS 458 Cross-Cultural Perspectives on Textiles and Costumes (3)

Technological, economic, social, ideological, esthetic, and communicative aspects of textiles and costume of non-Western societies analyzed from perspectives de-rived from anthropology and other social sciences. Modifications in the design and use of textile products due to impact of industrial society. Offered jointly with ANTH 458. Prerequisite: 10 credits in anthropology or sociology.

TSCS 460 Practicum in Apparel Manufacturing (2, max. 10)

Supervised observation and participation in apparel design industry. Prerequisite: senior standing.

TSCS 461. Textile Museology (3)

Methods of acquisition, cataloging, preservation, con-servation, restoration, exhibition. Public relations related to textile museology.

TSCS 482 Special Topics in Textile Structure (*) Recent developments in the field of textile structures.

TSCS 483 Special Topics in Historic and Ethnic Costume and Textiles (*)

Recent developments in the field of historic and ethnic costume.

TSCS 484 Special Topics in Apparel Design (*) Recent developments in the field of apparel design. Prerequisite: 233.

TSCS 485 Special Topics in Textile Science (*) Recent developments in the field of textile science.

TSCS 499 Individualized Study (*) For undergraduate students. Registrant must have a form from the School of Nutritional Sciences and Textiles endorsed by the faculty adviser most appropriate for the project proposed. Written report required.

Courses for Graduates Only

TSCS 525 Seminar in Textiles (3)

Readings and discussion of factors affecting economic utilization and technical development of textile products. Trends in current research and methods of investigation. Prerequisite: 325 or equivalent.

TSCS 527 Textile Dyeing: Research Techniques (4) Analysis of the dyeing process and evaluation of dyed fabrics. Dyeing theory and chemistry of dyes; procedures for achieving optimum color yield and maximum fast-ness; development and execution of independent research project. Prerequisite: 327 or equivalent.

TSCS 532 Seminar in Historic Costume (3) Readings and discussion of research in history of cos-tume and fashion. Methods of investigation of historic costume. Prerequisite: 432 or equivalent preparation in history, art history, or drama.

TSCS 534 Contemporary Costume Design (5) Mass production, using new fabrics and fibers. Study and experiment based on wearability, stress, strain, and drap-ability of fabric. Mass production of clothing for special sports incorporating differing stretch values. Motion, ease, and stress factors. Mass production for special groups. Growth factors for children, weight problems in-volving loss or gain. Experimental design of apparel that offers versatility, easy care, comfort and adjustment for weight mobilems. weight problems.

TSCS 537 Seminar: Clothing (3, max. 6) Selected readings and discussion of research and trends Selected readings and discussion of research and trends in production and marketing of apparel, and in esthetic and behavioral aspects of clothing usage. Prerequisite: approved preparation in textiles, clothing, and art, or al-lied disciplines.

TSCS 539 Seminar in Historic Textiles (3)

Readings and discussion of research in the history of textile design, with emphasis on current research and investigation techniques, preservation and restoration techniques, and museology. Prerequisites: 439 and ap-proved undergraduate preparation in textiles, clothing, and art history.

TSCS 551 Textile Economics (3)

Seminar. Readings and discussion of current periodical literature on: economic factors affecting technical devel-opment, quality control, cost and utilization of textile products; the responsibility of various segments of the in-dustry to the character and quality of the finished prod-uct; research resources and possibilities in textiles, espe-cially through cooperation with government and industry. Prerequisites: 325, 351, ECON 200 or equivalents.

TSCS 599 Seminar: Textile Science and Costume

Studies (3) Relationship between textile sciences, apparel design, historic costumes, and textile structures: woven/ nonwoven. Major research concepts in each area.

TSCS 600 Independent Study or Research (*)

TSCS 700 Master's Thesis (*)

OCEANOGRAPHY

Courses for Undergraduates

OCEAN 101 Survey of Oceanography (5) AWSpS origin and extent of the oceans; nature of the sea bottom; causes and effects of currents and tides; animal and plant life in the sea. Intended for nonmajors.

OCEAN 102 Man and the Ocean (3) W Designed to study in more detail the benefits and the sci-entific problems created by man's activities' impinging on the oceanic environment. Topics include the problems of, and potential for, the extraction of food, fresh water, inorganic minerals, gas, and oil from seawater or the sea floor; the ocean as a sink for such wastes as heavy met-als, pesticides, radioactive materials, gases, etc. Prerequisite: 101 or permission of instructor.

OCEAN 109 Survey of Oceanography—Honors (5) Origin and extent of the oceans; nature of the sea bottom causes and effects of currents, waves, and tides; animal and plant life in the sea. Not intended for oceanography majors. Prerequisites: College of Arts and Sciences honors program and permission of instructor.

OCEAN 110, 111, 112 Lectures in Oceanography

(1,1,1) A,W,Sp Lectures intended for oceanography majors. Students who might major in oceanography can learn more about the field. May be entered any quarter.

OCEAN 180 Lower-Division Tutortal-Honors (6) Research with a departmental program. Prerequisites: College of Arts and Sciences honors program and permission of instructor.

OCEAN 201 Introduction to Field Oceanography (6)

Introduction to methods of oceanographic field study. Students work in the laboratory and at sea; they must be prepared to go on overnight field trips scheduled on weekends. Routine seagoing operations and basic obser-vational procedures are examined. Prerequisites: sophomore standing in oceanography or a related science, or permission of instructor.

OCEAN 203 Introduction to Oceanography (5) Sp Baker

Description of the oceans and their relation to man; phys-Description of the occans and their relation to man; phys-ical, chemical, biological, and geological aspects of the sea; areal distribution and seasonal cycles of properties; currents; factors affecting populations. Intended for sci-ence majors. Prerequisite: sophomore standing in a sci-ence curriculum or permission of instructor.

OCEAN 280 Introduction to Oceanography-Honors (5)

Descriptive and regional oceanography covering physi-cal, chemical, biological, and geological aspects of the sea. Intended for science majors. Prerequisites: sopho-more standing in College of Arts and Sciences honors program and permission of instructor.

OCEAN 341, 342 Quantitative Methods in Oceanography I, II (3,3) A,W Winter

Winter Application of mathematical techniques and basic princi-ples of physics, chemistry, geology, and biology to ma-jor oceanographic problem areas. 341: mathematical models of biological growth, processes in marine chemis-try, wave phenomena. 342: applications of mechanics to marine geology and biology; diffusion and advection in the sea; underwater optics and marine life. Prerequisites: one year of physics and MATH 126 for 341; 341 for 342.

OCEAN 380 Upper-Division Tutorial-Honors (6) Research under faculty supervision. Prerequisites: junior standing in College of Arts and Sciences honors program and permission of instructor.

OCEAN 401, 402 General Physical Oceanography I, II (5,5) A,W

1, II (5,5) A, W Physical properties and processes; theories and methods involved in ocean currents, waves, and tides. Not open to physical oceanography majors. Prerequisites: one year of chemistry, one year of physics, MATH 126 for 401; 401 for 402.

OCEAN 405 General Geological Oceanography (6)

Sp Creager, McManus, Merrill, Sternberg Marine geophysics; shorelines and nearshore sedimenta-tion; structure and morphology of the continental terrace and deep-sea floor; sediment types and distribution; marine geological methods and applications. Not open to majors in geological oceanography. Prerequisites: 402 or 419, which may be taken concurrently, and GEOL 205.

OCEAN 406 Geological Oceanography Laboratory (2)

phy of a small area of Puget Sound. Prerequisite: senior or graduate standing in geological or geophysical oceanography or geological sciences.

OCEAN 415 Fundamentals of Underwater

Acoustics (3) A Vibrating strings, bars, and membranes; plane and spher-ical acoustic waves; transmission and reflection at boundaries. Prerequisites: 402 or 418, MATH 126 or 136, or permission of instructor.

OCEAN 416 Applications of Underwater Acoustics (2) W

Transducers and arrays, absorption and refraction in sea-water, sound channels and bottom effects, ambient noise, scattering, passive and active tracking, acoustic telemetering. Prerequisite: 415.

OCEAN 417, 418 Physical Oceanography I, II (5,5) Ă,₩

Geographic and hydrodynamic aspects of oceanography. Topics: physical properties of seawater; observed distri-butions of properties and currents; budgets; kinematics; hydrostatics; momentum dynamics of ocean circulation; vorticity dynamics; viscosity; Ekman's studies; eddy fluxes; estuaries. Prerequisites: MATH 427, which may be taken concurrently, PHYS 223, CHEM 160, or per-mission of instructor, for 417: 417 and MATH 428. which may be taken concurrently, for 418.

OCEAN 419 Ocean Tides and Waves (5) Sp

Theory of surface waves; wave forecasting transforma-tion of waves in shallow water, wave forces. Tide theory: analysis and prediction of tides and tidal currents. The course includes laboratory and computer simulation. Pre-requisite: 418 or permission of instructor.

OCEAN 421 Chemical Oceanography (3) A Physical and chemical properties of seawater and marine products; processes determining the chemical makeup of the oceans. Prerequisite: 401 or 417, or concurrent registration in one.

OCEAN 422 Theoretical Chemical Oceanography (3) Sp

Physical-chemical aspects of high-ionic-strength solu-tions as related to seawater, kinetics, thermodynamics, and heterogenous equilibria are included. Prerequisites: 421 and CHEM 350, 351, or permission of instructor.

OCEAN 423, 424 Chemical Oceanography Laboratory (3,2) AW,Sp Laboratory problems in the analytical and physical chem-istry of seawater and marine materials. Prerequisites: 421, CHEM 321, for 423; 422 and 423 for 424; 423 and 424 may be taken concurrently with 421 and 422, respec-tively. tively.

OCEAN 433 General Biological Oceanography (5) w

English

Marine organisms, their quantitative distribution in time and space and their effect on the sea. Recommended for nonbiologists. Prerequisites: 203 or 401 or 417 and BIOL 101-102, or permission of instructor.

OCEAN 434 Biological Oceanography: Phytoplankton (4) W Banse

Ecological physiology of phytoplankton. Quantitative distribution in time and space of primary producers in-cluding benthic plants. Rates of processes. Methods of measurement. Prerequisites: 203, 401, or 417, and 20 credits in biological sciences, or permission of instructor.

OCEAN 435 Biological Oceanography: Zooplankton and Nekton (3) Sp

Frost

Ecology of pelagic animals. Distribution in time and space of secondary production in the pelagic realm. Methods of measurement. Zoogeography in the pelagic realm. Prerequisite: 434 or permission of instructor.

OCEAN 436 Biological Oceanography: Benthic Communities (4) A Jumars

Inspection of the marine benthic domain, emphasizing subtidal, soft-bottom communities. Interrelationships between the water column and the sea floor. Adaptations of organisms, trophic relationships, and community struc-ture. Prerequisite: 15 credits in biological sciences or per-mission of instructor.

OCEAN 438 Marine Microbiology (3) Sp Ahmed

Taxonomy and symbiotic relationships of marine and estuarine micro-organisms; metabolic activities, includ-ing nutrient cycles and geobiological activities; effects of environmental parameters and land-based intusions; con-siderations of marine microbial activity. Prerequisites: BIOL 210, 211, 212, or equivalents and CHEM 231, 232, or equivalents.

OCEAN 439 Marine Microbiology Laboratory (2) Sp Ahmed

Techniques for enumeration and isolation of marine micro-organisms, heterotrophic activity measurements, anaerobic methods, and measuring dissolved oxygen; biochemical oxygen demand; effect of media and temperbiochemical oxygen definition, enter to micro and temper-ature on growth; marine metabolic activity measurement. Prerequisites: BIOL 210, 211, 212, or equivalents and CHEM 231, 232, or equivalents.

OCEAN 440 Instrumentation in Oceanography (3-6) Sp Lister

Lister Introduction to the general principles of instrument de-sign, including discussions of sensors, signal processing, telemetry, and recording from the point of view of the experimental scientist. Laboratory work, for variable credit, is offered in the form of projects, preferably prac-tical ones resulting in the completion of a small hardware device. device.

OCEAN 443 Regional Oceanography (3) Sp Applications of modern methods to the comprehensive description of selected areas of the oceans.

OCEAN 444 Design and Analysis of Oceanographic

Experiments (3) À Planning of field and laboratory experiments in oceanog-raphy; evaluation and processing of oceanographic data. Prerequisite: Q SCI 281 or permission of instructor.

OCEAN 450 Geophysical Oceanography (4) A Lewis, Merrill

Fundamentals of the seismic reflection and refraction, magnetic, gravity and heat-flow methods are discussed together with marine applications. Data from these egophysical methods is then used in conjunction with petrological and other geological data to investigate (1) the composition, structure, and origin of the oceanic crust and upper mantle, and (2) tectonic processes acting in the earth. Prerequisites: major in geological oceanog-raphy or geology, MATH 126, or permission of instruc-

OCEAN 451 Geochemistry of Marine Sediments (2) Emersor

Study of chemical aspects of the more abundant minerals in marine sediments; their origin or mode of formation; their isotopic and chemical composition; their rate of de-position; their distribution and relative importance in the major sedimentary cycle; their influence on the chemical composition of seawater. Prerequisite: one year of gen-eral chemistry.

OCEAN 452 . Physical Sedimentology (4) A Smith

Introduction to theoretical and experimental techniques Introduction to theoretical and experimental techniques used in studying erosion, transportation, and deposition of sediment. Analysis of sediment samples, initial motion of sediments, bed-load motion, suspension of sediment by turbulent flows, erosion and deposition of sediment by turbulent flows, mass movement of sediments, and applications of sediment transport theory to problems of geo-logical interest. Offered jointly with GEOL 452. Prereq-uisite: 402 or permission of instructor.

OCEAN 453 Sedimentary History of the Ocean Basin (2) Sp McManus

Synthesis of introduction to chemical, physical, and bio-logical processes of sedimentation and to marine geophysics, in terms of the historical record of sediments and the geological development of the ocean basins. Prerequisites: 450, 451, 452, or concurrent registration in same.

OCEAN 454 Biogenic Sediments I (3) W

Survey of pelagic organisms found as deep-sea microfossils with regard to their use as paleoecological indicators and their application to correlating radiometrically and paleomagnetically dated sediments. Prerequi-site: either 101, 405 or GEOL 205 or 361, or permission of instructor.

OCEAN 455 Biogenic Sediments II (3) W

Detailed survey of geologically important siliceous and calcareous pelagic microfossil taxa with emphasis on their use in the solution of biostratigraphic problems in the history of marine sediments. Prerequisite: 454 or per-mission of instructor.

OCEAN 456 Acoustic and Seismic Techniques (2) Sp

Acoustic data-taking techniques; analysis and interpreta-tion of acoustic bathymetry and seismic reflection and re-fraction data. Prerequisite: 415 or permission of instructor.

OCEAN 457 Marine Sedimentation (3) Sp Sternberg

Origin, transportation, and deposition of marine sediments; marine sedimentary environments; physical aspects of marine sedimentary processes. Prerequisite: 402 or permission of instructor.

OCEAN 458 Chemical Aspects of Marine Sediments (3) W

Carpenter

Laboratory exercises and lectures illustrating techniques and problems in marine geochemistry, especially the ori-gin or mode of formation, the chemical composition, and the alteration after deposition of minerals in marine sediments. Prerequisites: one year, of general chemistry and CHEM 321.

OCEAN 460 Field Experience in Oceanography (2/5, max. 7) WSp Duxbury

Duxbury Offered in two parts. In Winter quarter students discuss field projects, then design fieldwork and plan cruises for 2 credits. In Spring or Summer quarter, students participate in cruises collecting the appropriate chemical, biological, geological, or physical data, followed by an analysis of the data, a report that includes the data and an interpretation of the results for 5 credits. One or more prover by the results for 5 credits. One or more cruises may be required. Prerequisite: permission of instructor.

OCEAN 475 Biogeography (3) W

Survey of modern and classical approaches to the prob-lems of species geographic distributions. Prerequisite: BIOL 210. Recommended: BIOL 472.

OCEAN 480 Undergraduate Research—Honors (6) Independent research. Prerequisites: 180 or 380, and per-mission of instructor.

OCEAN 485 Topics in Oceanography (2) Series of weekly lectures on oceanographic topics, in-cluding physical and chemical properties of water, mo-tions, life in the sea, geological features, data collection and analysis, etc. For nonmajors. Prerequisite: upperdivision standing in science.

OCEAN 488 Field Experience-Honors

(2-6, max. 6)

Participation in extended oceanographic field operations on a research vessel; data analysis and reduction, report

preparation. Prerequisites: 380 or 480, and permission of instructor.

OCEAN 489 Undergraduate Thesis-Honors

(1-6, max. 6) Theoretical or experimental contribution to oceanogra-phy. Prerequisites: 480 and permission of instructor.

OCEAN 499 Undergraduate Research (1-12, max. 24) AWSpS

Research on assigned topics that may involve laboratory work, field work, or literature surveys. Prerequisite: permission of instructor.

Courses for Graduates Only

OCEAN 500 Current Problems in Oceanography

(1) Discussion of research topics that are currently being investigated within the department. Prerequisite: permission of instructor.

OCEAN 511, 512, 513 Marine Hydrodynamics I, II, III (4,4,4) A,W,Sp Methods for solving problems in physical oceanography. Prerequisite: major standing in a physical science.

OCEAN 514 Seminar in Physical Oceanography (1, max. 9) AWSp Discussion of selected problems of current interest in physical oceanography. Prerequisites: 402 or 419, and permission of instructor.

OCEAN 515 Waves (4) A Application of marine hydrodynamics principles to wave motion in oceans. Prerequisite: 513. (Offered even-numbered years.)

OCEAN 516 Ocean Circulation (4) W

Hydrodynamic theories concerning origin and characteristics of major ocean currents. Prerequisite: 513. (Offered even-numbered years.)

OCEAN 517 Oceanography of Inshore Waters (5)

Sp Theories and techniques of investigation and interpretation of conditions existing in inshore waters with particular reference to mixing and flushing and to areas adjacent to the state of Washington; use of dynamic models. Pre-requisite: S12. (Offered odd-numbered years.)

OCEAN 518 Seminar on Dynamical Oceanography

(1, max. 9) AWSp Selected problems of current importance concerning the dynamics of the ocean. Concentrates on those topics that are considered fundamental, of central importance to most of the areas of applications.

OCEAN 519 Oceans and Climate Variation (3) Sp Interchange of heat, water, and energy; study of budgets and of mechanisms of exchange. Prerequisites: 418, ATM S 462. (Offered even-numbered years.)

OCEAN 520 Seminar (1) AWSp

Introduction to current research topics for beginning graduate students.

OCEAN 521 Seminar on Chemical Oceanography

(*, max. 9) AWSp Lectures, discussions, and readings on selected problems of current interest. Prerequisite: permission of instructor.

OCEAN 523 Advanced Problems in Chemical Oceanography (1-4, max. 18) AWSp Field and laboratory work on selected problems of cur-rent interest. Prerequisites: 424 and permission of instructor.

OCEAN 524 Marine Chemical Thermodynamics (3)

Application of chemical thermodynamic principles to the study of chemical processes and chemical reactions in the oceans. Thermodynamics of seawater (pressure, temper-ature, and volume changes), thermodynamics of multicomponent systems, general equilibrium theory, pressure and temperature effects on chemical equilibria, equilib-rium models and calculation of complex equilibria. Pre-requisites: CHEM 455, 456, 457, 460, or permission of instructor.

OCEAN 525 Marine Chemical Dynamics (3) Sp

Application of reaction rate theory to the study of chemical processes not at equilibrium in the oceans. Nonequilibrium conditions in natural waters, transient states, basic kinetic theory, reaction rates at the air-sea and sediment-water interfaces, uptake and cycling rates of chemical species by biological systems. Prerequisites: 421, 422, CHEM 455, 456, 457, 460, or similar background.

OCEAN 526 Marine Organic Geochemistry (2) W Hedges

Sources, reactions, and fates of organic molecules in the marine environment along with the stable isotope geo-chemistry of marine organic substances. Prerequisites: 421, CHEM 231, 232, or permission of instructor.

OCEAN 530 Marine Primary Productivity (3) Sp G. Anderson

General concepts of marine phytoplankton production; laboratory and field studies; critical examination of spe-cial problems. Not open to students who have taken 534. Prerequisites: 433 or 434, and 435, and permission of instructor

OCEAN 531. Seminar in Biological Oceanography (*, max. 9) AWSp Lectures, discussions, and work on selected problems of

current interest. Prerequisite: permission of instructor.

OCEAN 533 Zooplankton Ecology (3 or 6 or 9) S Banse, Frost

Sampling methods, population dynamics and energetics, community structure, and other current topics. Three leccommunity structure, and other current topics. Inter lec-tures per week. Three additional optional credits for labo-ratory work and individual research projects. Prerequi-site: permission of instructor. (Offered for 9 credits even-numbered years at Friday Harbor Laboratories with additional lectures and fieldwork.)

OCEAN 534 Phytoplankton Ecology (9) S

Contemporary problems in marine phytoplankton investi-gations. Evaluation of methods used in field and laboratory studies. Prerequisite: permission of instructor. (Offered even-numbered years at Friday Harbor Laboratories.)

OCEAN 535 Advanced Plankton Ecology (2-4) A Banse

Methods of sampling and analysis of standing stock as af-fected by the ecology of plankton.

OCEAN 536 Benthos Ecology (3) Sp

Jumars

Distributions, abundances, and interrelationships of the organisms of the ocean floor; methods of sampling and analysis. Prerequisite: permission of instructor.

OCEAN 537 Environmental Physiology of Marine Microalgae (2-4) W Perrv

Physiology and biochemistry of microalgae, with empha-Physiology and biochemistry of incroagae, with empiri-sis on marine systems; physiological approach in under-standing phytoplankton processes in the ocean; labora-tory includes culturing methodology and techniques for the study of physiological processes relevant to phyto-plankton ecology. Prerequisite: permission of instructor.

OCEAN 538 Identification and Structure of Marine Benthic Communities (2) Sp Jumars

Sampling gear and sampling techniques; qualitative and quantitative methods for identification and ordination of communities; structure of benthic communities; biomass, productivity and benthos/fish relationships; historic review of benthos research. Prerequisite: permission of instructor.

OCEAN 540 Seminar in Geostatistics (1-3) AWSp Jumars

Lectures and discussions on selected problems in the applications of statistics in earth science. Prerequisite: Q SCI 383.

OCEAN 544 Statistical Models in Oceanography (3)

W Multivariate analysis: regression, trend surface analysis, factor analysis, discriminant functions, and stochastic process models in oceanography. Prerequisite: Q SCI 383 or permission of instructor.

OCEAN 548 Topics in Physical Oceanography (1-4, max. 9) AWSp

Lecture series on topics of major importance in physical oceanography.

OCEAN 550 Seminar on Geological Oceanography (*, max. 9) AWSp Lectures, discussions, and field and laboratory work on

selected problems of current interest. Prerequisite: per-mission of instructor.

OCEAN 551 Marine Sediments (2) Sp Topics in interpreting environmental significance of ma-rine sediments. Prerequisite: permission of instructor.

OCEAN 553 Research Techniques in Marine

Geochemistry (2) Analytical techniques and instruments applicable to prob-lems of marine geochemistry. Prerequisite: CHEM 351.

OCEAN 554 Research Techniques in Marine

Geology (3) A Planning field programs; selection of equipment and sur-vey procedures; collection, analysis, compilation, and presentation of bathymetric and sediment data; evaluation of techniques and results. Prerequisites: 450, 453 or 551, which may be taken concurrently.

OCEAN 555 Marine Geochemistry (3)

Topics in geochemistry of the oceans and marine sedi-ments. Prerequisites: CHEM 351 and permission of instructor.

OCEAN 556 Advanced Marine Geology (*, max. 9) AWSp

Contemporary problems in marine geology; concepts supporting or at variance with accepted hypotheses; dis-cussion of recent advances. Prerequisite: permission of instructor.

OCEAN 560 Fluid Mechanics of Erosion and Sediment Transport (3) W Smith

Advanced study of the erosion, deposition, and transpor-tation of sediments by turbulent flows. Emphasis on the use of theoretical fluid mechanics to formulate and solve problems of bed load and suspended load transport of sediments, erosion, and deposition of sediments, erodible boundary-wave problems, turbidity currents, beach ero-sion. Offered jointly with GEOL 560. Prerequisites: 452, 511, and permission of instructor.

OCEAN 561 Seminar in Geological Fluid Mechanics (3) Sp Smith

Reading and discussion of topics of current interest in geological fluid mechanics. Course work includes a re-port on a specialized topic. Offered jointly with GEOL 561. Prerequisite: permission of instructor.

OCEAN 570 Simulation Analysis of Marine Systems (3) Sp Winter

Introduction to the analytical methods of systems ecol-ogy. Simulation models are used in comparative analyses of the structure, of the nutrient and energy flow, and of the sensitivity of response in representative aquatic eco-systems. Prerequisites: BIOL 472, FORTRAN, MATH 126, Q SCI 382, or permission of instructor.

OCEAN 571 Gravity and Geomagnetic Interpretation (3) W

Lewis

Fundamental concepts; the earth's magnetic field; instru-mentation and reduction of magnetic measurements, interpretation of magnetic data; gravity measurements, reduction of gravity observations; interpretation of gravity anomalies. Offered jointly with GPHYS 571. Pre-requisites: MATH 328, PHYS 323, or equivalents, or permission of instructor.

OCEAN 573 Terrestrial Magnetism (3) Sp

Merrill Advanced aspects of earth magnetism intended for spe-cialists in this field. Extensive discussion of origin theories and their implications; physical basis and theories of magnetism in rocks; paleomagnetic techniques and re-sults. Offered jointly with GPHYS 573. Prerequisite: permission of instructor.

OCEAN 580 Marine Science for Coastal Zone Management (3) W

Duxbury, Jumars, Sternberg

Analysis of coastal marine scientific knowledge for use Analysis of coastal marine scientific knowledge for use in the decision-making process of coastal zone manage-ment. Lectures and discussion of the biological, chemi-cal, geological, and physical oceanography of the coastal zone. Techniques of generating data bases and using them to describe natural processes. Importance of consid-ering natural processes in management schemes. Not open to oceanography students except by permission. Prerequisite: IMS 503 or permission of instructor. OCEAN 600 Independent Study or Research (*) AWSpS

OCEAN 700 Master's Thesis (*) AWSpS

OCEAN 800 Doctoral Dissertation (*) AWSpS

PHILOSOPHY

Courses for Undergraduates

PHIL 100 Introduction to Philosophy (5) AWSp Introduction to major philosophical questions relating to such matters as ethics, the existence of God, the founda-tions of knowledge, and the nature of reality. The num-ber and nature of the problems studied and the works read vary with the instructor.

PHIL 101 Philosophical Classics (5)

Introduction to philosophy through the study of selected Aristotle, Augustine, Descartes, Hume, Kant, John Stu-art Mill, William James, and Bertrand Russell. The philosophers studied and the works read vary with the instructor.

PHIL 102 Contemporary Moral Problems (5) BonJour

Philosophical consideration of some of the main moral problems of modern society and civilization, such as abortion, euthanasia, war, sexual morality, governmental paternalism, reverse discrimination, and capital punishment. Topics vary.

PHIL 104 Ideas in the Western Tradition-Ancient (5) A Keyt

Introduction to the philosophy of the ancient world, pri-marily the views of man and the universe in selected works of Greek and Roman thought.

PHIL 105 Ideas in the Medieval and Renaissance Periods (5)

Boler Introduction to major ideas in Christian, Jewish, and Is-lamic thought from late antiquity to the beginnings of the modern period. Content and emphasis vary.

PHIL 106 Ideas in the Western Tradition-Modern (5) Coburn

Introduction to cultural issues and ways of thinking in the European traditions since the Renaissance. Organized topically or thematically, drawing from writing in philosophy, literature, science, or other areas. Principal empha-sis usually given to writings in philosophy. Content and emphasis vary; precise course descriptions available in advisory offices.

PHIL 110 Introduction to Social Ethics (5) AWSp Examination of such social ideals as liberty, distributive justice, democracy, peace, and human survival. Prob-lems involved in achieving social change are also considered. Content varies.

PHIL 114 Philosophical Issues in the Law (5) Crocker, Moore

Analysis and critical assessment of various philosophical 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, reverse discrimination, enforcement of morals, etc. No special legal or philosophical training required.

PHIL 115 Practical Reasoning (5) BonJour

Introduction to the practical analysis of arguments and reasoning, especially as they occur in such everyday contexts as newspaper editorials, textbooks, political speeches, etc. Attempts to develop a reasonably system-atic and practical workable procedure for discerning, un-derstanding, and assessing such arguments. Taught in di-text amplication to multiplicate orace rect application to realistic cases.

PHIL 120 Introduction to Logic (5) AWSp Elementary symbolic logic. Analysis of deductive arguments and definitions of such logical concepts as im-plication, validity, and consistency. The relationship of logical symbolics to Lagrance logical symbolism to language.

PHIL 160 A Historical Introduction to the Philosophy of Science (5)

Clatterbaugh Study of the historical development of selected concepts from science and from the philosophy of science.

PHIL 200 Types of Philosophy (5) Introductory philosophy. The content of the course is en-tirely at the discretion of the instructor.

PHIL 206 Philosophy of Feminism (3) Philosophical analysis of the concepts and assumptions central to feminism. Theoretical positions within the feminist movement; views of the ideal society, goals and strategies of the movement, its relation to racial liberation, and ethical issues. Offered jointly with WOMEN 206. Not open to students who have taken GIS 106.

PHIL 230 Philosophic Issues in World Affairs (2) Crocker

Philosophical examination of international political power and of the different ideologies contending on the world stage. Particular attention to liberal capitalism, imperialism, fascism, and socialism.

PHIL 240 Introduction to Ethics (5) Mish'alani, Richman Critical study of some typical views of the basis and pre-suppositions of morality and of moral knowledge. Custom, theology, human nature, and happiness as standards of moral judgments. Consideration of such topics as free will and responsibility, ethical relativism, and the problem of evil.

PHIL 250 Introduction to Epistemology (3) Kirk, Marks

Introduction to the theory of knowledge. Nature, defini-tion, and possibility of knowledge. Problems about our knowledge of the external world, the past, other minds, mathematics, etc.

PHIL 260 Introduction to Philosophy of Science (3)

Clatterbaugh, Crocker Examination of formal languages, the nature of probabil-ity, the problem of induction, and determinism.

PHIL 267 Introduction to Philosophy of Religion (5) Dietrichson, Mish'alani

Study of Western religious thought. Examination of the problem of evil, of the nature of mysticism, atheism, and theism, and of the relationship between religion and morality.

PHIL 286 Introduction to India's Philosophies (5) Potter

Survey of major tendencies in recent Indian thought in the light of their origins in classical Indian philosophy. Readings in such writers as Nagarjuna, Samkara, Gandhi, Aurobindo.

PHIL 320 History of Ancient Philosophy (5) A

Clatterbaugh, Cohen, Keyt Survey of the history of ancient Greek philosophy, em-phasizing the origin and development of problems and theories in metaphysics and epistemology. Philosophers discussed are some or all of the following: the pre-Socrat-ics; Socrates, Plato, and Aristotle; the Stoics, Epicu-reans, and Skeptics; Plotinus. Clatterbaugh, Cohen, Keyt

PHIL 321 History of Medieval Philosophy (5) Boler

Development of main lines of philosophical thought in the Lain West from 400 to 1400, with emphasis on Au-gustine, Anselm, Abelard, Aquinas, and Occam. Prereq-uisite: 320 or permission of instructor.

PHIL 322 History of Modern Philosophy (5) W

Chaterbaugh Examination of selected metaphysical and epistemologi-cal issues raised by philosophers in the modern classical period, seventcenth and eighteenth centuries. The philosophers studied vary from year to year, but always include Descartes.

PHIL 325 History of Nineteenth-Century Philosophy (5)

Burke

The post-Kantian idealism, Schopenhauer and Hegel and the revival of materialism in Feuerbach, Marx, and Engels. Some consideration of Kierkegaard and Nietzsche.

PHIL 326 History of Recent Philosophy (5) Sp Marks

Survey of the main problems in philosophical analysis from the English Realist reaction against Idealism at the beginning of this century to the present. Includes the log-ical atomism of Russell and Wittgenstein and the logical positivism of the Vienna Circle as well as more recent developments.

PHIL 327 American Philosophy (5)

Boler, Potter

Study of several of the major American philosophers: Peirce, Royce, Dewey, William James, C. I. Lewis, Goodman, Quine. Prerequisite: at least one course in philosophy.

PHIL 330 History of Ancient Political Philosophy (4)

Keyi Political philosophy of fourth- and fifth-century Greece, especially the Sophists, Plato, and Aristotle, stressing the connection between the political philosophy and the un-derlying philosophical system of each philosopher. Pre-requisite: at least one course in philosophy.

PHIL 331 History of Medieval Political Philosophy (4) Boler

Political philosophy in the Middle Ages, especially the major figures (Augustine, Aquinas, Occam), with special emphasis on the setting of their political thought in the context of their general philosophical positions. Prerequi-site: at least one course in philosophy.

PHIL 332 History of Modern Political Philosophy (5)

Burke

Examination of major political philosophies from the six-teenth century to the nineteenth century, with attention to the philosophical methods and foundations underlying the theories.

PHIL 334 Philosophy of Marxism (3) Burke. Crocker

Study of the philosophy of Marx and the Marxist tradi-tion with attention to the philosophical method and foundation of Marxism.

PHIL 338 Philosophy of Human Rights (2) Crocker

Examination of historical and contemporary arguments for and against the existence of human rights. Prerequisite: one course in philosophy or in society and justice, or junior standing.

PHIL 340 History of Ancient Ethics (5) Richman

Development of moral thought from Socrates through the Stoics. Particular emphasis on the ethical writings of Plato and Aristotle. Prerequisite: one course in philosophy.

PHIL 342 History of Modern Ethics (5) Richman

Development of moral thought from Hobbes through Nietzsche, with particular emphasis on the ethical writ-ings of Hume, Kant, and John Stuart Mill, Prerequisite: one course in philosophy.

PHIL 344 History of Recent Ethics (5) Richman

Study of major ethical writings in the twentieth century, with principal emphasis on the Anglo-American tradition. Prerequisite: one course in philosophy.

PHIL 345 Moral Issues of Life and Death (4) Coburn

Examination of moral problems that arise in connection with such topics as war and murder, famine relief, capital and the rights of future generations. Prerequisite: one course in philosophy or junior standing.

PHIL 347 Philosophy in Literature (3)

Mish'alani

Study of philosophical ideas expressed in works of literature.

PHIL 353 Introduction to the Philosophy of

Language (5) Introduction to philosophical theories about the nature of language. Topics include meaning, reference, truth, propositions, relations between language and thought and

between language and logic, relation of philosophy of language to linguistics and psychology. Prerequisite: 120 or permission of instructor.

PHIL 363 Introduction to the Philosophy of Mind (5) Cohen, Marks

Introduction to the philosophy of mind. Various theories of the nature of mind, the relationship between mind and body, the self, memory, the unconscious, introspection, and knowledge of other minds. Prerequisite: one course in philosophy.

PHIL 370 Intermediate Logic (5) A Kirk

An advanced treatment of sentential logic. Proof theory, model theory, and their interrelations.

PHIL 372 Introduction to Set Theory (5)

Historical development and basic concepts of set theory. Set theoretical paradoxes and their proposed solutions.

PHIL 410 Social Philosophy (3) Coburn

Examination of some of the philosophical issues that arise in connection with social ideals such as liberty and justice, and with social problems associated with current and prospective technological developments. Emphases of the course vary each year.

PHIL 412 Indian Philosophy (5)

Potter

Historical survey of the major systems and the traditional problems of philosophy in India. Readings in Buddhism, Nyaya, Samkhya, and Vedanta. Prerequisite: 100 or 286 or permission of instructor.

PHIL 413 Studies in Indian Philosophy (3, max. 9)

Potter

Study of one or more individual figures or problems in Indian philosophy selected by the instructor. Prerequisite: 412.

PHIL 414 Philosophy of Law (3)

Crocker, Moore

Nature and function of law. Relation of law to morality. Logic of legal concepts. Prerequisite: 110 or 114 or 240, or permission of instructor.

PHIL 415 Chinese Philosophy (5)

Development of Chinese philosophy from the sixth cen-tury B.C. to modern times. Emphasis on Confucianism, Mohism, Taoism, Legalism, the Dialecticians, Bud-dhism, and Neo-Confucianism; re-evaluation of them in the light of new trends of thought after contact with the West)

PHIL 416 Neo-Confucianism (5) Systematic study of Neo-Confucianism, its background and development with emphasis on the Rationalistic school of Ch'eng-Chu and the Idealistic school of Lu-Wang. Prerequisite: 415 or permission of instructor.

PHIL 417 Indian Philosophy of Religion (3) Arguments of Hindu, Jain, and naturalistic schools on topics important to religion: the existence of God; God's nature; God's relation to the world; creation; existence and immortality of the soul; transmigration; free will; grace; and moral responsibility. Comparisons with argu-ments found in Western philosophy. Readings in transla-tion. At least one course in Indian philosophy or Hindu-ien and Reideline responsibility. ism or Buddhism recommended.

PHIL 418 Indian and Tibetan Buddhist Philosophy (3) Ruegg

Topics from Buddhist thought, both Sravakayanist and Mahayanist, touching on the following areas: epistemol-ogy, theory of liberation, metaphysics and the theory of the Absolute, cosmology, and ethics. Readings in trans-lation. At least one course in Indian philosophy or Hindu-ism or Buddhism recommended.

PHIL 421 Studies in Medieval Philosophy (3. max. 9)

Boler

Detailed study of an individual figure or problem in medieval philosophy (of the Latin West) selected by the instructor. Prerequisite: 321.

PHIL 422 Studies in Continental Rationalism (3, max. 9)

Clatterbaugh

Study of the philosophical system, or some part of the philosophical system, of one or more of the major continental Rationalists: Descartes, Spinoza, Leibniz. Prerequisite: 322 or permission of instructor.

PHIL 431 Philosophy of Plato (3)

Cohen, Keyt Reading of selected middle and late dialogues. Prerequi-site: 320 or permission of instructor.

PHIL 433 Philosophy of Aristotle (3)

Cohen, Keyt Study of the Aristotelian system with emphasis on two major works. Prerequisite: 320 or permission of instructor.

PHIL 434 Philosophy of Thomas Aquinas (3) Boler

Examination of the major philosophical positions of Thomas Aquinas in the theory of knowledge, metaphys-ics, and ethnics. Prerequisite: 321 or permission of instructor.

PHIL 436 British Empiricism (3)

BonJour, Marks

Examination of the metaphysical and epistemological views of Locke and Berkeley, with perhaps some atten-tion also to Hume. Prerequisite: 322 or permission of instructor.

PHIL 437 Philosophy of Hume (3) Marks, Richman

Study of the principles and methods employed by Hume

in elaboration of his system of philosophy, comprising his analyses of knowledge, the passions, and morals. Prerequisite: 322 or permission of instructor.

PHIL 438 Philosophy of Kant (3) .

BonJour, Dietrichson

Systematic study of The Critique of Pure Reason or of one or more other major works of Kant. Prerequisite: one course in philosophy (other than logic) beyond the intro-ductory level.

PHIL 439 The Later Philosophy of Wittgenstein (3) Coburn. Marks

Detailed study of topics in the later philosophy of Wittgenstein. Particular attention is directed to the Philosophical Investigations. Prerequisite: 322 or permission of instructor.

PHIL 440 Advanced Ethics (3)

Coburn, Richman

Courter, Richman 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. Prerequi-site: 240 or permission of instructor.

PHIL 443 Philosophy and Linguistics (3)

Study of some of the connections between recent linguistics and philosophy, primarily of philosophical problems that arise in the attempt to understand current linguistic theories and the implications of linguistics for philosophy. Offered jointly with LING 443. Prerequisite: permission of instructor.

PHIL 445 Philosophy of Art (5) Мооте

Critical examination of characteristic accounts of the nature of art, artistic activity, the esthetic experience, and the artist and his art in relation to society. The philosophy of criticism, the role of the critic, and problems in interpretation and evaluation of works of art.

PHIL 446 Development of Aesthetic Theory (5) Moore

Historical development of esthetics, emphasizing such major figures as Plato, Aristotle, Plotinus, Hume, Kant, and Hegel. Prerequisite: 100 or 445, or permission of instructor

PHIL 447 Philosophy of Literature (3) Mish'alani

Investigation of philosophical questions about literature: What is literature? Why write? Must literature be inter-preted? What is interpretation? Literature and ideology; criticism of literature and society.

PHIL 450 Epistemology (3)

BonJour, Kirk

Systematic study of some of the main problems of the

theory of knowledge, such as: the definition of "knowledge"; a priori knowledge; such as: the definition of knowledge the external world; memory knowledge; theoretical knowledge; knowledge of other minds; and whether knowledge has or requires a foundation. Prerequisite: 250.

PHIL 453 Philosophy of Language (5) Kirk

Theories of meaning, reference, predication, and related concepts. Typical authors include Frege, Russell, Straw-son, and Austin. Prerequisite: 120 or permission of instructor.

PHIL 456 Metaphysics (3) Coburn, Dietrichson

Examination of issues and problems that arise in connection with such topics as freedom of the will, the nature of persons and personal identity, the existence of God, and universals. The emphases of the course vary from year to year.

PHIL 458 Phenomenology (5)

Burke

The contribution of phenomenology to selected topics in the theory of meaning, philosophy of mind, ontology, and epistemology.

PHIL 460 Philosophy of Science (5)

Clatterbaugh, Crocker Critical study of different theories about the nature of sci-entific theory. Topics include the relation of theory to ob-servation, the use of mathematics, how theories change, the requirements for the meaningfulness of a theory, and the relation between theory and methodology.

PHIL 461, 462 Philosophy of Man and Culture I, II (3,3) Mish'alani

Treatment of philosophical questions and concepts per-taining to the collective production and appropriation of culture: explanation and interpretation in anthropology; structural analysis; the relation of history to culture; dif-ferences and internelationships among the parts of culture (e.g., myth and ritual, science and magic); cultural invariance (e.g., death, the person, obligation); the struc-turing of experience by collective representations; the nature of conflict; interdependence and domination. Prerequisite: 461 for 462.

PHIL 463 Philosophy of Mind (3)

Marks

Examination of current theories of the nature of the mind and mental processes. Prerequisite: 363 or permission of instructor.

PHIL 464 Philosophical Psychology (3) Marks

Philosophical problems connected with research in psy-chology and/or artificial intelligence. Topics vary. Re-cent topics include the philosophical implications of split term topics include the philosophical implications of spint brain research, the possibility of reducing psychology to physiology, nativist versus empiricist explanations of language acquisition, the psychological reality of mental imagery, Skinnerian behaviorism. Readings are drawn from both philosophy and the relevant scientific litera-ture. Some philosophical sophistication is presupposed, but the course material should be accessible to nonphi-legenber with mitble interactive and background of the source of the losophers with suitable interests and backgrounds.

PHIL 465 Philosophy of History (3) Crocker, Mish'alani

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 (3) Crocker

Examination of fundamental issues in the methodology and the interpretation of the social sciences. Particular emphasis on value orientation and objectivity, functionalsim, reductionism, and the status of idealized models. Prerequisite: 120 or 260 or 460, or course beyond intro-ductory level in a social science.

PHIL 467 Philosophy of Religion (5) BonJour, Dietrichson

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. Prerequisite: one course, other than logic, beyond the introductory level.

PHIL 469 Existentialist Philosophy (3) Dietrichson

Critical examination of major ideas in Kierkegaard's phi-losophy and in Sartre's or Heidegger's philosophy. Pre-requisite: 322 or 325 or 326, or permission of instructor.

PHIL 470 Advanced Logic (5)

Keyt, Kirk Advanced treatment of predicate logic. Proof theory, model theory, and their interrelations.

PHIL 472 Axiomatic Set Theory (5)

Development of axiomatic set theory up to and including the consistency of the Axiom of Choice and Continuum Hypothesis with the Zermelo-Fraenkel Axioms. Prerequisite: 370 or permission of instructor.

PHIL 473 Philosophy of Mathematics (5)

Kirk Traditional accounts of the nature of mathematical entities and mathematical truth given by logicism, intui-tionism, and formalism, and the impact of Godel's in-completeness theorems on these accounts. Prerequisite:

some background in mathematics and formal logic.

PHIL 474 Modal Logic (5) Notions of necessity and possibility, using the classical systems T, S4, and S5, and the syntax and the semantics (Kripke models) of these systems. Prerequisite: 370 or permission of instructor.

PHIL 484 Reading in Philosophy (1-5, max. 15)

AWSp Reading of approved philosophical works. The name of the staff member with whom research will be done must be indicated in registration. Prerequisite: permission of adviser.

Courses for Graduates Only

PHIL 514 Seminar in Legal Philosophy (5, max. 20) Crocker, Moore

PHIL 520 Seminar in Ancient Philosophy (5, max. 20) Cohen, Keyt

PHIL 521 Seminar in Medieval Philosophy (5, max. 20) Boler

PHIL 522 Seminar in Modern Philosophy (5, max. 20) Clatterbaugh

PHIL 525 Seminar in Nineteenth-Century Philosophy (5, max. 20) Burke

PHIL 526 Seminar in Recent Philosophy (5, max. 20) Keyt, Marks

PHIL 540 Seminar in Ethics (5, max. 20) Coburn, Keyt, Richman

PHIL 545 Seminar in the Philosophy of Art (5, max. 20) Moore

PHIL 550 Seminar in Epistemology (5, max. 20) BonJour, Cohen

PHIL 556 Seminar in Metaphysics (5, max. 20) Coburn, Cohen

PHIL 560 Seminar in the Philosophy of Science (5, max. 20) Clatterbaugh, Kirk

PHIL 563 Seminar in the Philosophy of Mind (5, max. 20) Marks

PHIL 565 Seminar in the Philosophy of History (5, max. 20) Crocker, Mish'alani

PHIL 567 Seminar in the Philosophy of Religion (5, max. 20) Dietrichson

PHIL 570 Seminar in Logic (5, max. 20) Kirk

PHIL 584 Reading in Philosophy (1-4, max. 12)

AWSp Intensive reading in philosophical literature. The name of the done must the staff member with whom research will be done *must* be indicated in registration. Prerequisite: permission of the graduate adviser.

PHIL 586 Seminar in Indian Philosophy (5, max. 20) Potter Prerequisite: 412.

PHIL 587 Contemporary Analytic Philosophy (5, max. 20) Marks, Richman

PHIL 600 Independent Study or Research (*) AWSD

Prerequisite: permission of graduate adviser.

PHIL 700 Master's Thesis (*) AWSp

PHIL 800 Doctoral Dissertation (*) AWSp

PHYSICS

Courses for Undergraduates

PHYS 101-102, 103 Introductory Physics (5-5.5)

A,W,Sp Basic concepts of physics presented in a laboratory set-ting. Useful for students whose high school preparation in science is weak and who plan to take standard college science courses. Also provides background needed by teachers for effective use of science curriculum materials in the schools. Prerequisites: 101- for-102; -102 for 103.

PHYS 110, 111, 112 Liberal Arts Physics (5,5,5) AS,W,Sp

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. Also useful in lieu of high school physics. Prerequisites: 110 for 111; 111 for 112.

PHYS 114, 115, 116 General Physics (4,4,4) AWSpS,AWSpS,AWSpS Basic principles of physics presented without use of col-lege-level mathematics. Suitable for students majoring in tege-level mathematics. Suitable for students majoring in technically oriented fields other than engineering or the physical sciences. Concurrent registration in 117, 118, 119 strongly recommended. 114: mechanics and sound. 115: heat and electromagnetism. 116: light and modern physics. Prerequisites; working knowledge of algebra and trigonmetry, one year of high school physics or one quarter of college-level physical science; 114 for 115; 115 for 116.

PHYS 117, 118, 119 General Physics Laboratory (1,1,1) AWSpS,AWSpS,AWSpS 117: mechanics laboratory, to be taken concurrently with 114 or 121. 118: heat and electromagnetism laboratory, to be taken concurrently with 115 or 122. 119: sound, light, and modern physics laboratory, to be taken concur-rently with 116 or 123.

The courses 121, 122, 123, 221, 222 plus appropriate laboratory together make up the general physics se-quence for science and engineering students.

PHYS 121 Mechanics (4) AWSpS

Basic principles of mechanics. Concurrent registration in 117 or 131 strongly recommended. Prerequisites: one year of high school physics or permission of academic adviser, concurrent or previous MATH 124 or 134.

PHYS 122 Electromagnetism and Oscillatory Motion (4) AWSpS

Basic principles of electromagnetism, the mechanics of oscillatory motion. Concurrent registration in 118 or 132 strongly recommended. Perequisites: 121, concurrent or previous MATH 125 or 135.

PHYS 123 Waves (4) AWSpS

Electromagnetic waves, optics, and waves in matter. Concurrent registration in 119 or 133 strongly recommended. Prerequisites: 122, concurrent or previous MATH 126 or 136.

PHYS 131, 132, 133 Experimental Physics (1,1,1) Experimental topics in physics for science and engineer-ing majors. For students with a good background in high school laboratory work or other laboratory experience. Prerequisites: concurrent or prior enrollment in 121 for 131: 122 for 132: 123 for 133.

PHYS 205 Concepts of Physical Science (3) The nature, origin, and use of selected concepts of the physical sciences.

PHYS 207 The Physics of Music (3) The nature of sound; vibrations; traveling and standing waves; response of the ear to sound; production of musical sounds

PHYS 210, 211, 212 Intermediate Physics for Teachers and Students in Liberal Arts (5,5,5)

A,W,Sp Individualized study of selected topics emphasizing depth of understanding and development of skills essential to the scientific process. Useful as background for teaching physical sciences. Prerequisites: at least two quarters of physics at the 100 level; 210 strongly recommended prior to 211.

PHYS 221 Quantum Physics (3) AWSpS Introduction to the physics of atoms, molecules, and nu-clei; elementary quantum physics. Prerequisites: 123, concurrent or previous MATH 126 or 136.

PHYS 222 Thermal Physics (3) WSpS Introduction to heat, thermodynamics, and elementary kinetic theory. Prerequisites: 221, which may be taken concurrently, MATH 126 or 136.

PHYS 223 Elementary Mathematical Physics (3) Sp Applications of mathematics to physics, particularly as illustrated by classical mechanics. Prerequisites: 123 and MATH 238.

PHYS 310 Light and Color (3) Light and color treated as an introduction to basic scien-tific concepts to help students develop their understand-ing of scientific viewpoints and techniques. Objects treated include pigments, filters, prisms, lenses, rain-bows, eyes, lamps, etc. Emphasis on development of concepts used to understand these and other basic eleconcepts used to understand incse and other oaste ele-ments in light and color. With the help of lecturers from the humanities, cultural connections of these subjects are explored. Prerequisite: students must have accumulated a substantial number of credits in their own majors.

PHYS 321, 322, 323 Electromagnetism (3,3,3)

A,W,Sp Charges at rest and in motion; dielectric and magnetic Charges at rest and in motion; delectric and magnetic media; electromagnetic waves; relativity and electro-magnetism; physical optics. Prerequisites: 123, MATH 328, which may be taken concurrently, for 321; 321 and basic computer programming ability for 322; 322 for 222 323.

PHYS 324, 325 Quantum Mechanics (3,3) A,W Introduction to nonrelativistic quantum mechanics. Pre-requisites: 221, MATH 327 for 324; 324 and basic computer programming ability for 325. MATH 205 or 302 recommended.

PHYS 327 Introduction to Nuclear Physics (3) Nuclear structure including nuclear reactions, fission, particle accelerators, and nuclear instrumentation; applications of nuclear phenomena in atomic energy and astrophysics. Not open for credit to students who have com-pleted 422. Prerequisite: 221 or permission of instructor.

PHYS 328 Statistical Physics (3) Sp Elements of statistical mechanics and their applications. Prerequisites: 221, 222, 223; 324 or a similar introduction to quantum mechanics; MATH 327.

PHYS 331 Optics Laboratory (3) Sp Optical and spectroscopic measurements. Prerequisite: 323 (preferably concurrent).

PHYS 334, 335 Electric Circuits Laboratory (3,3) W,Sp

Basic elements of DC, AC, and transient circuits; elec-

tronic devices; electrical measurements. Prerequisites: 123, MATH 126 or 136 for 334; 334 for 335.

PHYS 401, 402, 403 Special Problems (*,*,*) Supervised individual study. Honors section offered.

PHYS 405-406 Physical Science for Teachers (2, max. 6)-(2, max. 6) AWSpS,AWSpS

Basic concepts of physical sciences providing back-ground for teaching modern elementary school curricula. Primarily for NSF Institute participants. Prerequisite: permission of instructor.

PHYS 407, 408, 409 Physics for Teachers (5,5,5) PHYS 407, 408, 409 Physics for Teachers (5,5,5)Individualized study of selected topics in basic physics with emphasis on depth of understanding and develop-ment of skills essential to the scientific process. Back-ground for teaching physics at secondary school and in-troductory college levels. Prerequisite: permission of instructor. Strongly recommended: 407 to be taken prior to 408 to 408.

PHYS 410 Physical Science for In-service Teachers

 (1-2, max. 10)
A "hands-on" inquiry-oriented course designed to train in-service teachers in the use of the physical science content of any of several science programs that might be se-lected by a school or school district. Prerequisite: in-service teacher in cooperating school district.

PHYS 411, 412, 413 Physical Science for Lead

For preservice and in-service teachers. Extends the physi-For preservice and in-service teachers. Extends the physical science content covered in previous courses and helps prepare lead teachers to train their colleagues in the use of the physical science content of any of several science programs that might be selected by a school or school district. Prerequisite: 101-102 or 400 or 405-406.

PHYS 421 Atomic and Molecular Physics (3) A Survey of the principal phenomena of atomic and molec-ular physics. Prerequisites: 323 and 325, or permission of instructor.

PHYS 422 Nuclear and Elementary Particle Physics (3) W

Survey of the principal phenomena of nuclear and ele-mentary particle physics. Not open for credit to students who have completed 327. Prerequisites: 323 and 325, or permission of instructor.

PHYS 423 Solid-State Physics (3) Sp Survey of the principal phenomena of solid-state physics. Prerequisites: 323 and 325, or permission of instructor.

PHYS 424, 425, 426 Mathematical Physics (3,3,3)

PHYS 424, 425, 420 maintenaucus ruyacs (3,3,3) 424: advanced classical mechanics. Prerequisites: 323 and 325, or permission. 425, 426: mathematical tech-niques of particular use in physics, including partial dif-ferential equations. Prerequisites: 323 and 325, or per-mission of instructor for 425; 425 for 426.

PHYS 427. Applications of Physics (1-3, max. 12) Current applications of physics to problems in the sciences and technology.

PHYS 428 Selected Topics in Physics

(1-3, max. 12)

PHYS 431, 432, 433 Modern Physics Laboratory (3,3,3) A,W,Sp 431, 432: measurement in modern atomic, molecular,

and solid-state physics. Prerequisite: 30 credits in physics or permission. 433: techniques in nuclear and elementary particle research. Prerequisite: 327 or 422, or permission of instructor.

PHYS 434 Application of Computers to Physical Measurement (3)

Laboratory giving specific instruction and experience in interfacing a minicomputer to laboratory equipment. Pre-requisite: junior standing or permission of instructor.

PHYS 441 Quantum Physics (4) A Methods of quantum mechanics and applications to physrecursors or quantum mechanics and applications to phys-ical systems. Examples from fields such as atomic and molecular systems, atomic collisions, nuclear physics, solid-state physics. Students are helped to make up defi-ciencies in physics background and mathematics profi-ciency. Typical preparation: 30 credits in physical science or engineering.

PHYS 485, 486, 487 Senior Honors Seminar (1,1,1) A,W,Sp

Courses for Graduates Only

PHYS 505, 506 Analytical Mechanics (3,3) A,W Topics from mechanics and applications of mathematics to physics.

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PHYS 513, 514, 515 Electromagnetism and Relativity (4,4,4) A,W,Sp Properties of electric and magnetic fields in free space and material media; boundary-value problems; radiation from accelerated charges and electromagnetic waves; the theory of special relativity leading to a relativistic formu-lation of electromagnetism and particle dynamics.

PHYS 517, 518, 519 Quantum Mechanics (4,4,4)

A,W,Sp The uncertainty principle and the interpretation of quantum mechanics; solutions of the Schrodinger equation in three dimensions; Dirac notation and matrix formulation; angular momentum; Wigner-Eckart Theorem; elementary collision theory; density matrix; approximation methods; atomic structure; semiclassical radiation theory; introduction to group theory and symmetry.

PHYS 520 Advanced Quantum Mechanics (4) A Second quantization; applications to the many-body problem; Dirac equation; Klein-Gordon equation; radiation theory; elementary meson theory. Prerequisite: 519.

PHYS 524, 525 Thermodynamics and Statistical Mechanics (3,3) A,W

Mechanics (3,3) A, W Statistical mechanical basis for the fundamental thermody-namical laws and concepts; applications of thermody-namic reasoning to selected physical problems; classical statistical distribution functions; quantum statistical me-chanics; introduction to equilibrium many-body prob-lems. Prerequisite: 517, which may be taken concurrently.

PHYS 527, 528 Current Problems in Physics (1,1) Introduction to current research topics for beginning graduate students.

PHYS 530 Physics Colloquium (*)

PHYS 531 Seminar in High Energy Physics (*)

PHYS 532 Seminar in Atomic Collisions and Spectroscopy (*)

PHYS 533 Seminar in Relativistic Astrophysics (*)

PHYS 534 Seminar in Coherent Spectroscopy (*)

PHYS 535 Seminar in Nuclear Physics (*)

PHYS 536 Seminar in Low Temperature and Solid-State Physics (*)

PHYS 537 Seminar in Theoretical Physics (*)

PHYS 538 Seminar in Cosmic Ray Physics (*)

PHYS 539 Seminar in Problems of Physics Education (*)

PHYS 541 Applications of Quantum Physics (4) Sp Techniques of quantum mechanics applied to lasers, quantum electronics, solids, and surfaces. Emphasis on approximation methods and interaction of electromagnetic radiation with matter. Prerequisite: 421 or 441 or equivalent.

PHYS 543 Models of Physical Processes (4) W processes and systems. Examples from dynamics, fluid mechanics, electromagnetic theory, and optics. Topics include diffusion, wave guides and cavities, dispersion, and normal modes of oscillation.

PHYS 545 Contemporary Optics (4)

Physical Section 2017 (2017) (543 or equivalent.

PHYS 546 Condensed Matter Physics (4)

Experimental techniques for investigating surface geo-metrical and electronic structure, surface composition, and surface thermodynamics. Auger electron spectroscopy, photo electron spectroscopy, low-energy electron diffraction, ion sputtering. Prerequisite: 441 or equivalent.

PHYS 547 Electronics for Physics Research (4) Trainor

Electronic techniques as applied in physics research. Topics include noise, control-system analysis, opera-tional amplifiers, lock-in amplifiers, precision power supplies and metering, data transmission, microproces-sors. Several integrated measurement systems are examined in the context of specific research problems. Prerequisite: elementary electronics.

PHYS 550, 551 Atomic Physics (3,3)

Theory of atomic structure and spectra; atomic and mo-lecular beams; resonance techniques; atomic collisions; topics of current interest. Prerequisite: 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 interstel-lar medium. Theories of the processes involved in the high-energy interaction of cosmic rays, including shower theory. Methods of measurement and current problems. Prerequisite: introductory quantum mechanics.

PHYS 557, 558, 559 High Energy Physics (3,3,3) High-energy kinematics; phenomenonology of high-en-ergy collisions. Second quarter is devoted to strong interactions, and the third quarter discusses weak interactions. Experimental results are emphasized. Prerequisite: 519.

PHYS 560, 561, 562 Theoretical Nuclear Physics

(3,3,3) Nuclear structure, scattering, reactions, and decays in terms of elementary properties of nucleons and current theoretical models. Prerequisite: 519.

PHYS 564, 565 General Relativity (3,3) General covariance and tensor analysis, the relativistic theory of gravitation as given by Einstein's field equa-tions, experimental tests and their significance, and ap-plications of general relativity, particularly in the areas of astrophysics and cosmology. Prerequisite: 515.

PHYS 567, 568, 569 Theory of Solids (3,3,3) A,W,Sp

A, w₁, b₂ A three-quarter course covering the fundamentals of solid-state physics. Various topics in solid-state physics are covered in considerable detail, bringing knowledge up to the current literature. Prerequisite: 519.

PHYS 570, 571 Quantum Field Theory (3,3) Emphasis varies in different years between relativistic quantum field theory and the many-body problem. Prerequisite: 520.

PHYS 576 Selected Topics in Experimental Physics (*)

PHYS 578 Selected Topics in Theoretical Physics (*)

PHYS 600 Independent Study or Research (*) Study or research under the supervision of individual fac-ulty members. Prerequisite: permission of supervisor.

PHYS 800 Doctoral Dissertation (*) Prerequisite: permission of Supervisory Committee chairperson.

POLITICAL SCIENCE

Most upper-division courses (300- and 400-level) do not require prerequision courses (soc matter) ab an generally offer more advanced subject matter, they are recommended for juniors and seniors. Interested fresh-men or sophomores who wish to enroll in upper-division courses may do so, but they should consult with the in-structor or the departmental adviser first.

Courses for Undergraduates

POL S 101 Introduction to Politics (5) AWSpS Introduction to the political problems that affect our lives and shape the world around us. Recommended for non-majors, for students who are thinking about political science as a major, and for political science majors who haven't decided on an area of specialization.

POL S 201 Introduction to Political Theory (5) Philosophical bases of politics and political activity. Pro-

vides an introduction to the study of politics by the read-ing of a few books in political philosophy. Organized equality, justice, authority, rights, and citizenship.

POL S 202 Introduction to American Politics (5)

AWSpS Introduction to people, institutions, and politics in the Drouides various ways of American political system. Provides various ways of thinking about how significant problems, crises, and conflicts of American society are resolved politically.

POL S 203 Introduction to International Relations (5) AWSp

Analysis of the world community, its politics, and government.

POL S 204 Introduction to Comparative Politics (5) Analysis of political systems in a comparative frame-work. Traditional and contemporary approaches to the study of governments and societies in different countries.

POL S 205 Introduction to Quantitative Political

POL S 205 Introduction to Sandra and Scientific methods ap-plied to social problems. Reading graphs and tables, dis-covering fallacies in arguments, evaluating the evidence for an assertion, and determining which of several deci-sions would be optimal. Students learn to do elementary operations on a computer, and computer programs do part of the teaching.

POL S 210 Ethnic Minorities and American Politics (5)

Roles of ethnic groups in American politics; the situation of minorities in urban society; sources of tension and frustration; historical relationship of minorities to the political process; protest as political activity; urban services and urban politics; the effect of national politics and policies on urban minorities. Each quarter focuses on one minority group.

POL S 211 The Future of American Minorities (5) Exploration of the alternatives open to different minority groups in the United States; their development and place in American politics, the possibilities_of community formation, integration, separatism, competitive economic structures, coalitions, etc. Prerequisite: 210 or permission of instructor.

POL S 301 Special Topics in Political Theory

(5, max. 10) Horowitz, Mosher, Teuber

Selected contemporary political issues. Political principles as reflected in concrete political problems. Selected topics might include: women's rights, civil disobedience, national health care, affirmative action, environmental protection, privacy, human rights, and redistribution of property. Recommended: introductory course in political science at the 100 or 200 level.

POL S 302 Field Experience in Politics (5, max. 10)

Classroom analysis of political theory and of methods of political research, combined with extensive field research in contemporary problems of government and politics experienced by people of the Seattle community.

POL S 303 Public Policy Formation (5)

Lujan 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 leg-islature, the executive, and the bureaucracy. Public pol-icy literature and familiarization with key aspects of policy decision making at the national, state, and local levels.

POL S 305 The Politics of Mass Communication (5)

Bennett 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.

POL S 311 Theories of Modern Government (5)

The principal political ideas of recent times with particu-lar reference to their significance for democracy and lib-eral values. Intended especially for nonmajors. Prerequisite: 201 of equivalent.

POLS 312 Radicalism in American Politics (5) Exploration of the varieties of radical dissent in Ameri-can politics. The historical roots, extending back to the eighteenth century and beyond, of both left and right contemporary radical movements are examined. Radical elements in American political thought (e.g., anarchism, nonresistance, abolitionism, feminism, socialism, libertarianism, etc.) are discussed. The relationship of radical to "ordinary" politics is explored, as is the more general implication for American society of the radical challenge. Prerequisite: an introductory course in political science.

POLS 313 Women and Patriarchal Politics (5) Sp

Analysis of political theory, historical and contemporary, including writings of the women's liberation movement on the political role of women in society. Emphasis is on empirical studies of the "apolitical" woman, and on the process of political socialization in various cultural con-texts. Field research on women's participation in political decision making.

POL S 321 American Foreign Policy (5) 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. Prerequisite: 101 or 202.

POL S 324 Contemporary International Relations in Europe (5)

European diplomacy and international relations between the two world wars; problems of European integration; contemporary developments.

POL S 325 The Arab-Israeli Conflict (5) Sheikholeslami

The politics of conflicting ideologies: Zionism and Arab nationalism; formation of the state of Israel; development of Palestinian nationalism; Arab-Israeli wars. Refemergence of Palestinian activism; domestic sources of for-eign policy; the role of the super-powers.

POL S 328 The United Nations and Specialized

Agencies (5) The structure and functions of the United Nations and specialized agencies; accomplishments; proposals for strengthening; relations of regional bodies and member states.

POL S 330 Comparative Analysis: Western Europe

(5) Contemporary politics and government in Western Europe, as the basis for an introduction to theoretical issues and practical problems involved in comparative political analysis. Prerequisite: 101 or 204. Recommended: at least 15 credits in social science.

POL S 341 Government and Politics of Canada (5) Critical analysis of parliamentary institutions, political parties, and the federal system in Canada. Prerequisite: 101.

POL S 342 Government and Politics of Latin

America (5) Analysis of the political dynamics of change in Latin America comparing various national approaches to the political problems of modernization, economic develop-ment, and social change. Prerequisite: upper-division standing or permission of instructor.

POL S 343 Government and Politics of Southeast Asia (5) Lev

Analysis of the organization and functioning of govern-ment and politics in the countries of Southeast Asia, with attention given to the nature of the social and economic environments that condition them. Recommended: 101.

POL S 346 Governments of Western Europe (5) Modern government and politics of Great Britain, France, and Germany.

POL S 347 Governments of Eastern Europe (5) Paul

Survey of the communist regimes of Poland, Hungary, Czechoslovakia, East Germany, and the Balkans.

POL S 348 The European Community (5) Rohn

The movement toward a political union of European states; national, international, and supranational elements in the law and politics of the community.

POL'S 349 Communism, Literature, and the Movies (5) Paul

Film and literature as media of social and political commentary in Communist societies. The role of the cultural intellectual under conditions of political constraint. Em-phasis is on materials from Eastern Europe, although in phasis is on materials from Eastern Europe, although in some years attention will be given to selected Soviet works. Feature films by such directors as Wajda, Schorn, Jancso, Kadar, Eisenstein, and Pudovkin are shown and discussed. Readings may include works by Kundera, Andrzejewski, Havel, and Solzhenitsyn. Of-fered jointly with SISRE 360.

POL S 350 Government and Interest Groups (5) Agrarian, labor, professional, business, and ethnic inter-

est in politics; impact on representative institutions and governmental processes. Prerequisite: 101 or permission of instructor.

POL S 351 The American Democracy (5) Democratic theory; constitutional theory; the Presidency; Congress; the Supreme Court; civil rights and civil liberties. Designed for nonmajors. Prerequisite: 202 or equivalent.

POL S 355 The American Presidency (5)

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 362 The Supreme Court in American Politics (5)

Scheingold

Introductory public law course that examines the inter-play of constitutional law and American politics with par-ticular 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 370 Government and the American Economy (5)

Government regulation, promotion, and services affect-ing such principal interest groups as business, labor, agri-culture, and consumers; the independent regulatory agen-cles, public ownership, government corporations, and the cooperative movement.

POL S 398 Honors Seminar (5, max. 15) AWSp Intensive and advanced studies in various aspects of political science. Open only to participants in the departmental honors program.

POL S 405 Seminar in Politics (5, max. 10) Intensive reading and research in selected problems or fields of political analysis. Prerequisite: permission of instructor.

POL S 406 Marxian Political Economy (5) W Levi

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 perspecevaluates these tools. Emphasis on theoretical perspec-tives, although the reading list has a few empirical appli-cations as well. Requirements include reading, participat-ing in class sessions, and completing a short midterm paper and a longer paper at the end of the quarter. Prerequisite 201

POL S 409 Undergraduate Seminar in Political Economy (5) Sp Levi, North

Undergraduate seminar in political economy with focus on Marxian and public choice approaches to political economy. Explores the questions raised by each ap-proach, the assumption(s) and testability of hypotheses, and applies these approaches to a number of problems in political economy. Offered jointly with ECON 409. Pre-requisites: 201, ECON 300, and permission of instructor.

POLS 411 The Western Tradition of Political Thought: Ancient and Medieval (5) A

Origin and evolution of major political concepts from an-cient Greece to the eighteenth century that underlie much contemporary thinking. A background in history is desir-able. Prerequisite: 101 or permission of instructor.

POLS 412 The Western Tradition of Political Thought: Modern (5) W Continuation of 411, treating materials from the seven-

teenth century through the early nineteenth century, Hobbes through Hegel. Prerequisite: 411 or permission of instructor.

POL'S 413 Contemporary Political Thought (5) Sp Developments from the eighteenth century to the present as a basis for contemporary philosophies of democracy, communism, and fascism. Prerequisite: 411 or equivalent.

POLS 414 Chinese Political Thought (5) Theories of the Oriental state as exhibited in the writings of statesmen and philosophers.

POL S 416 Economic Approaches to Political Analysis (5) W

Analysis (5) w Application of economic theory and methodology to po-litical phenomenon. Emphasis on theory construction, with application in the American context. Offered jointly with ECON 452. Prerequisite: ECON 201 or 400, or equivalent.

POLS 417 Asian Marxist Thought (3)

POL S 417 Astan Marxist Thought (3) Introduction the theory and, where appropriate, the prac-tice of Marxist-Leninism in Asia from 1920 to the pres-ent. Readings, in translation, of Mao Tse-tung, Ho Chih Minh, Kim II Song, D. P. Aidit, M. N. Roy, and Sanzo Nosaka. Emphasizes the relation of Asian Marxist thought to the specific domestic and international condi-tions of the time and to the classical ideas of Marx and Lenin. Offered jointly with SISEA 417. Prerequisite: one course from either the nineteenth- or twentieth-century Marxism series or a course in modern Asian politics or history.

POL S 418 American Political Thought (5)

Major thinkers and movements from the colonial period to the present.

POL S 420 Foreign Relations of the Soviet Union (5) Reshetar

Ideological, historical, and strategic components of So-viet foreign policy; Comintern, Cominform, and interna-tional communist movement; Soviet policy in foreign trade, in international law and organization, and in specific geographic areas.

POLS 423 International Law (5) A Rohn

History and present status of international law. Feedback between law and politics in international relations. Current trends in treaties and court cases. Prerequisite: 203

POL S 424 International and European Regional Courts (5)

Rohn

or equivalent suggested.

Survey and comparison of formal dispute settlement procedures among sovereign states (i.e., various ad hoc ar-bitration tribunals, the Permanent Court of Arbitration, the Central American Court of Justice, the two World the Central American Court of Justice, the two World Courts, the two major International Military Tribunals [war crime trials], the Court of Justice of the European Community [Common Market], the European Court of Human Rights), projects for other regional courts (Arab, Latin American, Commonwealth), and the role of courts in early federal systems (United States, Switzerland, Canada). Recommended: 423 or equivalent.

POLS 426 World Politics (5) A Modelski⁻

The nation-state system and its alternatives; world distributions of preferences and power; structure of interna-tional authority; historical world societies and their poli-

POL S 427 International Government and Administration (5)

Modelski

tics.

Comparative study of regional and general governmental international organizations.

POL S 430 Government and Politics in the Middle

East and North Africa (5) Breakdown of traditional society and the problems of building modern political systems.

POL S 431 International Relations in the Middle East (5)

Sheikholeslami

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 435 Japanese Government and Politics (5) Hellmann

Government and politics of Japan with emphasis on the period since 1945.

POLS 436 Ethnic Politics and Nationalism in Multi-Ethnic Societies (5) Brass, Chandler

Provides a broad theoretical base, both descriptive and analytical, for the comparative study of ethnicity and na-tionalism. Examples drawn from ethnic movements in different societies. Some previous exposure either to in-troductory courses in political science or to courses in ethnicity in other departments is desirable. Prerequisite: junior standing.

POLS 440 Government and Politics of South Asia (5)

Brass

Comparison of problems of national integration and polit-ical development in India, Pakistan, and Ceylon.

POL S 441 Government and Politics of the Soviet Union (5) A

Reshetar

Ideological and historical bases of Soviet politics; Leninism-Stalinism; Communist Party structure and func-tions; administrative agencies; the police and military; law and the judiciary; Soviet federalism and nationality policy.

POLS 442 Government and Politics of China (5) Townsend

Introduction to post-1949 government and politics, with emphasis on problems of political change in modern China. Prerequisite: junior standing.

POL S 443 Comparative Political Societies (5) W Cassinelli

Analyses of modern and premodern types of stable political society; special attention to contemporary representative democracy.

POLS 444 Revolutionary Regimes (5)

Cassinelli

Analysis of the several types of political regimes con-cerned with effecting fundamental social change; emphasis on the twentieth century.

POL S 445 Comparative Political Institutions (5)

Comparative study of the nature, structure, and function of the major institutions of government, including the party, executive, legislature, and judiciary. Prerequisites: 101 and one 300-level course in comparative government.

POLS 446 Peasants in Politics (5) Political interaction of peasants and governments, with emphasis on peasants' forms of autonomous political oranization Questions the utility of theories of modern-ization or political development in understanding this re-lationship and political interaction, suggesting instead a view of politics focused on power and participation.

POL S 447 Comparative Politics in Selected Systems (5)

Systems (5) Comparative study of nationally inherent and globally de-rived aspects of national political systems. Emphasis is on the extranational influences on national political cul-tures, governmental and political organization, and polit-ical processes in two or three national political systems. Prerequisite: permission of instructor.

POL S 449 Politics of Developing Areas (5)

Brass, Hellmann, Townsend Comparative study of problems of national integration and political development in the new states of Asia and Africa. Prerequisite: junior standing.

POLS 450 Political Parties and Elections (5) Theories of American parties, campaigns and voting be-havior; party leadership; political socialization and partic-ipation. Recommended: 101 or 202.

POL S 451 The Legislative Process (5) Organization and procedure of Congress; state legislative politics; lobbying; legislative roles; the theory and prac-tice of representative government. Prerequisite: 101 or 202

POLS 452 Political Processes and Public Opinion (5) Bennett

The foundations and environment of opinion; organiza-

tion and implementation of opinion in controlling government, and public opinion as a force in the development of public policy; public relations activities of government agencies.

POLS 453 The State Legislature (5) Intensive study of American state legislatures, with spe-cial reference to the Washington State Legislature. Student's schedule must permit spending several Fridays in Olympia when the legislature is in session. Those desir-ing a more extensive involvement with the legislature should enroll in the political internship or general studies special projects course. Prerequisites: upper-division standing and permission of instructor.

POL S 460 Introduction to Constitutional Law (5) Scheingold

Growth and development of the United States Constitu-tion as reflected in decisions of the Supreme Court; political; social, and economic effects.

POL S 461 The Courts and Civil Liberty (5) Cases and literature bearing on protection of constitution-ally guaranteed private rights, with particular reference to the period since 1937.

POL S 464 The Politics of Criminal Justice (5) Scheingold

Investigation of the political forces and value choices associated with the enforcement of criminal law. Distri-bution 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. Prerequisite: junior or senior standing.

POL S 465 Law and Public Policy (5) Scheingold

Scheingold Investigation of the relationship between law and public policy, with particular attention to problems of social, economic, and political change. The course considers le-gal and constitutional processes as they relate to such problems of public policy as race relations, the environ-ment, and the economy. Prerequisite: junior or senior standing. standing.

POL S 470 Public Bureaucracies in the Political Order (5)

Analysis of the growth, power, and roles of governmental bureaucracies in America; conflict and conformity with American political thought, other political institu-tions, and the public.

POL S 480 Introduction to Urban, Suburban, and Metropolitan Political Systems (5) Causes and consequences of variations in urban form and

political structure. Social, economic, and cultural charac-teristics of different urban forms, and processes by which they have developed; emphasis on suburbanization and metropolitanism. Offered jointly with URB P 460. Recommended: 101 or 202.

POL S 481 Introduction to Large City Government and Politics (5)

Introduction to contemporary large-city politics. Social, economic, and political trends that have shaped characteristics of large American cities. Distribution and use of economic and political power at national and local levels. Future of large cities and politics of change. Recommended: 101 or 202.

POL S 482 State Government (5)

Focus on the structures, processes, and policy outputs of state governments in the United States.

POL S 483 Environmental Politics and Policy (5)

FOLS 483 Environmental Politics and Policy (5) Examination of the interrelation between technological and environmental change and policy formation in urban political systems. The estimation of the impact of tech-nology and social change upon environment. Considera-tion 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 intervirte intercevent benerging in a state and states into account. Prerequisite: one course in state and local government or permission of instructor.

POL S 485 Problems in Urban Political Analysis (5, max. 10)

Advanced undergraduate course in urban politics. Oppor-tunity for more independent and intensive analysis of par-ticular problems or lines of inquiry. Prerequisites: 101 or 202 and 480 or 481.

POL S 487 Intergovernmental Relations (5) Analysis of the content and dynamics of the relations be-tween federal, state, and local governments, with-emphasis upon patterns in these relationships that reflect program structures.

POL S 488-489 Honors Senior Thesis (5-5) A,W 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. Prerequisites: 15 credits in 398, senior honors standing, and permission of instructor.

POL S 490 Analysis of Political Behavior (5)

Examination of quantitative and other systematic methods of political analysis. Roles of hypotheses, theories, and models in political science. Practical problems of data collection and interpretation. Methods needed in using a concernor and interpretation. Methods needed in planning a survey, using government documents, or ana-lyzing a policy problem. Basic techniques of computer usage are acquired. Prerequisite: 205 or equivalent or graduate standing.

POL S 491 Political Behavior Methodology (5) Numeric and symbolic approaches to the study of politi-cal phenomena. Analysis of the behavior of lawmakers, car pictorienta. Analysis of the densition of administrators, judges, administrators, and citizens. Students work on at-titude measurement, cross-cultural comparison, analysis of change and causation, precise description of structures and processes, probability and sampling, statistical and experimental control, and decision analysis. Graphical technizity mutting protections and comparison of the statistical and experimental control, and decision analysis. techniques, matrix operations, and conversational com-puter programming. Prerequisite: 490 or equivalent.

POL S 492 Politics and Culture (5) Bennett

How people interpret and shape the political world around them through the use of such cultural resources as 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 indi-vidual in society, influence the perception of political ëvents, and create opportunities for individual and mass political responses. Analyzing the processes through which political reality is created and changed helps us un-derstand some of the most fundamental problems of pol-tics: how social values are defined and allocated the hutics: how social values are defined and allocated, the human impact of political beliefs and institutions, and the variety of political responses to social change. Prerequisite: junior or senior standing.

POLS 493 Language and Politics (5) Pool

Language as a political phenomenon, a tool of political power, and a source of political problems. Includes the effects of "public doublespeak," the role of language in racism and sexism, and the search for ways to overcome national and international language barriers in several parts of the world. Primarily for students in political science, languages, and area studies. Prerequisite: permission of instructor.

POL S 495 Psychlatry, Psychology, and Politics (5) Survey of the contributions of psychiatry, psycho-analysis, and psychology to the understanding and analysis of politics. Background for further work in polit-ical psychology and social psychodynamic studies of pol-tice. itics

POL S 496 Undergraduate Internship (5, max. 15) Restricted to students serving in approved internships. Only 5 credits may count toward the minimum 50 credits required for the political science major. Prerequisites: sophomore standing or above and permission of undergraduate adviser.

POL S 497 Political Internship in State Government (5, max. 20)

Restricted to students serving in approved internship pro-grams with state government agencies. Only 5 credits may count toward the minimum 50 credits required for the political science major. Prerequisites: junior standing or above and permission of undergraduate adviser.

POLS 499 Individual Conference and Research (2-5, max. 20) AWSpS

No more than one registration in 499 under the same in-structor is permitted. Only 10 credits may count toward the minimum 50 credits required for the political science major. Prerequisites: junior or higher standing and per-minimum for understanding to the standing. mission of undergraduate adviser.

Courses for Graduates Only

POLS 505 Comparative Politics (5) Brass, Lev, Townsend Examination of modern theories, approaches, and meth-ods in the study of comparative politics.

POL S 506 Contemporary Problems, Domestic and Foreign (3, max. 6)

POLS 509 Reason, Value, and Politics I (3) Selected topics in the relationships between ethics and politics.

POL S 510 Reason, Value, and Politics II (3) Research and writing in the relationships between ethics and politics. Prerequisite: 509.

POL S 514 Seminar in Problems of Political Theory

(3, max, 9) Selected topics, historical and conceptual, national, re-gional, and universal. Prerequisite: permission of instructor

POLS 517 Modern Philosophy and Political Thought I (3)

Focuses on major representatives of analytic, existentialist, Marxist, and phenomenological schools of philosophy and further analyzes the terms and extent of their bearing on analysis of political phenomena.

POL S 519 Theories of Decision Making (3)

Survey of the several theories of collective decision making, including analysis of alternative strategies and the spectrum of decisional functions associated with each strategy.

POL S 520 Seminar on the Foreign Policy of the Soviet Union (3)

Reshetar

Selected topics in the development, methods, and objec-tives of the foreign policy of the Soviet Union. Prerequi-site: permission of instructor.

POL S 521 International Relations I: Theory and Method (5)

Modelski

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 Relations II: Organization and Politics (5) Modelski

Part two of the core course in the field of international re lations. Reviews basic literature on diplomacy and world organization, history of world politics, and selected spe-cial fields including foreign policies of major powers, in-ternational political economy, and global problems.

POLS 525 International Law I: Policy (3) Rohn

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: 423 or permission of instructor.

POL S 529 Problems of American Foreign Policy (3) Critical analysis of the historical foundations and contem-porary problems of foreign-policy making, with attention iven to selected foreign-policy decisions. Prerequisite: 321 or permission of instructor.

POL S 532 The Chinese Political System (3) Townsend

Examination of key approaches, interpretations, and sec-ondary literature in the study of contemporary Chinese politics. Prerequisite: permission of instructor.

POLS 533 Seminar on Contemporary Chinese Politics (3)

Townsend Research on selected problems in contemporary Chinese politics. Prerequisite: 532 or permission of instructor.

POL S 534 American Foreign Policy Formation (3) American foreign policy viewed whole, including de-fense policy, the relationships of foreign policy to do-mestic policies and priorities, and the full range of historical, constitutional, institutional, political, and theoret-ical questions related to the formation and execution of foreign policy in this broad sense. Offered jointly with PB PL 534.

POL S 535 International Relations of Modern China (3-5)

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.

POL S 536 Ethnic Politics and Nationality Formation (3)

Brass

brass Seminar concerned with the analysis and theoretical un-derstanding of two interrelated processes: ethnic group persistence and change over time; and the transformation of ethnic groups into politically self-conscious and influ-ential nationalities. The readings and discussions deal with these two processes in the contexts both of develop-ing societies and of advanced industrial societies.

POL S 537 Approaches to East European Politics (3-5) Paul

Selected concepts and methodologies useful for the analysis of politics and social structure in the socialist coun-tries of East-Central and Southeastern Europe. Offered jointly with SISRE 504. Prerequisite: permission of instructor. (Offered alternate years.)

POLS 540 Problems in South Asian Politics (3) Brass

Research problems in contemporary Indian politics.

POLS 541 The Soviet Political System (4)

Reshetar Critical appraisal of the principal research methods, theo-ries, and types of literature dealing with the government and politics of the Soviet Union. Prerequisite: permission of instructor.

POL S 543 Seminar on British Government (3) Advanced studies in British parliamentary government.

POL S 544 Problems in Comparative Government

(3, max, 9) Selected problems in the comparative analysis of political institutions, organizations, and systems.

POL S 545 Seminar on Japanese Government and Diplomacy (3, max. 6) Hellmann

POL S 546 Seminar on Problems of Soviet Politics (3) Reshetar

Selected problems of Soviet domestic politics. Prerequisite: 541 or permission of instructor.

POL S 549 Problems of Political Development (5) Comparison of aspects of political change and develop-ment in both contemporary and historical developing societies. Comprises second quarter) of core course sequence in comparative politics.

POL S 554 Legislative Politics (3, max. 6) Selected problems in legislative processes and leader-ship, state and national, Prerequisite: 451 or equivalent.

POLS 562, 563, 564 Public Law (3,3,3) Constitutional and legal concepts governing governmen-tal authority and institutions and the conduct of governmental activities.

POL S 566 Problems in Comparative Legal Institutions (3) Lev

Social science inquiry in comparative legal institutions. Worldwide scope, with attention to both theory of law in society and development, and practice of legal institutions.

POL S 567 Public Policy, Administration, and Political Theory (3) Levi

Meaning of democracy in the context of American public policies and administration. Perspective of individual and group participation in the policy process, individual's role in organizations, functions of the public servant in the making of policy decisions, and realities of policy formulation in relation to political values. Enables the student professionally committed to public activity to reflect in a discussion setting upon his or her position as a participant in the society in which he or she works. Offered jointly with PB PL 556. POLS 570 ' Public Policy and Administration (3) Kroll, Miller

Interaction between the bureaucracy and those institu-tions, organizations, and groups involved in the policy process. Analyses of current policy problems. Offered jointly with PB AD 501.

POL S 571 The Administrator and the Policy Process (3)

Kroll, Miller

Context of public administration from the perspective of the administrator. Case and research materials; field inquiries and interviews. Roles and functions of the administrator, particularly in relation to the process of implementing, making, and changing public policy. Offered jointly with PB AD 502. 1. ..

POLS 579 Comparative Administrative Systems (3) Kroll

Methodological problems of research in comparative administration. Theoretical and substantive aspects of administrative systems in urban-industrial and developing nations. Offered jointly with PB AD 551.

POL S 584 Approaches to Subnational Government (3)

Analysis of current approaches and concepts in the study of subnational government—urban, state, and regional public organization.

POL S 585, 586 Local, State, and Regional Politics and Administration (3.3)

Exploration and analysis of political and organizational behavior at the local, state, and regional levels of govern-ment, with emphasis upon methodology and field re-search.

POL S 589 Special Topics in Political Economy (3, max. 9)

(3, max, 5) Evaluating research in political economy as well as de-veloping research problems. Topics vary with instructor and with current problems in the literature. Prerequisites: 406, 416, ECON 400, and permission of instructor.

POL S 590 Seminar in Political Behavior (3, max. 6)

Bennett, Gore, Matthews

Analysis of behavioral research in selected fields of political science.

POL S 597 College Teaching of Political Science (1) Survey of approaches, methods, and problems associated with teaching political science at the college level. Prerequisite: appointment as a teaching assistant in the De-partment of Political Science.

POL S 600 Independent Study or Research (*)

POL S 700 Master's Thesis (*)

POLS 800 Doctoral Dissertation (*)

PSYCHOLOGY

Courses for Undergraduates

PSYCH 101 Psychology as a Social Science (5) AWSpS Keating, R. Smith

Survey of the scientific study of human behavior, covering experiments, observations and theories relating to ining experiments, observations and meones relating to in-dividual differences, personality, development, motiva-tions, social behavior, deviant behavior, genetics and physiology of behavior, learning and cognitive pro-cesses, and sensory and perceptual processes. Discussion of social problems and the research psychologists' efforts to help characterize and solve these problems. Not open for credit to students who have taken 100.

PSYCH 102 Psychology as a Natural Science (5) AWSoS

Bernstein, Sackett, Samson, Simpson, Woods Survey of the study of behavior from a natural science viewpoint. Discussion of the components and mechaviewpoint. Discussion of the components and mecha-nisms of behavior. Topics include evolution, genetics, and physiology of behavior, learning processes, motiva-tion, individual differences, development, social behav-ior, and sensory, perceptual, and cognitive processes. Not open for credit to students who have taken 100.

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PSYCH 200 Comparative Animal Behavior (5) AWSpS Barash, Beecher

Introduction to the methods and findings of comparative animal behavior. Emphasis on the reasons for studying the behavioral differences and similarities between animal species. Behavior is viewed as part of each species' adaptation to its natural habitat. Discussion of the importance of the findings of comparative animal behavior to understanding of human behavior. Recommended: 102 or BIOL 210.

PSYCH 205 Introduction to Personality and Individual Differences (4) AWSpS Marlatt, E. Robinson, R. Smith

Basic concepts, methods, and background for more in-tensive study in the field of personality. Prerequisite: 101 or 102, or equivalent.

PSYCH 209 Fundamentals of Psychological Research (3) AWSpS E. Loftus, Lumsdaine, Nelson, Rose

E. Loftus, Lunsdaine, Nelson, Rose Introduction to psychological research methodology and techniques. Topics include hypothesis testing, influence of paradigms, experimental design, techniques of scien-tific writing, research techniques, ethical issues in psy-chological research, bias and expectation problems. This course or its equivalent required for majors registered in any of the department's baccalaureate degree programs. Prerequisite: 101 or 102 or equivalent.

PSYCH 210 Psychology of Human Sexual Behavior (3) AWSpS

Survey of the current literature concerning the develop-ment of human sexual behavior. Discussion of physiological and psychological components of human sexu-ality and its deviations.

PSYCH 213. Elementary Psychological Statistics (6) AWSpS

Pagano, Sackett

Pagano, Sacken How data are described and reported. Introduction to probability theory. How psychological hypotheses are stated, tested, and evaluated in terms of numerical out-comes and the probability of outcomes. How to calculate and interpret the more commonly used statistical tests. This course or an equivalent statistics course is required for majors registered in the psychology Bachelor of Arts degree program. Prerequisites: 209 and 1½ years of high school algebra or permission of instructor.

PSYCH 217 Introduction to Probability and Statistics for Paychology (4) AWSpS E. Loftus, G. Loftus, M. H. Smith 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 distribu-tions, the normal distribution, problems of estimation from experiments. Prerequisites: 209 and MATH 157 or 124, or permission of instructor and major standing.

PSYCH 218 Statistical Inference in Psychological Research (4) AWSpS E. Loftus, G. Loftus, M. H. Smith Hypothesis testing and its probabilistic and statistical basis. Development and application of techniques of sta-tistical inference commonly employed in psychological research: t-test, analysis of variance, correlation and re-gression, and nonparametric statistics. Nature and control of experimental and inferential error in research. Reof experimental and inferential error in research. Re-quired for majors in the psychology Bachelor of Science degree program or in the psychology honors or distinc-tion programs. Prerequisites: 217 and psychology major standing.

PSYCH 222 Survey of Physiological Psychology (3)

AWS Diaz, Douglas, Samson, Simpson Introduction to the brain and how it works. Detailed ex-Introduction to the brain and how it works. Detailed examination of learning, memory, sleep, the senses, and the emotions. Intended primarily for students who do not intend to specialize in physiological psychology. Prereq-uisite: major standing in a biological science or either 101 or 102.

PSYCH 231 Laboratory in Human Performance (3) AWSpS

G. Loftus, Nelson

Laboratory on selected aspects of human learning, per-ception, and performance. Prerequisites: 209 and 213 or 217.

PSYCH 232 Laboratory in Animal Learning (3) AWSpS Samson

Laboratory on selected aspects of animal learning. Oper-ant techniques with the rat are stressed. Prerequisite: 209.

PSYCH 233 Laboratory in Animal Behavior (5) AWSDS Barash

Experience with a variety of animal species and a variety of experimental procedures and instrumentation. Prereq-uisites: 101 or 102, 209, and 200 or BIOL 212, or equivalents.

PSYCH 250 Racism and Minority Groups (4) ASpS Sue

Survey of the problems of racism and their effects upon minority groups, with particular emphasis on the condi-tions related to the development of mental health. Emphasis is placed on the situation of the Black, Chi-cano, American Indian, and Asian groups.

PSYCH 257 Psychology of Sex Differences (5) AS Kennev

Major psychological theories of sex-role development in young children and a study of the biological and environ-mental influences that determine and maintain sex differences in behavior. Topics include the genetic and endocrinological basis of sex, the development of sex roles in children, sex differences in aggression, cognitive abilities, achievement motivation, affiliation, and sexuality, and role of parents and schools in the development, maintenance, and modification of sex roles with specific focus on women. Not open for credit to students who have taken GIS 244. Offered jointly with WOMEN 257. Recommended: 101 or 102.

PSYCH 260 Psychological Aspects of Poverty and Affluence (3) A or Sp Lumsdaine

Experience of poverty in various United States and world situations; psychological as well as socioeconomic causes of poverty; attitudes and motives of both the poor and the more affluent whose views influence help given and obstacles to improving the lot of the poor, psychological and socioeconomic factors in world hunger and poverty in developing nations. Recommended: 101 or 345.

PSYCH 304 Issues and Concepts in Community Psychology (4) W or Sp Sue

Sue Topics include community mental health, epidemiology, program evaluation, and social ecology. Emphasis on re-search, theory, and practice in community settings and the influence of community-environmental factors in in-dividual functioning and the utilization of these factors in promoting mental health. Prerequisite: 10 credits in psy-obscore. chology.

PSYCH 305 Deviant Personality (5) AWSpS Jacobson, Kohlenberg, Sue Introduction to the field of psychopathology; analysis of forms, nature, and causes of disorders of behavior and personality. Prerequisite: 10 credits in psychology, in-cluding 101 or 102, or equivalent.

PSYCH 306 Developmental Psychology (5) AWSpS *R.M. Brown, M. Greenberg, H. Robinson* Analysis of psychological development of the child in re-lation to biological, physical, and sociological antecedent conditions from infancy to adolescence. Prerequisite: 101 or 102 or equipment or 102, or equivalent.

PSYCH 345 Social Psychology (5) AWSpS Davidson, Feldman-Summers, Steele

Study of the interaction of the individual and the group with emphasis upon interpersonal processes, social moti-vation, attitude formation and change, leadership, and the relation between personality and social behavior. Pre-requisite: 101 or 102, or equivalent.

PSYCH 350- Honors Research Seminar in Psychology (2-, max. 6) AWSp Carter-Saltzman

Carter-Salitman Presentations by professors and advanced Honors or dis-tinction students concerning the rationale, methodology, and progress of their research projects. Required quar-terly by all junior honors and distinction candidates in conjunction with 498 and 499. Meets with 450. Prerequisites: 231 and 232 or 233, or equivalents, and permission of departmental honors adviser.

PSYCH 355 Survey of Cognitive Psychology (5) AW L. Beach, E. Loftus

L. Beach, E. Loftus Survey of current theory and research in such areas as perception, attention, memory and learning, attitudes, thinking and decision making, and language. For both the student who wishes a survey and the student who in-tends additional work in any of the above content areas. Prerequisite: 10 credits in psychology, including an intro-ductory course. ductory course.

PSYCH 357 Psychobiology of Women (5) W Kenney

Kenney Physiological and psychological aspects of significant segments of women's lives. Topics include physiological determinants of biological sex; physiological and psycho-logical changes at puberty and during adolescence; psy-chological events related to the menstrual cycle and menopause; the psychobiological basis of female sex-uality; physical and psychological effects of contracep-tion, pregnancy, childbirth, and nursing; the role of cul-ture in determining the psychological esponse to the physiological events. Offered jointly with WOMEN 357. Not open for credit to students who have taken GIS 357. Prerequisite; 257 or WOMEN 257 or permission of in-structor. structor.

PSYCH 361 Laboratory in Social Psychology (5)

Feldman-Summers, Kealing Practice and discussion of methods of systematic obser-vation, content analysis, laboratory and field experimen-tal manipulation in social psychology; individual research projects. Prerequisites: 209, 213 or 217, 345, and major standing.

PSYCH 400 Learning (5) A,W or Sp

Bolles, M. H. Smith

Experimental research and basic theories primarily in animal learning. Prerequisite: 101 or 102.

PSYCH 403 Motivation (5) AW Bolles, M. H. Smith

Theory and research on reinforcement, punishment, frus-tration, preference, instinctual mechanisms, and other factors controlling animal behavior. Prerequisite: 101 or 102.

PSYCH 405 Advanced Personality: Theory and Research (5) WSp

I. Sarason

Intensive survey of theoretical concepts and detailed re-view of experimental methods and experiments in the field of personality. Prerequisite: 205 or equivalent.

PSYCH 406 Instrumentation for Behavioral Scientists (5) W

Pagano

Intensive laboratory course designed to provide basic and advanced training in complex electronic instrumentation advanced training in complex electronic instrumentation in current use by behavioral scientists. Emphasis on psy-chophysiological recording and biofeedback (skin resis-tance, finger temperature, EMG, heart rate, etc.) em-ploying research-caliber equipment. Covers basic electricity, test instruments (oscilloscope and digital mul-imeter), power supplies, amplifiers, digital logic (TTL), and psychophysiological recording. Registration limited to twelve students. Prerequisites: senior standing, high school physics, and permission of instructor.

PSYCH 407 History of Psychology (5) W Bolles

Historical and theoretical background of the basic assumptions of modern psychology, including such doc-trines as behaviorism, determinism, and associationism and the men who developed them. Prerequisite: 400 or equivalent.

PSYCH 409 Sociobiology (4) W

PSYCH 409 Sociobiology (4) W Barash Biological bases of social behavior, emphasizing evolu-tion as a paradigm. Topics are: individual versus group selection, kin selection, altruism, group versus individual living, mating systems, parental care of offspring, and competitive strategies. Offered jointly with ZOOL 409. Prerequisites: 200 or BIOL 211 and 212, or equivalent.

PSYCH 410 Deviant Development (5) AWSp Attneave

Introduction to developmental deviations, including sen-sory-motor handicaps, mental retardation, brain injury and emotional disturbances. Particularly for students in-terested in advanced work in clinical psychology or spe-cial education. Prerequisites: 305 and 306, or equivalents.

'n

PSYCH 412 Behavior Genetics (5) Sp Carter-Saltzman

Consideration of empirical research with both animals and humans. Background topics include basic transmission genetics, evolutionary theory, population genetics, and quantitative models. Human behavior genetics, including normal and abnormal social behavior, intellectual performance, sex differences, prenatal diagnosis and genetic counseling, and ethical considerations in behav-ior genetic research. Prerequisite: GENET 351 or 451 or equivalent.

PSYCH 413 Developmental Psychobiology (3) W Bernstein

Introduction to neural basis of behavioral development in normal and abnormal manifestations; survey of research used to examine the relationship between structure and function in the nervous system; survey of brain develop-ment and effects of prenatal and postnatal experiences on the brain and behavior. Prerequisite: 222 or 421 or 422 or equivalent.

PSYCH 414 Cognitive Development (5) AWSp R. M. Brown, Dale

Cognitive development from infancy through adolescence. Emphasis on object permanence, language devel-opment, imitation, logical reasoning, moral development, intelligence and its measurement, and educational implications. Focus on key theoretical approaches to general questions of cognitive development. Prerequisite: 306.

PSYCH 415 Socialization of the Child (5) W Dale, M. Greenberg

Date, M. Greenorg Socialization theory and research; infant social relation-ships; development of aggressive and altruistic behaviors; sex-role development; moral development; parent and adult influences; peer influences; media influences; social class and cultural influences. Prerequisite: 306.

PSYCH 416 Animal Behavior (5) A,W or Sp Beecher

Analysis of laboratory experiments, field investigations, and current theory of the behavior of animals from proto-zoa to man, including theoretical accounts of selected problems. Prerequisite: 200 or 233 or 10 credits in biology or zoology.

PSYCH 417 Evolution of Human Social Behavior (5) W J. Lockard

Analysis of animal social systems in comparative perspective, with emphasis on communication systems and adaptive significance of the social structure. Against this background, examination of human social behavior from an ethological viewpoint. Prerequisite: 200 or 409 or 416, or ZOOL 409.

PSYCH 418 Primate Social Behavior (5) Sp J. Lockard

Examination of the social structures and behaviors of New and Old World primates. Prerequisite: 200 or 409 or 416, or ZOOL 409, or equivalents.

PSYCH 419 Behavioral Studies of Zoo Animals (4, max. 8) AWSpS Beecher

Observational studies of social and reproductive behavior, infant development, activity cycles, and enclosure utilization of zoo animals, many of which are endangered and nor exotic. Designed to expand basic knowledge of animal behavior and research methodology in conjunction with discussions and tours focusing on zoo philosophy, operations, and animal maintenance. Offered in cooperation with Woodland Park Zoo. Two consecutive quarters highly recommended. Prerequisites: 200 and permission of instructor. Highly recommended: 233.

PSYCH 421 Neural Basis of Behavior (5) ASp Simpson

Anatomical and physiological principles involved in the integrative action of the nervous system and the results in behavior of this neural activity. Prerequisites: 101 or 102, and 10 credits in biology or zoology.

PSYCH 422 Physiological Psychology (5) WSp

Douglas Physiological mechanisms in behavior, including those basic to emotion, fatigue and sleep, learning, and mem-ory. Prerequisite: 101 or 102, or equivalent.

PSYCH 423 Sensory Basis of Behavior (5) W or Sp Makous

Sensory and perceptual phenomena; sensory equipment;

theories of sense-organ function. Prerequisites: 15 credits in psychology, including an introductory course.

PSYCH 424 Vision and Its Physiological Basis (5) A Teller

Phenomena of human vision, including spectral sensitiv-ity, color vision, spatial interactions, light and dark adaptation, distance perception, and binocular interaction. Techniques for the study of vision in human subjects; emphasis on correlation of human visual functioning with known optical, biochemical, anatomical, and physiologi-cal factors. Offered jointly with P BIO 424. Prerequisite: permission of instructor; some background in a physical , or biological science is recommended.

PSYCH 425 Surgical and Histological Techniques (5) Sp

Woods

Practicum in basic and advanced surgical and histological techniques used in psychophysiological experimentation. Registration limited to ten students. Prerequisites: 421 and permission of instructor.

PSYCH 427 Behavioral Endocrinology (5) W Woods

Comprehensive survey of the endocrine system and how its secretions influence and are influenced by behavior. Emphasis on relationships between the nervous and endo-crine systems. Prerequisites: 421 and two quarters of zoology, or permission of instructor.

PSYCH 430 Problems of Measurement in Psychology (5) Sp C. Lunneborg

Selection or development of instruments for the appraisal of individual or group differences in ability, achieve-ment, interest, or opinion. Students gain experience in the construction and validation of psychological tests and survey questionnaires. Prerequisite: 213 or 217.

PSYCH 434-435 Laboratory in Vision (2-3)

Introduction to techniques of research in visual psycho-physics. Instruction in alignment and calibration of basic optical systems; replication of some classical vision experiments or design and completion of original vision ex-periments. Limited to ten students. Prerequisites: 424 and permission of instructor for 434-; 434- and permission of instructor for -435.

PSYCH 440 Environmental Psychology (3) W Keating

Survey of research and methods of environmental psychology, with special emphasis on developing research strategies to study psychological implications of environ-mental issues. Prerequisites: 101 or 102, and 345, or equivalent.

PSYCH 441 Perceptual Processes (5) ASp Culbert

Consideration of the ways in which experience is orgaconstitution of the way in which theoretical treat-ment of perceptual aspects of sensory modalities, rela-tions between physical and psychological dimensions, nonstimulus determiners of the perceived world, and mediational feedback. Prerequisite: 101 or 102, or equivalent

PSYCH 442 Measurement and Design in Attitude Research (5) A or W Davidson

Major problems of research design and measurement in studies of attitude formation and change, design of procedures for laboratory and field experiments employing both traditional and more recent approaches to measure-ment of attitudes, beliefs, etc. Students are required to undertake an attitude-measurement or attitude-change project. Prerequisites: 213 or 218, and 345, or equiva-lents.

PSYCH 443 Evaluation of Social Programs: Psychological Perspectives (3) W Davidson

Davidson Major issues involved in the evaluation of social pro-grams from the areas of mental health, education, law and justice, and family planning. Topics include formu-lating program goals, selecting research designs, measur-ing outcomes, and interpreting and utilizing findings. Prerequisites: 213 or 217; upper-division and graduate students only. students only.

PSYCH 444 Attitude Change and Persuasive Communication (3) A or W,Sp Lumsdaine

Factors influencing attitude change, with emphasis on

message variables in persuasive communications, and ex-periments to measure their effects on opinions, attitudes, and associated behavior. Objectives include developing skills in interpreting, criticizing, and applying the results of experimental studies in relation to hypotheses about factors influencing persuasiveness of communications and experiences. Prerequisites: 345 and 209 or 213 or equivalents.

PSYCH 445 Theories of Social Psychology (5) W or Sp

Steele Individual determinants of social behavior, processes, and outcomes of social interaction, their effects on the individual and groups. Prerequisites: 345 and senior or

PSYCH 446 Objective Assessment of Personality (3)

Edwards

graduate major standing.

Methods and techniques of observing and measuring per-sonality variables. Problems of research design in personality and social psychology. Extra credit may be earned for research activity by registering concurrently in 499 with the permission of the instructor. Prerequisite: elementary statistics or permission of instructor.

PSYCH 447 Psychology of Language (5) W Culbert

Psychological principles applied to linguistic develop-ment and organization; language in both its stimulus and response aspects. Prerequisite: 101 or 102, or equivalent.

PSYCH 448 Seminar in Psychology (1-15) AWSpS Selected research topics of contemporary interest. May be repeated for credit. Quarterly listings of specific offer-ings are available at departmental advisory office. Pre-requisites: major standing and permission of instructor.

PSYCH 449 Organizational and Industrial Psychology (3) W Fiedler

Survey of research and methods in industrial-social psychology and of the application of social psychology to the behavior of individuals in large organizations and their subunits. Prerequisite: one course in elementary statistics or equivalent.

PSYCH 450- Honors Research Seminar in Psychology (2-, max. 6) AWSp

Carter-Saltzman

Presentations by professors and advanced Honors stu-dents concerning the rationale, methods, and progress of their research projects. Required quarterly by all senior honors and distinction candidates in conjunction with 498 and 499. Meets jointly with 350 during Autumn Quarter. Prerequisites: 231 and 232 or 233, or equivalents, and permission of departmental honors adviser.

PSYCH 456 Perceptual Development (5) Sp

Teller Investigation of the origins of visual perception in human infancy and childhood. Development of visual acuity, color vision, form perception; perception of three-dimen-sional space. Data from animals included where relevant. Written papers and oral presentations required. Prerequi-sites: 424, 441, or equivalent, and permission of instructor. (Formerly 502.)

PSYCH 457 Language Development (4) A or Sp Dale

First-language acquisition and use by children. Emphasis on theoretical issues and research techniques. Offered jointly with LING 447. Prerequisites: 306 or LING 400, and senior or graduate standing.

PSYCH 461 Human Learning (5) Discussion of selected topics in the recent theoretical and experimental literature on human learning.

PSYCH 462 Human Memory (5)

G. Loftus, Nelson Discussion of selected topics in the recent theoretical and experimental literature on human memory.

PSYCH 463 The Pathology of Human Memory (5)

Sp M. H. Smith Examination of effects of brain damage on human memory; comparison of observed kinds of losses with current theories of memory. Emphasis on amnesia and consideration of other impairment of intellectual functions (aphasia, agnosia, apraxia) as they relate to memory. Prerequisite: 421. Recommended: 461 or 462.

PSYCH 465 Intelligence in Psychology (3) Sp Hunt

Historical and contemporary treatments of the concept of intelligence by psychology, evolution and validity of techniques for intellectual assessment; biological and environmental issues in intellectual assessment; intelligence and personality; experimental and psychometric indica-tors of the future role of intelligence in psychology. Prerequisite: 15 credits in psychology, including one statistics course.

PSYCH 468 Information Processing (4) W Hunt

Human thought is treated as a phenomenon to be de-scribed by formal models. Current theories and experimental studies of rational information processing; emphais on how man notices, recognizes, remembers, and recalls information that subsequently can be used in ra-tional problem solving; detailed discussion of theoretical models of rational problem solving. Prerequisite: 231 or 355, or equivalent.

PSYCH 475 Computing in Behavioral Sciences (5) Sp Hunt, G. Loftus

Application of computers to research problems in the be-havioral and social sciences; functional and performance characteristics of batch processing, interactive and concharacteristics of batch processing, interactive and con-trol computing systems; computing languages; computer methods of data processing, control of experiments, and automated instruction. Prerequisites: upper-division or graduate standing in behavioral or social sciences, some knowledge of statistics and computer programming, or permission of instructor.

PSYCH 488 Sociological and Psychological Theories of Sexuality (5) Sp

Blumstein, Schwartz

Advanced course on human sexuality covering psychological and sociological theories of sexual identity and life-styles, analysis of present research in sexuality, and generation of new research. Topics include acquisition of sexual identity differences in male and female sexual patsexual identity anterences in male and remare sexual pat-terns, sex in relationships, sexual malfunctioning, etc. Term paper and research proposal are required. Offered jointly with SOC 488. Prerequisites: 210 or SOC 110 or permission of instructor, and statistics.

PSYCH 489 Clinical Psychology (3) AWSp Attneave, R. Smith

Introduction to basic issues, methods, and research in the Introduction to basic issues, memods, and research in the area of clinical psychology, with emphasis on profes-sional issues, psychological assessment, and approaches to psychotherapy and behavioral change. Prerequisites: 205 and 305, and junior or senior major standing.

PSYCH 497 Undergraduate Fieldwork (1-3, max. 18) AWSpS P. Lunneborg

Individual consultation with faculty member and supervised practicum experience in a broad range of com-munity settings and agencies dealing with psychological problems. An overall maximum of 18 credits in 497, 498, and 499 may apply toward a baccalaureate degree. Prerequisites: junior or senior major standing and permission of instructor.

PSYCH 498 Readings in Psychology (1-3, max. 18) AWSpS Readings in special interest areas under supervision of departmental faculty. Discussion of reading in confer-ence with the instructor. An overall maximum of 18 credits in 497, 498, and 499 may apply toward a bacca-laureate degree. Prerequisite: permission of a supervising psychology faculty member.

PSYCH 499 Undergraduate Research (1-3, max. 18) AWSpS

An overall maximum of 18 credits in 497, 498, and 499 may apply toward a baccalaureate degree. Prerequisites: 213 or 217, and permission of a supervising psychology faculty member.

Courses for Graduates Only

SEMINARS AND SPECIAL TOPICS

The content of each graduate seminar (numbered 540 through 560) offered by the department changes from quarter to quarter. A list of offerings is published each quarter and can be obtained from the Department of Psy-

chology. Students registering for independent study or research courses must receive permission of the departmental instructor.

PSYCH 503 Advanced Social Psychology (4) A Fiedler

Problems in person perception; attitude; socialization; and group processes. For graduate and advanced under-graduate students only. Prerequisite: one undergraduate statistics course.

PSYCH 504 Biological Basis of Development (4) A Bernstein

Embryological, genetic, physiological, and evolutionary perspectives on human development; biological development in infancy; sensory development and its influence on the development of perception; primate models for hu-man development. First quarter of a three-quarter pro-seminar required for graduate majors in developmental psychology. Prerequisite: graduate standing or permission of instructor.

PSYCH 505 Cognitive and Linguistic Development (4) W

Carter-Saltzman, Dale Biological, Piagetian, and information-processing perspectives on cognitive and language development through the lifespan. Consideration of assessment of in-telligence and educational implications for normal and exceptional children. Second quarter of a three-quarter proseminar, required for graduate majors in developmen-tal psychology. Prerequisite: graduate standing or permission of instructor.

PSYCH 506 Personality and Social Development (4) Sp M. T. Greenberg, H. Robinson

Survey of theories and empirical literature in the area of personality and social development throughout infancy, childhood, and adulthood. Third quarter of a three-quarter proseminar required for graduate majors in developmental psychology. Prerequisite: graduate standing or permission of instructor.

PSYCH 507 Developmental Psychology: Historical and Philosophical Perspectives (4) Sp Dale

Introduction to the origins and development of develop-mental psychology, together with a consideration of the philosophy of science as it relates to the field. Prerequisite: 504

PSYCH 508 Research Methods in Social Psychology (3) Sp Steele

Examination and evaluation of research problems most typically encountered by social psychologists. Examina-tion of various types of research settings; discussion of factors relevant to the validity of experiments. Prerequisite: 514 or equivalent.

PSYCH 509 Leadership (3) Sp

Fiedler Critical review of leadership literature and research with emphasis on empirical studies on leadership selection, training, and prediction of group and organizational ef-fectiveness. Prerequisites: 345 and 514, or equivalents.

PSYCH 510 Advanced Attitude Change Theory (3) Lumsdaine

Review of theoretical and experimental work dealing with major concepts and hypotheses about factors in-fluencing attitude and associated behavioral change. The-ories are critically evaluated in the light of current re-search. Prerequisites: 503 or 444, and 508 or 442, or equivalents.

PSYCH 511 Experimental Approaches to Personality (3) A I. Sarason

Survey of current methodology and experimental re-search in the area of personality. Topics include the rela-tionships of anxiety, hostility, need achievement, and personal styles to behavior. Prerequisite: graduate major standing or permission of instructor. (Offered alternate years; offered 1981-82.)

PSYCH 513 Introduction to Measurement (4) A Hunt. Rose

Introduction to basic concepts of measurement, and prob-ability as applied to the design of psychological experi-ments. Statistical tests appropriate for simple experimen-tal designs using ordinal, nominal, or interval data.

Required of all first-year graduate students in psychol-ogy; may be challenged by examination at the beginning of each academic year. Prerequisite: graduate standing or permission of instructor.

PSYCH 514, 515 Experimental Design (3,3) W,Sp Edwards

Design of experiments and analysis of experimental data in the behavioral sciences. 514 required of all first-year graduate majors. Prerequisites: elementary statistics and 513, or permission of instructor for 514; 514 for 515.

PSYCH 516 Introduction to Theory of Educational and Psychological Tests (3) AS Sar

Theory of measurement; an examination of assumptions involved in test theory, errors of measurement, factors affecting reliability and validity, and problems of weighting. Taught with EDPSY 592. Prerequisites: 213 or 217, and permission of instructor.

PSYCH 517 Mathematical Psychology (3) Sp Rose

Application of mathematics (drawn from set theory, finite mathematics, and probability theory) in the areas of measurement, psychophysics, and learning. Open to un-dergraduates with permission of instructor. Prerequisite: 514 or equivalent.

PSYCH 518 Single Subject Design and Research (3) Consideration of types of single subject designs (reversal, multiple baseline, changing criterion), research employ-ing these designs, and application of such designs to clinical cases. Prerequisite: graduate major standing in clini-cal psychology or permission of instructor. (Offered alternate years; offered 1981-82.)

PSYCH 519 Statistical Methods in Longitudinal Research (3) Sp

M. T. Greenberg, Sackett Presentation of those aspects of statistics and experimen-tal design unique to, or heavily used in, developmental research, including: behavioral observation methods. analysis of variance and nonparametric techniques, and time series analysis methods. Prerequisites: 514 or equivalent, and graduate standing.

PSYCH 522 Cognitive Perception (3) A G. Loftus

Current topics in perception, including psychophysics, sensory memory, pattern recognition, letter and word perception, and visual masking. Prerequisites: 441 and 517, or permission of instructor.

PSYCH 523 Cognition (4) Hunt

Problem solving, concept learning, individual differences in cognition, attention, and pattern recognition. Also, brief discussions of computer simulation and mathemati-cal models of cognitive phenomena. Prerequisites: gradu-ate standing and completion of departmental mathemati-cal and statistical requirement through 514.

PSYCH 524 Cognitive Approaches to Human Memory (4) A

Nelson

Survey of cognitive approaches to human memory. Examination of theories and behavioral data base of the following areas: perceptual memory; short-term memory; acquisition, organization, and retention of information in long-term memory; relation between reinforcement and memory. Prerequisites: 462 and 522, or equivalents.

PSYCH 525 Assessment of Intelligence (5)

Perry, E. Robinson Nature of intelligence. Issues in assessment of intelli-gence. Test construction and evaluation of the adequacy gence. test construction and evaluation of the aucquacy of tests. Training in administration, scoring, and interpre-tation of individual intelligence tests. Prerequisite: gradu-ate major standing in clinical or child-clinical psy-chology, or minor standing in child-clinical psychology.

PSYCH 526 Psychological Assessment of Children (5) W

Perry

Review of assessment techniques appropriate to children, including infant tests, tests for special problems of pre-school and school-age children, projective tests, family interviews, and target observational assessment. Training in administration of selected techniques. Prerequisites: 525 and permission of instructor.

PSYCH 527 Psychological Assessment of Adults (3) Broedel

Brocael Training in the psychological assessment of adults, in-cluding development of skills in administration, scoring, and interpretation of the Rorschach, TAT, and Draw-a-Person tests. Prerequisites: 525 and permission of in-structor. (Offered alternate years; offered 1981-82.)

PSYCH 528 Decision Processes (3) A Beach

Literature on predecisional diagnosis of environmental states relevant to subsequent decisions; various models for decisions and relevant evidence for decisions. Open to undergraduates with permission of instructor. Prerequisite: 218 or equivalent.

PSYCH 534 Foundations of Psychological Research (3) Á Nelson

Interpretation of psychological research results, related issues from the philosophy of science, and nonstatistical pitfalls in psychological research. Prerequisites: psychological research. Prerequisites: psychological research of instructor and com-pletion of first-year graduate statistics sequence. (Offered alternate years; offered 1980-81.)

PSYCH 535 Approaches to Psychological Assessment (4) Sp

Perry Problem-solving approach to psychological assessment; review of psychological tests and procedures and presentation of approaches to their clinical interpretation and use. Prerequisite: graduate major standing in clinical psychology.

PSYCH 536 Behavioral Assessment (4) A

Linehan

Research, theory, and technique in the field of behavioral assessment. Emphasis on assessing for change with atten-tion to the relationship between assessment and therapy. Procedures include: interviewing, observational tech-niques, self-monitoring, simulated environments, and physiological, self-report, and imaginal procedures. Pre-requisites: clinical psychology graduate standing and per-mission of instructor.

PSYCH 537 Methods of Psychotherapy (5) W Linehan

Gives the graduate clinical student a working knowledge of a wide range of psychotherapy skills. Research, the-ory, and application of a wide range of procedures, in-cluding desensitization, relaxation, biofeedback, induced effect, sex therapy, assertion/social skills, and cognitive behavior therapy procedures. Treatment planning for wide range of problem areas. Prerequisites: clinical psychology graduate standing and permission of instructor.

PSYCH 538 Systems of Psychotherapy (3) A Marlatt

Survey and overview of theory and research of major systems of psychotherapy, including the psychodynamic, behavioral, cognitive, and humanistic/transpersonal schools as an introduction to subsequent practica in clinical psychology. Prerequisites: graduate major standing in clinical psychology and permission of instructor.

PSYCH 539 Interviewing and Case Formulation (2, max. 6) AWSp

Becker, Carlin

Sessions alternate between intake interviewing of a pa-tient one week and a case presentation the following week. Emphasis on developing interviewing skills that facilitate psychiatric classification (by the Research Diagnostic Criteria), case formulation, treatment planning, and case presentation. Offered jointly with PBSCI 539. Prerequisite: permission of instructor.

PSYCH 540 Seminar in Clinical Psychology (2) Attneave, Becker, Broedel, Jacobson, Kohlenberg, Linehan, Marlatt, Perry, E. Robinson, Sarason, R. Smith. Sue

May be repeated for credit. Prerequisite: permission of instructor.

PSYCH 541 Seminar in Cognitive Processes (2) E. Loftus, G. Loftus, Nelson

May be repeated for credit. Prerequisite: permission of instructor

PSYCH 542 Seminar in Animal Behavior (2)

Barash, Beecher, J. Lockard May be repeated for credit. Prerequisite: permission of instructor.

PSYCH 543 Seminar in Developmental Psychology (2)

R. M. Brown, Carter-Saltzman, M. T. Greenberg,

P. Lunneborg, H. Robinson

May be repeated for credit. Prerequisite: permission of instructor.

PSYCH 544 Seminar in Experimental Psychology

May be repeated for credit. Prerequisite: permission of instructor.

PSYCH 546 Seminar in Learning (2) Bolles

May be repeated for credit. Prerequisite: permission of instructor.

PSYCH 547 Seminar in Motivation (2)

May be repeated for credit. Prerequisite: permission of instructor.

PSYCH 548 Seminar in Perceptual Processes (2) Culbert

May be repeated for credit. Prerequisites: 441 and permission of instructor.

PSYCH 549 Seminar in Physiological Psychology

(2) Diaz, Douglas, Kenney, Simpson, M. H. Smith, Teller, Woods

May be repeated for credit. Prerequisite: permission of instructor.

PSYCH 550 Seminar in Psycholinguistics (2)

Culbert, Dale May be repeated for credit. Prerequisites: 447 and per-mission of instructor.

PSYCH 551 Seminar in Psychophysics (2)

Teller May be repeated for credit. Prerequisite: permission of instructor.

PSYCH 552 Seminar in Quantitative Techniques (2) Edwards, C. Lunneborg, Rose May be repeated for credit. Prerequisite: permission of instructor.

PSYCH 553 Seminar in Social Psychology (2) Davidson, Feldman-Summers, Fiedler, Keating,

Lumsdaine, Steele

May be repeated for credit. Prerequisite: permission of instructor.

PSYCH 554 Seminar in Decision Processes (2)

L. Beach May be repeated for credit. Prerequisite: permission of instructor.

PSYCH 559 Seminar in Current Research in Vision (1) AWSpS Teller

May be repeated for credit. Prerequisite: permission of instructor.

PSYCH 560 Seminar (*) AWSp

May be repeated for credit. Prerequisite: permission of instructor.

PSYCH 567 Syntactic and Semantic Development (3) W Dale

Advanced study of the patterns of child language, linguistic approaches to characterizing them, and psycho-logical approaches to understanding the nature of devel-opment. Includes cross-linguistic comparisons, the opment. opinent. Includes cross-inguistic comparisons, the relationship of comprehension to production, the cogni-tive basis for syntax, early semantic systems, and others. Offered jointly with LING 567. Prerequisite: one course in child language development.

PSYCH 569 Law and Psychology (3) Sp Loh

Policy-oriented, interdisciplinary focus on the uses and Policy-oriented, interdisciplinary focus on the uses and limits of psychology in the law-making process on appeal and the fact-finding process at trial. Analytical, process-orientation intended to develop critical perspectives on the role of psychology in adjudication. Instruction by use of case method, socratic questioning, and discussion. Readings consist of judicial opinions, jurisprudential es-says, and empirical research reports. Offered jointly with LAW 569. Prerequisites: permission of instructor for law students; permission of department for upper-division un-dergraduates.

PSYCH 570 Child Clinical Psychology (4) A

Perry Review of issues and content of child clinical psychology, integration of field experiences with content and research, promotion of student's beginning work in research. Prerequisite: graduate major or minor standing in child clinical psychology.

PSYCH 571 Child Psychopathology and Behavior Change (5) W

Major theoretical views of childbood disorders and re-search literature in these areas. Principal treatment mo-dalities appropriate to children and families. Prerequisite: graduate standing in psychology or permission of instructor.

PSYCH 572 Approaches to Child Treatment (4) Sp E. Robinson

Overview of major approaches to child psychotherapy, including specific applications, issues in treatment, and research. Includes case assignment and supervision. Pre-requisites: 526 and graduate major standing in child-clinical psychology, or permission of instructor.

PSYCH 575 · The Family Process (3) W Attneave

Overview of the structures, relationships, and interactions within the family. Follows a developmental sequence based on the human life cycle, with two or sequence obset on the namen in cycle, while two of more generations in synchrony. Prerequisites: second-year graduate major standing in clinical psychology and permission of instructor. (Offered alternate years; offered 1981-82.)

PSYCH 576 Intervention Techniques With Families (3) Sp

Attneave

Theory and practice of principal methods of therapeutic intervention with families. Attention to clinical problems arising in a family context and use of family members and processes by the clinician. Prerequisites: 592 and 593 or equivalent and permission of instructor. (Offered alter-nate years; offered 1981-82.)

PSYCH 578 Affective Disorders: Theory and Research (2) A Becker

Causes, sustainers, correlates, and consequences of affective disorders, including biological and psychosocial factors. Emphasis on current support systems. Primarily for graduate and professional students in the topic area. Offered jointly with PBSCI 578. Prerequisites: graduate or professional student standing or permission of instruc-tor; graduate course in psychopathology and personality desirable.

PSYCH 579 Depression: Diagnosis and Psychological Treatment (2)

Becker

Becker Differential diagnosis of depression and depressive sub-types; emphasis on psychodynamic, cognitive-behav-ioral, and combined forms of psychological treatment of less severely incapacitated patients. Some discussion of biological approaches (i.e., antidepressant drugs, electro-convulsive therapy, etc.) as alternative or adjunctive treatments in severe, psychotic, and endogenous-like de-pressions. Offered jointly with PBSCI 579. Prerequisites: PBSCI 578; graduate or professional student standing or permission of instructor. Recommended: graduate course in psychopathology and personality.

PSYCH 580 Etiology and Epidemiology of Alcoholism and Drug Abuse (3) A Roffman

Intensive survey of the historical evolution of etiological concepts pertaining to alcoholism and drug abuse; review and critique of current research on testing etiological hyand childre of culture research on the unique problems of applying epidemiological research methodologies to the study of alcohol and other drugs. Offered jointly with SOC W 544 and PBSCI 544. Prerequisites: graduate or postdoc-toral standing in social, behavioral, or biological sciences and permission of instructor.

PSYCH 585 Research in Psychotherapy (5) A or W Marlatt

Marian Review of research in psychotherapy, including process and outcome. Experience in designing research projects in this area. Prerequisites: graduate major standing and permission of instructor. (Offered alternate years; offered 1980-81.)

PSYCH 590 Practicum in Psychological Assessment (2) Sp Perrv

Demonstration and practice of selected psychological test procedures and practice of interviewing skills. Concur-rent registration in 535 required. Prerequisites: graduate major standing in clinical or child-clinical psychology and permission of instructor.

PSYCH 591 Issues in Clinical Psychology (1, max. 3) AWSp Perry

Consideration of personal and professional issues in clini-cal psychology. Prerequisite: graduate major standing in clinical psychology.

PSYCH 592, 593 Clinical Methods (1-6, max. 6; 1-6, max. 6) AWSpS,AWSpS

Perry, E. Robinson

Advanced training the application of clinical psychologiraduate majors in the clinical psychology training pro-graduate majors in the clinical psychology training pro-gram. Must be taken in sequence. Prerequisites: 591, graduate major standing, and permission of instructor.

PSYCH 594 Advanced Personality Theory (5) A Linehan

Critical analysis of a broad range of personality theories and conceptual models of behavioral functioning with emphasis on applications to the development, maintenance, and change of behavior. Prerequisites: 405 and permission of instructor.

PSYCH 595 Behavior Disorders (5) W 1. Sarason

Review of major types of behavior disorders, with emphasis on clinical manifestations, relevant research, and theoretical perspectives. Prerequisite: graduate major standing in clinical psychology or permission of instructor.

PSYCH 596 Psychology of Behavior Change (5) W

Kohlenberg Review of behavioral theory and behavioral approaches to treatment. Prerequisites: 595 and permission of instructor.

PSYCH 597 Fieldwork in Clinical Psychology (1-5, max. 36) AWSpS Attneave, Becker, Broedel, Jacobson, Kohlenberg, Linehan, Marlatt, Perry, E. A. Robinson,

N. M. Robinson, Sarason, R. Smith, Sue

Prerequisites: second-year graduate major standing and permission of departmental faculty.

PSYCH 598 Advanced Clinical Practicum (4) AWSpS

Supervised psychotherapy involving several individual clients. Separate consultations with supervising instructor chemist, separate consummons with supervising instructor for intensive supervision of each case. Occasional meet-ings in small groups of instructors and students to discuss case material. Assigned readings appropriate to each case with opportunities to discuss these with instructor. Pre-requisites: clinical psychology graduate standing and per-mission of instructor. mission of instructor.

PSYCH 599 Readings in Psychology (*) AWSpS Selected topics. Prerequisite: permission of a supervising psychology faculty member.

PSYCH 600 Independent Study or Research (*) AWSpS

PSYCH 700 Master's Thesis (*) AWSpS

PSYCH 800 Doctoral Dissertation (*) AWSpS

ROMANCE LANGUAGES AND LITERATURE

Courses in English translation appear at the end of the departmental listing.

ROMANCE LINGUISTICS AND LITERATURE, GENERAL AND COMPARATIVE

Courses for Undergraduates

ROM 401 Introduction to Romance Linguistics (5) AWSpS

Contreras, Hanzeli, Klausenburger, Saporta Descriptive analysis of the phonological, morphological,

and syntactical structures of the modern Romance languages. Prerequisite: the equivalent of two college years of a Romance language, or permission of instructor.

ROM 402 Introduction to Romance Linguistics (5)

Sp Klausenburger Comparative historical survey of the development of the Democra tengues. Prerequisite: 401 or permisprincipal Romance tongues. Prerequisite: 401 or permis-sion of instructor.

ROM 490 Senior Essay (2) AWSpS Conireras, Hanzeli, Klausenburger In consultation with the appropriate faculty, the under-graduate major in Romance linguistics writes an essay on a linguistic problem of his or her choice.

Courses for Graduates Only

ROM 505, 506 Advanced Romance Linguistics (5,5) Klausenburger

Advanced problems in the phonological, morphological, and syntactical analysis of the Romance languages. De-scriptive, comparative, and historical considerations. Prerequisites: FREN 401, 402, or SPAN 400, or FREN or SPAN 541, 542.

ROM 521, 522 Seminar on Romance Linguistics (5,5)

Contreras, Hanzeli, Klausenburger Specific problems in linguistic analysis of the Romance languages. Prerequisites: 401, 402.

ROM 531 Problems in Romance Linguistics (2-5, max. 15)

Contreras, Hanzeli, Klausenburger Group seminars, or individual conferences, are scheduled under this number to meet special needs. Prerequisite: permission of the graduate program adviser.

ROM 551 Romance Linguistics: History, Methodology, and Bibliography (5) A Hanzeli, Klausenburger

For new graduate students in the Romance linguistics program. Lectures in the history of Romance linguistics and the history of linguistic science in the nineteenth and and the inderly of infigurate science science studies; lec-tures, discussions, and readings in comparative and de-scriptive methods used in contemporary scholarship; stu-dent library projects (periodical literature, reference works, preparation of specialized bibliographies).

ROM 584 Seminar in Romance Culture (5) Nostrand

Individual and collective research in the evolution of concepts common to Romance literatures and cultures. Open to graduates of this and other departments.

ROM 590 Special Seminar and Conference (1-10, max. 20)

Group seminars, or individual conferences, are scheduled under this number to meet special needs. Prerequisite: permission of the graduate program adviser.

ROM 600 Independent Study or Research (*)

CATALAN

CATA 535 Catalan Language and Literature (5, max. 10) Field

FRENCH

FREN 101, 102, 103 Elementary (5,5,5) AWSpS,AWSpS,AWSpS

Methods and objectives are primarily oral-aural. Oral practice in the language laboratory is required. Students who have received credit for 107 may not receive credit for 101; students who have received credit for 108 may not receive credit for 102; students who have received credit for 109 may not receive credit for 103. Prerequisite for 102: 101 or college equivalent, or placement test; for 103: 102 or equivalent, or placement test.

FREN 107, 108, 109 First-Year Reading (5,5,5) A,W,Sp

Beginning courses devoted to reading. Introduction to the grammar and syntax of written French, with representative texts of literary and scientific interest. Students who have received credit for 101 may not receive credit for 107; students who have received credit for 102 may not

receive credit for 108; students who have received credit for 103 may not receive credit for 109. Prerequisites: 107 for 108; 108 for 109.

FREN 111, 112, 113 Elementary (5,5,5) Administered by Independent Study Through Correspondence. The three courses correspond to 101, 102, 103, but students who wish to transfer to day school courses must satisfactorily complete placement examinations, including an oral proficiency test. All assignments are written, but oral practice is provided through purchase and use of tape recordings.

FREN 201, 202, 203 Intermediate (5,5,5) AWSp,AWSp,AWSp Systematic review of French grammar. Intensive practice in writing and conversation. Readings in literature, cul-ture, and the sciences. Prerequisites: 103 or college equivalent or placement test for 201; 201 or college equivalent or placement test for 202; 202 or college equivalent or placement test for 203.

FREN 222 Introduction to French Literature (5)

AWSp Transition between reading for content on the intermedi-ate level and the critical reading ability required for more advanced courses in French literature. Introduction to problems of style, genre, and esthetics. Prerequisite: 202 or equivalent or placement test.

FREN 237 Conversational French (2-8, max. 8)

For participants in the Foreign Study Program. Prerequi-sites: 103 or college equivalent and permission of Foreign Study Office.

FREN 297 French Civilization (3 or 6) S

For participants in the Foreign Study Program. Readings on aspects of French literary tradition; discussion of soon aspects of rener interary tradition; discussion of so-cial and cultural values as reflected in French literature. Field trips to sites of literary historical, and artistic interest. Substantial paper (written in English), and higher degree of participation, required for 6 credits. Course conducted in English. Prerequisites: two years of college English end and the participation of the second se college French and permission of Foreign Study Office.

FREN 301, 302, 303 Advanced French (5,5,5) Prerequisites: 203 or college equivalent or placement test for 301; 301 for 302; 302 for 303.

FREN 304 Survey of French Literature: Origins to 1600 (5) A Ellrich

Survey of the important thematic and formal developments in French literature during the period indicated, with emphasis on literary movements and characteristic texts, which is related to cultural background. Lecture and discussion. Desirable preparation: at least one course in either the 301, 302, 303 series or the 350, 351, 352 series.

FREN 305 Survey of French Literature: 1600-1789 (5) Sp

Survey of French literature from 1600 to 1789, with em-phasis on literary movements and characteristic texts, which is related to cultural background. Lecture and discussion. Desirable preparation: at least one course in ei-ther the 301, 302, 303 series or the 350, 351, 352 series.

FREN 306 Survey of French Literature: 1789 to the Present (5) Sp

Survey of French literature from the Revolution to the present day, using major writers to examine the development of literature through its most important movements. Includes Romanticism, Realism, Symbolism, Surreal-ism, Existentialism, Theater of the Absurd, the New Novel, and Structuralism. Major writers outside movements also are considered, but the emphasis is on a defi-nition of what is typical throughout the period. Lecture and discussion. Desirable preparation: at least one course in either the 301, 302, 303 series or the 350, 351, 352 series.

FREN 307 Composition (3-5, max. 10) S

For participants in the Foreign Study Program. Composi-tions on topical subjects of intermediate difficulty relating to the civilization of the French-speaking coun-tries of Europe. Grammar review, as needed. Prerequisites: 222 or college equivalent and permission of For-eign Study Office.

FREN 309 French Phonetics (5) AWSp

Creore Training in diction and oral expression; interpretation of literary texts; phonetics as a teaching device. Prerequisite: 203 or equivalent.

FREN 327 Advanced Conversation (2, max. 8) AWSp

Not open to students whose native language is French. Prerequisite: 203 or college equivalent or placement test.

FREN 337 Conversational French (2-8, max, 8) Sp or S

For participants in the Foreign Study Program. Prerequisite: 222 or college equivalent.

FREN 350 Drama (3)

Generic study of French drama. Prerequisite: 203 or 222 or college equivalent or placement test.

FREN 351 Poetry (3) Generic study of French poetry. Prerequisite: 203 or 222 or college equivalent.

FREN 352 Fiction (3)

Generic study of French fiction. Prerequisite: 203 or 222 or college equivalent.

FREN 378 The Making of Contemporary France, Studied in French (5) W

Nostrand Study of the historical origins and subsequent development of nine contemporary problems and subsequent develop-ment of nine contemporary problems and characteristics of French government and politics, economy, and soci-ety. Prerequisite: 203 or 222 or equivalent.

FREN 390 Supervised Study (2-6, max. 20) AWSp Prerequisites: permission of the instructor and the under-graduate French adviser.

FREN 397 French Civilization (3 or 6) S

For participants in the Foreign Study Program. Readings on aspects of French literary tradition; discussion of social and cultural values as reflected in French literature. Field trips to sites of literary, historical, and artistic interest. Taught in French, Substantial paper (written in French), and higher degree of participation, required for 6 credits. Prerequisites: two years of college French and permission of Foreign Study Office.

FREN 400 The Syntactic Structure of French (5) AWSD

Hanzeli Scientific study of the syntax of French: phrase structures and transformations (emphasis on passives, relativiza-tion, pronominalization, reflexive structures). Prerequi-sites: ROM 401 or LING 200 or 400, and two years of college-level French.

FREN 401 The Morphological Structure of French (5)

Hanzeli

Linguistic study of French morphology. Prerequisite: ROM 401 or LING 400.

FREN 402 The Phonological Structure of French (5) AWSp Hanzeli

Scientific study of the French sound system with special emphasis on "lower level" phonetic rules, with integral values. Focus on data from standard French as well as socioeconomic and geographic variations. Prerequisites: ROM 401 or LING 200 or 400, and two years of collegelevel French.

FREN 403 Background of Modern French (5) Klausenburger

Linguistic analysis of the important developments in the history of the French language from its Latin origin to contemporary speech. Prerequisite: the equivalent of two college years of French.

FREN 404 Old French (5)

Field Designed for acquisition of reading facility in Old French through intensive study of selected texts. Prerequisite: ROM 401.

FREN 410 French Literature of the Sixteenth Century: Prose (5)

Keller Study of sixteenth-century literature, with emphasis on cultural and intellectual background.. Prerequisite: 304.

FREN 411 French Renaissance: Poetry (5) Creore

Study of sixteenth-century literature with emphasis on poetry and the general artistic ambiance. Prerequisite: 304 or 410 or permission of instructor.

FREN 412 Baroque Literature (5) AWSpS

Leiner Study of the whole phenomena of Baroque literature, in-cluding prose, poetry, and theater. Prerequisite: 9 credits at the 300 level above 303.

FREN 413 French Literature of the Seventeenth Century: Classicism (5) Wortley

Study of seventeenth-century literature, with emphasis on the development of classicism. Prerequisite: 304 or 412 or permission of instructor.

FREN 414 French Literature of the Eighteenth Century: Enlightenment (5) Ellrich

Study of eighteenth-century literature, with emphasis on the development of the Enlightenment ideology. Prerequisite: 305.

FREN 415 French Literature of the Eighteenth **Century: Post-Enlightenment (5)** Ellrich

Study of eighteenth-century literature, with emphasis on the "dark side of the Enlightenment" and nascent romanticism. Prerequisite: 414 or permission of instructor.

FREN 416 French Literature of the Nineteenth Century: Romanticism (5) Dale

Study of nineteenth-century literature, with emphasis on romanticism and the early manifestations of realism. Prerequisite: 305.

FREN 417 French Literature of the Nineteenth Century: Realism and Symbolism (5) Dale

Study of nineteenth-century literature, with emphasis on the realist, naturalist, and symbolist currents. Prerequi-site: 416 or permission of instructor.

FREN 418 French Literature of the Early Twentieth Century (5)

Leiner Study of twentieth-century literature, with emphasis on the period 1900-1939. Prerequisite: 306.

FREN 419 French Literature Since World War II (5) Leiner

Study of twentieth-century literature, with emphasis on the period 1939 to the present. Prerequisite: 418 or per-mission of instructor.

FREN 421 Fiction: 1660-1800 (5) Ellrich

Prerequisite: 305.

FREN 424 Flction: 1800-1850 (5) Dale

Prerequisite: 305 or 306.

FREN 425 Fiction: 1850-1900 (5) Dale

Prerequisite: 306.

FREN 427 Fiction: Twentleth Century (5) I. Leiner Prerequisite: 306.

FREN 437 Advanced Conversational French

(2-8, max. 8) Not open to students whose native language is French. Prerequisite: 327 or equivalent.

FREN 444 Poetry: Romantic (5)

Prerequisite: 305.

FREN 445 Poetry: Parnassian and Symbolist (5) . Leine Prerequisite: 306.

FREN 446 Poetry: Twentieth Century (5) Prerequisite: 306.

FREN 451 History and Literature of the French Religious Wars (5) Sp *Griffuhs, Keller*

Study of the 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.

FREN 457 Twentieth-Century Nonfiction (5) Prerequisite: 306.

FREN 454 Nonfiction of the Classic Period (5) Christofides, Keller, Wortley Prerequisite: 304.

FREN 458 French Art and Literature: Period Studies (5) Sp

Comparative studies of theme and technique in art and literature to illustrate major concerns of a particular period as expressed in these two media. Prerequisite: backaround in French literature or art history (the appropriate 300-level course in art history or the appropriate 400-level survey course in French literature).

FREN 461 Seventeenth-Century Drama (5) Wortlev

Prerequisite: 304.

FREN 463 Nineteenth-Century Drama (5) Prerequisites: 306, 350.

FREN 465 Twentleth-Century Drama (5) Prerequisite: 306.

FREN 470 Cinema (5) Dale

Major films and figures of French cinema from the beginnings to the present.

FREN 474 Linguistics and the Teaching of French

(5) Hanzeli

Examination of areas of linguistics that can be particularly helpful to the French teacher. Prerequisite: 401 or permission of instructor.

FREN 477 African Literature in French: 1939 to the Present (5) W J. Leiner

Survey of African literature from 1939 to the present. Survey of African interautie from 155% to use present. Readings, discussions, and reports on representative works in poetry, prose, and drama by Cesaire (West In-dies), Senghor (Senegal), Damas (Guiana), Camara Laye (French Guinea), B. Dadie (Ivory Coast), Ouologuem and Kourouma (Mali), Oyono and Beti (Cameroun).

FREN 480 Social and Cultural Background (5) H. Nostrand

H. Nostrand Common values, presuppositions, social behavior pat-terns and institutions of the culture area, as differentiated by social classes, regions, age groups, and time change over the past twenty years. Conducted in English, unless all registrants are sufficiently fluent in French. For French majors, some reading in French, with papers writ-ter in Europh. ten in French.

FREN 490 Honors Seminar (5, max. 10) AWSp

FREN 496 Poetry and Song as Elements in French Civilization (5) WS Creore

Relationship of poetry and music as expressed in the chanson in several periods of French culture. Emphasis on twentieth-century poet-composer-performers such as Trenet, Brassens, Brel, Moustaki. Attention given to the in the Renaissance and later periods. Prerequisite: 203 or equivalent.

FREN 498 The French-Speaking Countries and Their Culture (5) A

J. Leiner, Nostrand

Readings on aspects of French literary tradition; discussion of social and cultural values as reflected in French literature. Taught in French.

FREN 499 Special Topics (1-5, max. 10) AWSpS Topics to meet special needs. Prerequisites: permission of the instructor and the undergraduate or graduate program adviser.

Courses for Graduates Only

FREN 105 Elementary (5) W To prepare graduate students to pass the reading exami-To prepare graduate students to pass the reading exami-nation required for advanced degrees. Credit is granted only to students who have received no previous credit in French. Students receiving credit in 105 may not later register for credit in 101. Credits earned in 105 may not be applied toward an advanced degree. Prerequisite: graduate standing or permission of the department.

FREN 106 Elementary (5) WSp Continuation of 105. Students who have received credit for 102 and/or 103 may also receive credit for 106. Credits earned in 106 may not be applied toward an advanced degree. Prerequisite: 105 or permission of the department.

FREN 507 Stylistics (5, max. 10) SpS Compositions or translations into French written by the participants; study of advanced grammar, the authorities for good usage, and variations in style. Attention to English interferences. Outside reading on the nature and place of language training and rhetoric in French education.Taught in French.

FREN 515 French Literature of the High Middle Ages (5, max. 10) Friedman

Old French literature, from the beginning to 1315. Prerequisite: permission of instructor.

FREN 516 Middle French Literature (5, max. 10) Friedman

French literature from 1315 to 1500. Prerequisite: permission of instructor.

FREN 520 Renaissance Prose: Rabelais (5) Keller

FREN 521 Renaissance Prose: Montaigne (5) Keller (Formerly 552.)

FREN 523 Studies in Fiction: 1660-1800 (5, max. 10) Ellrich

FREN 525 Studies in Fiction: 1850-1900 (5, max. 10) Dale. J. Leiner

FREN 526 Studies in Fiction: 1900-1950 (5, max. 10) J. Leiner

FREN 530 Studies in Renaissance Poetry (5, max. 10) Creore, Keller

FREN 532 Studies in Nineteenth-Century Poetry (5, max. 10)

FREN 534 Studies in Twentieth-Century Poetry (5, max. 10)

FREN 541, 542 History of the French Language (5.5)

Field, Klausenburger Survey of the phonological, morphological, and syntactical development of the French language from its origins to the present.

FREN 555 French Nonfiction (5, max. 10) Ellrich

FREN 561 Studies in Seventeenth-Century Drama (5, max. 10) . Wortley

FREN 565 Studies in French Drama (5, max. 10) Sp Studies in French drama, sixteenth to twentieth centuries.

FREN 570 Seminar in Cinema (5, max. 10) Dale Prerequisite: permission of instructor.

FREN 575 Literary Criticism (5)

FREN 590 Special Seminar and Conference (1-10, max. 30) AWSp Group seminars, or individual conferences, are scheduled

under this number to meet special needs. Prerequisite: permission of the graduate program adviser.

FREN 591 Literary Problems: Middle Ages (5, max. 10)

FREN 592 Literary Problems; Renaissance (5, max. 10)

FREN 593 Literary Problems: Seventeenth Century (5, max. 10)

FREN 594 Literary Problems: Eighteenth Century (5, max. 10)

FREN 595 Literary Problems: Nineteenth Century (5, max. 10)

FREN 596 Literary Problems: Twentieth Century (5, max. 10)

FREN 600 Independent Study or Research (*) AWSp

ITALIAN

ITAL 101, 102, 103 Elementary (5,5,5) A,W,Sp Methods and objectives are primarily oral-aural. Oral practice in the language laboratory is required. Prerequi-sites: 101 or college equivalent or placement test for 102; 102 or college equivalent or placement test for 103.

ITAL 107 Italian Language and Civilization (3) Aspects of Italian culture, past and present. Language, considered both in its essential structure and as a reflection of the society for which it serves as a means of comnunication. Range and complexity of the readings are coordinated with the increasing mastery of the language. Students receiving credit in 107 may not later register for credit in 101.

ITAL 108 Italian Language and Civilization (3) Continuation of 107. Students who have received credit for 102 and/or 103 may also receive credit for 108.

ITAL 111, 112, 113 Elementary (5,5,5) Administered by Independent Study Through Corre-spondence. Basic study of Italian grammar and idiomatic usage of the language. The three courses correspond to 101, 102, 103, but students wishing to transfer to day school courses must satisfactorily complete examinations, including oral proficiency test.

ITAL 201, 202, 203 Intermediate (5,5,5) A,W,Sp Intensive practice in speaking, reading, and writing. Functional review of grammar. Prerequisites: 103 or col-lege equivalent or placement test for 201; 201 or college equivalent or placement test for 202; 202 or college equivalent or placement test for 203.

ITAL 211, 212, 213 Intermediate (5,5,5)

Administered by Independent Study Through Correspondence. Intensive practice in reading and writing. Functional review in grammar. The three courses correspond to 201, 202, 203 but students wishing to transfer to day extra courses must satisfactorily complete placement examinations, including oral proficiency test. Prerequi-sites: 113 for 211; 211 for 212; 212 for 213; or college equivalent.

ITAL 301, 302 Advanced Syntax and Composition (3,3) A,W Prerequisites: 203 or college equivalent or placement test

for 301; 301 for 302.

ITAL 303 Italian Stylistics (3) Sp Functional grammar review; creative written and oral composition and reading, with special attention to prob-lems of style. Prerequisite: 302.

ITAL 327 Advanced Conversation (2, max. 8)

AWSp Not open to students whose native language is Italian. Prerequisite: 203 or college equivalent or placement test.

ITAL 390 Supervised Study (2-6, max. 20) AWSp Prerequisites: permission of the instructor and the under-graduate Italian adviser.

ITAL 401 The Development of the Italian Language (5)

Historical survey of Italian phonology, morphology, an syntax. The evolution of the language is illustrated with the study of pertinent documents from the various periods. Prerequisites: 301, 302, 303, or LING 400, or ROM 401, or permission of instructor.

ITAL 404, 405, 406 Survey of Italian Literature (5,5,5) A,W,Sp Prerequisite: 203 or college equivalent or placement test.

ITAL 413 Literature of the Renaissance: Quattrocento (5)

The early Renaissance. Humanism; writings of Lorenzo de' Medici, Poliziano, Belcari, Alberti, Masuccio, San-nazzaro, Pulci, Boiardo. Prerequisites: 404, 405, 406.

ITAL 414 Literature of the Renaissance: Cinquecento (5)

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The high Renaissance. Bembo and the Petrarchans, Machiavelli, Guissance, Johnson and Activity, Machiavelli, Guiscandini, Castiglione, Ariosto, Guarini, Tasso. Prerequisites: 404, 405, 406.

ITAL 423, 424 Eighteenth-Century Italian

Literature (5,5) 423: Poetry: The Arcadian Movement, Parini, Monti, Foscolo. 424: Drama: Metastasio, Goldoni, Alfieri. Prerequisites: 404, 405, 406.

ITAL 450 Manzoni and the Romantic Movement (5)

Study of Manzoni's works-the Promessi Sposi, the lyric, drama, and critical writings. Prerequisites: 404, 405, 406.

ITAL 451 Leopardi and the Lyric (5) Sp Study of the Canti with extensive collateral readings from the Zibaldone, the Operette morali, the Pensieri, and other pertinent writings. Prerequisites: 404, 405, 406

ITAL 460 Verismo (5)

Friedrich The development of Verismo with extensive readings from its main exponents---Capuana, Verga, Serao, Deledda, Fucini, and d'Annunzio. Prerequisites: 404, 405.406.

ITAL 465 Contemporary Italian Narrative (5) Friedrich

Critical reading of selected modern exponents of the short story and novel. Prerequisites: 404, 405, 406, or equivalent.

ITAL 490 Proseminar in Italian Literature (3-5)

Friedrich

Special studies intended to help the student achieve a mature critical mastery of Italian literature. Required of Ital-ian majors; others by permission of instructor.

ITAL 499 Special Topics (1-5, max. 10) AWSpS Topics to meet special needs. Prerequisites: permission of the instructor and the undergraduate or graduate program adviser.

Courses for Graduates Only

ITAL 514 Dante (3)

ITAL 570 Seminar on 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) AWSp Group seminars, or individual conferences, are scheduled under this number to meet special needs. Prerequisite: permission of the graduate program adviser.

ITAL 591 Literary Problems: Middle Ages and Fourteenth Century (5, max. 10)

ITAL 592 Literary Problems: Renaissance (5, max. 10)

ITAL 593 Literary Problems: Baroque (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: Twentleth Century (5, max. 10)

ITAL 600 Independent Study or Research (*) > AWSp

PORTUGUESE

PORT 101, 102, 103 Elementary (5,5,5) A,W,Sp Methods and objectives are primarily oral-aural. Oral practice in the language laboratory is required. Prerequi-

sites: 101 or college equivalent or placement test for 102; 102 or college equivalent or placement test for 103.

PORT 150 Accelerated (5) For graduate students in Spanish who wish to develop a rapid command of Portuguese primarily for reading pur-poses. Prerequisite: graduate standing in Spanish or permission of instructor.

PORT 201, 202, 203 Intermediate

(5,5,5) A,W,Sp Modern texts. Modern texts, compositions, conversation, and functional grammar. Students with advanced standing in Spanish courses may apply to instructor for permission to enter 301, instead of 201, after 103. Prerequisites: 103 or equivalent or permission of instructor for 201; 201 for 202; 202 for 203.

PORT 301, 302 Advanced Syntax and Composition

(3,3) A,W Students with advanced standing in Spanish courses may apply to instructor for permission to enter 301 after 103. Prerequisites: for 301: 203 or equivalent, or permission of instructor, for 302: 301.

PORT 303 Portuguese Stylistics (3) Sp

Functional grammar review; creative written and oral composition and reading with special attention to problems of style. Prerequisite: 302.

PORT 304 Survey of Luso-Brazilian Literature: Middle Ages and Renaissance (3) A Prerequisite: 203 or equivalent or permission of instructor.

PORT 305 Survey of Luso-Brazilian Literature: Seventeenth, Eighteenth, and Early Nineteenth Centuries (3) W

Prerequisite: 203 or equivalent or permission of instructor.

PORT 306 Survey of Luso-Brazilian Literature: Late Nineteenth and Twentieth Centuries (3) Sp Prerequisite: 203 or equivalent or permission of instructor.

PORT 310 Introduction to Brazilian Literature (3)

Prerequisite: 302 or permission of instructor.

PORT 327 Advanced Conversation (2, max. 8) Prerequisite: 203 or equivalent or permission of instructor

PORT 390 Supervised Study (2-5, max. 20) AWSp Prerequisites: permission of the instructor and the undergraduate Portuguese adviser.

PORT 409 Portuguese Phonetics (3) Phonetic structure of the Portuguese language as spoken in Portugal and Brazil; practice in Portuguese and Bra-zilian pronunciation. Prerequisite: 4 credits in 327 or equivalent or permission of instructor.

PORT 424, 425, 426 Fiction: 1800-1950 (3,3,3)

A,W,Sp Romanticism, realism, symbolism, and modernism in Portugal and Brazil. Eca de Queiros, Machado de Assis, twentieth-century novelists. Prerequisites: 304, 305, and 306.

Courses for Graduates Only

PORT 541, 542 History of the Portuguese Language (3,3)

Phonological, morphological, and syntactical develop-ment of the Portuguese language from its origin to the present. Prerequisite: ROM 401 or equivalent.

PORT 590 Special Seminar and Conference

(1-9, max. 30) AWSp Group seminars or individual conferences are scheduled under this number to meet special needs. Prerequisite: permission of graduate program adviser.

PROVENCAL

PROV 534 Provencal Language and Literature (5) Field

ROMANIAN

RMN 401, 402, 403 Elementary Romanian

401, 402: comprehensive introduction to both spoken and literary Romanian. 403: designed to increase the stuthrough the reading of short fictional material in modern Romanian. Offered jointly with ROMN 401, 402, 403.

RMN 404, 405, 406 Advanced Romanian

(5,5,5) Continuation of 401, 402, 403. Offered jointly with ROMN 404, 405, 406. Prerequisite: 403 or permission of instructor.

RMN 420, 421 Structure of Romanian (3,3) Descriptive analysis of the phonological, morphological, syntactical, and lexical structures of modern Romanian. Prerequisite: ROM 401 or permission of instructor.

SPANISH

SPAN 101, 102, 103 Elementary (5,5,5) AW,AWSp,AWSp

Methods and objectives are primarily oral-aural. Oral practice in the language laboratory is required. Prerequi-sites: 101 or college equivalent or placement test for 102; 102 or college equivalent or placement test for 103.

SPAN 111, 112, 113 Elementary (5,5,5) Administered by Independent Study Through Correspon-dence. Basic study of Spanish grammar and idiomatic usage of the language. The three courses correspond to 101, 102, 103, but students wishing to transfer to day school courses must satisfactorily complete placement examinations, including oral proficiency test. All assign-ments are written, but oral practice is provided through purchase and use of tabe recordings. purchase and use of tape recordings.

SPAN 114 Chicano-Spanish (5) A

Oral and written communication in Chicano-Spanish Supplemented by class presentations, lecturers, and films. Emphasis on the oral manipulation of the Spanish language as used by Chicanos in the various regions of the United States. Prerequisite: background in oral Chicano-Spanish or permission of instructor. (Last time of-fered: Spring Quarter 1981.)

SPAN 115 Chicano-Spanish (5) W Oral and written communication in Chicano-Spanish sup-plemented by class presentations, lecturers, and films. Emphasis on written expression. Compositions on Chicano themes serve as the basis for class readings, tapes, and speakers. Concentration on development of clear ex-pository style. Prerequisite: background in oral Chicano-Spanish or permission of instructor. (Last time offered: Winter Quarter 1981.)

SPAN 116 Chicano-Spanish (5) Sp Oral and written communication in Chicano-Spanish supplemented by class presentations, lecturers, and films. Emphasis on advanced conversational skills. Production of a collection of publishable student writings is antici-pated. Course development and structure depends on 114 and 115 in the sequence. Prerequisite: background in oral Chicano-Spanish or permission of instructor. (Last time offered: Spring Quarter 1981.)

SPAN 122 Basic Grammar Review (5)

Administered by the Office of Independent Study Through Correspondence. Refresher course that reviews the grammar generally covered in the first year of Span-ish at the university level or in the first two years at the high school level.

SPAN 128 Spanish for the Elementary School (5) S Friedrich

Practice in the basic language skills is combined with the demonstration and analysis of methods and techniques appropriate to FLES. Emphasis is given to the language structures and vocabulary that normally occur in elementary school Spanish. Offered jointly with EDC&I 132.

SPAN 201, 202, 203 Intermediate (5,5,5) AWSp,AWSp,AWSp Intensive practice in speaking, reading, and writing. Sys-tematic review of Spanish grammar. Oral practice based on selected pieces of Spanish literature. Prerequisites: 103 or college equivalent or placement test for 201; 201 or college equivalent or placement test for 202; 202 or college equivalent test for 203. college equivalent or placement test for 203.

SPAN 211, 212, 213 Intermediate (5,5,5)

Administered by the Office of Independent Study Through Correspondence. Intensive practice in reading and writing. Functional review in grammar. The three courses correspond to 201, 202, 203, but students wishing to transfer to day school courses must satisfactorily complete placement examinations, including oral profi-ciency test. All assignments and examinations are written, but oral practice is provided through purchase and use of tape recordings. Prerequisites: 113 for 211; 211 for 212; 212 for 213; or college equivalent.

SPAN 231 Chicano Culture (3) WSp

The folk and popular traditions of people of Mexican cul-ture, both within the present borders of Mexico and in the United States.

SPAN 237 Conversational Spanish (2 or 4 or 6) Sp For participants in the Foreign Study Program. Pre-requisites: 103 or college equivalent and permission of Foreign Study Office.

SPAN 301, 302 Advanced Syntax and Composition (4,4) AW,WSp Prerequisites: for 301: 203 or college equivalent, or placement test; for 302: 301.

SPAN 303 Spanish Stylistics (4) ASp

Functional grammar review; creative written and oral composition and reading with special attention to problems of style. Prerequisite: 302.

SPAN 304 Survey of Spanish Literature: 1140-1498 (3) A

Masterpieces of Spanish literature from origins to 1498. Prerequisites: 203 or college equivalent, or placement test, and 350 or 351 or 352.

SPAN 305 Survey of Spanish Literature: 1498-1681 (3) W Prerequisites: 203 or college equivalent, or placement test, and 350 or 351 or 352.

SPAN 306 Survey of Spanish Literature: 1681 to the Present (3) Sp Prerequisites: 203 or college equivalent, or placement test, and 350 or 351 or 352.

SPAN 311 Black Literature of the Caribbean (3) Survey in English of the rise of Black literature from its beginnings in the Afro-Cuban current of the vanguardista movement of the 1930s to the present. Authors from the French-, English-, and Spanish-speaking territories are studied.

SPAN 312 Black Poetry of the Caribbean (3) A The poetry of the Caribbean centered around the problem of being Black in a colonial situation. The evolution from a superficial attitude to a viable politicoracial one is examined.

SPAN 327 Advanced Conversation (2, max. 8) AWSp

Not open to students whose native language is Spanish. Prerequisite: 203 or equivalent or placement test.

SPAN 331 Themes in Mexican-American Studies (5) Examination of significant historical and cultural themes of the Mexican-American experience. Creation of multi-media Chicano educational materials. Prerequisite: speaking knowledge of Spanish.

SPAN 337 Conversational Spanish (2 or 4 or 6) Sp For participants in the Foreign Study Program. Prerequi-sites: 203 or equivalent and permission of Foreign Study Office.

SPAN 350 Drama (3) A Generic study of Spanish drama. Prerequisites: 203 or college equivalent or placement test.

SPAN 351 Poetry (3) A

Generic study of Spanish poetry. Prerequisite: 203 or col-lege equivalent or placement test.

SPAN 352 Fiction (3) W

Generic study of Spanish fiction. Prerequisite: 203 or college equivalent or placement test.

SPAN 359 Introduction to Mexican Literature (3) Main outlines of literary expression in Mexico, from pre-Hispanic poetry to the contemporary period. Reference is made to Chicano literature in the United States. Prerequisite: 303 or permission of instructor.

SPAN 390 Supervised Study (2-6, max, 20) AWSp Prerequisites: permission of instructor and undergraduate Spanish adviser.

SPAN 400 The Structure of Modern Spanish (5) W Contreras

Analysis of the spoken language from a linguistic point of view; phonological, morphological, and syntactic analysis. Prerequisites: 203, and ROM 401 or LING 400.

SPAN 406 Advanced Spanish Grammar (5) AWSpS Anderson, Friedrich

Reviews perennial problems of Spanish grammar and explores subtleties of Spanish grammar not adequately treated in the first three years. Considers the differences between forms and structures of Spanish and English, as well as techniques for the effective teaching of Spanish. Designed for students who have had at least three years of college Spanish. Prerequisites: 301, 302, and 303, or graduate standing.

SPAN 407 The Spanish of Latin America (5) A Contreras

Introduction to the dialectal variants of Latin-American Spanish through the reading of dialectological studies and selected literary works. Prerequisite: 203 or equivalent.

SPAN 409 Advanced Phonetics (5) AWSn Contreras, Salinero

Analysis of sounds: training in pronunciation, intonation, and close transcription of Spanish language in its modalities

SPAN 410 Spanish Medieval Literature: Tenth Through Fourteenth Centuries (5) A or W Petersen

The first of a two-quarter advanced survey of Spanish and comparative literature. The literary forms of the Iberian Peninsula from the tenth to the fourteenth centuries. ian reminsula from the tenth to the fourteenth centuries, including the Spanish national epic, the development of lyric and narrative poetry, and the evolution of romance prose through the reading of principal works (Jarchas, Poema del Cid, Los milagros de Nuestra Senora, conde Lucanor and the Libro de buen amor) in the original texts, with supplementary reading of secondary materi-als. Taught in Spanish. Prerequisites: 304, 305, 306.

SPAN 411 Spanish Medieval Literature: Fifteenth Century (5) W or Sp Petersen

Petersen Principal literary forms of the fifteenth century: narrative poetry (Romancero viejo): lyric poetry (Santillana, Mena, Manrique, and the Cancionero poets); political and social satire (prose and verse); historiography (Perez de Guzman and Fernando del Pulgar); early prose fiction (novelas de caballerias and novela sentimental) and the Caloride Terubhi is Sentisch Ere compared undergraph Celestina. Taught in Spanish. For advanced undergraduate majors and graduate students in Spanish and compar-ative literature. Prerequisites: 304, 305, 306.

SPAN 412 Spanish Literature: Sixteenth Century (5) Shipley

Golden Age and Age of Conflict. Close study of key texts from all genres, as well as their sociohistorical contexts. Prerequisites: 304, 305, 306.

SPAN 413 Spanish Literature: Seventeenth Century (5)

(5) Shipley Golden Age and Age of Conflict. Close study of key texts from all genres, as well as their sociohistorical con-texts. Prerequisites: 304, 305, 306.

SPAN 414 Spanish Literature: Eighteenth Century (5) A

Anderson, Penuelas Prerequisites: 304, 305, 306. Recommended: 350, 351 or 352.

SPAN 415 Spanish Literature: Nineteenth Century (5) W

Anderson, Penuelas Prerequisites: 304, 305, 306. Recommended: 350, 351, or 352.

SPAN 416 Spanish Literature: 1900-1936 (5) Sp Survey of Spanish literature of the twentieth century prior to the Civil War (1900-1936). Concentration on Genera-tions of 1898 and 1927. Prerequisites: 304, 305, 306. Recommended: 350, 351, or 352. SPAN 417 Spanish Literature From 1940 to the Present (5) Penuelas

Prerequisites: 304, 305, 306. 416 and 350, 351, or 352 recommended.

SPAN 420 Spanish Poetry: Origins Through the Fifteenth Century (5) Prerequisites: 304, 305, 306.

SPAN 423 Spanish Poetry: The Golden Age, Sixteenth Through Seventeenth Centuries (5) Shigley

Prerequisites: 304, 305, 306. Recommended: 351.

SPAN 424, 425, 426 Hispanic Poetry (5,5,5) Predmore

Modern lyric poetry of the Hispanic world, The period studied extends from 1870 to 1936 and deals with thir-teen major poets, from Becquer to Hernandez. Prerequi-sites: 304, 305, 306. Recommended: 351.

SPAN 433 Golden Age Prose (5)

Shipley The study of representative, and outstanding, prose works of sixteenth- and seventeenth-century Spain. Texts examined include fictional narratives of several sorts (from among sentimental, pastoral, chivalric, and Byzantine romances, collections of anecdotes and stories, novellas, the picaresque novel, the Cervantine novel) as well|as|nonfiction|(from|among|political, religious, and spiritual treatises, social satire, history, saints' lives and autobiography, defenses of the language). Special attenamonography, defenses of the language). Special atten-tion given to stylistic-formal analysis, to the recognition of convention and innovation, to the relation of works to the historical-social situation in Spain. Prerequisites: three of the following: 350, 351, 352, 304, 305, 306, or permission of instructor.

SPAN 436 Spanish Novel of the Nineteenth Century (5) AWSpS

(5) AWSp3 Anderson, Penuelas

Close reading of representative works of Galdós, Clarín, Pereda, Valera, and Blasco Ibáñez. In addition to formal and thematic considerations, special emphasis is placed upon the sociohistorical dimensions of the novels read. Prerequisites: three of the following-304, 305, 306, 350, 351, 352-or permission of instructor.

SPAN 437 Spanish Novel: 1900-1936 (5) A,W,Sp, or S Penuelas

renuetas Spanish novel from the generation of 1898 to the begin-ning of the Civil War (1936). Close reading of novels by Baroja, Unamuno, Azorin, V. Inclan, Ayala, and Sen-der. Literature and society of the period. Prerequisites: three of the following—304, 305, 306, 350, 351, 352— or permission of instructor.

SPAN 438 Spanish Novel: 1939 to the Present (5) Sp Penuelas

Prerequisites: three of the following-304, 305, 306, 350, 351, 352-or permission of instructor. (Offered alternate years.)

SPAN 440 Spanish Drama: 1150-1600 (5) From the beginning to Lope de Vega. Prerequisites: 304, 305, 306. Recommended: 350.

SPAN 441 Spanish Drama: 1600-1635 (5)

Spanish theatre of the seventeenth century, with empha-sis on Lope de Vega. Study of the comedia's intrinsic characteristics and its relation to its social context in sev enteenth-century Spain. Prerequisites: 304, 305, 306. Recommended: 350, 440.

SPAN 445 The Modern Theatre in Spain, 1700-1900 (5) Anderson

Anderson Survey of the literature and historical context of Spain's theatre in the eighteenth and nineteenth centuries. Read-ings include fifteen plays, plus supporting documents. Audio and visual materials used when available. Plays studied primarily with regard to the evolution of dramatic form and its relation to the historical framework. Major periods/styles considered are Neoclassicism, Romanti-cism, and Realism. The *Genero chico* also is considered. Prerequisites: 304, 305, 306. Recommended: 350.

SPAN 446 The Modern Theatre in Spain, 1900-1936 (5) Anderson

Major currents and literature of Spain's theatre in this century, up to the Spanish Civil War in 1936. Course

concentrates on the consolidation of modern realism on the Spanish stage, and on the concurrent avant-garde re-actions against realism. Developments in the theatre are actions against realism. Developments in the unsate are related to political developments, principally the creation and short duration of the Second Spanish Republic (1931-36). Playwrights studied include Benavente, Valle-Inclan, Unamuno, Lorca, Mihura, Jardiel Poncela. Prerequisites: 304, 305, 306. Recommended: 350.

SPAN 447 Spanish Theatre Since the Civil War (5) Anderson

Readings include works of Spain's major dramatists of the postwar period: Sastre, Buero Vallejo, Paso, Jardiel Poncela, etc., as well as appropriate critical and theoreti-cal readings. Special attention given to the social and po-litical context of the theatre in Spain under the Franco re-gime. Prerequisites: 304, 305, 306. Recommended: 350.

SPAN 449 Spanish Drama and Play Production (5, max. 10)

Anderson

Prerequisite: permission of instructor.

SPAN 453 Cervantes and His Times (5) W

Salinero Study of Cervantes and his moment in Spanish history. such or Cervanes and his moment in spanish history, with special attention to his cultural and artistic environment. Study of *Don Quixote* as a milestone of modern fiction. Prerequisites: 304, 305, 306. Recom-mended: 350, 351, or 352.

SPAN 461 Cultural Background of Latin American Literature (5) Survey of ideas and art forms and their relationship to

Survey of notas and art forms and uncerterationality to literature in four periods: pre-Columbian, colonial, early independence, and twentieth century. Prerequisites: any three of the following: 304, 305, 306, 350, 351, 352, or permission of instructor.

SPAN 462 Spanish Civilization (5) ASp

Salinero

Summary of the development of Spanish society and art forms as a background to Spain's literature, from early times to 1900. Taught in Spanish. Prerequisites: 304, 305, 306.

SPAN 465 Contemporary Chicano Literature (5) Sp Examination of one or more problems, themes, and/or figures in the developing body of Chicano literature.

SPAN 466 Chicano Literature: Fiction (5) Sp

Chicano fiction, both short story and novel. Nineteenth-and early twentieth-century fiction, as well as contempo-rary works, are examined in attempts to trace the development of Chicano fiction in the proper historical trajec-tory. Focus primarily on purely literary questions, secondarily, on the social and cultural context of the works, and, to a lesser extent, on the relationship of Chicano fiction to that of both Latin and Anglo America. Primary readings in English and Spanish as well as considreable reading in secondary sources. Students must research and write on problem areas related to theory, theme, and genre. Prerequisites: any three of 300-level literature courses.

SPAN 470 Latin American Literature of the Conquest and the Colonial Period (5) A Concha

Prerequisites: any three of the following: 304, 305, 306, 312, 331, 359. Recommended: 350, 351, or 352.

SPAN 471 Latin American Literature: 1810-1916 (5) W

Concha

Prerequisites: any three of the following: 304, 305, 306, 312, 331, 359. Recommended: 350, 351, 352, 470.

SPAN 472 Contemporary Latin American Literature (5) Sp Concha

Prerequisites: any three of the following: 304, 305, 306, 312, 331, 359. Recommended: 350, 351, or 352.

SPAN 473 Latin American Fiction: Nineteenth

Century (5, max. 15)

Concha, Rabago Study of prose fiction in Latin America in the nineteenth century. Prerequisites, any three of the following: 304, 305, 306, 312, 331, 359. Recommended: 352.

SPAN 474 Latin American Fiction: Twentieth

Century (5) Sp Prerequisites: any three of the following: 304, 305, 306, 350, 351, 352, or permission of instructor.

SPAN 475 Latin American Poetry: Coloniai Through Nineteenth Century (5) A Concha

Poetic movements of the seventeenth, eighteenth, and nineteenth centuries in Spanish American, Renaissance, Baroque, Neoclassicism, Romanticism, and Modernism. Establishes a sense of continuity among the movements and the relationship that they have with the contemporary intellectual background. Prerequisites: three of the fol-lowing—304, 305, 306, 350, 351, 352—or permission of instructor of instructor.

SPAN 476 Contemporary Latin American Poetry (5) Concha

Evolution of Latin American poetry, from post-Mod-emism and Vanguardism to the most recent poetic ex-pression: Vicente Huidobro, Pablo Neruda, Cesar Val-lejo, Octavio Paz. Texts relate the poetic creation to its sociohistorical framework. Prerequisites: any three of the following: 304, 305, 306, 312, 331, 359. Recommended: 351.

SPAN 477 Latin American Essay (5) Concha

Literary expression of ideas in Latin American countries, nineteenth and twentieth centuries. Sarmiento, Rodo, Mariategui, Reyes, etc. Prerequisites: three of the follow-ing-304, 305, 306, 350, 351, 352-or permission of instructor.

SPAN 478 Modern Latin American Theater (5) W Concha

Study of the origin, development, and achievements of Latin American theater with an overview of its history prior to the twentieth century. General considerations are combined with monographic considerations. Playwrights studied include: Sanchez, Cuzzani, Nino, and other ma-ing forums of the modern period. Percentifies any three jor figures of the modern period. Prerequisites: any three of the following: 304, 305, 306, 350, 351, 352.

SPAN 491 Individual Authors and Special Topics in Spanish Literature (5, max. 10) Focus on an individual Spanish author or a special prob-lem in Spanish literature. Prerequisites: 304, 305, 306.

SPAN 495 Study in Spain (12) Sp Anderson

Anderson One-quarter study group in Spain. Course content varies from year to year. Prerequisites: command of the Spanish language adequate for academic work at the 400 level and for living in Spain. Consult Foreign Study Office for availability and further requirements.

SPAN 499 Special Topics (1-5, max. 10) AWSpS Topics to meet special needs. Prerequisites: permission of the instructor and the undergraduate or graduate program adviser.

Courses for Graduates Only

SPAN 105 Elementary (5)

SPAN 105 Elementary (5) Prepares graduate students to pass the reading examina-tion required for advanced degrees. Credit is granted only to students who have received no previous credit in Span-ish. Students receiving credit in 105 may not later regis-ter for credit in 101. Credits in 105 may not be applied toward an advanced degree. Prerequisite: graduate transition of instructor standing or permission of instructor.

SPAN 106 Elementary (5)

Continuation of 105. Students who have received credit for 102 and/or 103 may also receive credit for 106. Credits in 106 may not be applied toward an advanced degree. Prerequisite: 105 or permission of instructor.

SPAN 500 Seminar in Spanish Linguistics (3) Sp Contreras

Problems in the phonological and grammatical analysis of modern Spanish. Prerequisite: 400.

SPAN 501 Graduate Study of Hispanic Literature (3)

Close studies of literary texts exemplifying a variety of practical critical methods.

SPAN 521, 522 The Renaissance in Spain (5,5) Shipley

Literary creation and the cultural, social, historical con-text of Spanish literature from La Celestina through the sixteenth century. Extensive study of secondary materials, intensive analysis of representative literary texts.

SPAN 541, 542 History of the Spanish Language (5,5) W,Sp Salinero

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) Predmore

SPAN 573 Twentieth-Century Spanish-American Poetry (5, max. 10) Concha

SPAN 575 Literary Criticism (5) Penuelas

SPAN 590 Special Seminar and Conference

(1-10, max. 30) AWSp Group seminars, or individual conferences, are scheduled under this number to meet special needs. Prerequisite: permission of the graduate program adviser.

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 (*) AWSD

ROMANCE LANGUAGES AND LITERATURE

ROMAN 600 Independent Study or Research (*)

ROMAN 700 Master's Thesis (*) AWSp

ROMAN 800 Doctoral Dissertation (*)

ENGLISH TRANSLATION

These courses are recommended as appropriate support-Insection set of the experimentation of the support of the support ing studies for students majoring in other departments. Courses in English translation are not applicable toward undergraduate or graduate major programs in the De-partment of Romance Languages and Literature. Majors ment take course of the course of the course of the sectors. may take any of these courses for credit as one of their electives.

Courses for Undergraduates

FRENCH

FREN 458 French Art and Literature: Period Studies (5) Sp

Comparative studies of theme and technique in art and Comparative status of theme and technique in at rain literature to illustrate major concerns of a particular pe-riod as expressed in these two media. Prerequisite: back-ground in French literature or art history (the appropriate 300-level course in art history or the appropriate 400-level survey course in French literature). FREN 481 Twentieth-Century French Novel in English (5)

FREN 482 French Poetry From Baudelaire to the

Analysis in English (5) Analysis in English of the major trends and movements in modern French poetry (e.g., symbolism, surrealism, etc.). Textual studies of representative works, from Baudelaire to the poets of the 1950s.

FREN 483 Trends in Twentieth-Century Theatre in English (5)

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.

FREN 484 Rabelais and Montaigne in English (5) Keller

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 Renais-sance in France.

FREN 485 Racine and Moliere in English (5) Wortley

FREN 486 Literature of the Enlightenment in English (5) Ellrich

FREN 487 Nineteenth-Century Fiction in English (5) Dale

FREN 488 Women in French Literature in English (5) J. Leiner

Masterpieces of French literature are read in an attempt to understand French attitudes toward women. Economic, social, sexual, and personal attitudes form the core of the course. The works read trace French attitudes from the sixteenth century, with a concentration on the twentieth century.

ITALIAN

ITAL 318 Italian Literature in English (5)

ITAL 319 The Italian Short Story in English (5) Friedrich

The short story from the Novellino and Bocaccio 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. Prerequi-site: at least sophomore standing.

ITAL 384 Renaissance Literature of Italy in English (3)

ITAL 481 The Divine Comedy in English (5) Studies of Dante's Divine Comedy in English translation, with consideration of its background and influence.

ITAL 482 The Decameron in English (5) Friedrich

An integral reading of the Decameron, with some consideration of its place in world literature and as an ex-pression of the culture of its time. Prerequisite: upperdivision standing.

ROMANCE LITERATURE

SPANISH

SPAN 129 Latin American Literature and Culture in English (5) AWSp Rabago

Explanation of contemporary Latin American literature in terms of the development of its culture. Key works read and discussed in the light of pivotal moments and movements.

RUSSIAN AND EAST EUROPEAN STUDIES See International Studies.
SCANDINAVIAN LANGUAGES AND LITERATURE

Courses for Undergraduates

DANISH

DAN 101-102, 103 . Elementary Danish (5-5,5) A,W,Sp Fundamentals of oral and written Danish.

DAN 300, 301, 302 Studies in Danish Language and Literature (5, max. 10 each) A,W,Sp Rossel

Special emphasis on expanding the speaking, reading, and writing skills obtained in 101-102, 103. Fictional texts, of varying degrees of difficulty, chosen from dif-ferent genres and periods in Danish literary history. Pre-requisites: 101-102, 103 for 300; 300 for 301; 301 for

DAN 350 Danish Ballads (3) W

Conroy, Rossel Extensive study of Scandinavian ballads stressing Danish and Faroese traditions, with special reference to origin, transmission, themes, music, and broadside ballads.

DAN 450 History of Danish Literature (3) Rossel

Historical survey of periods and genres in Danish litera-ture from the beginnings to the present.

DAN 490 Supervised Reading (*, max. 10) AWSp Conroy, Rossel

Students with an adequate reading knowledge of Danish pursue in this course a program of study in a selected area of Danish language, literature, or related fields. Conferences with the instructor; reports. Prerequisite: permission of adviser.

FINNISH

FINN 101, 102 Elementary Finnish (5,5) Fundamentals of written and oral Finnish. Offered by Independent Study Through Correspondence.

ICELANDIC

ICEL 101, 102, 103 Elementary Modern Icelandic (3,3,3) Conroy

Fundamentals of oral and written modern Icelandic. (Offered upon demand.)

NORWEGIAN

NORW 101-102, 103 Elementary Norwegian (5-5,5) AW, WSp, SpA Fundamentals of oral and written Norwegian.

NORW 220 The Norwegian Short Story (3) A Selected short stories by twentieth-century Norwegian

writers. Prerequisite: 103 or equivalent.

NORW 221 Ibsen (3) W

Sehmsdorf, Sjåvik Study of two plays by Ibsen. Prerequisite: 220 or equivalent

NORW 222 Hamsun (3) Sp Sehmsdorf, Sjåvik Study of two novellas by Hamsun. Prerequisite: 221 or equivalent.

NORW 223, 224, 225 Norwegian Conversation and Composition (2,2,2) A, W, Sp Leiren, Sehmsdorf, Sjävik Prerequisites: 103 for 223; 223 for 224; 224 for 225.

NORW 300 The Norwegian Contemporary Novel (3) A Sehmsdorf, Sjåvik Prerequisite: 222 or equivalent.

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NORW 301 Norwegian Lyrical Poetry (3) W Sehmsdorf, Sjåvik Prerequisite: 222 or equivalent.

NORW 302 Drama After Ibsen (3) Sp Sehmsdorf, Sjåvik Prerequisite: 222 or equivalent.

NORW 303, 304, 305 Advanced Norwegian Conversation and Composition (2, max. 4; 2, max. 4; 2, max. 4) A, W, Sp Leiren, Sehmsdorf, Sjåvik Prerequisite: 225 or equivalent.

NORW 350 The Norwegian Short Story (3)

Schnsdorf, Sjåvik Generic study of the Norwegian short story. Prerequisite: 220 or permission of adviser.

NORW 351 Norwegian Romanticism (3)

Selmsdorf, Sjåvik Historical study of Norway's cultural and, specifically, literary renewal from 1814 to approximately 1865. Pre-requisite: 220 or permission of adviser.

NORW 352 New Norwegian Writers (3) Sehmsdorf, Sjåvik

Study of fiction and poetry in *Nynorsk* by Duun, Vesaas, Garborg, and others. Prerequisites: two Norwegian courses on the 300 level and permission of adviser.

NORW 450 History of Norwegian Literature (3) Sp A one-volume history serves as text. Representative liter-

ary works from the earliest times to the present supple-ment the literary historical account and show the evolu-tion of the thought and form of the various genres. Prerequisite: 222 or equivalent.

NORW 490 Supervised Reading (*, max. 10) AWSp Leiren, Sehmsdorf, Sjåvik

Students with an adequate reading knowledge of Norwegian pursue in this course a program of study in a se-lected area of Norwegian language, literature, or related fields. Conferences with the instructor; reports. Prerequisite: 302 or permission of adviser.

SWEDISH

SWED 101-102, 103 Elementary Swedish (5-5,5) AW, WSp, SpA Fundamentals of oral and written Swedish.

SWED 220 Modern Swedish Poetry (3) AW

Warme

Selected poems by Froding, Lagerkvist, Sodergran, and others. Prerequisite: 103 or equivalent.

SWED 221 The Swedish Short Story (3) WSp

Warme Hjalmar Soderberg and his short stories. Prerequisite: 220 or equivalent.

SWED 222 Modern Swedish Drama and Film (3) ASp Warme

Shorter works of Par Lagerkvist and one film by Ingmar Bergman. Prerequisite: 221 or equivalent.

SWED 223, 224, 225 Swedish Conversation and Composition (2,2,2) A,W,Sp Bonebrake, Warme Prerequisites: 103 for 223; 223 for 224; 224 for 225.

SWED 300 Swedish Women Writers (3) A Warme

The contribution of women to Swedish literature by way of an analysis and consideration of representative texts from the late eighteenth to the twentieth centuries. Prerequisite: 222 or permission of instructor.

SWED 301 Swedish Poetry After 1940 (3) W Warme

Selection of poems by such poets as Karl Vennberg, Erik Lindegren, Werner Aspenstrom, Thomas Transtromer, and Harry Martinson. Prerequisite: 300 or equivalent.

SWED 302 The Swedish Contemporary Novel (3) Sp Warme

Selected works by Delblanc, Gyllensten, Sara Lidman, and others. Prerequisite: 301 or equivalent.

SWED 303, 304, 305 Advanced Swedish Conversation and Composition (2, max. 4; 2, max. 4; 2, max. 4) A,W,Sp Bonebrake, Warme

Third-year conversation and composition, based on read-ings in Swedish newspapers and journals. Prerequisite: 225 or equivalent.

SWED 350 Selected Swedish Prose and Fiction (3) A Steene, Warme

Study of essays, articles, and works of fiction that reflect social and literary concerns in twentieth-century Sweden. Prerequisite: 222 or permission of instructor.

SWED 351 The Swedish Novel Before 1940 (3) W

Steene, Warme Selected works by S. Lagerlöf, Hj. Söderberg, Hj. Berg-man, and others. Reading in the original. Prerequisite: 350.

SWED 352 Strindberg and His Works (3) Sp Warme

Representative short stories, dramas, autobiographical works, poems, and one novel. Prerequisite: 222 or equivalent.

SWED 450 History of Swedish Literature (3) Sp Warme

A one-volume history serves as text. Representative liter-ary works from the earliest times to the present are read to supplement the literary historical account and to show the evolution of the thought and form of the various genres. Prerequisite: 222 or equivalent.

SWED 490 Supervised Reading (*, max. 12) AWSp Bonebrake, Warne

Bonebraice, warme Students with an adequate reading knowledge of Swedish pursue in this course a program of study in a selected area of Swedish language, literature, or related fields. Confer-ences with the instructor, reports. Prerequisite: 302 or permission of instructor.

SCANDINAVIAN COURSES IN ENGLISH

SCAND 100 Introduction to Scandinavian Culture (2 or 21/2) AWSpS

Bonebrake, Conroy, Leiren Broad survey of the Scandinavian experience from the Viking age to the present day; the background for contemporary Scandinavian democracy, with major empha-sis on the cultural, political, and religious development of the Scandinavian countries. 2½ credits available Summer Quarter only.

SCAND 232 Hans Christian Andersen and the Literary Fairy Tale (3) Sp

Rossel

Introduction to Andersen and his tales, with particular emphasis on what they have to say about man and his world.

SCAND 251 Holberg and His Comedies in English (2) Rossel

Holberg and his major dramas, with attention to the comic tradition in the Scandinavian theatre.

SCAND 260, 261 Scandinavian Cinema (5.5) Steene

Study of major Scandinavian films and film directors from the 1920s to present. Courses may be taken con-secutively or independently.

SCAND 309 The Icelandic Saga in Translation (2 or 2¹/₂) SpS Conroy

Icelandic family sagas in the context of thirteenth-century society. 21/2 credits available Summer Quarter only.

SCAND 310 The Scandinavian Emigrant Novel (2 or 2½) Leiren, Sjåvik, Warme

The emigrant novel in its historical and literary context. 2½ credits available Summer Quarter only.

SCAND 311 Modern Scandinavian Fiction in English (2 or 21/2) WS

Rossel, Sjåvik, Warme

Representative novels and short stories of Jacobsen, Hamsun, Dinesen, Undset, and Lagerkvist. 2½ credits available Summer Quarter only.

SCAND 330 Scandinavian Mythology (21/2 or 3) AS Sehmsdorf

Introduction to the study of the mythology of Germanic, and especially the Scandinavian, peoples. Emphasis on the source material, particularly the *Poetic Edda* and Prose Edda; also historical and archaeological material. 21/2 credits available Summer Quarter only.

COLLEGE OF ARTS AND SCIENCES

SCAND 331 The Hero in Scandinavian Tradition (3) W Sehmsdorf

As a continuation of Scandinavian 330, this course explores the exemplary character and quest of the divine and the human hero. Emphasis on the two *Eddas* and the Volsung cycle and its derivatives. For comparative pur-poses, one Icelandic saga, as well as the Anglo-Saxon Beowulf, the Frankish Song of Roland, and the German Nibelungenlied also is considered. Prerequisite: 330 or permission of adviser.

SCAND 332 The Scandinavian Folktale (3) A

Sehmsdorf Study of the Scandinavian folktale as oral literature and as expression of popular beliefs.

SCAND 370 The Vikings (3) A Leiren

Study of 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.

SCAND 380 History of Scandinavia to 1521 (3) W Leiren

Survey of Scandinavian history from the Viking age to 1521, with emphasis on the efforts at unification between Iceland, Denmark, Finland, Norway, and Sweden and their relationship to the European continent. Offered jointly with HSTEU 380.

SCAND 381 History of Scandinavia to 1809 (3) Sp Leiren

Survey of Scandinavian history from 1521 to 1809 with emphasis on the Lutheran Reformation, the Thirty Years War, and the Napoleonic wars. Offered jointly with **HSTEU 381.**

SCAND 382 History of Scandinavia From 1809 to the Present (3) A Leiren

Survey of Scandinavian history from 1809 to the present with major emphasis on the political, social, cultural, and economic development of the Scandinavian countries. Offered jointly with HSTEU 382.

SCAND 384 Scandinavian Immigrant Culture (3) Leiren

Scandinavian immigration and immigrant culture in the United States.

SCAND 390 Kierkegaard (2) Rossel

Discussion of such works as *Either/or* and *Stages on* Life's Way, as both philosophical and literary works.

SCAND 455 Introduction to Scandinavian Linguistics (3) Bonebrake, Conroy

Descriptive analysis of the phonological, morphological, and syntactical structures of the modern Scandinavian languages. Prerequisite: equivalent of two college years of a Scandinavian language.

SCAND 460, 461 History of the Scandinavian

Languages (3,3) Bonebrake, Conroy

Survey of the development of the languages from primitive Scandinavian to contemporary Danish, Faroese, Ice-landic, Norwegian, and Swedish. Prerequisite: two years of a Scandinavian language or permission of instructor.

SCAND 480 Ibsen and His Major Plays in English (2 or 2½) AS Sjåvik, Steene 2½ credits available Summer Quarter only.

SCAND 481 Strindberg and His Major Plays in English (2 or 2½) WS Steene

21/2 credits available Summer Quarter only.

SCAND 484 The Films of Ingmar Bergman (5) A Steene

Study of the major films of Ingmar Bergman. Open to majors and nonmajors. Recommended: 260, 261, and 481 or CINE 201, 202, and 203.

SCAND 485 Existentialism in Scandinavian Literature (3) A Steene

Study of "Kierkegaardian" existentialism in works by

major Scandinavian authors such as Ibsen, Jacobsen, Strindberg, Lagerkvist, and Bergman.

SCAND 490 Special Topics (1-5, max. 15) AWSpS Bonebrake, Conroy, Leiren, Rossel, Schmsdorf, Sjävik. Steene, Warme

Special topics in Scandinavian art, literature, culture, and history. Course offerings are based on instructor's spe-cialty and student demand.

Courses for Graduates Only

SCAND 500, 501, 502 Old Icelandic (3,3,3) A,W,Sp Conrov

SCAND 503 Scandinavian Literature: Methodology (3) A Sehmsdorf

bibliographical resources for Scandinavian literature; concepts and methods of literary scholarship (linguistics, textual criticism, literary history, literary criticism); various approaches to literary criticism.

SCAND 506 Studies in Scandinavian Drama: Ibsen (3) A Steene

Selective reading in Ibsen's dramas in the original. Prerequisite: baccalaureate degree in Scandinavian or equivalent.

SCAND 508 The Nineteenth-Century Scandinavian Novel (3) A Rossel, Warme

SCAND 509 The Twentleth-Century Scandinavian Novel (3) W

Rossel, Warme

SCAND 510 Studies in Scandinavian Drama: Strindberg (3) A Steene

Selective reading in Strindberg's dramatic production in the original. Prerequisite: baccalaureate degree in Scandinavian or equivalent.

SCAND 513 Scandinavian Linguistics (3) Bonebrake, Conroy Selected topics in Scandinavian linguistics.

SCAND 519 Recent Scandinavian Drama (3)

Steene

Seminar on Scandinavian drama since Ibsen and Strindberg. Considers such playwrights as Par Lagerkvist, Stig Dagerman, Nordahl Grieg, Soya, Munk, and Kjeld Abel.

SCAND 520 Modern Scandinavian Poetry (3) Rossel, Warme Seminar on the poetry from 1880 to 1930.

SCAND 521 Recent Scandinavian Poetry (3) Sp Rossel, Steene, Warme

Seminar on recent and contemporary poetry from 1930 to the present.

SCAND 522 Scandinavian Romanticism (3)

Rossel, Schnedorf Backgrounds: German idealism; organicist concept of history and esthetics; the poet as visionary genius; revo-lutionary tendencies and political conservatism; folklore and mythology. Genres: lyrical poetry, national epic, the beginning of the avail beginnings of the novel.

SCAND 523 Scandinavian Literature and Film (3) Sp Steene

Study of the film adaptations by Sjostrom and Stiller of the works of Selma Lagerlof; a consideration of the film adaptations by Carl Dreyer of such works as Kaj Munk's Ordet and Hj. Soderberg's Gertrud; Alf Sjoberg's ver-sion of Strindberg's Miss Julie. Recommended: 260 or 261.

SCAND 524 Scandinavian Emigration: History and Literature (3) Sp

Seminar focusing on an area of Scandinavian history and literature that has received increasing scholarly attention in the past ten years. Studied are the forces behind Scandinavian emigration to the United States, the structure of Scandinavian communities in certain parts of America, and the literature by and about Scandinavian emigrants.

SCAND 530, 531 Medieval Scandinavian Literature (3,3) S,Sp

Conroy, Rossel The study of the main genres in the vernacular, with primary emphasis on the ballads.

SCAND 541 Scandinavian Mythology (3) Sp

Sehmsdorf Seminar on the historical development and special problems in Scandinavian mythology.

SCAND 542 Scandinavian Folklore I: Folk Beliefs (3) A

Sehmsdorf

Popular beliefs about the soul, the dead, magic, witchcraft, nature spirits, the agricultural year, as expressed in the oral traditions and customs of Scandinavia.

SCAND 543 Scandinavian Foiklore II: Foik Literature (3) W Sehmsdorf

Various forms of Scandinavian folk literature: legends, fictional folktales; proverbs, riddles, folk song, and ballad.

SCAND 590 Special Topics in Scandinavian Literature (3, max, 12) AWSp Conroy, Rossel, Sehmsdorf, Warme

SCAND 600 Independent Study or Research (*) AWSp

SCAND 700 Master's Thesis (*) AWSp

SCAND 800 Doctoral Dissertation (*)

SLAVIC LANGUAGES AND LITERATURE

Courses for Undergraduates

BULGARIAN

BULGR 401, 402, 403 Elementary Bulgarian (5,5,5) A,W,Sp 401, 402: introduction to Bulgarian phonology and gram-mar in terms of the modern spoken language. Writing conventions of literary Bulgarian. 403: reading of mod-ern texts to increase student's command of grammar and vocabuler. vocabulary.

BULGR 404, 405, 406 Advanced Bulgarian (5,5,5)

A,W,Sp Continuation of 401, 402, 403 to provide an introduction to Bulgarian literature, history, and culture through se-lected readings. These courses also reinforce and extend the student's basic knowledge of Bulgarian grammar and vocabulary through daily discussions in the language. Prerequisites: 403 for 404; 404 for 405; 405 for 406 or permission of instructor.

CZECH

CZECH 401, 402, 403 Elementary Czech (5,5,5) A,W,Sp 401, 402: introduction to the essentials of spoken and

written Czech. 403: modern Czech prose, leading to a command of the language as a research tool and provid-ing an adequate basis for further study.

CZECH 404, 405, 406 Advanced Czech (5,5,5)

A,W,Sp Continuation of 401, 402, 403 to provide an introduction to Czech literature through selected readings from the main works of Czech authors of the nineteenth and twen-tieth centuries. The courses also reinforce and extend the student's basic knowledge of Czech grammar and vocabsuccess of the second s

POLISH

POLSH 401, 402, 403 Elementary Polish (5,5,5)

401, 402: acquaints the student with the principal mor-phological and syntactic features of the Polish language through the medium of a basic vocabulary. 403: designed to enlarge the student's general vocabulary by the reading of short texts selected from Polish authors of the nineteenth and twentieth centuries.

POLSH 404, 405, 406 Advanced Polish (5,5,5)

A,W,Sp Continuation of 401, 402, 403 to provide introduction to Polish literature through selected readings of the main works from nineteenth and twentieth centuries. The course also reinforces the student's basic knowledge of vocabulary, grammatical patterns, and conversation. Pre-requisites: 403 for 404; 404 for 405; 405 for 406, or per-mission of instructor.

ROMANIAN

ROMN 401, 402, 403 Elementary Romanian

(5,5,5) A,W,Sp 401, 402: comprehensive introduction to both spoken and literary Romanian. 403: designed to increase the student's vocabulary and enhance his knowledge of grammar through readings in modern Romanian. Offered jointly with RMN 401, 402, 403.

ROMN 404, 405, 406 Advanced Romanian (5,5,5)

A,W,Sp Continuation of 401, 402, 403 to provide an introduction Communication of 401, 402, 405 to provide an introduction to Romanian literature, history, and culture through se-lected readings. Reinforces and extends basic knowledge of Romanian grammar and vocabulary through daily dis-cussions in the language. Offered jointly with RMN 404, 405, 406, Prerequisities: 403 for 404; 404 for 405; 405 for 406 406, or permission of instructor.

RUSSIAN

RUSS 101, 102 First-Year Russian (5,5) A,W RUSS 101, 102 First-Year Russian (5,5) A, W Introduction to Russian. Emphasis on oral communica-tion with limited vocabulary. Basic grammatical features and some reading. Conducted entirely in Russian except for periodic lectures on pronunciation, grammar, and writing (see also 110). For continuation, see 103.

RUSS 103 First-Year Russian (5) Sp

Sequel to 102. Continued extensive oral practice with short readings and compositions. Prerequisite: 102 or 110 or permission of instructor.

RUSS 110 Accelerated Russian (10) A

Requivalent to 101, 102. Meets two hours daily. Recom-mended for students who wish to study Russian at a more intensive pace and to progress rapidly.

RUSS 115 Accelerated Russian (10) W Continuation of 110. Equivalent to 103 and 201. Meets two hours daily. Prerequisite: 102, 110, or permission of instructor.

RUSS 150 Intensive First-Year Russian (15) S Covers material of 101, 102, 103 in one quarter. Recom-mended for students who want to acquire rapidly a con-siderable proficiency. Meets three to four hours daily. For continuation, see 250 or 201, 202, 203.

RUSS 201 Second-Year Russian (5) A

Sequel to 103. Complete review of Russian grammar with continuing oral practice and elementary composi-tion. For continuation, see 202, 203. Prerequisite: 150 or 103, or permission of instructor.

RUSS 202, 203 Second-Year Russian (5,5) W,Sp Continuation of 201. Reading and composition with care-ful attention to word derivation and vocabulary develop-ment. Prerequisite: 201 or 115, or permission of instructor.

RUSS 210 Accelerated Russian (10) Sp Continuation of 115. Covers material of 202, 203 in one quarter. Meets two hours daily. Prerequisite: 201 or 115, or permission of instructor.

RUSS 221, 222, 223 Russian for Reading and Research (5,5,5) A,W,Sp Provides students who have no previous knowledge of

Russian with all the essentials of granmar that they need to read expository prose. During the third quarter stu-dents are assigned readings on the basis of their particular interests. Aural-oral and writing skills, while not emphasized, are given some attention.

RUSS 250 Intensive Second-Year Russian (15) S Continuation of 150. For Summer Quarter students who wish to complete a second 15 credits of Russian. Pre-requisite: 150, 103, or permission of instructor.

RUSS 301, 302, 303 Intermediate Russian (5,5,5) A,W,Sp Extensive practice in spoken and written Russian based

on a variety of prose readings. Intensive review and sup-plementation of strategic grammatical concepts. One hour of grammar per week conducted in Russian and English, four hours per week of conversation in Russian. Prerequisite: 203, 210 or 250 or permission of instructor.

RUSS 331, 332, 333 Intermediate Russian for

RUSS 331, 332, 333 Intermediate Russian for Reading and Translation (5,5,5) A,W,Sp For those with some knowledge of Russian fundamentals wishing a greater facility in reading and translation from Russian to English. Some grammar review, primarily readings from a variety of sources. With instructor's ap-proval, individuals may substitute readings in their field for readings assigned. For students with varied back-grounds working at different levels of competence. Need not be taken in sequence. Prerequisites: 203, 210, 223, 250, or permission of instructor.

RUSS 350 Intensive Third-Year Russian (15) S Covers 301, 302, 303 in one quarter. Recommended for those desiring intensive review and supplementation of structural knowledge of Russian. Prerequisite: 210, 250, or 203, or permission of instructor.

RUSS 351 Intermediate Russian Phonetics (3) A Systematic exploration and analysis of the Russian sound system, including phonetic transcription and intonational patterns. Instruction in correcting individual pronuncia-tion errors. Conducted partly in Russian. Prerequisite: 203, 210, or 250.

RUSS 352 Intermediate Russian Morphology (3) W Examination of Russian morphology with emphasis on topics that help to prepare the student for advanced courses in Russian. Conducted partly in Russian. Prereq-uisite: 203, 210, or 250.

RUSS 381 Phonetics in Leningrad (2-5) AWSpS Systematic exploration and analysis of the Russian sound system (with its phonetic transcription), including separate phonemes, sound combinations, and modifications in normal speech as well as intonational patterns. Introductory discussions of pronunciation norms prepare the student for practical reading exercises, which represent the bulk of classwork. Special attention is given to corthe blick of classwork. Special attention is given to cor-recting individual pronunciation errors. (2 credits are of-fered for the six-week Summer Quarter program, 5 credits for the fourteen-week semester program.) Pre-requisite: 203 for Summer Quarter, 303 for semester.

RUSS 382 Advanced Syntax and Composition in Leningrad (2-5) AWSpS Class lectures on Russian syntactic structures are supple-mented by active oral drilling and written exercises and compositions. (2 credits are offered for the six-week Summer Quarter program.) S credits for the fourteen-week semester program.) Prerequisite: 203 for Summer Quarter, 303 for semester.

RUSS 383 Conversation in Leningrad (4-8) AWSpS Designed to increase active vocabulary, to further the student's control of idiomatic Russian, and to develop all the basic skills of oral expression. Every attempt is made to evoke spontaneous discussion about daily life, includ-ing excursions, lectures, and other parts of both the aca-demic and cultural programs in Leningrad. (4 credits are offered for the six-week Summer Quarter program, 8 credits for the fourteen-week semester program.) Prereq-uisite: 203 for Summer Quarter, 303 for semester.

RUSS 384 · Soviet Culture in Leningrad (4-6) AWSpS

Monograph lectures on major Soviet literary figures: two lectures per week on the life and writings of the week's author are followed by one seminar hour devoted to the analysis of texts for characteristic stylistic features and thematic concerns. Summer program has only lectures, thematic concerns. Summer program has only lectures, no seminar discussion. Also, weekly lectures on educa-tion, history, economics, law, art, ethnography, architec-ture, etc., which are complemented by regular excursions to museums, places of cultural and historical interest, and meetings with Soviet groups. (4 credits are offered for the six-week Summer Quarter program, 6 credits for the fourteen-week semester program.) Prerequisite: 203 for Summer Quarter, 303 for semester.

RUSS 401, 402, 403 Advanced Russian (5,5,5)

A,W,Sp Class conversation and composition based on reading. Prerequisites: 303 for 401; 401 for 402; 402 for 403.

RUSS 450 Intensive Fourth-Year Russian (15) S Intensive practice in conversation, composition, and

reading at an advanced level. Equivalent to 401, 402, 403. Prerequisite: 303, 350, or permission of instructor.

RUSS 451, 452 Structure of Russian (5,5) A,W

Descriptive analysis of contemporary standard Russian. Detailed phonetic transcription, discussion of major Great Russian dialects as well as variations in popular Great Russian inflaters as well as variations in popular speech, examination of common roots and productive derivational elements in Russian words, elementary prin-ciples of syntax. Prerequisites: 303 or equivalent for 451; 451 for 452; or permission of instructor.

RUSS 461, 463 Advanced Russian Reading Skills

(5,5) Advanced course for undergraduate or graduate students consisting of reading and discussion in Russian of a variconsisting of reading and discussion in Russian of a vari-ety of literary texts with the particular aim of expanding reading skills. Class discussions and frequent written es-says further develop writing skills and serve to activize vocabulary needed for discussing literary texts. A de-tailed examination of various texts from different historical periods, along with a systematic exploration of the stylistic resources and characteristics of the Russian language. 461 concentrates on artistic literary texts (both poetry and prose), while 463 is directed toward texts from the general humanities and social sciences, includ-ing journalism. Both courses are appropriate for students of Russian language, literature, or area studies.

RUSS 499 Undergraduate Research (3-5, max. 15) AWSp For Slavic majors only.

SERBO-CROATIAN

SER C 401, 402, 403 Elementary Serbo-Croatian (5;5,5) A,W,Sp 401, 402: comprehensive introduction to both spoken and written literary Serbo-Croatian. 403: designed to increase the student's vocabulary and enhance his knowledge of grammar through the reading of short stories in the mod-ern literary idiom.

SER C 404, 405, 406 Advanced Serbo-Croatian (5,5,5) A,W,Sp Continuation of 401, 402, 403 to provide instruction and practice designed to reinforce the basic grasp of the language, and to enlarge both vocabulary and command of grammatical patterns. Prerequisites: 403 for 404; 404 for 405; 405 for 406, or permission of instructor.

SLAVIC

SLAV 351 History of the Slavic Languages (5) Sp External and internal history of Slavic literary languages from the beginnings to the present time, including the development of writing systems, external attempts at re-form, and the development of vocabulary.

SLAV 499 Undergraduate Research (3-5, max. 15) AWSp For Slavic majors only.

UKRAINIAN

UKR 401, 402, 403 Elementary Ukrainian (5,5,5) Introduction to spoken and written Ukrainian.

LITERATURE COURSES IN ENGLISH

Courses in this section usually do not require prerequi-sites. The 300-level courses generally deal with particu-lar themes running through a body of literature or involve a comprehensive study of cultural history. The 400-level courses deal with Slavic literatures other than Russian or specific authors and periods in Russian litera-ture. Both levels 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.

CZECH 420 Modern Czech Literature in English

(5) A Study of representative twentieth-century works of Czech literature from the 1920s to the present in the context of earlier Czech and general European literary trends. Em-phasis on prose and drama of major writers, including Hasek, Capek, Vancura, Skvorecky, Kundera, Vaculik, and Havel.

POLSH 420 Modern Polish Literature in English (5) W

Major trends in modern Polish literature through an ex-amination of representative works by leading twentieth-

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century Polish writers. Presents modern Polish literature in a European context, and stresses parallels in philoso-phy and art. At the same time, the student gains an appreciation of the originality of Polish literature through acquaintance with the peculiar historical and political sit-uation of twentieth-century Poland.

RUSS 224 Russian Folk Literature in English (3) W Introduction to representative works of various genres of Russian oral literature, including the epic, fairy tale, historical and lyrical songs and the spiritual verses.

RUSS 321 Russian Literature and Culture to 1800 (5) A Russian literature and culture from the beginnings

through the eighteenth century. Discussions center on literature as an element in Russian culture; however, art, architecture, music, philosophy, and popular culture are treated as well. Periods covered include Monumental Simplicity, Ornamentalism, Renaissance, Reformation, Baroque, Sentimentalism, and Classicism.

RUSS 322 Russian Literature and Culture of the Nineteenth Century (5) W

Russian literature and culture of the nineteenth century. Discussion centers on literature as an element in Russian culture; however, art, architecture, music, and philoso-phy are treated as well. Periods covered include romanti-cism, realism, and the beginnings of socialist criticism.

RUSS 323 Russian Literature and Culture of the Twentieth Century (5) Sp Discussion centers on literature as an element in modern Russian culture, but art, architecture, and music are con-sidered as well. Periods covered include symbolism, rev-olution, postrevolution, Stalinist, the "thaw," and con-temporare temporary.

RUSS 341 Growing Up Russian: Childhood and Adolescence in Russian Fletion (5) W Examination of the unique character of childhood and

adolescent experience as a recurrent theme in the work of major nineteenth- and twentieth-century writers, includ-ing Tolstoy, Aksakov, Turgenev, Dostoevsky, Gorky, Bely. For nonmajors only.

RUSS 342 Holy Fools and Madmen: The Theme of Madness in Russian Literature (5) Sp Madness—and its peculiar Russian variant, the holy

fool-as a theme in nineteenth- and twentieth-century Russian literature. Works by Pushkin, Gogol, Tolstoy, Dostoevsky, Sologub. For nonmajors only.

RUSS 421 Russian Literature of the Soviet Period in English (5) A

Reading and discussion of major Russian authors of the twentieth century. Selections from the works of Blok, Mayakovsky, Akhmatova, Babel, Pasternak, Solzhenit-syn, and others.

RUSS 423 Russian Film and Fiction (5) Sp

Thematic and structural interrelationships of narrative in film and fiction in post-revolutionary Russia. Analysis of the work of film directors Eisenstein, Pudovkin, and Vertov and authors Bely, Pilnak, Zanyatin, Pedin, A. Tol-stoy, Pasternak, and Solzhenitsyn.

RUSS 426 Pushkin, Gogol, Turgenev in English (5)

Reading and discussion of major works by Pushkin, Gogol, and Turgenev. Selections include Eugene Onegin and The Queen of Spades by Pushkin, Dead Souls by Go-gol, Fathers and Sons by Turgenev, and works of one or two of their contemporaries.

RUSS 427 Tolstoy in English (5) W Kramer

Reading and discussion of major works by Leo Tolstoy, War and Peace and Anna Karenina particularly.

RUSS 428 Dostoevsky in English (5) Sp Konick

Reading and discussion of major works of Dostoevsky. The Possessed and The Brothers Karamazov are among the selections.

RUSS 429 Chekhov in English (5) A Krame

Introduction to the writings of Chekhov, including both short stories and plays, as well as works of one or two of his contemporaries.

RUSS 430 Solzhenitsyn: Artist and Social Critic (5)

Introduction to fiction and nonfiction of Solzhenitsyn; his development, not only as literary artist, but also as social critic and political thinker.

RUSS 490 Studies in Russian Literature

(3-5, max. 15) Studies on various aspects of Russian literature, either in Russian or English, varying from quarter to quarter.

SER C 420 Yugoslav Literature in Its European Context in English (5) Sp

Kapetanic

Examination of the chief works of Yugoslav literature, in Examination of the chief works of Yugoslav literature, in English translation. Particular attention is paid to Yugo-slav modifications of Renaissance genres as the comedy and pastoral drama; Yugoslav folk poetry and its impact on Romantic movement in Europe; Yugoslav participa-tion in general European movements of nineteenth and twentieth centuries; Yugoslav literature in the postwar period and its original and influential position in Eastern Europe.

SLAV 490 Studies in Slavic Literature (5, max. 15)

Studies in various aspects of Slavic literatures including: Russian, Polish, Czech, Serbian, Croatian, and Bulgarian. Themes vary.

Courses for Graduates Only

RUSSIAN

RUSS 501 Russian Language for Graduate Students

(C, max. 10) AWSp To develop skills that will be of particular use to the graduate student and to those seeking employment using the Russian language. Emphasis on rapid assimilation of a variety of written materials with both sophisticated una variety of written materials with ooth sophisticated un-derstanding and maximum retention of vocabulary, and on ability to discuss in Russian the more theoretical and abstract kinds of material. Prerequisites: 403 or equivalent.

RUSS 502 Russian Translation (3) AWSpS Insolucion to the theory of translation and involving translation to and from Russian of selected prose pas-sages in a variety of styles, with emphasis on idiomatic uccuracy and stylistic compatibility. Prerequisite: four quarters of 501, or the equivalent established by a diagnostic test

RUSS 512 Russian Literary Criticism (3) A study of critical positions, problems, and literary values of major Russian literary critics from Belinski to the present.

RUSS 520 Seminar in Russian Poetry (5) Topics in Russian poetry and poetry criticism to be se-lected by the instructor and students. Some emphasis on recent theoretical approaches to poetry criticism that are current in the USSR and Eastern Europe. For advanced M.A. and Ph.D. students.

RUSS 522 Russian Literature, 1800-1840 (5)

ROSS 522 Russian Literature, 1600-1640 (5) Representative works, including poetry, prose, and liter-ary criticism, by Alexander Pushkin, his contemporaries, and his immediate predecessors. Illustrates the crucial lit-erary controversies of the day, and gives the student a strong sense of the scope of Russian literature in its most formative period, and varieties of Russian style. Read-ings cover prose from Karamzin to early Gogol; poetry from Zhukovsky to Lermontov; and contemporary criti-cal writings. cal writings.

RUSS 524 Russian Literature, 1840-90 (5) Russian poetry and prose in the period 1840 to 1890. Short prose works and excerpts from longer works, by Gogol, Turgenev, Leskov, Saltykov-Shchedrin, Pisem-sky, Uspensky, Goncharov, and Dostoevsky; poetry by Tyutchev, Fet, and Nekrasov; plays by Gogol and Os-trovsky; and excerpted contemporary critical writings.

RUSS 525 Russian Literature, 1890-1917 (5)

Survey of major trends in Russian literature around the turn of the twentieth century, based on texts and critical readings in Russian. Includes both the prose and the po-etry of realists of the late nineteenth century, symbolists, acmeists, and futurists.

RUSS 527 Seminar in Nineteenth-Century Russian Poetry (5)

Selected topics in nineteenth-century Russian poetry to be investigated in depth and with some critical sophisti-cation. For Ph.D. and advanced M.A. students.

RUSS 528 Seminar in Nineteenth-Century Russian Prose (5)

Topic course devoted to one specific problem or theme in nineteenth-century Russian prose literature, seen in its widest possible dimensions. Students must read in Russian the literary works involved and become familiar with the social, historical, and philosophical backgrounds that inspire them.

RUSS 529 Seminar in Early Twentieth-Century Russian Literature (5) One specific problem or theme in twentieth-century Rus-

sian poetry and prose, seen in the widest possible dimensions. Students must read, in Russian, the literary works involved and become familiar with the social, historical, and philosophical backgrounds that inspire them.

RUSS 532 Pushkin (5) Reading, in Russian, of the major works of Alexander Pushkin and important critical works on him, and discus-sion of them in depth. 522 strongly recommended.

RUSS 533 Chekhov (5) Detailed analysis of the plays and short stories of Anton Chekhov in Russian.

RUSS 534 Dostoevsky (5) Analysis of the works of Fyodor Dostoevsky in Russian.

RUSS 535 Tolstoy (5)

Close analysis of one or two works by L. Tolstoy, in Russian.

RUSS 541 Russian Literature, 1917 to Present (5) Study of Russian poetry and prose since 1917. From Blok and Pilnyak to contemporary Soviet and Russian émigré authors.

RUSS 542 Seminar in Contemporary Russian Poetry (5)

One specific problem or theme in contemporary Russian poetry, seen in its widest possible dimensions. Students must 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)

Analysis of Russian prose fiction of the post-1917 pe-riod. Selected authors and topics.

RUSS 550 Advanced Russian Morphophonology (3) Review and supplementation of Russian phonological and morphological data, with detailed discussion and evaluation of methods of incorporating these data in sci-entific grammars. Prerequisite: 452.

RUSS 551 Advanced Russian Syntax (3)

Presentation and structural analysis of various simple and complex sentence types in the Russian literary language and an evaluation of ways in which these structures may be economically described in formal grammars. Prerequisite: 550.

RUSS 554 History of the Russian Literary

RUSS 554 Inistory of the Russian Laterary 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. Four years of Russian language or equivalent recommended.

RUSS 555 History of the Russian Language (4)

Brief review of the development of Russian from Indo-European to late Common Slavic, followed by a detailed account of grammatical and lexical developments of liter-ary Russian from the earliest documents to the present. Prerequisite: SLAV 550 or permission of instructor.

RUSS 556 Readings in the History of the Russian Language (4)

Reading, translation, and detailed grammatical interpre-tation of selected texts from various literary genres and periods in the development of the Russian literary lan-guage. Prerequisite: 555.

RUSS 565 Russian Eighteenth-Century Literature (5)

Discussion of representative works of poetry, prose, fiction, and criticism in the eighteenth century.

RUSS 574 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 begin-ning graduate students in Russian literature.

RUSS 575 Kievan' Literature (5)

Analysis of representative works of prose and poetry of Kievan Rus' from the beginning to the end of the fourteenth century.

RUSS 576 Muscovite Literature (5) Analysis of representative works of prose and poetry of the Muscovite period from the end of the fourteenth century to the reign of Peter I.

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 578 Studies in Klevan Literature (4) Field course for students with a specialization in Kievan literature. Work with primary sources, textual tradition, and bibliography.

RUSS 579 Studies in Muscovite Literature (4) Field course for students with a specialization in Muscovite literature. Work with primary sources, textual tradition, and bibliography.

RUSS 588 Introduction to Literary Analysis (2) Introduction to study of Russian literature, covering bib-liographic materials, major critical problems, terms, schools, and genres.

RUSS 600 Independent Study or Research (*) AWSD

SLAVIC

SLAV 520 Slavic Literary Theory (3) Main works of the Russian, Czechoslovakian, and Polish theorists of the twentieth century, with special emphasis on Formalist, Structural, and Semiotic schools.

SLAV 550 Historical Survey of Common Slavic (5) Slavic languages and their geographical and dialectical distribution; Slavic civilization throughout prehistoric and early historic periods; principal phonological and morphological features of Slavic as a subgroup of the Indo-European family of languages.

SLAV 552 History of the East Slavic Languages (3) Designed to acquaint majors in Slavic linguistics with the details of the historical development of the phonological and morphological structure of the Ukrainian and Bye-lorussian literary languages. Prerequisite: 550 or permission of instructor.

SLAV 553 History of the West Slavic Languages (3) 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 Serbian languages. Prerequisite: 550 or permission of instructor.

SLAV 554 History of the South Slavic Languages

(3) Designed to acquaint majors in Slavic linguistics with the details of the historical development of the phonological and morphological structure of the South Slavic lan-

SLAV 555 Old Church Slavonic (4)

Rise and development of earliest Slavic literary language and a descriptive study of its orthography, phonology, morphology, and syntax. Readings from normalized texts.

SLAV 556 Readings in Old Church Slavonic (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: 555.

SLAV 557 Seminar on Slavic Linguistics (3) Seminar designed to permit the investigation and discus-

sion of special topics in Slavic linguistics. May be repeated for credit.

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SLAVIC LANGUAGES AND LITERATURE

SLAVC 600 Independent Study or Research (*) AWSpS

SLAVC 700 Master's Thesis (*)

SLAVC 800 Doctoral Dissertation (*)

SOCIETY AND JUSTICE

Courses for Undergraduates

SO JU 310 Research in Society and Justice (1-5, max. 15) AWSpS

Stotland Individual research, under supervision, on some aspects of society and justice. Prerequisite: major standing.

SO JU 320- Field Experience in Society and Justice (5-) AWSpS Stotland

Participant observation in some public or private agency relevant to the system of justice. Prerequisite: major standing.

SO JU 321-322 Case Study in the System of Justice (2-3) AWSpS,AWSpS Stotland

Personally follow a felony case through the agencies of the system of justice. Prerequisite: major standing.

SO JU 400 Seminar in Society and Justice (3, max. 6) AWSpS

Stotland Seminar in various aspects of the administration of jus-tice. Prerequisite: major standing.

SO JU 405 Seminar in Institutionalized Crime (2, max. 6) AWSp Stotland, Staff

Faculty members from different disciplines jointly examine one or more problem areas in institutionalized crime. Prerequisite: major standing.

SO JU 410 Legal Aspects of Economic Crime (3) A

Anderson Legal definitions of economic "white collar" crime; use of sanctions; the corporation and criminal responsibility; economic crime and government. Recommended: POL S 101 or 201 or SOC 110.

SO JU 415 Accounting, Government, and Auditing (3) Sp Gould

Concepts and principles for the accumulation, process-ing, and reporting of financial information with emphasis on accounting systems, fund accounting, auditing and criminal investigation of accounting records. Recom-mended: ACCT 210 and junior or senior standing.

SO JU 418 Basic Investigative Methods in Institutionalized Crime (5) W

Institutionalized Crime (5) w Elhert, Karchmer Investigative research by persons involved in law en-forcement; consumer protection; regulatory, private se-curity, and investigative work; journalism; paralegal work; public interest research. Existence, nature, and lo-cation of information; problems of access and dissemina-tion; practical techniques for acquiring, documenting, re-ceding and accessing information; the problems of the beside cording, and organizing information; outline of the basic legal concepts of evidence; and ethical and public policy considerations about investigations. Recommended: SOC 110, or POL S 101 or 202 or equivalent.

SO JU 420 Organized Crime and Criminal Organization (3) Sp Walsh

Focus on criminal conduct involving more than the indi-vidual offender acting alone. Examined from the perspec-tives of: the degree of formal or informal organization present and the permanency of such bases for develop-ment and maintenance of organization; and relative strengths and weaknesses of various organizational groupings. Attention given not only to highly structured organizations, like the continuing criminal conspiracy, but also to more fluid and temporary associations among offenders. Discussion on the specific weaknesses of the criminal justice system. Recommended: SOC 371 or 372 or POL S 464.

SO JU 430 The Police (5) W D.H. Smith

Examination of conceptual and empirical issues concerning the multifaceted and changing roles of the American police. Recommended: POL S 101, 202, or 204; or SOC 110.

SO JU 440 Criminal Law and Procedure (4) W Browne

substantive and procedural criminal law for lay persons; analysis of the philosophy behind the law, with an em-phasis on due process in adult and juvenile courts; caseanalysis teaching technique. Recommended: POL S 464 or SOC 372.

SO JU 450 Special Topics in Society and Justice (1-5, max. 15)

Stotland

Examination of various current topics or issues concern-ing the criminal justice system in our society.

SO JU 470 Evaluation Research in Criminal Justice (5) Å Newcomb

Acquaints students with research techniques applicable to the criminal justice system. Topics include an examina-tion of available data sources; measures and measurement tion of avalable data sources; measures and measurement techniques; the planning, design, and implementation of evaluation methodologies; and the use of research find-ings. Emphasis on consideration of research ethics. Pre-requisite: major standing or permission of department.

SO JU 499 Readings in Society and Justice

(1-5, max. 10) AWSpS Individual readings in society and justice. Prerequisite: major standing.

SOCIOLOGY

Course for Undergraduates

SOC 105 Sociology of Black Americans (5)

Black Evaluates the sociocultural context of the Black person's environment and consequences of interaction with that' environment.

SOC 110 Survey of Sociology (5) AWSp Human interaction patterns shaped by ecology, social structure, and culture. Communication, family pro-

cesses, social differentiation, and formal organization as integrative mechanisms. Deviance, adaptation, social change. Course content may vary, depending upon instructor.

SOC 223 Social Statistics (5) AWSp

Costner, McCann, Roberts Methods and sources for quantitative investigation. Pre-

requisite: 110.

SOC 240 Introduction to Social Psychology (5) AWSp

Blumstein, Hill, Schmitt Socialization of the individual; social processes; and in-teractions of persons in groups. Prerequisites: 110 and PSYCH 101.

SOC 270 Social Problems (5) AWSp Analysis of the processes of social and personal disorganization and reorganization in relation to poverty, crime, suicide, family disorganization, mental disorders, and similar social problems. Prerequisite: 110.

SOC 271 Introduction to the Sociology of Deviance (5)

Bainbridge, Weis

Bainbridge, Weis 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.

COLLEGE OF ARTS AND SCIENCES

SOC 301 War (5) Sp Chirot

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 320 Introduction to Sociological Research (5) Introduces basic methods of sociological research. Various research strategies such as participant observation, experimentation, and survey research typically pre-sented, although relative emphasis may vary across sec-tions. Major problems in research design such as hypothesis formulation, sampling of subject population, data analysis, and report writing. Recommended: introductory course in sociology.

SOC 330 Human Ecology (5) Campbell

Factors and forces that determine the distribution of people and institutions. Prerequisite: 110.

SOC 331 Population Analysis (5) Campbell, Guest

Population growth and distribution, population composition, population theory, urbanization. Determinants and consequences of fertility and mortality trends and migra-tion in economically developed and underdeveloped areas. Prerequisite: 110.

SOC 340 Symbolic Interaction (5) W Blumstein

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 environ-ment. Prerequisite: introductory course in social psychology.

SOC 345 Collective Behavior (5)

Larsen

Behavior of large numbers in crowds, masses, publics, and social movements where institutional definitions for joint action are minimal and the collectivity seeks to define new patterns of collective action. Prerequisite: 240 or permission of instructor or adviser.

SOC 346 Group Processes (5) Cook, Schmitt

Systematic analysis of social processes in small groups, Systematic analysis of social processes in small groups, including conformity, deviance, cooperation, competi-tion, 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 simula-tion of social processes. Prerequisite: 240 or equivalent.

SOC 347 Socialization (5) Hill

How social systems control the behavior of their constitu-ent groups, and persons, through the socialization process, sanctions, power, allocation of status and re-wards. Prerequisite: 110.

SOC 348 Social Movements (5)

Bainbridge

Social movements as collective enterprises to establish new social orders; types, formation, and organization of movements

SOC 352 The Family (5)

Barth, Schwartz

The family as a social institution; personality development within the family; marriage adjustment; changing family patterns; disorganization and reorganization. Prerequisite: 110.

SOC 354 The Comparative Study of Societies (3) van den Berghe Entire societies at various levels of technological com-

canne societies at various levels of technological com-plexity are compared to explore problems of their devel-opment and structural organization. Both historical and contemporary, and Western and non-Western societies are examined. Offered jointly with ANTH 354. Prerequi-site: 110 or ANTH 202.

SOC 361 Age and Sex Differentiation (3) Physiological and social bases of age and sex differentiation in human societies. The implications of age and set differentiation in human societies. The implications of age and set distinctions for kinship, economic, and political structures. The relationship between age, sex, and other bases of social inequality. Prerequisite: 110.

SOC 362 Race Relations (5) Barth, Black

Interracial contacts and conflicts. Prerequisite: 110.

SOC 364 Women in the Social Structure (5) Women's current roles within social institutions, focusing on women's work roles both in the labor force and in the home. Women in political organizations, reli-gion, education, and law. Includes selected groups of women with compounded problems: Black women, lesbians, older women, women on welfare. Examines the structural, ideological, and historical determinants of women's position. Prerequisite: 110.

SOC 365 Urban Community (5) Barth, Guest

Comparative and analytic study of organization and activities of urban groups. Prerequisite: 110.

SOC 366 Bureaucracy in Society (3)

Gross The coming of organizational societies; causes of bureau-Ine coming of organizational societies; causes of bureau-cracy; informal relations and work groups; ideologies; authority and the division of labor; social change in bu-reaucracies; the "faceless" bureaucrat in relationship to client needs; comparative organizations; complex organizations as settings for research.

SOC 367 Community Power and Urban Life (5) Background on forces influencing the growth of contem-porary cities. Major focus on who controls the city and particularly on the policy outcomes of this control as they influence community life. Exploration of a variety of substantive areas, including urban renewal, welfare, and transportation through city case studies. Prerequisite: 110. Recommended; 365.

SOC 371 Criminology (5)

Solvrag, Weis 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. Prerequisite: 110. Recommended: 271.

SOC 372 Introduction to Criminal Justice (5) Costner; Schrag, Weis

Costner; Schrag, Weis Examines roles of police, courts, and corrections in crim-inal justice. Traces cases from reporting of offense through investigation, detention, charging, prosecution and defense, adjudication, sentencing, and punitive sanc-tions or correctional treatment. Treatment alternatives. Community corrections. Legislative reforms. Innovations in policy. Prerequisite: 110. Recommended: 271.

SOC 373 Social Factors in White Collar Crime (5)

Schrag, Weis Concept and etiology of white collar crime, its forms, costs, victims, and innovative developments. Prospects for theoretical explanations and social control. Prerequisite: 110, or POL S 101, 201, or permission of instructor . or adviser.

SOC 410 History of Sociological Thought (5) Campbell, Roth

Compositions of individual theorists (from Comte to the present) to a coherent body of testable hypotheses; emphasis on cumulative development of concepts and principles, emergence of sociology as a science, probable future developments. Prerequisite: 110.

SOC 411 Selected Topics in History of Sociological Thought (5) Campbell, Roth

Specific areas or eras in the history of sociological thought. Emphasis on the development of sociological theory in relation to the intellectual and social setting of the time. Topics change from quarter to quarter, but always are selected from Western sociological thought, from 1700 to the present. Some topics are: the develop-ment of concepts of order in sociological thought; con-flict theories; the development of action theory in sociol-ogy; German sociology; Marx, Weber, and Simmel.

SOC 414 Theory Construction (5) Costner, Schrag

Logical structure of sociological theories; the role of concepts, relations between variables, and operationalization in constructing and testing theoretical formations. Prerequisite: 20 credits in social sciences.

SOC 415 Theory of Social Organization (5) Wager

State and usages of theory in social organization; importance of linkage between theory and methodology; major features of social organization demonstrated by intensive examination of representative theories of social organiza-tion with particular focus on complex forms. Prerequisite: 110,

SOC 419 Fieldwork: Observations and Interviewing (5)

(5) Perspective, logic, and techniques of qualitative social research and analysis. Nature and uses of intensive inter-viewing, participant observation, and analytic ethnogra-phy. Application of field research principles. Research project required in addition to reading and analysis of classic studies. Prerequisites: 110 and 240 or 352.

SOC 420 Methods of Sociological Research (5) Roberts

General survey of the principal methods of research used in sociology, and of special issues and problems in meth-odology. Prerequisite: 223 or equivalent.

SOC 422 General Methodological Strategies (3) Wager

Introduction to the varied strategies of research in sociol-ogy. These strategies include laboratory and field experi-mentation, statistical studies, surveys, field observations, historical and comparative studies, mathematical modeling, and computer simulation. Prerequisite: 223.

SOC 423 Statistical Inference (5) Roberts

Application of statistical methods to the analysis of sociological data.

SOC 424-425 Applied Social Statistics (3-3)

Applications of social statistics in sociology and related social sciences, with emphasis on problems of analysis with imperfect data, measurement errors, theory construction, and writeup of data analysis; emphasis on use of probability in statistical inference; comparisons among means and proportions and applications of analysis of variance; contingency table analysis, applied nonparametric procedures; use of correlation, multiple regression analysis in social research. Prerequisites: 223 or 423; 424- for -425.

SOC 426 Methodology: Quantitative Techniques in Sociology (3) McCann

Measures of relationships among variables and among at-tributes; calculation techniques; application to typical so-ciological problems; interpretation. Prerequisite: 223 or 424.

SOC 427 Statistical Classification and Measurement (3)

Blalock, Costner

Application of statistical principles and methods to prob-lems of classification and measurement in social re-search. Prerequisites: 426, 428, 429.

SOC 428-429 Principles of Study Design (3-3) Sp Costner

Study design from problem formulation to the analysis and interpretation of data. Prerequisite: 223.

SOC 432 Population and Modernization (3) W Preston

Presson Examines the role played by 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 dem-ographic relationships, with special attention to less-developed regions. Prerequisite: 331 or permission of in-structor adviser structor or adviser.

SOC 433 Demographic Methods (3) W

SUC 455 Demographic methods (5) w McCann, Preston, Pullum Basic procedures for measuring human population growth and structure, including rate construction, stan-dardization, and life table analysis. An introduction to population projections, indirect measurement procedures, and the formal handwise of computation ground. and the formal analysis of population growth. Prerequisites: 110 and 223.

SOC 440 **Primary Interaction and Personal** Behavior (5)

Hill

Social sources of cooperative motives; social basis of the

self; nature of primary groups; institutional roles; exceptional and unconventional roles; methodology. Prerequisite: 240 or equivalent.

SOC 442 Public Opinion (3) Larsen

The nature of public opinion; formation and measurement of public opinion; the operation of public opinion polls. Prerequisite: 240 or equivalent.

SOC 443 Mass Communication (5)

Larsen

Control, structure, and functioning of mass media of communications as a force in social life; methods of research. Prerequisite: 240 or equivalent.

SOC 444 Theory and Research in Social Exchange (3)

Emerson

Drawing upon behavioral psychology, economics, and anthropology, social structure and social process as a form of exchange are examined. Emphasis is placed upon theory formation concerning social power and reward structures that differ sharply from perfectly competitive markets. Prerequisite: 240.

SOC 446 Theories and Tactics of the Women's Movement (3)

Links information on the history of the women's move-ment and its current philosophies with tactics used to achieve change in women's status. Four focal areas: (1) images of the ideal status of women, (2) assumptions made about how social change occurs, (3) women's cur-rent status and tactics used to achieve change, (4) comparative studies of the outcomes (successes/failures) of various movement tactics used, examining specific situa-tions cross-nationally and historically. Offered jointly with WOMEN 446. Prerequisites: 110 or WOMEN 200; upper-division or graduate standing; background in status of women and philosophies of women movements.

SOC 450 Contemporary American Institutions (5) Guest, Wager

Origins and developments of major social institutions. Sociology of economic structure, political organization, religion, education, recreation, and other institutionalized patterns. Prerequisite: 110.

SOC 451 Theory and Process of Social Change (5) Hechter, Wager

Basic trends in American life; frames of reference for analysis of social change; forces causing social change. Prerequisite: 15 credits in social sciences.

SOC 452 Health and Social Behavior (5) Sharp

Theoretical and methodological aspects of health, dis-ease, and illness as deviant behavior in relation to social (organizational and occupational), ecological, demo-graphic, and cultural determinants of health and health care. Prerequisite: 110.

SOC 453 Social Factors in the Family (3)

Review and analysis of empirical research in courtship and marriage, marital adjustment, and specific areas of marriage and family life. Prerequisites: 223 and 352.

SOC 454 Social Change in Pre-Industrial Societies (5)

Chirot, Hechter

Chiror, Hechier Theories and evidence concerning social change in prein-dustrial societies. Topics, include: the Neolithic Revolu-tion, rise and fall of classical empires, development of Western European feudalism, and rise of the modern world-system in the sixteenth century. Last part of course deals with theories of modernization and development in contemporary developing societies, but not in contempo-rary developing societies.

SOC 455 Social Change in Industrial Societies (5) Chirot, Hechter

Theories and evidence concerning social change in industrial societies, with major emphasis on Britain, France, and the United States from about 1780 to the present day. Topics include: economic development, the development of class consciousness, national development, and impe-rialism. Texts include nineteenth-century theories of industrialization plus contemporary research on these themes.

SOC 456 Political Sociology (3) Roth

Bases of political legitimacy; modern and traditional

structures of domination: theories of democracy, authori-tarianism, and totalitarianism; relationship to social classes, status groups, and economic organization. Prerequisite: 110.

SOC 457 Sociology of Religion (5)

Roth The relations between religion, polity, economy, and so-cial 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 458 Institutional Forms and Processes (5) Process of institutionalization and the general nature of institutions; relationship of institutions to persons; institutions and social control; social change and institutional disorganization. Prerequisite: 110.

SOC 460 Social Differentiation (5) Barth, Roberts

Barin, Roberts Analysis of societal organization based on sex, age, resi-dence, occupation, community, class, caste, and race. Prerequisite: 110.

SOC 462 · Comparative Race and Ethnic Relations (3) ۰ ·

van den Berghe

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. Pre-requisites: 110, 362.

SOC 463 American Black Communities (3)

Barth. Black

Internal structure of class and caste patterns; resultant personality and institutional development. Prerequisite: 110.

SOC 465 Complex Organizations (3) Gross

Examination of the structure of complex organizations. Particular attention is given to developing generalizations applicable to industrial organizations, businesses, hospitals, prisons, labor unions, governments, universities, ar-mies, and similar formally instituted organizations. The major focus is on empirical research, with some attention to methodological problems in studying such organiza-tions. Prerequisite: 15 credits in sociology.

SOC 466 Industrial Sociology (5)

Wager

Changing focus of field; cultural variation, work, and the Changing focus of new, cultural variation, work, and the worker, technology, society, and the evolution of industrial forms; types and forms of industrial organiza-tions; industrial organizations as social and technical sys-tems; issues of control, process, and change; the individ-ual in social and technical systems. Prerequisite: 110.

SOC 468 Sociology of Occupations and Professions (5)

Frameworks for study of occupations and professions; occupational structure and mobility in American society and relation to adult socialization and career develop-ment; occupational and professional associations and so-ciety. Prerequisites: 240 and 15 credits in social sciences.

SOC 469 Balkan Societies (3)

Chirot

Examination of the roots of Balkan social problems (eco-Examination of the roots of Bankan social proofens (eco-nomic backwardness, minority-group conflicts, peasant problem), the failure of pre-1945 attempts to solve these problems, and the post-1945 communist attempts at solu-tion. Particular emphasis placed upon Bulgaria and Al-bania. Prerequisite: at least one introductory social science course.

SOC 472 Juvenile Delinquency (5) Costner, Weis

Factors in delinquency, juvenile courts. Programs of treatment and prevention. Prerequisite: 371 or equivalent.

SOC 473 Corrections (5) Schrag, Weis Analyzes research on diversionary methods and treatment of convicted offenders. Emphasis on program evaluation. Community treatment, fines, restitution; probation, pa-ola holfitut, however, and other elitensities to incorrect role, halfway houses, and other alternatives to incarcera-tion; correctional institutions. Organization of state and federal systems. Problems of administration. Subsidies and governmental control. Planning and public participation. Prerequisite: 371 or 372. Recommended: 223.

SOC 481, 482, 483 Issues in Analytic Sociology (3, max. 9; 3, max. 9; 1-3, max. 9) Examination of current issues in sociological analysis. The specific content of the course varies according to recent developments in sociology and according to the in-terests of the instructor. Any of the sequence may be repeated with permission of instructor.

SOC 486 Human Family Systems: Biological and Social Aspects (3) W van den Berghe

Survey of the biological bases for human mating and reproduction, and an examination of the range of cross-cultural variability in human systems of kinships and 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 ANTH 486. Prerequisite: 110 or ANTH 100 or PHY A 201.

SOC 488 Sociological and Psychological Theories of Sexuality (5) Sp

Blumstein, Schwartz Advanced course on human sexuality covering psycho-logical and sociological theories of sexual identity and life-styles, analysis of present research in sexuality, and generation of new research. Topics include acquisition of sexual identity differences in male and female sexual patterns, sex in relationships, sexual malfunctioning, etc. Paper and research proposal are required. Offered jointly with PSYCH 488. Prerequisites: 110, PSYCH 210 or permission of instructor or adviser, and statistics.

SOC 496, 497, 498 Honors Senior Seminar (3 or 5, 3 or 5, 3 or 5) A,W,Sp

Blumstein

Exploration of selected sociological problems with em-phasis on research experience and the interpretation of data. For sociology majors only, primarily for honors students. Prerequisites: senior standing and permission of instructor.

SOC 499 Undergraduate Independent Study or Research (2-5, max. 15) AWSp Open only to qualified undergraduate students by permission of instructor.

Courses for Graduates Only

SOC 510 Seminar on Sociological Theory (3) Roth

Macrosociological theories; functionalism and neoevolutionism; conflict and consensus approach; comparative strategies; models and long-range theories; ideology and sociology. From Marx and Tocqueville to contemporary literature.

SOC 513 Demography and Ecology (3) Review of selected research problems related to demography and ecology. Provides substantive knowledge of determinants and consequences of population patterns, to delimit areas where current knowledge is deficient; to be-gin instilling the analytic skills required to advance knowledge in the area.

SOC 514 Current Theories in Social Psychology (3) Blumstein, Schmitt

Broad graduate-level introduction to the theories in the field of social psychology.

SOC 515 Current Research in Social Psychology (3) Broad graduate-level introduction to the research in the field of social psychology.

SOC 516 Organizations (3)

Cook, Gross Broad graduate-level introduction to the theory and re-search on complex organizations.

SOC 517 Deviance and Social Control (3)

Schrag, Weis Survey of current research on deviant behavior and Survey of current research on deviant behavior and forms of mechanisms of social control; definitions and forms of deviant behavior, causal analysis, and legal or other methods of social control.

SOC 518 Social Stratifications (3) Chirot, Guest

Intensive preparation in theoretical, methodological, and substantive topics in social stratification.

SOC 519 Political Sociology and Social Change (3) Hechter, Roth

Precimer, Koln Designed for first-year graduate students as part of the re-quirements for the M.A. degree. The course is intended to thoroughly familiarize graduate students with basic perspective in the area of political sociology and social change, which is an examination field for the Ph.D., with some classical works and some exemplary empirical studies of recent date.

SOC 521, 522 Seminar on Methods of Sociological Research (3,3) Prerequisites: 223 and 420, or equivalents.

SOC 525 Experimental Methods in Social Research (3) Sp Hill

For graduate students who already have taken the required methodology courses in sociology and who wish additional understanding of techniques, problems, and is-sues 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 in social research. Prerequisites: 424-425 and 428-429, or equivalents.

SOC 526 Causal Approach to Theory Building and Data Analysis (3) Blalock

Theory construction and testing from a causal models perspective. One-way causation (recursive models); implications for data analysis, path analysis, standardized versus unstandardized measures. Feedback models and simultaneous-equation systems: identification problems, estimation in over-identified models, difference equa-tions, differential equations, stability conditions. Multi-plicative models as alternatives to additive ones. Causal approach to measurement error: random measurement error, alternative nonrandom error models.

SOC 527 Measurement of Basic Sociological Concepts (3) Blalock

Seminar focuses on general types of conceptualization and measurement problems in sociology, using major concepts as illustrations of basic issues. A causal ap-proach to measurement is employed to deal with prob-lems of indirect measurement, differing levels of gener-lity and measurement applying inclusion in the proality, and cross-level measurement problems involving structural-effects models and aggregation and disaggre-gation. Consequences of crude measurement for data analyses are explored. Prerequisite: 424. Recommended: 426

SOC 528 Seminar on Selected Statistical Problems in Social Research (3) Costner

Prerequisite: 426.

SOC 529 Multiple Indicators in Social Measurement (3) Costner

Use of multiple indicators (e.g., repeated measures, al-ternate measures, multiple observers) in estimating the reliability, assessing the validity, and analyzing conceptual and indicator problems in social measurement. Implications of constant measurement error, random measurement error, and correlated measurement error for research conclusions. Traditional reliability theory and structural equation models in the analysis of multiple in-dicator data. Prerequisites: 424 and 426.

SOC 530 Advanced Human Ecology (3) Prerequisites: 330 and 15 credits in social sciences.

SOC 531 Demography (3) Research problems in population and vital statistics. Pre-requisites: 331 and 15 credits in social sciences.

SOC 533 Research Methods in Demography (3) Measures of population composition, fertility, and mor-tality. Life table analysis, standardization procedures, population projects and estimates. Prerequisite: 331.

SOC 539 Selected Topics in Demography and Ecology (3, max. 9) Pullu

Specialized problems in demography or ecology are cov-

ered; for example, migration, fertility, mortality, lan-guage, race and ethnic relations, metropolitan community. See guarterly announcement for specific problem to be covered.

SOC 542 Selected Topics in Group Processes (3) Cook

Theories, methodology, and studies in the area of small-group research. May be repeated for credit. Prerequisite: permission of instructor for nonmajors.

SOC 543 Communications Seminar (3)

Larsen Sociological research in mass communication. Emphasis on the role of groups in providing norms and networks in the flow of information and influence from the mass media. Prerequisite: 443 or equivalent.

SOC 544 Seminar on Social Power (3)

Emerson Examination of basic principles concerning power, influ-ence, and authority in small groups, organizations, and communities. Prerequisites: 240, 415, and 460.

SOC 545 Methods of Experimental Analysis in Social Research (3) Schmitt

Application of the method of experimental analysis to problems in sociology and social psychology.

SOC 546 Seminar on Symbolic Interaction (3) Blumstein

Focuses each year on several key areas in, and related to, the symbolic interactionist perspective (e.g., language, the self, the dramaturgic perspective, ethnomethodology, attribution theory, etc.). Prerequisite: permission of instructor for nonmajors.

SOC 548 Seminar in Interpersonal Attraction (3) Hill

Nature of interpersonal attraction, the social and psychological factors that underlie it, and the ways in which it is structured in social relationships. Examines various theo-retical approaches to attraction and research ranging from initial attraction among strangers to the development of ongoing social relationships. Prerequisite: previous course in social psychology.

SOC 550, 551 Marriage and the Family (3,3) Schwartz

Analysis of marriage and family patterns and problems, with initial emphasis on research findings and methods. Individual research on selected projects. Prerequisites: 352 and 453, or equivalents.

SOC 555 Methods in Macro, Comparative, and Historical Sociology (3) Chirot

SOC 561 Sociology of Health and Illness: An Organizational and Managerial Perspective (3) Shortell

Critical examination and discussion of sociological ap-proaches—methodological, theoretical, and empirical— in the health-care field. Particular attention is paid to applied studies in the field and, more broadly, to the implications for decision making from the sociological per-spective. Offered jointly with HSERV 554. Prerequisite: HSERV 511 or undergraduate major in sociology, or permission of instructor.

SOC 562 Seminar in Comparative Race Relations

(3) van den Berghe

Cross-cultural approach to race and ethnic relations, in-cluding case studies from Africa and Latin America, Prerequisite: graduate standing in social science

SOC 563 Advanced Seminar in Medical Sociology (3) Cook. Shortell

Development and testing of theories related to illness be-havior, health occupations and professions, and the organization of health services. Particular emphasis is given to provider-patient relationships and the sociology of health-care-delivery organizations. Offered jointly with HSERV 564. Prerequisite: admission to health services doctoral opportunities program or graduate status in soci-ology, or permission of instructor.

SOC 566, 567 Seminar in Complex Organizations (3,3) Gross, Wager

Research training in industrial sociology. Readings and field projects. Prerequisite: 465 or equivalent.

SOC 568 Women and Technology (3) Interdisciplinary seminar for those interested in an investigation of the interaction between technology and women. Topics include comparing technological ration-ality with feminist modes of thought (focusing on values that are/could be applied in assessing technologies in or-der to evaluate their effects); the impact of industrialization and the division of labor on the home and the labor force; technologies that have a particular impact on women (such as obstetric and gynecological care); and investigating how the needs of women can be met through technological means. Offered jointly with SMT 568

SOC 574 Seminar on Methods of Criminological Research (3)

Provides training in the technical analysis of published research in criminology; designs and processes studies in parole prediction, prediction of prison adjustment, and

SOC 581, 582, 583 Special Topics in Sociology

(3,3,3) A,W,Sp Examination of current substantive topics in sociology. Content varies according to recent developments in sociology and the interests of the instructor. May be repeated for credit with permission of instructor.

SOC 588 Sociological Aspects of Human Sexuality (3)

Blumstein, Schwartz

Research-oriented seminar taking a sociological approach to issues in human sexuality. Readings and discussions aimed at achieving a broad mastery of the sociological writings on the subject. Students develop individual research projects based on readings and seminar discus-sions of methodological strategies for studying human sexuality. Topics include: cross-cultural perspectives on sexuality, the social scripting of sexual conduct, sex roles, sexual identity, gender identity, sexual life-styles, prostitution, pornography.

SOC 600 Independent Study or Research (*) AWSp

SOC 700 Master's Thesis (*) AWSp

SOC 800 Doctoral Dissertation (*)

SOUTH ASIA

See International Studies.

SOUTHEAST ASIA

See International Studies.

SPEECH AND HEARING SCIENCES

Courses for Undergraduates

SPHSC 100 Voice and Articulation Improvement (3) AWSp

(3) Avap of the process of voice production and of the sound system of standard American speech. Questions of speech standards, regional and social dialects, and voice quality. Special laboratory work may be available to students with significant voice or pronunciation problems.

SPHSC 104 Human Speech and Hearing Behavior

(3) WSpS Survey of man's most clearly human endowment: his ca-pacity for speech production and perception. Speech and hearing mechanisms considered from the point of view of the speech production and perception. their development, structure, and function, with special reference to current and significant problems and issues, such as the nature of speech learning, and the signifi-cance of diversity in patterns of speech production and reception. Not open to speech and hearing sciences ma-ice iors.

SPHSC 111 Standard and Nonstandard American Speech: Theory and Applications (2, max. 4) AWSp A wide variety of American speech patterns or dialects is studied in terms of their phonetic, phonological, sociolinguistic, and psycholinguistic characteristics. Study of standard and nonstandard American speech patterns is supplemented by readings in phonetics, phonology, sociolinguistics. Students analyze their own patterns and de-velop appropriate phonetic skills if desired. Especially useful for foreign students and minority students from nonstandard speech communities. Prerequisite: permission of instructor.

SPHSC 201 Anatomy of the Speech and Hearing Mechanisms (5) AWSpS Palmer

Anatomy and functional coordination of those parts of the human body associated with the oral communicative activities of phonation, articulation, resonance, and hearing.

SPHSC 250 Introduction to Communication Disorders (3) WS

Survey of normal and disordered oral communication. Required for majors.

SPHSC 300 Speech Science (5) AWSpS

Reich, Tiffany Study of the basic physiological and acoustical attributes of speech. For nonmajors.

SPHSC 302 General Phonetics (4) AWSpS

Tiffany Applied phonetic analysis and transcription. Applications to the problems of speech improvement, speech disor-ders, and standard and nonstandard English.

SPHSC 303 Applied Analysis of Language Behavior

(3) AW Application of linguistic analysis techniques to the lan-guage behavior of speech-disordered persons.

SPHSC 307 Speech and Language Development (3)

WSp Study of the normal acquisition of speech and language in children. Prerequisite: 250, 302, 303, or permission of instructor.

SPHSC 310 Introduction to Hearing Science (5) AWSpS

Folsom, Wilson

Introduction to acoustic properties of simple and complex sounds; description of normal audition; elementary struc-ture and function of the hearing mechanism.

SPHSC 311 Speech Science: Speech Production (5) WSDS

Cooker, Minifie, Reich

Concentrated study of the physiological, acoustical, and bencentual spects of speech production. Examples and laboratory work directed toward students with interests in speech pathology and audiology. For majors only. Pre-requisites: 201 and 310; 310 may be taken concurrently.

SPHSC 315 Survey of Hearing Impairment (3) ASp Thompson, Wilson, Yantis

Causes of hearing impairment and their psychological, social, and educational/vocational effects on the individual. Prerequisite: 310.

SPHSC 330 Disorders of Articulation (3) ASp

Till Nature, etiology, and treatment. Prerequisites: 250, 302, and 307.

SPHSC 332 Introduction to Evaluation and Interviewing (4) ASp

Olswang

Study of materials and procedures used in the evaluation of speech disorders. Prerequisites: 307 and 330.

SPHSC 350 Methods of Clinical Management (4) AWSDS

Olswang Principles and procedures for planning effective manage-ment of speech disorders. Prerequisites: 330, 332, and permission of undergraduate adviser.

SPHSC 351 Practicum in Speech Pathology

(1-4, max. 6) AWSpS Laboratory experience. Students are encouraged to take 4 to 6 credits of 351 over a two- or three-quarter sequence. Prerequisites: 332, 350, and permission of undergraduate adviser.

SPHSC 370 Basic Audiometry (5) WS Introduction to the theory and practice of the assessment of hearing function, including standard pure-tone audi-ometry, speech audiometry, and basic impedance audi-ometry. Two hours of laboratory required each week.

Class size limited to twenty-five students. Prerequisites: 315 and permission of undergraduate adviser.

SPHSC 380 Introduction to Aural Rehabilitation (3) WS

Wilson Principles and methods of amplification, speech reading, auditory training, and speech conservation. Enrollment limited to thirty-five students. Prerequisites: 315 and per-mission of undergraduate adviser.

SPHSC 391 Practicum in Audiology (2, max. 10) AWSpS

Supervised practicum in audiological assessment (section A) and aural rehabilitation (section B) of children and adults. Prerequisites: 350 for section A; and 350, 380 for section B, and permission of undergraduate adviser.

SPHSC 401 Neural Bases of Speech and Language (4) ASp Flowers

Introduction to the neuroanatomical and neurophysiological bases of motor speech production and language pro-cesses. Laboratory. Prerequisite: 201 or permission of instructor.

SPHSC 402 Advanced Phonetic Analysis (2) W Tiffany

Advanced transcriptional and feature analysis of ab-normal and nonstandard speech patterns. Prerequisite: 302 or equivalent introductory phonetics course by permission of instructor.

SPHSC 410 Psychology and Physiology of Audition (4) W Wier

Qualitative and quantitative description of physiological and perceptual auditory analysis. Two hours of labora-tory per week required. Prerequisite: 310 or permission of instructor.

SPHSC 420 Instrumentation for Speech and Hearing Sciences (3) A Wilson

General problems in design and application of electronic equipment used in the speech and hearing sciences. Lab-oratory problems and demonstrations; two hours of laboratory required each week.

SPHSC 430 Nature of Stuttering (3) ASp Prins

Major theories of stuttering are studied in light of re-search concerning the characteristics of stutterers and their symptoms. Prerequisite: 250 or permission of instructor.

SPHSC 431 Language Disorders of Children (3)

ASp Carpenter, Coggins Consideration of descriptions and theories, both historical and contemporary, of disordered language in children and related problems. Prerequisites: 250, 303, and 307.

SPHSC 449 Special Studies in Speech Pathology

and Audiology (*) AWSpS Intensive study of selected special problems in speech pa-thology and audiology. Prerequisite: permission of instructor.

SPHSC 450 Treatment of Stuttering (3) WS Prins

Description and evaluation of therapy systems for chil-dren and adults who stutter. Two hours per week of therapy observation are integrated with class material. Prerequisites: 350 and 430, or permission of instructor.

SPHSC 451 Speech Pathology-Audiology Practicum in the Schools (1-10, max. 10) AWSp Special projects in clinical practicum, offered only in the school setting. Provides an opportunity for students to extend practicum experiences in this special environ-ment; does not fulfill requirements for teaching practicum in the College of Education. Prerequisites: 350 and permission of undergraduate adviser.

SPHSC 452 Rehabilitation Medicine Information in Speech Pathology (3) Sp Beukelman

Orientation information for speech pathology and audiol-ogy students on rehabilitation principles and techniques. Lecture and clinical observation in all areas of rehabilitation, emphasizing cooperation and coordination of various professions in rehabilitation. Offered jointly with REHAB 479.

SPHSC 454 Voice Disorders (3) WS Reich

Etiology, evaluation, and treatment. Prerequisites: 201, 250, and 311.

SPHSC 470 . Survey of Audiological Assessment (3) Thompson, Yantis

General review of methods, techniques, and instruments to used in the measurement of auditory function designed for majors in speech pathology, speech science, and spe-cial education. Not open to audiology majors except by permission. Review of research literature. Prerequisite: 370 or permission of instructor.

SPHSC 479 Pediatric Audiology (3) Sp Thompson

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: 370 or equivalent:

SPHSC 484 Hearing Conservation for Children (3) SpS Wilson

Planning and execution of identification and educational programs relative to hearing-impaired infants and chil-dren of preschool and school ages. Prerequisite: 370 or permission of instructor.

SPHSC 499 Undergraduate Research (1-5, max. 15) AWSpS

Prerequisite: permission of instructor.

Courses for Graduates Only

SPHSC 502 Advanced Anatomy of Speech and Hearing Structures (2) AWSp Palmer

Directed individual dissection and study of selected ana-tomic structures of the speech or hearing mechanisms. Prerequisites: 201 and permission of instructor.

SPHSC 503 Current Issues in Speech Science

(3, max. 9)

Application of experimental methods to research in speech science.

SPHSC 504 Research Methods in Speech and Hearing Science (3) WS

Kuhl. Till

Introduction to empirical methods in the speech and hearing sciences.

SPHSC 510 Physiological Acoustics (3) W Wier

Study of pertinent literature and experimental techniques incident to the scientific study of the normal and abnor-mal auditory system. Prerequisites: 410 and familiarity with algebra and trigonometry. (Offered alternate years.)

SPHSC 511 Psychoacoustics (3) W

Wier

Review of significant literature and theory pertinent to normal auditory sensitivity, pitch, loudness, and other at-tributes of auditory sensation. Prerequisites: 410 or permission of instructor, familiarity with intermediate math-ematics (105 or equivalent). (Offered alternate years.)

SPHSC 514 Speech Physiology (4) A

Cooker. Study of the physiological parameters of speech pro-duction. Prerequisites: 310, 311, or permission of instructor.

SPHSC 515 Speech Acoustics (4) W

Minifie Study of the acoustical correlates of the distinctive pa-rameters of speech. Prerequisities: 310, 311, or permis-sion of instructor.

SPHSC 516 Speech Perception (4) Sp Kuhl

Study of the perceptual and linguistic parameters of speech perception. Prerequisites: 310, 311, or permission of instructor.

SPHSC 519 Seminar in Speech Science (2. max. 6)

COLLEGE OF ARTS AND SCIENCES

SPHSC 520 Advanced Instrumentation for Speech and Hearing Sciences (3) Sp Cooker, Wier

Design and use of electronic and electro-acoustic devices in the speech and hearing sciences. Four hours of labora-tory required each week. Prerequisite; 420.

SPHSC 530 Maxillofacial Bases of Speech Disorders (3) AS Palmer

Causation and remediation of speech disorders derived from upper vocal tract defects, including cleft palate and other craning cief plate and other craning cief plate and intact anatomy and physiology as well as speech acous-tics. Recommended: 201 or permission of instructor.

SPHSC 531 Neurogenic Disorders of Speech and Language (3) AW

Flowers Includes aphasia, apraxia of speech, and dysarthria. Pre-requisite: 401 or permission of instructor.

SPHSC 532 Evaluation and Treatment of Neurogenic Speech and Language Disorders (3) WSp

Flowers Principles and procedures of evaluation and treatment. Prerequisite: 531 or permission of instructor.

SPHSC 535 Psychological Factors in Communication Disorders (2)

Prerequisite: PSYCH 305 or permission of instructor.

SPHSC 536 Evaluation of Communication Disorders in Children (5) AWSpS Till

Approaches and experience in differential diagnosis of speech and language disorders in children. Two hours of laboratory required per week. Class size limited. Prerequisites: 332 and permission of instructor.

SPHSC 551 Advanced Practicum in Speech Pathology (1-9, max. 10) AWSpS Laboratory experience. Prerequisites: 351 and permission of instructor.

SPHSC 552 Clinical Management of Stuttering (4) AWSpS Cerf, Prins

Study and application of clinical procedures for the diagnosis and the treatment of persons who stutter. Theoreti-cal problems are dealt with as a part of actual case management. Two hours of laboratory required each week. Prerequisites: 430, 450 and permission of instructor.

SPHSC 555 Externship in Speech and Hearing Sciences (1-9, max. 9) AWSpS Practicum experience in speech pathology or audiology in an established professional center. Twenty hours per week must be free for this placement late in the student's master's level program. Prerequisites: 150 hours of su-pervised practicum and permission of instructor.

SPHSC 561 Language of Normal Children (3) Advanced study of language acquisition and use by nor-mal children, with emphasis on behavioral, semantic, study of early language development are presented. Two hours of laboratory required each week. Class size lim-ited. Prerequisites: 307 or equivalent and permission of instructor.

SPHSC 562 Evaluation and Management of Language Disorders of Children (4) AW Procedures and tools used in evaluating the language skills of children are presented along with parent interwhile of children are presented along with patent methods. Three hours of practicum each week in an interdiscipli-nary clinic are required. Class size limited. Prerequisites: 303, 307, 431, and permission of instructor.

SPHSC 563 Clinical Management of Language Disorders of Children (2-3, max. 10) AWSpS Laboratory experience. Prerequisites: 431, 562, and per-mission of instructor.

SPHSC 564 Clinical Evaluation of Language Disorders of Children (3-4, max. 10) AWSpS Laboratory experience. Prerequisites: 536, 562, and per-mission of instructor.

SPHSC 565 Classroom Management of Language Behaviors (1-9, max. 10) AWSpS Rieke

Methodology and supervised experience in management

of language behaviors in a preschool class setting. Prerequisites: 562 and permission of instructor.

SPHSC 566 Seminar in Language Development and Disorders (2, max. 6) Prerequisites: 307, 431, 562.

SPHSC 569 Seminar in Speech Pathology (2. max. 6)

SPHSC 570-571 Assessment of Auditory Dysfunction I, II (4-4) A,W Yantis

Utilization of acoustic variables in the evaluation of abnormal hearing. Critical analysis of the literature. Con-current registration in 591 required. Prerequisite: 370 or equivalent.

SPHSC 572 Impedance Audiometry (3) A Wilson, Yantis

Instrumentation and approaches to evaluation of auditory function through determination of impedance characteris-tics, including tympanometry, and detection of the acoustic reflex. Prerequisite: 370 or equivalent. (Also offered alternate Summer quarters.)

SPHSC 573 Electrophysiologic Assessment of Auditory Function (3) A Folsom

Consideration of electrophysiologic techniques that may be used to evaluate the normal and disordered auditory system. Outside laboratory required. Prerequisite: 310 or permission of instructor.

SPHSC 574 Speech Audiometry (2) W

Thompson, Yantis

Use of speech stimuli in predicting general communica-tive functioning and in making differential diagnosis of the auditory system. Prerequisite: 370. (Offered alternate vears.)

SPHSC 575 Medical Background for Audiology (2) Snyder

Diseases and injuries of the ear resulting in reduced audi-tion. Prerequisite: 315 or permission of instructor.

SPHSC 580 Advanced Aural Rehabilitation (3) Sp Wilson

Survey and study of the pertinent research literature in speech reading, auditory training, and speech conserva-tion for the auditorily handicapped. Prerequisite: 380 or permission of instructor.

SPHSC 581 Management of Hearing-Impaired

Children (3) S Management of hearing-impaired children, including identification of target behaviors and methods for modifi-cation such as individualized therapy programs and parent and teacher involvement.

SPHSC 582 Hearing Aid Amplification (5) Sp Yantis

Study of acoustic amplification and pertinent audiologic techniques. Prerequisites: 370 and 380, or permission of instructor. (Also offered alternate Summer quarters.)

SPHSC 584 Industrial and Community Hearing Conservation (2) W

Yantis

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: 370 or permission of instructor. (Offered alternate years.)

SPHSC 589 Seminar in Audiology (2, max. 6) Prerequisite: permission of instructor.

SPHSC 591 Advanced Practicum in Audiology (2, max. 10) AWSpS

Prerequisite: forty hours of practicum.

SPHSC 596 Experimental Design in Speech and Hearing Sciences (3) Sp Applications of basic statistical procedures to investiga-

reprint on some state and the communication sciences. Prerequisites: 504, course in statistics, or permission of instructor. (Offered alternate years.)

SPHSC 599 Research Practicum (2, max. 12) AWSpS

Supervised laboratory experience in experimental approach to problems in speech and hearing sciences. Pre-requisite: permission of instructor. SPHSC 600 Independent Study or Research (*) AWSpS Prerequisite: permission of instructor.

SPHSC 700 Master's Thesis (*) AWSpS

SPHSC 800 Doctoral Dissertation (*) AWSpS

SPEECH COMMUNICATION

Courses for Undergraduates

SPCH 102 Speech, the Individual, and Society (5) AWSp Parks

Provides a basic understanding of human speech com-Provides a obsite understanding of numan speech com-munication. Covers three major areas: (1) the nature of human communication, including models, principles, settings; (2) elements of verbal and nonverbal communi-cation; and (3) approaches to, and functions of, human communication including persuasion, interpersonal communication, argument, propaganda, free speech.

SPCH 103 Principles of Oral Communication (5) AWSp

Introductory course in interpersonal communication. Emphasizes analyzing and understanding communication variables affecting human relationships, such as person perception, feedback, idea development, nonverbal cues. Focus on informal communication settings.

SPCH 140 Oral Interpretation of Literature (5) AWSp Post

Introduction to the analysis and critical study of imagina-tive literature through the medium of oral performance. Analysis and interpretation of verse, prose, and drama.

SPCH 203 Communication in the Classroom (5) AWSp Staton-Spicer

Station-Spicer Theory and practice of interpersonal communication in-instructional settings. Designed to prepare prospective teachers to employ communication effectively as a me-dium of teaching and learning, to create a classroom communication environment in which interaction is open and productive, and to guide students toward desirable communication behavior. Recommended for all teacher candidates.

SPCH 220 Introduction to Public Speaking (5) AWSp Campbell

Beginning course in public speaking emphasizing choice and organization of material, sound reasoning, audience analysis, oral style, and delivery. Overview of history of rhetoric. Classroom speeches followed by conferences with instructor.

SPCH 222 Speech Communication in a Free Society (3) W

Bosmajian

Examination of problems and arguments related to free-dom of speech; early English writers on freedom of ex-pression; background of freedom of speech in the United States; contemporary freedom of speech issues.

SPCH 235 Parliamentary Procedure (3) A

Bosmajian

Principles and practice: a study of the historical bases and contemporary uses of parliamentary procedure; methods and practice in organizing and conducting public meetings.

SPCH 270 Introduction to Empirical Research in Speech Communication (5) ASp

Basic research principles in speech-communication sci-ence; survey of substantive research findings. Recom-mended: any 100- or 200-level speech communication course.

SPCH 305 Perspectives on Language in Speech Communication (5)

Philipsen, Stewart

Introduction to the study of language and meaning, and survey of several influential modern approaches, includ-ing: the semantic, general-semantic, behavioral, and ana-lytic philosophical. Relates theories of language and meaning to the study of speech communication.

SPCH 308 Humanistic Approaches to Interpersonal Communication (5) Stewart

Exploration of several humanistic approaches to inter-personal speech communication, emphasizing the theorists' philosophical orientations.

SPCH 310 The Rhetorical Tradition in Western Thought (5) A Shadow

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 man as a user of symbols. Some back-ground in history, philosophy, and literature is desirable. Recommended: junior standing.

SPCH 320 Public Speaking (5) A 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. Rec-ommended: 220.

SPCH 329 Rhetoric of Social and Political Movements (5) Sp

Bosmajian

Inquiry into the rhetoric of social and political move-ments; emphasis on investigation of persuasive discourse; examination of the nonverbal symbols of persuasion.

SPCH 334 Essentials of Argument (5) AWSp

Argument as a technique in the investigation of social problems; evidence, proof, refutation, persuasion; training in argumentative speaking.

SPCH 335 Methods of Debate (3)

Introduction to debate as a method of advocacy with study and practice of its more important forms.

SPCH 339 Forensic Studies (1-3, max. 9)

Discussion of selected public questions before audiences on and off campus. No more than 3 credits may be earned in one year, and these should normally be distrib-uted through at least two consecutive quarters.

SPCH 341 Oral Interpretation of Children's Literature (2½) S

Post Study and performance of children's literature, empha-sizing oral interpretation as a method of teaching litera-ture in the elementary school.

SPCH 349 Readers Theatre (2, max. 10) AWSp Post

Preparation and public presentation of programs of literary works. Prerequisites: 140 and permission of in-structor.

SPCH 368 Small Group Facilitation (3) AWSp

Study of methods for facilitating discussion in small groups formed for the purposes of instruction. Examines theoretical principles of group communication and group thought-line development. Considers both the cognitive goals and processes of small instructional discussion goals and processes of small instructional discussion groups, particularly those used in 102. Emphasis is on each class member's practical application of the insights derived. Prerequisites: permission of instructor, concurrent registration in 369. Recommended: 102.

SPCH 369 Small-Group Facilitation Practicum (2) AWSp

Avop Nyquist Practicum experience in the implementation of the theo-retical principles taught in 368 of facilitating discussion in small groups formed for instructional purposes. Emphasis is on the direct application of those principles to an assigned group of students from 102. Prerequisite: con-current registration in 368.

SPCH 373 Principles of Group Discussion (5)

AWSp Bell, Philipsen, Scheidel

Discussion as an everyday community activity, with em-phasis on the informal cooperative decision-making methods of committee, conference, and round-table groups.

SPCH 400 Theoretical Backgrounds in Speech Communication (3) Nilsen

Speech viewed as a form of individual and social behav-

ior, with emphasis on the function of symbols in speech communication in informal and societal settings. The development of speech as a field of study, and its contemporary emphases.

SPCH 421 Advanced Speech Composition (5) Preparation and delivery of public speeches, with emphasis on style, thought organization, and proof. Analysis of model speeches. Recommended: 220 or 320.

SPCH 424 Rhetorical Perspective in Revolutionary Documents (5) A Campbell

Rhetorical investigation of selected major writings. Examines the thetorical dimension in the progress of ideas through analysis of revolutionary documents as persua-sive works. Relates principal revolutions in Western thought to contemporary controversy. Examines Rights of Man, Communist Manifesto, The Origin of Species, etc.

SPCH 425 American Public Address (5) A

SPCH 425 American Public Address (5) A Historical and critical study of principal speakers and speeches and of their relationship to American political, social, and intellectual life. Oratory of the American Revolution; the "Golden Age" of American oratory; de-bates on ratification of the federal Constitution, the slav-ery question, Reconstruction, woman suffrage, popu-lism, imperialism. Lectures, discussions, and readings.

SPCH 426 American Public Address (5) Sp Historical and critical study of principal speakers and speeches and of their relationship to American political, social, and intellectual life. The public lecture-Lyceum to Chautauqua; academic addresses; the progressive era; League of Nations debate; polemics of the New Deal era; isolationism versus one world; the cold war era; controversy over civil rights. Recommended: 425.

SPCH 428 British Public Address (5) W

Campbell Blend of historical and critical analysis of significant speeches and speakers and of their relationship to British social, political, and religious life. Course provides historical overview of the major periods of British oratory and of the unique role of the oration in each as a means of exhortation and advocacy.

SPCH 440 Oral Interpretation of Poetry (3) W Post

Study of forms of verse through analysis and oral presentation. Recommended: 140.

SPCH 442 Oral Interpretation of Fiction (3) A Post

Analysis and oral interpretation of narrative perspectives_ in the novel and the short story. Recommended: 140.

SPCH 444 Oral Interpretation of Modern Dramatic Literature (3) Sp Post

Study of dramatic literature from Ibsen to the present for purposes of developing understanding, appreciation, and ability to communicate its meaning. Recommended: 140.

SPCH 455 Communication in Children's Environments (4) A Nyquist, Staton-Spicer

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.

SPCH 456 Communication in Youth Environments (4) A

Nyquist, Staton-Spicer Study of the communication process in youth environ-ments with a primary focus on formal and informal learn-ing. Includes critical analysis of communication in contemporary instructional settings, and the development of communication strategies for teaching and learning.

SPCH 471 Persuasion (3)

Analysis of the ways in which beliefs, values, attitudes, and behavior are deliberately influenced through communication. Recommended: junior standing.

SPCH 472 Empirical Approaches to Interpersonal

Communication (5) Examination of major theoretic positions and empirical research findings in current speech communication literature on interpersonal influence. Emphasis on the insights that such theory and research provides on human speechcommunication behavior in common interpersonal situations. Recommended: junior standing.

SPCH 473 Problems of Discussion Leadership (3) Bell

Critical analysis of leadership in committee and confer-ence, with emphasis on the development of speech effectiveness in the cooperative achievement of goals. Recommended: 373.

SPCH 475 Organization Communication (5) Albrecht

Analysis of the role of communication in organizations, Analysis of the lote 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. Recommended: junior standing.

SPCH 476 Models and Theories in Speech **Communication (4)**

communication of selected theories and models of speech communication from the behavioral sciences, 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 study of speech communication phenomena. Recommended: junior standing.

SPCH 498 Special Topics in Speech Communication (2-5, max. 15) AWSp Lecture, seminar, and/or team study with topics varying

from quarter to quarter.

SPCH 499 Undergraduate Research (1-5, max. 15) AWSpS

Prerequisite: permission of instructor.

Courses for Graduates Only

SPCH 501 Introduction to Graduate Research in Speech Communication (3) A Scheidel

SPCH 521 Studies in Greek and Roman Rhetoric (5) A

Shadow

Development of the Greek tradition in rhetorical theory, criticism, and pedagogy from Homer to Augustine; anal-ysis of the contributions of major figures and works to that tradition.

SPCH 522 Studies in Medieval and Renaissance Rhetoric (5) W

Shadow

Critical analysis of selected persons, works, and topics related to the development of rhetorical theory during the Middle Ages and the Renaissance.

SPCH 523 Studies in Modern Rhetoric (5) W Campbell

Critical analysis of writings on rhetoric by Cox, Wilson, Bacon, Campbell, Blair, Whately, and others.

SPCH 524 Studies in Contemporary Rhetoric (5) Sp Nilsen

Critical analysis of theories of rhetoric from early twentieth century. Influences on theory; rhetoric and related disciplines.

SPCH 525 Rhetorical Criticism (5)

History and method of rhetorical criticism. Application of critical standards to notable British and American speeches.

SPCH 540 History of Oral Interpretation (3) Critical analysis of writings by Sheridan, Walker, Rush, Delsarte, Bell, Curry, Emerson, and others.

SPCH 550 Studies in Speech Communication

Education (3) A Philosophical, curricular, and methodological problems of speech instruction.

SPCH 575 Phenomenological Methods and Philosophical Criticism in Speech Communication (5) Philipsen, Stewart

Application of philosophical criticism, participant obser-vation, and ethnomethodology primarily in interpersonal and small-group communication.

SPCH 576 Research Methods in Speech Communication (5) A Parks

Application of behavioral research principles to problems in quantification, design, and analysis of data in speechcommunication research.

SPCH 577-578 Research Problems in Speech Communication (3, max. 6)-(3, max. 6) W, Sp Application of methodology and design principles to re-search problems in speech communication. Prerequisite: 577- for -578.

SPCH 590 Seminar in Theory of Speech Communication (2, max. 6) W

SPCH 592 Seminar in Public Address

(2, max. 6)

SPCH 593 Seminar in Rhetorical Theory (2. max. 6)

SPCH 595 Seminar in Speech Communication Education (2, max. 6) Sp

SPCH 597 Seminar in Interpersonal Communications (2, max. 6) WSp

Examination of experimental literature on selected topics. Subject to change from year to year; topics include conflict resolution, information processing, communica-tion networks, feedback systems, audience composition research, communication effects.

SPCH 598 Small-Group Discussion and Communication (2, max. 6) ASp

Introduction to study of communication within small problem-solving groups. Theoretical as well as methodo-logical dimensions of selected studies. Emphasis on role communication in decision-making process. From a communication viewpoint, examines topics such as conformity, consensus, interpersonal attraction, and emergent phases of discussion.

SPCH 600 Independent Study or Research (*) AWSpS

SPCH 700 Master's Thesis (*) AWSpS

SPCH 800 Doctoral Dissertation (*)

STATISTICS

Courses for Undergraduates

STAT 220 Basic Statistics (5) AWSp Structure of data sets and description and summary of these by histograms, means, standard deviations, etc.; summary of bivariate data; objectives and pitfalls of statistical studies; elements of probability theory, and its publicities to unious statistical tests objectives of hu-

application to various statistical tests; objectives of hy-potheses testing, application to data sets, and interpreta-tion. Prerequisite: 1/2 years of high school algebra.

STAT 311 Elements of Statistical Method (5) AWSp Elementary concepts of probability, binomial and normal distributions; basic concepts of hypotheses testing and es-timation; application to binomial and normal distributions; chi-square tests; linear regression theory. For nonmajors only. Prerequisite: MATH 105. (Formerly MATH 281) MATH 281.)

STAT 341 Elementary Probability (3) AWSp Sample space, random variables, laws of probability; combinatorial probabilities; distributions: binomial, normal; expectation, variance. Not open for credit to stu-dents who have taken 394. Prerequisite: MATH 126 or 136. (Formerly MATH 391.)

STAT 342 Elements of Statistics (3) WSp Basic concepts of testing hypotheses and of estimation (interval and point); binomial and normal tests and esti-mates. Prerequisite: 341. (Formerly MATH 392.)

STAT 381 Elements of Statistics for Majors (3) A > Concepts of probability, binomial, and normal distribu-tions; concepts of hypothesis testing and estimation; ap-plication to binomial and normal distributions; various plication to binomial and normal distributions; various chi-square tests; linear regression; theory; analysis of vari-ance; multiple linear regression; nonparametric statistics. Prerequisites: MATH 126, statistics major standing, or permission of instructor.

STAT 382, 383 Statistical Inference in Applied Research (5,5) AW,WSp Analysis of variance and covariance; chi-square tests;

multiple and curvilinear regression; sampling theory; discrete distributions; experimental design and power of tests. Applications to biological problems. Use of com-puter programs in standard statistical problems. Offered jointly with Q SCI 382, 383. Prerequisites: MATH 124 or Q SCI-291 or 381, or permission of instructor for 382; 382 for 383. 382 for 383.

STAT 394 Probability I (3) AWS

Sample spaces; basic axioms of probability; combinato-rial probability; conditional probability and indepen-dence; binomial, Poisson and normal distributions. Offered jointly with MATH 394. Prerequisite: MATH 327 or 236.

STAT 395 Probability II (3) WSpS Random variables; expectation and variance; laws of large numbers; normal approximation and other limit theorems; multidimensional distributions and transformations. Offered jointly with MATH 395. Prerequisite: 394.

STAT 396 Probability III (3) Sp

Characteristic functions and generating functions; recurrent events and renewal theory; random walk. Offered jointly with MATH 396. Prerequisite: 395 or 511.

STAT 404 Multivariate Analyses for the Social Sciences (5) A

Sciences (5) A Survey of multivariate techniques commonly used in the social and behavioral sciences. Development of linear models for interdependence (factor and canonical an-alyses) and dependence (MANOVA, discriminant func-tion, and classification) studies. Illustrations of the tech-niques utilizing social science data and computer statistical packages. Prerequisite: 311 or PSYCH 218 or equivalent. (Formerly PSYCH 532.)

STAT 472, 473 Statistical Inference (3,3) A,W Introduction to sampling and general theory of statistical inference; general theory of estimation and hypothesis testing; multivariate theory and correlation. Prerequisite: 395 or 511 for 472; 472 and MATH 205 or MATH 302 for 473. (Formerly MATH 482, 483.)

STAT 480 Sampling Theory for Biologists (3) Sp Theory and applications of sampling finite populations including: simple random sampling, stratified random sampling, ratio estimates, regression estimates, systemsampling, ratio estimates, regression estimates, system-atic sampling, cluster sampling, sample size determina-tions, applications in fisheries and forestry. Other topics include sampling plant and animal populations, sampling distributions, estimation of parameters and statistical treatment of data. Offered jointly with Q SCI 480. Pre-requisites: 382, 383, or permission of instructor.

STAT 484 Distribution-Free Inference (3) Sp Distribution-free methods in estimation, testing; chi-square theory. Prerequisite: 473 or 512. (Formerly MATH 484.)

STAT 485 Analysis of Variance (3) Sp General linear hypothesis tests and estimates; distribution theory of tests; tests of all contrasts; fixed, mixed, and random models. Prerequisite: 473 or 512. (Formerly MATH 485.)

STAT 486 Experimental Design (3) Sp Topics in analysis of variance and experimental designs; choice of design comparison of efficiency, power, sam-ple size, use of computer for standard analyses. Offered jointly with Q SCI 486. Prerequisite: 383 or 485.

STAT 490 Undergraduate Research (*, max. 15) Prerequisite: permission of undergraduate adviser.

STAT 491, 492 Introduction to Stochastic Processes (3,3) A,W

(3,3) A.W. Random walks, Markov chains, branching processes, Poisson processes, point processes, birth and death pro-cesses, queuing theory, stationary processes. Offered jointly with MATH 491, 492. Prerequisites: 396 for 491; 491 for 492.

Courses for Graduates Only

STAT 511 Probability (5) A' Fundamental concepts; discrete and continuous random variables; expectation law of large numbers; important

distributions; characteristic functions; central limit theorem. No more than 6 credits from among 394, 395, and 511 can be counted toward any degree. Prerequisites: MATH 327 or MATH 236 and senior or graduate stand-ing, or permission of instructor. (Formerly MATH 481.)

STAT 512 Statistical Inference (5) W

Introduction to sampling and general theory of statistical inference; general theory of estimation and hypothesis testing; multivariate theory and correlation. Prerequisites: 395 or 511, and MATH 205 or MATH 302. (Formerly MATH 482, 483.)

STAT 521, 522, 523 Advanced Probability (3,3,3)

A,W,Sp Measure theory and integration, independence, laws of large numbers. Fourier analysis of distributions, central limit problem and infinitely divisible laws, conditional expectations, martingales. Offered jointly with MATH 521, 522, 523. Prerequisite: MATH 426.

STAT 524 Design of Medical Studies (3) A Fisher, Peterson

Design of medical studies, with emphasis on randomized controlled clinical trials. Bias elimination, controls, treat-ment assignment and randomization, precision, replica-tion, power and sample size calculations, stratification, and ethics. Suitable for graduate students in biostatistics and research-oriented graduate students in other scientific fields. Offered jointly with BIOST 524. Prerequisites: BIOST 511 and one of 512, BIOST 513, EPI 512, or STAT 473. (Offered even-numbered years.)

STAT 529 Sample Survey Techniques (3) Sp

Design and implementation of selection and estimation procedures in sample surveys. Emphasis on the sampling of human populations, although principles apply to other sampling problems. Simple, stratified, and cluster sam-pling; multistage and two-phase procedures; optimal allo-ration of mercaneus etiliantics theory multistage and two-phase procedures; optimal allocation of resources; estimation theory; replicated designs; variance estimation; national samples and census materi-als. Course content comparable to QMETH 529. Offered jointly with BIOST 529. Prerequisite: 511 or permission of instructor.

STAT 541 General Linear Model (3) A

Multiple linear regression, selecting the best regression equation, analysis of covariance, distribution theory. Prerequisite: 485.

STAT 542 Multivariate Analysis (3) W

Multivariate normal distribution; partial and multiple correlation; Hotelling's T²; Bartlett's decomposition; various likelihood ratio tests; discriminate analysis; principal components. Prerequisite: 473.

STAT 543 Nonparametric Statistics (3) Sp Linear rank statistics; tests of fit; estimation; higher way

layouts. Prerequisite: 484.

STAT 561, 562, 563 Special Topics in Applied Statistics (3,3,3) AWSp Data analysis, spectral analysis, robust estimation. Pre-requisite: permission of instructor.

STAT 571 Applied Regression Analysis (3) A Kronmal, Martin, Wahl

Advanced statistical methods course for biostatistics and other graduate students already familiar with the general linear hypothesis. Develops extensions of the usual linear least squares theory and discusses the effects of deparleast squares theory and discusses the effects of depar-tures from this theory. Examples of analyses for nonstan-dard problems are presented; computers are used for homework assignments. Analysis of residuals, use of transformations, polynomial models, methods of model selection and robust methods. Offered jointly with BIOST 571. Prerequisites: 485, BIOST 513, a matrix algebra course or permission of instructor.

STAT 573 Statistical Methods for Categorical Data (3) Sp Breslow

Exact and asymptotic methods of analysis for 2x2 contin-gency tables. Maximum likelihood estimation of logistic regression models for binary response variables, and se-lected examples of the use of these models in epidemiologic and clinical research. Introduction to the theory and applications of log-linear models for discrete data. Se-vected special topics. Offered jointly with BIOST 573. Prerequisites: 473, 581, and BIOST 513, or permission of instructor.

STAT 574 Statistical Computing (3) W Kronmal, Martin, Wahl

Introduction to topics in statistical computing: application of numerical methods to statistical problems; generation of pseudorandom numbers, design and execution of Monte Carlo studies, comparative evaluation of statistical algorithms, matrix methods and least squares, computa-tion of probabilities, data structures, and data base man-agement. Offered jointly with BIOST 574. Prerequisites: 473 and programming, or permission of instructor.

STAT 575 Population Models (3)

SIAI 5/5 Population Models (3) Polissar Models in demography, using real and simulated data. Estimation of demographic rates, the life table; station-ary, stable, and quasi-stable populations; determinants of the age-structure of a population; age-specific models of mortality, fertility, and nuptiality. Offered jointly with BIOST 575. Prerequisite: 473 or permission of instructor.

STAT 576 Statistical Methods of Survival Data (3)

Breslow, Prentice, Peterson

Statistical methods for censored survival data arising from follow-up studies on human or animal populations. 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, Of-fered jointly with BIOST 576. Prerequisites: 473, BIOST 513 or Q SCI 383, and 581, or permission of instructor. (Offered alternate years.)

STAT 578 Special Topics in Advanced Biostatistics (*, max. 3)

Advanced-level topics in biostatistics offered by regular and visiting faculty. Offered jointly with BIOST 578. Prerequisite: permission of instructor.

STAT 581, 582, 583 Advanced Theory of Statistical

SIAT 581, 582, 583 Advanced Theory of Statistical Inference (3,3,3) A, W,Sp Limit theorems, asymptotic efficiency, maximum likeli-hood statistics; sufficient and ancillary statistics; ele-ments of decision theory; Neyman-Pearson theory, uni-formly most powerful unbiased and invariant tests; sequential analysis; distribution-free statistics; linear hy-potheses. Prerequisites: 473 or 512 for 581; 581 for 582; 582 for 583. (Formerly MATH 581, 582, 583.)

STAT 590 Statistics Seminar (*, max. 15) AWSp Prerequisite: permission of graduate program adviser.

STAT 591, 592, 593 Special Topics in Statistics

(3,3,3), A, W,Sp Distribution-free inference, game and decision theory, advanced theory of estimation (including sequential esti-mation), robustness. Advanced probability theory, sto-chastic processes. Prerequisite: permission of instructor.

STAT 599 Statistical Consulting (3) AWSpS

Consulting experience in data analysis, applied statistics, etc. Student required to provide consulting services to students and faculty three hours per week. Prerequisite: permission of graduate program adviser.

STAT 600 Independent Study or Research (*) AWSoS

Prerequisite: permission of graduate program adviser.

STAT 700 Master's Thesis (*) AWSpS Prerequisite: permission of graduate program adviser.

STAT 800 Doctoral Dissertation (*) Prerequisite: permission of graduate program adviser.

WOMEN STUDIES

Courses for Undergraduates

WOMEN 200 Introduction to Women Studies (5)

AWSpS Interdisciplinary course introducing women studies (5) Interdisciplinary course introducing women studies through lectures, readings, and discussions, drawing selectively from the College of Arts and Sciences and in-cluding the following fields: anthropology, art history, economics, history, law, literature, psychology, and so-ciology. Not open for credit to students who have taken GIS 255 or 256.

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WOMEN 206 Philosophy of Feminism (3) WS Philosophical analysis of the concepts and assumptions rentration of eminism. Theoretical positions within the feminist movement; views of the ideal society, goals and strategies of the movement, its relation to racial liberation, and ethical issues. Offered jointly with PHIL 206. Not open to students who have taken GIS 106.

WOMEN 257 Psychology of Sex Differences (5) A Kennev

Major psychological theories of sex-role development in young children and a study of the biological and environ-mental influences that determine and maintain sex differnences in behavior. Topics include the genetic and endocrinological basis of sex, the development of sex roles in children, sex differences in aggression, cognitive abilities, achievement motivation, affiliation, sexuality, and role of parents and schools in the development, maintenance, and modification of sex roles with specific focus on women. Offered jointly with PSYCH 257. PSYCH 101 or 102 recommended. Not open for credit to students who have taken GIS 244.

WOMEN 290 Special Topics in Women Studies (2-5, max. 15) Offered occasionally by visitors or resident faculty.

WOMEN 310 Women and the Law (5) AWSpS Focus on the status of women and the law; the legal rocus on the status of women and the law, the regal status of single and married women, the rationale of pro-tective legislation, and the effect of the legal changes such as the Civil Rights Act of 1964 and Equal Rights Amendments. Study of current cases on abortion, child care, tax laws, and Social Security benefits. lesbianism, prostitution, etc. Not open for credit to students who have taken GIS 355.

WOMEN 353 Anthropological Studies of Women (5) W Jacobs

Cross-cultural and comparative survey of the varieties of Cross-cultural and comparative survey of the varieties of women's cultural experiences, statuses, and roles in cul-tural context and the anthropological theories used to account for them. Topics include: is biology destiny? studies of primates, woman the gatherer, work in pre-industrial and industrial societies, woman in folklore and music, matriarchy and matrilineal kinship, childbirth, and women's roles in economic development. Offered jointly with ANTH 353. Prerequisites: 200 and ANTH 202, or permission of instructor. 202, or permission of instructor.

WOMEN 354 Lesbianism (3) Familiarizes students with lesbianism, the biological, cross-cultural, and psychosocial evidence, and the posi-tion and concerns of lesbians in our society. Broadly conceived and interdisciplinary, course content provides his-torical and current information and discussion on the nature of lesbianism. Prerequisite: 200 or 257; or ANTH 100 or 353; or PSYCH 101 or 210 or 257 or 305; or SOC 110 or 271 or 347; or permission of instructor.

WOMEN 357 Psychobiology of Women (5) WS Kennev

Physiological and psychological aspects of significant segments of women's lives. Topics include: physiologi-cal determinants of biological sex; physiological and psy-chological changes at puberty and during adolescence; psychological events related to the menstrual cycle and personne a prunchelialogical begin of fample segments. psychological events related to the menstrual cycle and menopause, psychological basis of female sexuality; physical and psychological effects of contraception, pregnancy, childbirth, and nursing; the role of culture in determining the psychological response to the physiologi-cal events. Offered jointly with PSYCH 357. Not open for credit to students who have taken GIS 357. Prerequi-site: 257 or PSYCH 257 or permission of instructor.

WOMEN 400 Senior Seminar in Women Studies (3) Sp Jacobs

Part of the senior thesis requirement in Women Studies. Affords students an opportunity to share research knowl-edge and experience with their peers, under faculty supervision. The thesis should be completed by the end of the course. Must be taken concurrently with G ST 493. Prerequisites: senior standing, General Studies ma-jor concentrating on Women Studies, and permission of adviser.

WOMEN 404 Women and the Cinematic Imagination (5, max. 15) AWSp Murphy

Examines women's roles in film and the current body of criticism assessing the history of women in the cinema. Topics, which vary each quarter, include: Women in For-eign Films, The Actress and the Director, and Films by Women, among others. Offered jointly with CINE 404. Prerequisites: CINE 201, 202, 203, or permission of instructor.

WOMEN 446 Theories and Tactics of the Women's Movement (3)

Links information on the history of the women's movement and its current philosophies with tactics used to achieve change in women's status. Four focal areas: (1) images of the ideal status of women, (2) assumptions made about how social change occurs, (3) women's cur-rent status and tactics used to achieve change, (4) comparative studies of the outcomes (successes/failures) of various movement tactics used, examining specific situa-tions cross-nationally and historically. Offered jointly with SOC 446. Prerequisites: 200 or SOC 110; upper-division or graduate standing; background in status of women and philosophies of women movements.

WOMEN 490 Special Topics in Women Studies (2-5, max. 15)

Offered occasionally by visitors or resident faculty. Pri-marily for upper-division and graduate students.

WOMEN 499 Undergraduate Research (1-5, max. 10) AWSpS Prerequisite: permission of instructor and adviser.

ZOOLOGY

Courses for Undergraduates

ZOOL 118 Survey of Physiology (5) AWSp Griffiths, Martin

Elementary human physiology. For nonmajors. Credit is not given for 118 if credit has previously been given for 208

ZOOL 119 Elementary Physiology Laboratory (1) A Griffiths, Martin

Specifically for kinesiology majors. May be taken by others only with permission. Prerequisite: 118 taken concurrently.

ZOOL 208 Elementary Human Physiology (5) Sp

Griffiths Each organ system is described and its function illus-Each organ system is described and its function indu-trated in the laboratory. Credit is not given for 208 if credit has previously been given for 118. Prerequisites: two quarters of college chemistry, two quarters of college biological sciences completed or in progress.

ZOOL 220 Diversity in Animals (5) WS

Morphological, functional, and ecological diversity within the major phyla of animals. Prerequisite: BIOL 212.

ZOOL 301 Introductory Physiology (4) Deyrup-Olsen, Riddiford, Truman Fundamentals of physiology: biochemistry of cell constitremeanering of physiology: of cell constit-uents, environment of the cell, bioenergetics, intermedi-ary metabolism, membranes, control mechanisms. Labo-ratory project required. Prerequisites: chemistry through organic, one year of college physics, 10 credits in biological sciences.

ZOOL 330 Natural History of Marine Invertebrates (5) SpS

Kohn, Paine Field and laboratory course emphasizing the habits, habi-tats, adaptations, and interrelationships of marine animals. Students may be required to share a portion of the transportation costs of ZOOL 362 Natural History of Vertebrates (5) SpS

ZOOL 362 Natural History of Vertebrate (5) SpS Snyder

Field and laboratory course on the classification, ecology, adaptations, and natural history of fishes, amphibi-ans, repliles, birds, and mammals. Students may be re-quired to share a portion of the transportation costs of field trips. Prerequisite: permission of instructor.

ZOOL 403 Comparative Vertebrate Histology (5) A Cloney

Microscopic and submicroscopic anatomy of the tissues and organs of vertebrates. Prerequisite: BIOL 212.

SCHOOL OF BUSINESS ADMINISTRATION

ZOOL 409 Sociobiology (4) W Rohwer

Biological bases of social behavior, emphasizing evolubiological oasts of section behavior, chiplastic could be availing. Topics are: individual versus group selection, kin selection, altruism, group versus individual living, mating systems, parental care of offspring, and competitive strategies. Offered jointly with PSYCH 409. Prerequisites: BIOL 211 and 212 or PSYCH 200, or equivalent equivalent.

ZOOL 410 Ethology and Ecology Laboratory (1-4) Sp Orians, Paine

Field projects on foraging and social behavior, species interactions and structure of terrestrial and marine communities, including special student research problems. Students may be required to share a portion of the costs of transportation. Prerequisite: permission of instructor.

ZOOL 418 Invertebrate Physiology (3) Sp Fields, Martin, Truman Physiology of the essential organ systems, with emphasis

on the major invertebrate phyla and special attention to their evolution and integration. Prerequisite: 301. Rec-ommended: 433, 434.

ZOOL 419 Invertebrate Physiology Laboratory (2) Sp Fields, Martin, Truman

Experiments on invertebrate materials to illustrate the principles developed in 418. Prerequisite: prior or con-current registration in 418. Recommended: 433, 434.

ZOOL 423 Protozoology (5)

Introduction to protozoa exclusive of parasites, with em-phasis on morphology (including fine structure and func-tion), ecology, taxonomy, and life histories. Prerequisite: 20 credits in biological sciences or permission of instructor. Recommended: BIOL 401.

ZOOL 428 General Physiology of Excitable Tissues (3) Willows

Simple and complex ionic equilibria, electrical properties of membranes; active and passive membrane responses; impulse generation and conduction; electrical and chemical synapses; structure of muscle, and mechanical, thermal, chemical, and electrical aspects of contraction. Prerequisite: 301.

ZOOL 429 General Physiology of Excitable Tissues Laboratory (2) Willows

Laboratory work to demonstrate the basic properties of nerve and the electrical and mechanical characteristics of muscle. This is followed by experiments with diverse species that emphasize less-well-known nerve, muscle, and synaptic phenomena. Training is given in the use of intracellular and extracellular stimulating and recording methods and other basic electrophysiological techniques. Prerequisites: 428, taken concurrently, and permission of instructor.

ZOOL 430 Marine Zoology (8) ASp

Kozloff, Strathmann

Kozioji, Siralihmann Survey of groups of invertebrate animals represented in marine environments; natural history, ecology, distribu-tion, habitat, adaptation, and trophic interrelationships. Offered at Friday Harbor Laboratories. Concurrent regis-tration in BOT 445 required at Friday Harbor. Prerequi-sites: 20 credits in biological sciences and permission of Director of Friday Harbor Laboratories. (Not offered Au-tore Ourcea 1990) tumn Quarter 1980.)

ZOOL 432 Marine Invertebrate Zoology (9) S

Morphology and phylogeny of marine invertebrates. Laboratory study covers the structure and interrelationships among marine invertebrate animals. Representatives of all major and most minor phyla are collected, ob-served alive, and studied in some detail. Offered at Friday Harbor Laboratories. Not open for credit to stu-dents who have taken 433 or 434. Prerequisites: BIOL 212 or equivalent and permission of Director of Friday Harbor Laboratories.

ZOOL 433, 434 Invertebrate Zoology (5,5) A,W

Illg, Koin, Kozloff Morphology and phylogeny of invertebrates exclusive of terrestrial arthropods. Not open to students who have had 432. Prerequisites: BIOL 212; 433 for 434.

ZOOL 435 Parasitology (5) General course covering the principles of parasitism and .

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the major groups of animal parasites. Prerequisite: 20 credits in biological sciences or permission of instructor.

ZOOL 438 Comparative Endocrinology (3) W Gorbman

Hormonal integration of living processes at all levels in animals: cells, organs, organisms, populations. Prerequi-site: one year of biology. Recommended: histology and organic chemistry.

ZOOL 439 Comparative Endocrinology Laboratory (2) Sp Gorbman

Appropriate experiments to accompany and enlarge on material presented in 438. Prerequisites: 438 and permission of instructor.

ZOOL 444 Entomology (3) Sp

Edwards

Biology of terrestrial arthropods, with emphasis on in-sects. Structure, classification, physiology, and ecology of insects. Interrelationships of insects and man. Prerequisite: 15 credits in biological sciences or permission of instructor.

ZOOL 445 Entomology Laboratory (2) Sp Edwards

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. Prerequisites: con-current registration in 444 and permission of instructor.

ZOOL 448 Concepts of Nervous System Function (3)

Palka

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,

ZOOL 449 Concepts of Nervous System Function Laboratory (2) Palka

Experiments to accompany material presented in 448. Prerequisites: 448 and permission of instructor.

ZOOL 453-454 Comparative Anatomy of Chordates (5-5) A,W Snyder

Morphology and phylogeny of the chordates; structure, function, and evolution of vertebrate organ systems. Pre-requisite: BIOL 212.

ZOOL 455-456 Developmental Biology of Animals and Developmental Biology of Animals Laboratory (3-3) AWS, AWSpS Bakken, Laird, Schubiger

Properties and experimental analysis of developing systems. Descriptive and comparative study of development with emphasis on chordates. 456 (laboratory experi-ments) accompanies material presented in 455-. Prerequisite: BIOL 212. Recommended: prior completion of 301.

ZOOL 457 Methods and Problems in Development (3)

(3) Lecture course in experimental embryology focusing on modern approaches to developmental problems and em-phasizing their analysis at a biochemical level. Selected topics are covered in two lectures each week. Readings topics are covered in two fectures each week. Readings from primary sources are assigned in conjunction with lecture material, to be discussed in a discussion section once weekly. Prerequisites: 456 and permission of in-structor.

ZOOL 458 Vertebrate Physiology (3)

Devrup-Olsen, Kenagy, Martin, Riddiford Emphasis on the physiology of vertebrates' major func-tions and organ systems viewed extensively from ecologic and evolutionary aspects. Special attention is given to respiration, circulation, excretion, locomotion, energy metabolism, seasonal adaptation. Prerequisite: 301 or permission of instructor.

ZOOL 459 Vertebrate Physiology Laboratory (2) Deyrup-Olson, Kenagy, Martin, Riddiford Experiments on vertebrate materials to illustrate the prin-ciples developed in 458. Prerequisite: prior or concurrent registration in 458.

ZOOL 464 Natural History of Birds (5) Sp Rohwe

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Field, lecture, and laboratory study of birds framed in bi-

ological theory rather than taxonomy. Breeding systems, brood parasitism, appearance, molt, migration, orienta-tion, social behavior, song, and flight are emphasized. Includes Saturday and weekend field trips for which stu-dents are required to share a portion of transportation costs. Prerequisites: BIOL 210, 211, 212 or equivalent, and permission of instructors and permission of instructor.

ZOOL 465 Natural History of Mammals (5) Sp Kenagy

Field, lecture, and laboratory course introducing mam-Field, lecture, and laboratory course introducing mam-mals in a general biological context, emphasizing ecol-ogy, evolution, behavior, morphology, and adaptation to the environment. Fieldwork focuses on rodent popula-tions and their habitats in Washington State. Includes weekend field trips, for which students may be required to share a portion of transportation costs. Prerequisites: BIOL 210, 211, 212 and permission of instructor. Rec-ommended: 453-454 and BIOL 472.

ZOOL 469 Reproductive Endocrinology (3) Sp Gorbman

Endocrine regulation of the processes of mammalian reproduction. Integration of reproduction with envronmen-tal features through behavioral and metabolic adjustments. Planned endocrine manipulation of reproduction and its demographic implications. Prerequisite: one year of college-level biology.

ZOOL 475 Zoogeography (3) A

Schoener Present and past distribution of animals and plants, both aquatic and terrestrial, especially as determined by eco-logical factors. Prerequisites: BIOL 210, 211, 212, or equivalent.

ZOOL 478 Environmental Physiology (3) Sp Kenagy

Physiological adaptation in an ecological and evolutionary context, with emphasis on vertebrate animals, Adap-tation to physical parameters of the environment and to temporal environmental cycles; whole-animal energetics, including thermal relations; water and solute regulation. Prerequisite: 301

ZOOL 479 Environmental Physiology Laboratory (2) Sp

(2) Sp Kenagy Field and laboratory studies in physiological ecology, with major emphasis on team exercises and projects on selection topics. Students may be required to share a portion of the transportation costs of field trips. Prerequi-sites: 478, and a course in vertebrate or invertebrate zool-ogy, and permission of instructor. Recommended: 400-level physiology course.

ZOOL 490 Undergraduate Seminar (3, max. 6) Supervised reading and group discussion on selected con-cepts of zoology. Prerequisites: 20 credits in zoology and permission of instructor.

ZOOL 491 Topics in Zoological Research (1, max. 3)

Undergraduate seminar on research problems currently under investigation by department faculty members. In-cludes discussions and laboratory demonstrations of aims, techniques, and results of zoological research. Prerequisites: upper-division standing and permission of ipstructor.

ZOOL 498 Special Problems in Zoology

(1-5, max. 15) AWSpS Prerequisites: 30 credits in zoology and permission of instructor.

Courses for Graduates Only

ZOOL 506 Topics in Experimental Embryology (2, max. 6)

Seminars and discussions of aspects of growth of special current interest. Prerequisite: permission of instructor.

ZOOL 509 Topics in Animal Behavior (1-3, max. 9) AWSp Orians, Rohwer

Detailed consideration of topics in behavioral integration, communication, and social organization. Prerequisite: 409 or PSYCH 409 or equivalent.

ZOOL 517 Comparative Developmental Physiology (6 or 9) Whiteley

The topics of oogenesis, fertilization, and differentiation

of invertebrates are considered from the point of view of biosyntheses, permeability, metabolic changes, acquisi-tion of specific biochemical properties and physical mechanisms of developmental processes. The laboratory deals comparatively with a variety of marine inverte-brates, 9 credits available at Friday Harbor Laboratories only. Prerequisite: permission of instructor.

ZOOL 520, 521, 522 Seminar (1,1,1) A,W,Sp

ZOOL 528 Advanced Topics in Physiology $(1-3, \max, 15)$

Bakken, Edwards, Laird, Riddiford, Schubiger Advanced considerations in physiology with emphasis on recent developments. Prerequisite: at least one 400-level course in physiology.

ZOOL 533 Advanced Invertebrate Zoology (9) S Invertebrate fauna of the San Juan Archipelago. Topic changes from year to year. Individual research projects are emphasized. Offered at Friday Harbor Laboratories. Prerequisites: 10 credits in invertebrate zoology or equivalent and permission of Director of Friday Harbor Laboratories.

ZOOL 534 Topics in Advanced Invertebrate Zoology (3 or 6 or 9) Illg, Kohn, Kozloff Advanced considerations in morphology, ecology, phy-

logeny of invertebrates, emphasizing current develop-ments. 9 credits available at Friday Harbor Laboratories only. Prerequisite: permission of instructor.

ZOOL 536 Comparative Invertebrate Embryology

(9) SpS Morphological and experimental studies of development of selected types of marine invertebrates. Offered at Fri-day Harbor Laboratories. Prerequisites: 433, 434, and 456 and permission of Director of Friday Harbor Laboratories.

ZOOL 538 Advanced Invertebrate Physiology (9)

Sp General and comparative aspects of nerve and muscle physiology with particular emphasis upon neuronal con-trol of behavior, neuronal interactions, and other ad-trol of behavior, neuronal interactions, and other adaboratory experience, including intracellular and extra-cellular stimulating and recording techniques. Offered at Friday Harbor Laboratories. Recommended: background in cellular physiology and invertebrate morphology.

ZOOL 554 Advanced Vertebrate Morphology (3) Snyder

Current problems and trends in vertebrate anatomy emphasizing functional relationships. Prerequisites: 454, 456, and permission of instructor.

ZOOL 556 Insect Development (3) Edwards, Riddiford, Schubiger Characterizes developmental processes and their adapta-tions in diverse insect groups. Emphasizes hormonal con-trol mechanisms in metamorphosis, polymorphism and discusse reconstruction and constitution of development diapause, regeneration and genetic analysis of develop-ment. Prerequisites: 456 or equivalent, BIOL 212 or equivalent, or permission of instructor.

ZOOL 568 Chemical Integration (2, max. 6) AW Gorhman

Graduate seminar dealing with current problems in endo-crinology and neuroendocrinology. Offered on credit/no credit basis only. Prerequisite: permission of instructor.

ZOOL 572 Topics in Ecology (2 or 3) W Edmandson, Kohn, Orians, Paine Graduate seminar on modern problems in ecology. Pre-requisites: BIOL 472 or equivalent, and permission of instructor.

ZOOL 574 Ecology of Marine Communities (3) Paine

Lecture course emphasizing the ecological structure and functioning of marine communities. Topics include population interactions and dynamics, distributional pat-terns, bioenergetics, stability, and species diversity. Pre-requisites: BIOL 472 or equivalent, and permission of instructor.

ZOOL 575 Principles of Ecology as Applied to Fishes (3) A Zaret

Theoretical ecology as applied to fishes. Includes fish vi-sion, color pattern determinants, adaptive radiation, com-

petition and predation, fish behavior, reproductive pat-terns, community organization, and species diversity. Offered jointly with FISH 575. Prerequisite: graduate standing or permission of instructor.

ZOOL 576 Environmental Marine Physiology (6)

The relationship of vertebrate and invertebrate physiol-ogy to physical factors in the marine environment. Inogy to physical factors in the marine environment. In-struction in principles and applications of modern instru-mentation for quantitative study of animal-environment interactions. Offered at Friday Harbor Laboratories. Pre-requisites: invertebrate and/or vertebrate zoology, one year of college physics, organic chemistry. Recommended: physiology.

ZOOL 578 Advanced Ecology (5) Orians

Strategies of reproduction, habitat selection, foraging and spacing; theory of competition and predator-prey interac-tions; niche theory and community structure. Prerequi-sites: BIOL 472 or equivalent, and permission of instructor.

ZOOL 579 Population and Community Ecology (3)

Schoener Community diversity, mainly from a theoretical point of view. Prerequisites: two quarters of calculus, BIOL 472 or equivalent, and permission of instructor.

ZOOL 583 Advanced Techniques in Microscopy (5)

Cloney

Theory and use of light and electron microscopes, mod-em techniques of specimen preparation for morphologi-cal studies, photomicrography. Methodologies are ap-plied to analyses of special problems selected by students. Prerequisite: permission of instructor.

ZOOL 600 Independent Study or Research (*) AWSpS

ZOOL 700 Master's Thesis (*) AWSpS

ZOOL 800 Doctoral Dissertation (*) AWSpS

SCHOOL AND GRADUATE SCHOOL **OF BUSINESS** ADMINISTRATION

ACCOUNTING

Courses for Undergraduates

ACCTG 210 Introduction to Accounting (3) Nature and social setting of accounting; uses of account-ing information; introduction to basic accounting concepts, and some accounting techniques. Prerequisite: sophomore standing or above.

ACCTG 220 Fundamentals of Financial Accounting (3)

Principal procedures and concepts utilized in contempo-rary financial accounting and reporting. Preparation and interpretation of financial statements. Prerequisite: 210.

ACCTG 230 Fundamentals of Managerial Accounting (3)

Analysis and evaluation of accounting information as part of the managerial processes of planning, decision mak-ing, and control. Concentrates on types of economic decision making in enterprises and on accounting informa-tion useful to enterprise managers. Prerequisite: 220.

ACCTG 301 Intermediate Accounting I (3)

Concepts and principles of financial accounting. Analysis of controversies and problems related to the measurement of enterprise income. Prerequisites: 230 and admission to accounting major.

ACCTG 302 Intermediate Accounting II (3) Continuation of 301. Prerequisite: 301.

ACCTG 303 Advanced Accounting (3) Theory and problems in accounting for ownership equities in corporations and partnerships. Financial statement analysis and internal measurement of business per-formance. Prerequisite: 302.

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: 301.

ACCTG 371 Auditing or Industrial Internship (2) One quarter's internship with a certified public accounting firm, industrial organization, or government agency. Prerequisite: prior departmental approval.

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 princi-ples. Prerequisite: 230; not open to accounting majors.

ACCTG 401 Federal Income Tax Factors in Business Decisions (3)

Service course recommended for the junior year for the School of Business Administration. May also be taken by M.B.A. students for graduate credit. Prerequisite: 230.

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. Prerequisites: 303, 311.

ACCTG 421 Federal Income Tax (5) Comprehensive development of individual and corpora-tion income tax. Includes concepts of income, deduc-tions, nontaxable exchanges, tax basis, and capital asset, transactions. Prerequisite: 303 or permission.

ACCTG 430 Introduction to Information Systems (3) Study of the concepts of information systems in administrative organizations and the processes of analyzing and traitve organizations and the processes of analyzing and designing systems, with an emphasis on those using com-puter facilities. Includes sufficient study of computer sys-tems to understand their present and future impact on information systems and to evaluate proposals for computerization of existing systems. Prerequisites: 230 and OMETH 200.

ACCTG 440 Accounting Systems (3) Concepts and methodology of computerized information systems analysis and design, and a study of the manage-ment of the information function. Introduction to CO-BOL. Advanced study of computer equipment and its im-pact on systems. Prerequisite: 430.

ACCTG 450 Special Tax Problems (3) Development of basic principles of federal income taxation applicable to partnerships, estates, and trusts, corporate reorganization, gifts, and estates; consideration of foreign taxes, Social Security taxes, and appeals pro-cedure. Prerequisite: 421.

ACCTG 460 Advanced Cost Accounting (3) Advance analysis of cost and management accounting problems; special applications of cost accounting tech-niques for management planning and control; current de-velopments in cost accounting. Prerequisite: 311.

ACCTG 470 Case Studies in Auditing (4) Application of the theory, standards, and principles to a simulated audit engagement. Guest lecturers discuss the broad-ranging audit involvement. Prerequisite: 411.

ACCTG 480 Fund Accounting (3)

Fund and budgetary accounting as applied to public sec-tor organizations, such as governments, foundations, hospitals, and colleges. Prerequisite: 303.

ACCTG 485 Consolidated Financial Statements (3) Accounting for parent-subsidiary and branch relation-ships; mergers; foreign exchange. Prerequisite: 303.

ACCTG 490 Advanced Problems (3) Intensive study of accounting principles, procedures, and financial reporting, principally through consideration of C.P.A. examination problems. Prerequisites: 311, 411, 421, 480.

SCHOOL OF BUSINESS ADMINISTRATION

ACCTG 495 Advanced Accounting Theory (3) Theory of accounting related to income measurement, as-sets, and equities. Prerequisites: 303 and senior standing.

ACCTG 499 Undergraduate Research (3, max. 9) Arranged and supervised by individual members of the faculty. Prerequisite: permission of undergraduate office.

Courses for Graduates Only

Approval of graduate business program office and entry card required.

ACCTG 500 Financial Accounting (3)

Introduction to concepts and proceedures underlying de-termination 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 (3) Study of the generation and the use of accounting inforstudy of the generation and the use of accounting mot-mation within the firm for purposes of planning and con-trolling operations. Topics covered include cost concepts, responsibility accounting systems, cost con-trol, and the use of accounting information in short- and long-term management decision problems. Prerequisite: 500.

ACCTG 510 Concepts in Accounting Measurements

(3) An intensive study of accounting principles underlying financial statement, the measurement of income, the valuation of assets, and accounting for corporate stock equities. Emphasis is placed on the uses and limitations of accounting data, including analysis and interpretation of financial statements. Prerequisite: 500, 501, or permission.

ACCTG 511 Concepts in Accounting Measurements

Identifying and measuring attributes of resources of the firm relevant to management decisions. Topics covered include: developing standards, budgets and plans; formal planning models; decision analysis; control analysis; and information analysis. Prerequisite: 500, 501, or permission of graduate office.

ACCTG 520 Seminar in Financial Accounting (3) Critical examination of alternative approaches to the study and the development of accounting theory. Evalua-tion of selected classic contributions to accounting theory. Extensive readings and discussion of recent attempts in English-speaking countries to formulate meaningful and useful conceptual bases for accounting.

ACCTG 521 Seminar in Financial Accounting (3) Application of accounting theories to unresolved prob-lems in financial accounting. Topics vary with the chang-ing importance of current accounting concepts and prob-lems. Stress is placed on developing research and writing skills along with analytic abilities. Prerequisite: 520 or permission of modulus office permission of graduate office.

ACCTG 522 Seminar in Managerial Accounting (3) Critical examination of theories of cost and managerial accounting. Differentiation of objectives of managerial and financial accounting; joint costs, absorption, direct, standard, and distribution costing; techniques of analysis of data, including differential cost analysis.

ACCTG 540 Seminar in International Accounting

(3) Emergence of the international accounting problem and organizations associated with the study of the issues in-volved; national differences in accounting thought and practice; international standards of accounting and audit-ing and financial reporting.

ACCTG 570 Seminar in Auditing (3) Examination of the changing business environment of the auditor and the impact of these changes on auditing phi-losophy, objectives, and methodology. The seminar fo-cuses on the auditing of information systems, man-agement control systems, and the expansion of the re-porting function. Outside project includes an audit of an actual company selected by students. Prerequisites: 510, 511.

ACCTG 571-572 Research Reports (3-3) Independent study in business administration; critical evaluation of business analysis and research methods. Ef-

fective communication of ideas is emphasized. Methods and content of independent research studies being com-pleted by the students are subjected to critical evaluation. Open only to M.B.A. nonthesis students. Prerequisites: instructor's approval of preliminary research topic outline for 571-; 571- for -572.

ACCTG 585 Seminar in Financial Control Systems

Design and administration of formal information systems Design and administration of formal information systems to aid the planning and control process in large organiza-tions; formulation of divisional financial goals and control criteria; measurement of divisional performance and problems of goal congruence; administration of new investment programs. Prerequisites: 501 and A ORG 550 or permission of graduate office.

ACCTG 595 Introduction to Accounting Research (3) A

Examination of research problems and techniques in accounting. Interdisciplinary nature of accounting research emphasized. Work in finance, economics, and psychology may be used to develop current trends in a counting research. Prerequisite: admission to doctoral program.

ACCTG 596 Seminar in Financial Accounting Research (3, max. 6) Sp

Review and critical analysis of research strategies and methods applied to problems in financial reporting prac-tice and financial accounting standard setting. May be re-peated for credit with permission. Prerequisite: doctoral standing and 520 or equivalent or permission of graduate office.

ACCTG 597 Seminar in Managerial Accounting Research (3, max. 6) A

Critical analysis of current managerial accounting re-search, both published and unpublished. May be repeated for credit with permission. Prerequisite: doctoral standing and 522 or equivalent or permission of graduate office.

ACCTG 599 Doctoral Seminar in Accounting (3) Study and research in advanced topics of accounting. The seminar is generally concerned with unpublished areas of research as well as research methodology and philos-ophy. It is conducted by departmental faculty and occasional distinguished visiting faculty. For doctoral students only.

ACCTG 600 Independent Study or Research (*)

ADMINISTRATION

Approval of graduate business program office and entry card required.

Course¹ for Graduates Only

ADMIN 510 Integrative Administration (15) S Johnson

Includes materials basic to the study and analysis of ad-ministration in organizations: organization theory and ad-ministrative behavior; resource allocation, accounting, ministrative behavior, resoluce anocation, accounting, and financial control; systems operation and analysis; marketing; and governmental-societal framework. Fac-ulty team-teaching approach. Not open to business ad-ministration majors. Offered on credit/no credit basis only. Prerequisite: permission of Graduate School of Business Administration.

ADMINISTRATIVE THEORY AND ORGANIZATIONAL **BEHAVIOR**

Courses for Undergraduates

A ORG 301 Behavioral Science and Administration (4) Introduction to some of the fundamental research and

theories of behavioral science that are particularly rele-vant to the study of management. Materials are presented to aid the student of management and administration in understanding the behavior of individuals and work groups. Prerequisite: junior standing or above.

A ORG 420 Human Relations in Organizations (4) Develops understanding of organizational behavior, with a focus on basic processes and methods involved in diag-nosing human situations and in taking action; includes

specific personal, social, and organizational aspects; case discussion, instrumental exercises, and analysis of concepts and conceptual schemes. Prerequisite: admission to business administration or permission of undergraduate office.

A ORG 440 Organization Theory (3)

Studies of concepts of formal organization structures, power, authority, and influence; communications, delegation and decentralization, decision and planning theory; philosophy and values in business organizations, and site: admission to business administration or permission of undergraduate office.

A ORG 441 Advanced Organization Theory (3) Deals with current research, measuring organizational effectiveness, planning, leadership patterns, current problems, developments in related disciplines. Prerequisite: 440.

A ORG 461 Two-Person Behavior in Organizational Contexts (4)

Clinically examines those behavioral skills and processes that are most basic in the development of effective in-dividual behavior in business and other organizational dividual behavior in business into dute toganizational contexts. Emphasis on practice in developing; (1) self-awareness; (2) skills and processes in face-to-face communication and interaction; and (3) structuring of ef-fective interpersonal relationships in organizational con-texts. Offered on credit/no credit basis only.

A ORG 463 Administrative Behavior (4) Studies practice and theory in formal organizations through selected readings and actual cases. Emphasizes unrougn selected readings and actual cases. Emphasizes the superior-subordinate relationship at all levels. Con-siders the administrator's frame of reference, communi-cation in organizations, motivation, informal organiza-tion, situational and environmental aspects, and administrative controls. Offered on credit/no credit basis only. Prerequisite: 420 or HRSYS 301.

A ORG 464 Racial, Ethnic, and Cultural Factors in Administration (4) Understanding difference based upon racial, ethnic, and cultural factors and the impact of difference on the administration of organizations. Emphasis on the comprehension of behavioral dynamics of discrimination through case analysis, role playing, and other exercises. Offered on credit/no credit basis only. Prerequisite: permission of undergraduate office.

A ORG 499 Undergraduate Research (3, max. 9) Prerequisite: permission of undergraduate office.

Courses for Graduates Only

Approval of the graduate business program office re-quired.

A ORG 500 Human Relations in Organizations (3) A OKG S00 Human Kelations in Organizations (3) Analytically examines basic processes related to diagnos-ing organizational behavior and taking action. Aspects of individual and group behavior, basic human relations skills, behavioral processes, and the effects of organiza-tional systems and processes on human behavior. Offered on credit/no credit basis only. Prerequisite: permission of eventues office graduate office.

A ORG 550 Organization and Management (3) Studies concepts of objectives and goals, decision mak-ing and planning, communication, delegation and decentralization, power, authority and influence, leadership and motivation, and considerations of values, social issues, and future trends in organization. Research and theories in other fields, such as behavioral science and economics, are related to business organization and man-agement theory. Prerequisite: permission of graduate of-

A ORG 560 Seminar in Organization Design (3) W Those who design organizations in business firms, or other organizations, have available to them certain alter-native patterns from which they may choose. Each is thought to be contingent upon (1) current conditions out-side the organization, or (2) current conditions inside the organization, or (3) the stage of evolution or growth in which the organization exist. The seminar examines these alternative patterns, asking which structure is likely to be most productive. Prerequisite: permission of gradu-ate office. ate office.

A ORG 565 Seminar in Comparative

Administrative Theory (3) Identifies and evaluates the variations that occur among significant factors within organizations, across organiza-tions, institutional groups (business, education, health services, government), national cultures (U.S., Russia, France, Brazil) and supranational cultures (SEATO, EEC), and their effect upon unit effectiveness. Prerequisite: permission of graduate office.

A ORG 571-572 Research Reports (3-3) See ACCTG 571-572 for description.

A ORG 575 Human Aspects of Administration (3) Examines administration process with a primary focus on organizational behavior. Develops the basic contributions of social science and other sources in the formulation of administrative-organizational conceptual schemes. Criti-cally evaluates administrative theory in relation to admin-istrative practice. Prerequisite: permission of graduate office.

A ORG 576 Human Aspects of Administration (3) Develops in depth some of the basic contributions to ad-Develops in depth some of the basic contributions to ad-ministrative theory and practice made by past and current research, thought, and experience. Typically examines several major research studies, drawing on findings from psychology, sociology, social and cultural anthropology, business administration, government, and other sources. Prerequisite: permission of graduate office.

A ORG 577 Practicum in Human Relations (3) Utilizes the concepts, structures, methods, and tech-niques, commonly called the laboratory training method, for learning about personal and interpersonal phenomena, The seminar presents the opportunity for an in-depth ex-amination of one's own and others' behavior and of the consequences of that behavior, using the vehicle of the T-(for training) group—an unstructured, agendaless small group that focuses on the here and now actions, reac-tions, and interactions of the group members. The T-group provides the environment for inourve, examinagroup provides the environment for inquiry, examina-tion, and experimentation; the data are created and analyzed by the group members working together. Offered on credit/no credit basis only. Prerequisite: permission of graduate office.

A ORG 580 Planning and Decision Theory (3) Usually focuses on the development of a theory of deci-sion making, with emphasis on behavioral aspects. Consideration of information-decision systems and the role of model building. Occasionally emphasizes the de-velopment of a theory of planning, including foundation for theory, process of planning, role of participants in planning, the auxiliary functions, and integration into general theory. Prerequisite: permission of graduate of-fice.

A ORG 581 Seminar in Advanced Organizational

Behavior (3) Analysis and examination in depth of human behavior in the organizational setting. Emphasis on research, theory, and practice and their impact on individual or group be-havior. In different quarters one topic such as leadership, motivation, interpersonal communication, small-group dynamics, etc., is covered. Prerequisite: permission of graduate office.

A ORG 584 Theory and Practice in Organization Development (3)

Provides a conceptual understanding of organization development and some practice in developing applicable skills. Inquires into such matters as the history of organi-zation development, conditions for successful application, organization diagnosis, client-consultant relation-ships, the action research model, team building, intergroup-conflict resolution, and implications for the total organization. Prerequisite: permission of graduate office.

A ORG 587 Seminar in Advanced Organization Theory (3)

Investigates the development of a theory of organization with subtheories on structures, processes, goal determi-nation, problem solving, innovation, and change. Ap-praises various approaches to the study of organizations praises various approaches to the study of organizations such as the sociological, normative, descriptive, analyti-cal, and systems approach. Studies in detail the most important conceptual and analytical models of organiza-tion such as bureaucratic, information-communication, coalition, economic, and behavioral. Appraises the re-search methodologies in field studies, laboratory investi-gations, model building, and simulation. Discusses the future trends in organization theory. Prerequisite: permission of graduate office.

A ORG 599 Doctoral Seminar in Administrative Theory and Organizational Behavior (3)

Study and research in advanced topics of administrative theory and organizational behavior. The seminar-is gen-erally concerned with unpublished areas of research and is conducted by visiting professors and departmental fac-ulty. May be repeated for credit. For doctoral students only. Prerequisite: permission of graduate office.

A ORG 600 Independent Study or Research (*) Prerequisite: permission of graduate office.

BUSINESS ADMINISTRATION

Courses for Graduates Only

Approval of the graduate business program office and entry card required.

B A 700 Master's Thesis (*) AWSp

B A 800 Doctoral Dissertation (*)

BUSINESS ADMINISTRATION RESEARCH METHODS

Courses for Graduates Only

Approval of the graduate business program office and entry card required.

BA RM 500 Statistical Methods I (4) Statistical methods useful for research in various areas of business administration. Topics include estimation and hypothesis testing, enumerative techniques, and simple linear models. Prerequisite: QMETH 500 or equivalent.

BA RM 501 Statistical Methods II (4) Continuation of 500. Further coverage of statistical re-search methods. Topics include introduction to multiple regression, analysis of variance, analysis of covariance, design of experiments, nonparametric techniques. Pre-requisites: 500 and permission of graduate office.

BA RM 510 Applied Econometrics I (3) Emphasizes the application of econometric methods rather than the mathematical proofs of statistical pro-cedures. Introduction to the linear regression model, in-terpretation of summary statistics, bias and precision of regression estimates, analysis of the residuals. Prerequi-citary 500 and 501 are appricing of methods of file sites: 500 and 501, or permission of graduate office.

BA RM 511 Applied Econometrics II (3) Continuation of 510. Hypothesis testing, distributed lags, serial correlation models, simultaneous equation models. Prerequisite: 510.

BA RM 520 Behavioral Research Methods—Theory and Design (3) Philosophy of science, development of scientific method, and meaning of behavioral research. Historical per-spective of scientific investigation and the evaluation of science the development of the platienche research. The development of theory and its relationship to research. Various strategies and designs in behavioral research. Prerequisites: 500 and 501, or permission of graduate office.

BA RM 521 Behavioral Research Methods-

BA RM 521 Behavioral Research Methods— Approaches and Applications (3) Considers alternative research approaches, such as labo-ratory and field experimentation, simulation, and sur-veys, with data-gathering techniques appropriate for each approach. It is primarily concerned with developing alter-native approaches to research problems and with discussing specific applications. It builds upon a back-ground of specific statistical tools and techniques and an understanding of theory development and research de-sign. Prerequisites: 500 and 501, and permission of sraduate office. graduate office.

BUSINESS COMMUNICATIONS

Courses for Undergraduates

B CMU 301 Basic Written Business

Communications (4)

Broad analytical approach to written communications as a management tool. Analysis of the psychology, seman-tics, planning, and principles of effective business writ-ing. Practical application through messages that inform and persuade, grant and refuse; plus short business reports and applications for positions. Prerequisite: junior standing or above.

B CMU 410 Business Reports and Other Specialized Communications (5) Covers both internal and external communications that

businessmen and businesswomen write on the job. Emphasis is on various types of internal reports, ranging from short informal memos to the more complex formal reports. Also covered are specialized external types of communications directed to customers. Prerequisite: junior standing or above.

BUSINESS ECONOMICS

Courses for Undergraduates

B ECN 300 Managerial Economics (3)

Analysis of economic factors affecting decisions made by business firms. Demand and cost analysis, and alterna-tive policies from the firm's point of view. Prerequisites: ECON 201 and admission to business administration or permission of undergraduate office.

B ECN 301 Money, National Income, and Prices (4) Measurement and analysis of business activity in the commodity and money markets; static and dynamic models of income and interest rate determination; problems and policies in the stabilization of business conditions. Prerequisites: ECON 200 and 201 and admission to business administration or permission of undergraduate of-

B ECN 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 develop-ments. Prerequisites: 301 and senior standing.

B ECN 427 International Finance (4)

B ECN 427 International Finance (4) Asset choice and institutional operations in international finance; foreign exchange problems; the impact of inter-national financial problems and operations on business; short-term and long-term international financing. Prerequisite: 301.

B ECN 439 Business Forecasting (4) Analysis of basic variations affecting general business conditions as a background for business and investment decisions; appraisal of proposals for controlling cycles and of forecasting techniques. Prerequisites: 301 and **OMETH 201.**

B ECN 499 Undergraduate Research (3, max. 6) Research in selected areas of business economics. Pre-requisites: 300 and 301, and permission of undergraduate

Courses for Graduates Only

Approval of the graduate business program office and entry card required.

B ECN 500 Business Economics I (3) Factors underlying the determination of cost and prices for the industry and the firm; demand analysis with focus on application.

B ECN 501 Business Economics II (3)

Analysis of real and monetary factors affecting the na-tional and international economic environment, supply and demand for money, interest rates, stabilization problems and policies, in relation to government and policy effects on business and individual affairs. Prerequisite: 500.

SCHOOL OF BUSINESS ADMINISTRATION

B ECN 512 Advanced Managerial Economics (3) B ECN 512 Advanced Managerial Economics (3) Focus is on application of basic firm theory as developed in 500. Principles of optimum resource allocation, empir-ical estimation of cost and demand schedules. Prerequi-sites: 500 and QMETH 500, and permission of graduate

B ECN 513 Forecasting the Economic Environment of the Firm (3)

Survey, evaluation, and synthesis of techniques available to forecast supply and demand conditions at the macro and industry levels. Emphasis on understanding macro forecasts and converting them to industry forecasts. Prerequisite: 501.

B ECN 514 Seminar in Input-Output Analysis (3) Application of input-output techniques to the analysis and forecast of industrial and regional markets and production requirements. Input-output as general applications of forecasting of economic growth impact analysis and pol-icy simulation in the context of national, international, and regional linkages. Prerequisites: 500, 501.

B ECN 520 Financial Markets (3)

Analysis of the functions and the structure of money mar-Analysis of the functions and the structure of money mar-kets; the saving-investment process and financial inter-mediaries; supply and demand for lendable funds and the level and structure of interest rates, role of the Federal Reserve and Treasury in the money markets. Prerequisites: 501 and permission of graduate office.

B ECN 521 Seminar in Financial Markets (3)

Analysis of managerial and environmental financial problems of banks and nonbank financial institutions; theory of flow of funds and financial intermediation. Prerequisites: 500, 501, 520.

B ECN 522 Macroeconomic Policy (3)

B ECN 522 Macroeconomic Policy (3) Exploration of the recent and current literature in the area of monetary and income theory and an examination of monetary and fiscal policy problems in the area of do-mestic finance. Prerequisite: 501.

B ECN 527 International Finance and Investments (3)

Study of selected problems in financing, international trade, investment, and foreign business operations; inter-national aspects of money markets; problems of evalua-tion of foreign investments. Prerequisites: 501, FIN 502.

B ECN 528 International Financial Management (3) Analysis of financial problems facing United States busi-nesses engaged in international activities: financing foreign investment, financial control of foreign operations and working capital management, including for-eign-exchange positions.

B ECN 529 Competition Policies in the Context of International Business (3) Legal and economic analysis of the competition policies, of selected developed countries, including the Common Market, the Federal Republic of Germany, the United Kingdom, Japan, Canada, and the United States, with particular reference to the impact of the policies upon the multinational corporation enterprise and international business transactions. Offered jointly with BG&S 555. Entry card required.

B ECN 530 Industry Structure and Performance (3) Market structure, conduct, and performance; mergers and diversification; price and nonprice patterns of firm behav-ior. Prerequisite: 500.

B ECN 531 Seminar on the Economics of Social Welfare (3)

Analysis of social welfare economics as affecting the en-vironment of the business firm. Topics may include in-come maintenance, welfare, labor, the demand and supply of social services, crime, and human capital. Offered jointly with ECON 518 and SOC W 560. Prerequisite: 500 or ECON 500 or permission of graduate office.

B ECN 532 Seminar on Applied Economic Analysis (3)

Analysis of contemporary economic issues. Emphasis on current problems and policies. Prerequisites: 500, 501.

B ECN 571-572 Research Reports (3-3) See ACCTG 571-572 for description.

B ECN 599 Doctoral Seminar in Business

Economics (3) Study and research in advanced topics of business eco-nomics. The seminar is generally concerned with unpub-

lished areas of research, and is conducted by visiting professors and departmental faculty. May be repeated for credit. For doctoral students only. Prerequisite: permission of graduate office.

B ECN 600 Independent Study or Research (*)

BUSINESS, GOVERNMENT, AND SOCIETY

Courses for Undergraduates

BG&S 101 Business: An Introductory Analysis (5) The nature and role of American business in modern society, its growth, structure, organization, and relationship to environment. Business firms, their objectives, functions, and management. Problems of organization, decision making, controls, investment in business, and related aspects. Career opportunities in business.

BG&S 200 Introduction to Law (5)

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 volun-tary arrangements in a business society. Prerequisite: sophomore standing or above.

BG&S 310 Legal Aspects of Business and Public Policy (5)

Legal questions involved in government and institutions including government regulation of competition, busineurality government regulation of competition, busi-ness-labor relations, government ownership, government assistance to business as well as business influences on government, regulation and the alternative of public con-trol in selected case studies in such areas as pollution control and public utilities. Prerequisites: 200 and junior standing or above.

BG&S 333 Business and Society (4) Major concepts in the behavioral sciences with respect to the influence of cultural norms and goals upon business activity, and the interdependence of business and other elements of the social order. Lectures and discussion. Prerequisite: admission to business administration or per-mission of undergraduate office.

BG&S 361 Business History (3) Exploration and analysis of the development of the American business system within the context of environmental forces shaping the growth of the nation. Prerequisite: junior standing or above.

BG&S 403 Commercial Law (5) Principles of the law of property, sales, negotiable instru-ments, and security transactions. Prerequisites: 200 and junior standing or above.

BG&S 440 Pre-Modern Social and Economic * Systems (3)

Examination of the social and economic institutions of representative premodern societies around the world. Prerequisite: junior standing or above.

BG&S 445 Comparative Enterprise Systems (5) Investigation of functions, modes of operation, and meth-

ods of coordinating business enterprises in various economic systems, ranging from the competitive to the highly centralized. Prerequisite: junior standing or above.

BG&S 462 The Social Responsibilities of Business (3) Focus on the more conventional issues of social responsi-

bility: economic, social, and political trends and their implications for business managers and the business system; role of business ethics and corporate morality in capitalist ideology; managerial responses to the changing social and political environment; corporate social audits. Pre-requisite: junior standing or above.

BG&S 490 Special Topics and Issues in Business,

Government, and Society (3, max. 9) Emphasis is on contemporary topics and issues of busi-ness in their governmental and societal contexts. The content of the course reflects contemporary developments and the current interests of the instructors and students. Prerequisite: junior standing or above.

BG&S 497 Behavioral Science and the Study of **Business** (3)

Business (3) Demonstrates the applicability of behavioral concepts to the role of business. Among the aspects of human behav-ior studied are: man as an evolved species; ethology (comparative animal behavior) and its meaning to human self-understanding; culture and personality; the advent of civilizations, their types and histories; the origins of industrialism and its growth; the place of American soci-ety in Western civilization and the contemporary world; the interplay between American can industry and the con-sumer, with special attention to the economic impact of fashions in taste. Prerequisiter junior standing or above.

BG&S 499 Undergraduate Research (3, max. 9) Selected problems in social, legal, and economic institu-tions. Prerequisite: permission of undergraduate office.

Courses for Graduates Only

Approval of the graduate business program office and entry card required.

BG&S 510 Business and Public Policy (3)

Legal institutions and processes in the development of public policies affecting business with special emphasis on the newly emerging issues of business and public pol-icy. Emphasis on the analysis of selected public policy developments relating to competition, corporate power, the governance of the corporation, and consumer and en-vironmental protection. Analysis of the relation of these developments to corporate social responsibility. Prereq-uisite: permission of graduate office.

BG&S 511 The Context of the Business System (3) Specific problems that arise between the business system and the environmental context within which it operates. The role and contribution of the business system to American society and the symbiotic relationship that ex-ists between the two. Prerequisite: permission of graduate

BG&S 523 Commercial Law (3) Sp Graduate business law, including selected topics in the law of contracts, agency, partnership, corporations, com-mercial paper, sales, securities regulation. Opportunities for guided, independent study of recent legal develop-ments of special interest to individual students.

BG&S 540 Cultural Change and Modernization (3) Intensive analyses of specific cases of culture change around the world. The emphasis is on economic development and modernization with special attention to prob-lems of introducing change and the practical consequences of change.

BG&S 552 Legal Aspects of Business Regulation (3) Examination, from the point of view of the business manager and the society, of advanced problems bearing upon top management's operating policy, with particular reference to selected legal and economic issues in public policies relating to competition. Prerequisite: permission of graduate office.

BG&S 553 Advanced Problems in Business and

BG&S 553 Advanced Problems in Business and Public Policy (3) Advanced contemporary problems in business and public policy; wage and price controls; collective bargaining and strikes in essential industries; racial integration; "unde-sirable" and "excessive" advertising; industrial impact on the physical environment. Prerequisite: permission of graduate office.

BG&S 555 Competition Policies in the Context of International Business (3) Sp

Legal and economic analysis of the competition policies of selected developed countries, including the Common Market, the Federal Republic of Germany, the United Kingdom, Japan, Canada, and the United States, with particular reference to the impact of the policies upon the multinational corporation enterprise and international business transactions. Offered jointly with B ECN 529.

BG&S 562 Responsibilities of Business Leadership

(3) Relationships among business and consumers, government, labor, and agriculture as affected by changing so-cial forces. Problems of business ethics. Prerequisite: permission of graduate office.

BG&S 565 Industrialization and Social Structure (3)

Continuity and change in the structure of societies undergoing industrialization, with special attention to theories of the American experience and to the status and power of business. Prerequisite: permission of graduate office.

BG&S 571-572 Research Reports (3-3) See ACCTG 571-572 for description.

BG&S 575 Theories of Capitalism (3)

Focuses upon the various theories of capitalism devel-oped over the past several centuries and their relevance for our contemporary society. Prerequisite: permission of graduate office.

BG&S 590 Business History (3) Development of the American business system, with special emphasis on dynamic forces, both internal and external, that shape the form and character of business. Prerequisite: permission of graduate office.

BG&S 597 Behavioral Science of the Business

System (3) Examination of basic developments in behavioral science relevant to the American business system. Attention cen-ters on the business scholar's need for an integrative approach to the social environment of business. Prerequi-site: permission of graduate office.

BG&S 598 Analysis of Business Behavior (3) Analysis of the behavior of the modern firm and its environment in the light of traditional and contemporary theory. Emphasis is placed upon empirical investigation of firm behavior. Prerequisite: permission of graduate office.

BG&S 599 Doctoral Seminar in Business,

Government, and Society (3) Study and research in advanced topics of business, gov-emment, and society. Generally concerned with unpub-lished areas of research and conducted by visiting professors and departmental faculty. May be repeated for credit. Prerequisite: permission of graduate office.

BG&S 600 Independent Study or Research (*) Prerequisite: permission of graduate office.

BUSINESS POLICY

Courses for Undergraduates

B POL 470 Business Policy (4)

Case study of 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. This course integrates and builds upon the work of the core curriculum. Prerequisites: senior standing or above and FIN 350, MKTG 301, OPSYS 301, and HRSYS 301 or A ORG 420, or permission of understudents office. Entry, and peruing undergraduate office. Entry card required.

B POL 471 Small Business Management (4)

Policy formulation and implementation in smaller firms For the top manager's point of view. Integrates and builds upon work of the core curriculum. Includes analy-sis of cases and field projects related to small firms. Pre-requisites: senior standing or above and FIN 350, MKTG 301, OPSYS 301, and HRSYS 301, or permission of un-dergraduate office. Entry card required.

B POL 480 Business Simulation (5) Critical analysis of integrated business policy formulation in a complex and dynamic industrial environment by in a complex and dynamic industrial environment by means of simulation (business gaming). Prerequisites: se-nior standing or above and FIN 350, MKTG 301, OPSYS 301 and HRSYS 301, or A ORG 420, or permis-sion of undergraduate office. Entry card required.

B POL 499 Undergraduate Research (3, max. 9) Prerequisite: permission of undergraduate office.

Courses for Graduates Only

Approval of the graduate business program office and entry card required.

B POL 509 Policy Decisions in Business and Non-Business Institutions (3) Analysis of policy problems faced by managers in busi-

ness, government, and nonprofit institutions. Determini-tion of organizational product/service objectives, devel-opment of operating policies and methods to achieve objectives at a satisfactory cost to the consumer and to society. Designing organizational structures, provision of executive personnel to fit the organization's goals and perspine methods. Persentistic accord user in M.B.A. operating methods. Prerequisite: second year in M.B.A. program or final stages of other graduate programs.

B POL 510 Strategic Planning in Larger

Corporations (3) Similar to 509 and can be taken instead of 509. Brings together in one course students who plan careers in larger regional, national, and international business corporations; or in firms that serve such corporations (accounting, law, engineering, and consulting firms).

B POL 530 Entrepreneurship (3) 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. Prerequisite: permission of graduate office.

B POL 54S Field Projects and Experience Exercises in General Management (3) Provides experiences such as: (1) case writing in on-going organizations, (2) analysis and recommendations going organizations, (2) analysis and recommendations on real policy problems in corporations or other institu-tions; and (3) management games or simulations specifi-cally designed according to the business policy area of courses. Prerequisite: 509 or 510.

B POL 571-572 Research Reports (3-3) See ACCTG 571-572 for description.

B POL 596 Technological and Social Responsibilities in Management Decisions (3) The job of any manager, whether in a corporation, hospi-tal, or government agency, includes: (1) awareness of the technical responsibility of the organization to provide eftechnical responsibility of the organization to provide ef-ficient goods or services to society; (2) awareness of hu-man responsibility of the organization to provide a good life for human beings inside and outside the organization; and (3) an ability to reconcile and balance these often conflicting values in managerial (policy) type decisions. The primary goal of the course is to develop a method for making this kind of decision by use of case analyses and evention. selected reading. Prerequisite: second-year standing.

B POL 599 Doctoral Seminar in Business Policy (3) AWSpS

Study and research in advanced topics of business policy. The seminar is generally concerned with unpublished areas of research and is conducted by visiting professors and departmental faculty. May be repeated for credit. Prerequisite: permission of graduate office.

B POL 600 Independent Study or Research (*) Prerequisite: permission of graduate office.

FINANCE

Courses for Undergraduates

FIN 350 Business Finance (4) Sources, uses, cost, and control of funds in business en-terprises. Internal management of working capital and in-come sources and cost of long-term funds; capital budgeting; financing of the growth and expansion of business enterprises; government regulation of the finan-cial process. Prerequisites: B ECN 300 and admission to business administration or permission of undergraduate office. office.

FIN 423 Banking and the Financial System (4) Role of banks and nonbank financial institutions in the

foncial system; asset choices of banks and nonbank financial institutions; problems in the management of financial institutions with emphasis on commercial banks. Prerequisites: 350 and B ECN 420.

FIN 450 Problems in Corporation Finance (4)

Case problems in corporation Finance (9) Case problems in corporation management. Includes cases on management of current assets, obtain-ing short-term loans, raising long-term capital, capital budgeting, and dividend policy. The management point of view is stressed. Prerequisites: 350 and ACCTG 375,

FIN 453 Financial Theory and Analysis (4)

Physical and the processing of the second state of the second state of the second state of the second state of the second state of the second

FIN 460 Investments (4) Introduction to the nature, problems, and process of eval-uating particular securities and portfolio construction and administration. Special attention is directed to the risk and rate of return aspects of particular securities, securi-ties portfolios, and total wealth. Prerequisites: 350 and senior standing.

FIN 461 Investment Analysis (4) A sequence course to 460 in which traditional investment analysis of securities is explored in more detail, and special emphasis is directed to more recent developments, especially portfolio analysis. Prerequisite: 460.

FIN 499 Undergraduate Research (3, max. 6) Research in selected areas of business finance, money and banking, or investments. Prerequisites: 350 and per-mission of undergraduate office.

Courses for Graduates Only

Approval of the graduate business program office and entry card required.

FIN 502 Business Finance (3)

Financial management of the firm including capital budgets, working capital analysis, and financing policy. Pre-requisites: ACCTG 500, B ECN 500, QMETH 500.

FIN 515 Capital Investment in Urban Development

(3) Develops principles for evaluating opportunities to invest in urban real estate, discusses the question of determining of cavital for such investments, investigates some problems in the application of an appropriate in-vestment criterion to specific types of opportunities, and explores some aspects of the urban renewal problem. Of-fered jointly with U D 515 and URB P 553. Prerequisite: 502, U D 505, URB P 552, or permission of graduate office.

FIN 530 Financial Management of Banks (3) Haley

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. Prereq-uisite: B ECN 520 or permission of graduate office.

FIN 550 Advanced Business Finance (3)

Systematic coverage of the theory of financial manage-ment. Application of quantitative analysis to the financial problems of the firm. Examination of empirical studies on the financing of the modern corporation. Prerequisite: 502.

FIN 551 Problems in Business Finance (3)

The application of financial principles and techniques to and oppresent of management. Topics include cash management, credit management, problems in short-term and long-term financing, and capital budgeting. Prerequi-site: 502.

FIN 552 · Seminar in Business Finance (3)

Study of the financing of the corporation, including re-cent 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 pro-cess. Prerequisites: 502, 550.

FIN 560 Investments (3)

FIN 500 Investments (3) Introduction to the nature, problems, and process of eval-uating particular securities and portfolio construction and administration. Special attention is directed to the risk and rate-of-return aspects of particular securities, securi-ties portfolios, and total wealth. Prerequisite: 502 or per-mission of graduate office.

FIN 561 Seminar in Investments (3)

Discussion and analysis of concepts, processes, and problems of investment media valuation, portfolio valua-tion, and portfolio construction, and administration for individuals and institutions. Prerequisite: 560.

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FIN 571-572 Research Reports (3-3) See ACCTG 571-572 for description.

FIN 599 Doctoral Seminar in Finance (3) Study and research in advanced topics of finance. The seminar is generally concerned with unpublished areas of research and is conducted by visiting professors and de-partmental faculty. May be repeated for credit. For doc-toral students or by permission. Prerequisites: for Au-tumn Quarter, 560; for Winter Quarter, 550 and 599; for Spring Quarter), 599 (taken Autumn Quarter and Winter Quarter) and BA RM 510, or equivalent.

FIN 600 Independent Study or Research (*)

HUMAN RESOURCE SYSTEMS

Courses for Undergraduates

HRSYS 301 \ Personnel Systems and Industrial Relations (3)

The recruitment, selection, utilization, and development of human resources, with special emphasis on union-management relations and relevant behavioral science re-.. search. Prerequisite: junior standing or above.

HRSYS 443 Staffing (4)

Includes manpower planning, recruitment, testing, selec-tion, placement orientation, training, promotion. Prerequisite: junior standing or above.

HRSYS 445 Compensation and Performance **Evaluation** (4)

Includes job evaluation; wage and salary administration, performance standards and appraisal, employee benefits. Prerequisite: junior standing or above.

HRSYS 450 Collective Bargaining and Arbitration

(5) Focus on helping the student acquire knowledge and skills that will enable him to be effective in resolving intergroup conflict. This is accomplished almost exclutergroup connect. This is accompanied almost exclu-sively through the active participation of each student in arbitration and collective bargaining simulations. These experiences are analyzed at the end of the course from a behavioral science perspective. In addition, attention is given ways in which the knowledge and skills acquired can be utilized in other conflict situations. Prerequisite: inviter steading or above junior standing or above.

HRSYS 499 Undergraduate Research (3, max. 9) Prerequisite: permission of undergraduate office.

Courses for Graduates Only

Approval of the graduate business program office and entry card required.

HRSYS 510 Human Resource Management (3)

HISS'S SIU Human Resource Management (3) Focuses on critical policy and practice questions in the human resource area, such as fair employment practices, and policies toward labor organizations. Examines the personnel/industrial relations function from a general management perspective. Topics include selection and appraisal interviewing, discipline, and compensation. A case/experiential method is used to foster the develop-ment of stills in managing employme relations offer case experiential menor is used to toster the develop-ment of skills in managing employee relations effec-tively. Recommended for students without previous courses in personnel and human resource systems. Pre-requisite: permission of graduate office.

HRSYS 520 Job Design and Staffing (3) A Job design considerations as they affect employee per-formance, such as job enrichment and work simplificaformance, such as job emictiment and work simplinea-tion schemes. Examines systems related to manpower planning, recruitment, selection, placement, training, and development. Focus on advanced techniques with emphasis on validating predictive measures of perfor-mance. Topics include criterion development, psycho-logical testing, validation procedures, and cost effective-ness of personnel research.

HRSYS 530 Compensation and Performance Appraisal (3)

Analyzes the strategies, problems, and procedures of as-sessing and rewarding human potential, abilities, and performance. Topics include: measurement methods, performance appraisal systems, feedback, and the design of operational assessment systems and the integration of

performance appraisal and job evaluation dimensions within an overall compensation program.

HRSYS 540 Collective Bargaining (3)

HRSYS 540 Collective Bargaining (3) Focuses on current and emerging forms of management and employee relations systems. Primary emphasis is given to new forms of white-collar unionization, public sector labor relations, bargaining and quasi-bargaining situations between professionals and management, and emerging forms of third-party participation in these rela-tionships. Prerequisite: permission of graduate office.

HRSYS 560 Dispute Settlement in Labor Relations

(3) Sp Examines, from an interdisciplinary perspective, tech-niques such as fact-finding mediation, and arbitration that are used to resolve disputes between labor and manage-ment: recent innovations such as last-offer arbitration and endisting and skills. mediation-arbitration formats; understanding and skills necessary to function as a neutral third party in labor relations disputes.

HRSYS 571-572 Research Reports (3-3) See ACCTG 571-572 for description.

HRSYS 599 Doctoral Seminar in Personnel and Industrial Relations (3) Study and research in advanced topics of personnel and

industrial relations. The seminar is generally concerned with unpublished areas of research and is conducted by visiting professors from other universities, professors from other departments in the University, and departmen-tal faculty. For doctoral students only. May be repeated for credit. Prerequisite: permission of graduate office.

HRSYS 600 Independent Study or Research (*) Prerequisite: permission of graduate office.

INTERNATIONAL BUSINESS

Courses for Undergraduates

I BUS 300 The International Environment of Business (3)

Prepares students to understand the most important as-pects of the international political economy. Emphasis on the important relationships among nations and business and economic institutions that influence students' performance as managers, consumers, and citizens. Prereq-uisite: admission to business administration or permission of undergraduate office.

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. Prerequi-sites: 300 or equivalent and junior standing or above.

I BUS 340 Business Environment in Industrial Countries (4)

Countries (4) Study of factors and conditions affecting business opera-tions and behavior in developed countries; international integration; business relations among nation states and in-tegrated supranational systems; direct investments and multinational industrial activities; analysis of sources and causes of international change. Prerequisites: 300 or equivalent and junior standing or above.

I BUS 470 Management of International Trade **Operations** (4)

Applicable for students interested in exporting and importing activities, but especially relevant to small compa-nies. Emphasis on the management of import-export op-erations and the application of relevant functional tools. Cases and class projects are drawn from service companies as well as from manufacturers. Prerequisites: 300 and junior standing or above.

I BUS 480 Multinational Operations Management

(4) Case studies in foreign operations management: planning Case studies in toteran operations management planning international objectives and strategies; developing multi-national company structures and executives; adapting ad-ministrative practices and operating policies to interna-tional diversities. Prerequisite: 300 or permission. Recommended: 470 and junior standing or above.

I BUS 490 Special Topics in International Business

(4, max. 12) Students and faculty focus on current topics of concern. Offered when faculty, student interest, and availability allow. Prerequisites: 300 or permission of instructor and junior standing or above.

I BUS 499 Undergraduate Research (3, max. 9) Prerequisite: permission of undergraduate office.

Courses for Graduates Only

Approval of the graduate business program office and entry card required.

I BUS 550 International Business Environment (3) Understanding the underlying economic, political, and social forces in the international business environment and assessing impact of these forces on international trade and investment. Theories of international trade, for-eign investment, international monetary relations and economic integration, international monetary relations and economic integration, and national policy response to in-ternational market forces. May be taken first year of M.B.A. program, preferably after student has had B ECN 500 and 501, or equivalent.

I BUS 560 Multinational Business Management (3) Managerial responses to problems of international busi-ness organizations and operations. Emphasis on: (1) strat-egy formulation in an international context; (2) design and control of multinational organization; and (3) adaptation of management systems and policies to different eco-nomic, sociocultural, and policical environments. Prereq-uisite: 550 or equivalent, or course in international economics or trade or international finance, or permission of graduate office.

I BUS 570 International Business in Less-Developed Countries (3)

Emphasis on understanding the economic, sociocultural, and political environment in less-developed countries. Problems of international trade and investment, northaouth relations, commodities, technology transfer, foreign aid, and capital flows. Prerequisites: 550 or equivalent, a course in international economics or trade or international finance, or permission of graduate office. Entry card required.

I BUS 571-572 Research Reports (3-3) See ACCTG 571-572 for description.

I BUS 580 International Business in Industrialized Countries (3)

Emphasis on understanding the economic, sociocultural, emphasis on understanding the economic, sociedulari, and political environment in developed, industrialized countries. Problems of international trade and payments relations, economic integration, national policies, and su-pranational organizations' impact on managerial environments. Prerequisite: 550 or equivalent, or course in inter-national economics or trade or international finance, or permission of graduate office.

I BUS 595 Business Studies Abroad (*, max. 9) 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 a studenty with the direct strength of their work in accordance with a definite program of studies. Prereq-uisite: permission of graduate office.

I BUS 599 Doctoral Seminar in International

A BUS 539 Doctoral Seminar in International Busitiess (3) Study and research in advanced topics of international business. The seminar is generally concerned with un-published areas of research and is conducted by visiting professors and departmental faculty. May be repeated for credit. For doctoral students only. Prerequisite: permission of graduate office.

I BUS 600 Independent Study or Research (*)

MARKETING

Courses for Undergraduates

MKTG 300 Marketing Concepts (4) Analysis of tools, factors, and concepts used by manage-ment in planning, establishing policies and solving mar-keting problems. Topics cover marketing concepts, con-

sumer demand and behavior, location analysis, marketing functions, institutions, channels, prices, and public policy. Not open to business administration students for credit, nor to those who have taken 301.

MKTG 301 Marketing Concepts (4) Analysis of tools, factors, and concepts used by manage-ment in planning, establishing policies, and solving mar-keting problems. Topics cover marketing concepts, consumer demand and behavior, location analysis, mar-keting, functions, institutions, channels, prices, and pub-lic policy. Prerequisites: ECON 201 and admission to business administration or permission of undergraduate office. office

MKTG 341 Product and Price Policies (4)

Examines important aspects of product planning and de-velopment, product line decisions, packaging, brand pol-icies, guarantees, and services. Price theory is considered but emphasis is placed on special pricing policies and problems and legal constraints on pricing activity. Pre-requisites: 301, B ECN 300, and junior standing or above.

MKTG 361 Marketing Channels and Institutions (4)

Analysis of marketing institutions and their functions, marketing channel structure, and channel alternatives available to management. Special attention is given to the role and perspective of the channel manager in directing marketing channel systems. Prerequisites: 301 and junior standing or above.

MKTG 381 Retailing (4)

Profit planning and business control; buying, stock control, pricing, promotion; store location, layout, organiza-tion, policies, systems; coordination of store activities. Prerequisites: 301 and junior standing or above.

MKTG 401 Sales Management (4)

Sales and distribution planning; sales organization and training; management of the sales force; methods of sales, cost, and performance analysis. Prerequisites: 301 and junior standing or above.

MKTG 411 Advertising (4) The management of the advertising function and its inte-gration with other forms of promotion. Topics covered are planning the program; determining the most effective approach; evaluation of media and budget; advertising research; advertising institutions; economic and social as-pects. Prerequisites: 301 and junior standing or above.

MKTG 415 Consumer Behavior (4)

Theory and practice pertinent to marketing decisions of individuals and business firms; 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. Prerequisites: 301 and junior standing or above. Recommended: QMETH 201.

MKTG 420 Marketing Research (4)

MK1G 420 Marketing Research (4) The marketing research process; preliminary steps and re-search design, questionnaires, secondary and primary data, sampling, processing and interpreting data, evalua-tion and effective presentation of findings. A class re-search project provides practical application of methods studied. Prerequisites: 301, QMETH 201, or equivalent, and junior standing or above.

MKTG 430 Measurement and Analysis of Marketing Data (4)

Marketing Data (4) Application of various analytical methods in marketing research. Examines the applied aspects of multivariate techniques (multiple regression, factor analysis, and mul-tidimensional scaling) and their usefulness in such mar-keting problems as communication strategy, market seg-mentation, and product positioning. Prerequisites: 301, QMETH 201 or equivalent; and junior standing or above.

MKTG 440 Advanced Marketing Management (4) Introduction to advanced marketing management through the application of various decision-making models and the application of various technological and the application of various and selected computer routines to such marketing problems as advertising budgeting, media planning, sales forecasting, sales-force allocation, and pricing. Applications include market simulation, Bayesian approaches, and linear programming. Prerequisites: 301, MATH 157, or equivalent, and junior standing or above. MKTG 490 Special Topics and Issues in Marketing (4, max. 8)

(4, max. 8) Emphasis on contemporary topics and issues in marketing ing: 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. Prerequisites: 301 and junior charding a charact. standing or above.

MKTG 491 Cases in Marketing Management (4) Analysis of managerial marketing cases involving market trends, marketing research, product planning, distribu-tion channels, pricing, promotion, and social trends. Pre-requisites: 301 and senior standing.

MKTG 499 Undergraduate Research (3, max. 9) Prerequisite: permission of undergraduate office.

Courses for Graduates Only

Approval of the graduate business program affice and entry card required.

MKTG 500 Marketing Management (3) Analysis of markets and institutions and the role of marketing in the economy. Considerations necessary for sound marketing management decisions in pricing, de-mand creation, physical distribution, channel selection, and product development; marketing structures and poli-cies under various competitive relationships; public pol-icy and legislative constraints. Prerequisite: permission of comdute office of graduate office.

MKTG 510 Marketing Channels (3) AW Location and distribution decisions for goods and ser-vices in profit and nonprofit organizations. Considers methods of optimizing the number and quality of institu-tions and activities employed in dealing with exchange, and space and time aspects of distribution. Relates distri-bution questions to the marketing inix and organizational objectives. Prerequisite: 500.

MKTG 512 Promotion Management (3) Management of advertising and personal selling and their integration with other elements of the marketing mix. The communication process, situation analysis, deter-mining promotional mix and the budget, media selection, management of personal selling resources, stimulating reseller promotional support, measurement and evalua-tion of promotional effectiveness, and social and eco-ments or inductive Deservation 500 nomic considerations. Prerequisite: 500.

MKTG 514 Marketing Research (3)

Methods and applications of marketing research incorporating analytical procedures and relevant concepts from behavioral and quantitative sciences. Deals with various aspects of research: problem definition, research design, apects of research problem definition, research design, questionnaire construction, sampling, and data analysis, Introduces promising new developments: multivariate techniques of data analysis, laboratory and field experi-mentation, and demand analysis in both business and public environments. Prerequisites: 500, QMETH 500.

MKTG 515 Product and Price Policies (3) ASp Identification of market opportunities, choice of which goods and services in what combinations to market, and prices at which to offer them. Considers product and price interrelationships in product-line management; product differentiation; the marketing mix; and multiplemarket, oligopoly, and monopoly contexts. Includes pol-icy considerations. Prerequisite: 500.

MKTG 521 Analysis of Multivariate Marketing

Data (3) ASp Methods of analyzing multivariate data in such marketing multivariate data in such marketing and moduct research problems as market segmentation and product positioning. The analytical procedures include factor, cluster, and discriminant analysis, multidimensional scal-ing, and conjoint measurement. Prerequisites: 500 and QMETH 500.

MKTG 522 Marketing Management Models (3) W Introduction to advanced marketing management through the application of various decision-making models to the application of various decision-making models to such marketing problems as advertising budgeting, media planning, brand switching, sales forecasting, sales-force allocation, and pricing. The applications include com-puter simulation, stochastic models, Bayesian ap-proaches, and optimization techniques. Prerequisites: 500, QMETH 510 and OPSYS 500.

MKTG 525 Seminar in Consumer Behavior (3) Analysis of current research in consumer behavior. Topics include consumer decision-making processes, models of buyer behavior, and contributions from the behavioral sciences. Prerequisites: 500 and permission of graduate office.

MKTG 571-572 Research Reports (3-3) See ACCTG 571-572 for description.

MKTG 599 Doctoral Seminar in Marketing (3) Study and research in advanced topics of marketing. The seminar is generally concerned with unpublished areas of research and is conducted by visiting professors and de-partmental faculty. May be repeated for credit. For doc-toral students only. Prerequisite: permission of graduate office.

MKTG 600 Independent Study or Research (*)

OPERATIONS AND SYSTEMS ANALYSIS

Courses for Undergraduates

OPSYS 301 Principles of Operations Analysis (3) Fundamentals of systems management and the techniques used in the analysis and control of operating systems. Background of management decision making and sys-tems analysis, concepts of alternate systems of operations, selection of resources, scheduling and control of tons, sciencia of resources, sciencialing and control of the flow of transactions in systems, maintenance of effi-ciency, statistical analysis of systems behavior, use of computers and quantitative models in analysis and con-trol of operations. Prerequisites: QMETH 200, 201, and definition to human deministration. admission to business administration, or permission of undergraduate office.

OPSYS 401 Administration of Operations (4)

OPSYS 401 Administration of Operations (4) Case problems of decision situations confronting manag-ers of operations. Cases focus upon a systems approach to decisions, system analysis, and application of analyti-cal techniques in actual situations. Problems of im-plementation in design and planning of operating sys-tems, and in control of systems. Includes problems of re-source allocation, project planning, scheduling, inven-tory, quality control, cost control, distribution systems, facilities planning, and coordinating operations with other parts of the enterprise. Prerequisites: 301 and junior standing or above. standing or above.

OPSYS 441 Systems Theory and Design (4) Planning and design of systems, including analytical techniques particularly suited to systems design (e.g., systems dynamics, continuous-flow computer simulation models, systems analysis, and network analysis). Analy-sis of organizations as complex systems, emphasizing the interactions between management decisions and informa-tion feedback. Prerequisites: 301 and junior standing or above. shove

OPSYS 442 Operations Planning and Control (4) Analysis of design, planning, and control of operating systems. Topics vary among facilities location, layout, capital equipment selection and replacement, design of statistical control systems, and applications of improvement curve theory to systems planning and control. Pre-requisites: 301 and junior standing or above.

OPSYS 443 Scheduling and Inventory Systems (4) Analysis of alternative scheduling and inventory systems with emphasis on application of mathematical models and computer simulation. Includes effective utilization of inventory resources, inventory systems, distribution systems, aggregate forecasting and scheduling, network planning methods, job shop scheduling, and sequencing operations. Prerequisites: 301 and junior standing or

OPSYS 499 Undergraduate Research (3, max. 9) Prerequisite: permission of undergraduate office.

Courses for Graduates Only

Approval of the graduate business program office and entry card required.

OPSYS 500 Operations and Systems Analysis (3) Study of the management of operations in business and public enterprises. Basic concepts, philosophy, and tech-

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niques of analysis for management decision making; analysis of structure and dynamic behavior of manage-ment systems; use of computers and quantitative models in planning and control of operations; selection of re-sources; choosing among alternative systems of opera-tions. Prerequisites: QMETH 500, 510, and permission of graduate office.

OPSYS 520 Systems Analysis and Current Issues

(3) (3) Evaluation and redesign of organizations using the systems approach. Both macrosystems and microsystems are studied; however, the emphasis is on the larger units, for example, corporate conglomerates or metropolitan centers. Each member of the class selects some segment of an issue to research, but all use the same model for analy-in the production of the class selects some segment of an issue to research, but all use the same model for analysis. Prerequisites: 500 and permission of graduate office.

OPSYS 521 Studies in Operations Analysis (3) Policy formulation and administration of operating sectors of organizations, emphasizing applications of quantitative models to operating problems, systems anal-ysis, and integration of functions of operations manage-ment with the major goals of the organization. Case studpermission of graduate office.

OPSYS 571-572 Research Reports (3-3) See ACCTG 571-572 for description.

OPSYS 577 System Dynamics (3)

Analysis of the feedback structure and dynamic behavior of management decision and information systems. The dynamics of management decision making from an over-all systems point of view. Emphasis on the interaction of the separate components of an enterprise. Organizational control and growth of fittns and other social, economic, and environmental systems viewed as feedback systems. Construction of continuous-flow computer simulation models using specialized languages, such as MIMIC and DYNAMO. Prerequisite: 500 or permission of graduate office.

OPSYS 582 Analytical Models (3, max. 6) Application of quantitative methods to operations prob-lems. Content varies. Topics include inventory, theory, location, scheduling, maintenance scheduling, quality control, with one or two areas covered in depth each quarter. Prerequisites: 500, QMETH 510, and permission of products office of graduate office.

OPSYS 585 Systems Analysis Models (3)

Study of elements and structure of system analysis models. Examination of systems analysis in public sector, of complex organizations, and in environmental affairs. Emphasis on quantitative, computer-oriented forms of analysis. Prerequisite: permission of graduate office.

OPSYS 599 Doctoral Seminar in Operations and Systems Analysis (3)

Study and research in advanced topics of operations man-agement. The seminar is generally concerned with un-published areas of research and is conducted by visiting professors and departmental faculty. May be repeated for credit. Prerequisite: permission of graduate office.

OPSYS 600 Independent Study or Research (*) Prerequisite: permission of graduate office.

QUANTITATIVE METHODS

PROBABILITY AND STATISTICS

Courses for Undergraduates

OMETH 201 Statistical Analysis (4)

QME111 201 Statistical Analysis (4) Survey of statistical techniques useful in guiding business decisions: introduction to probability, decision making, correlation, and regression. Prerequisites: MATH 157 and sophomore standing or above.

QMETH 401 Statistical Methods for Business Research (4) Sampling distributions, estimation, tests of hypotheses,

simple nonparametric methods, elements of statistical de-cision theory. Prerequisites: 201 and junior standing or above.

Courses for Graduates Only

Approval of the graduate business program office and entry card required. Students interested in probability and statistics are also urged to consider BA RM 500 and 501

OMETH 500 Probability and Statistics (3)

Introduction to statistical techniques useful for aiding management decisions. Emphasis on use of interactive management decisions. Empirasis on use of micractive computer methods in basic business problems. Topics in-clude random sequences, probability distributions, linear regression, and elementary time series analysis. Prerequi-sites: 350 or equivalent preparation in elementary cal-culus and 200 or equivalent preparation in computer programming.

QMETH 508 Introduction to Probability Theory (4) Introduction to fundamental concepts of probability. Topics include combinatorial techniques, point probabila opics increase communatorial techniques, point probabil-ity and density functions, transformations of random variables, expectation, and families of distributions. Pre-requisite: 350 or equivalent preparation in elementary calculus.

QMETH 520 Applied Multivariate Analysis (4) Exploration and inference using linear models. Advanced treatment of simple and multiple regression, use of dummy variables, analysis of covariance, and selection of variables to be included in the equation. Prerequisite: 500.

QMETH 529 Topics in Applied Business Statistics (4, max. 8)

Application of statistical techniques. Topics vary. Prerequisite: 500 or equivalent.

QMETH 530 Stochastic Series Analysis and Forecasting (4) Introduction to modern time series analysis and forecast-

Introduction to movern time series analysis and forecast-ing. Autoregressive, moving average, and mixed models. Practical methods for model identification, estimation, diagnostic checking, and adaptive forecasting. Oriented toward real data and application. Prerequisite: 500. Strongly recommended: 520 or equivalent.

QMETH 540 Statistical Decision Theory (4) Application of utility theory and probability theory to de-cision making under conditions of uncertainty. Emphasis

on Bayesian methods-prior-to-posterior, preposterior analysis, design of optimal experiments. Prerequisite: 500 or equivalent.

OPERATIONS RESEARCH AND COMPUTER METHODS

Courses for Undergraduates

OMETH 200 Computer Programming (2) (A) Computer programming (2) Introduction to computer programming using the BASIC language and "canned" programs. Applications to busi-ness problems. (Not recommended for students with credit for ENGR 141 or MATH 114.) Prerequisite: sophomore standing or above.

QMETH 350 Quantitative Analysis for Business (4) Introduction to mathematical tools utilized for analysis of business problems; appreciation of the use of these tools in business situations; calculus; linear algebra. Prerequi-sites: MATH 157 and junior standing or above.

QMETH 404 Computer Programming for Business (4)

(4) Programming techniques and languages for solution of quantitative business problems. Assembly language, FORTRAN, COBOL. Basic data-processing techniques. Programming assignments, Prerequisite: 200 and junior standing or above. Recommended: 350.

OMETH 424 Simulation Techniques (4)

Construction and operation of simulation models, includ-ing study and use of specialized simulation languages on digital computers. Prerequisites: 200, 201, and junior standing or above. Recommended: 350.

QMETH 450 Operations Research—Deterministic

Models (4) Formulation and solution of business problems of primar-ily deterministic nature through use of operations research tools. Emphasis on techniques of mathematical programming, dynamic programming, network algorithms. Prerequisites: 350 or equivalent and junior standing or above.

QMETH 490 Special Problems in Quantitative Analysis (4) Specialized quantitative techniques useful for solving

business problems. Topics from operations research, statistics, computer methods. Emphasis on application. Pre-requisites: 401, 404, 450, depending on topic, and junior standing or above.

QMETH 499 Undergraduate Research (3, max. 9) Research in selected problems in business statistics, oper-ations research, decision theory, and computer applications. Prerequisite: permission of undergraduate office.

Courses for Graduates Only

Approval of the graduate business program office and entry card required.

QMETH 504 Computer-Based Information Systems for Management (3)

Introduction for graduate students with little or no prior course work or experience in information systems and computing technology. Covers concepts of information use in decision processes and an introduction to computing technology. Management's responsibilities in deter-mining and developing information systems is the focal point.

QMETH 510 Quantitative Methods (3)

Survey of operations research techniques for business problem solving. Emphasis on linear programming and general mathematical programming techniques. Prerequi-site: 350 or equivalent preparation in elementary calculus.

OMETH 551 Mathematical Programming (4)

Advanced topics in linear programming and an introduc-To to nonlinear programming and in indone tion to nonlinear programming; the managerial significance of nonlinear models. Topics include the re-vised and dual simplex algorithms, decomposition of large linear programs, shortest route problems, uncon-strained optimization of nonlinear functions, steepest descent and feasible direction methods, quadratic and separable programming; Kuhn-Tucker conditions for nonlinear programming, penalty functions. Prerequisite: 510 or 450 or MATH 407.

QMETH 552 Stochastic Models in Operations Research (4)

Optimal decision making in an uncertain environment; probabilistic dynamic programming, including finite ho-rizon and unbounded horizon models, Markov chain models, inventory models, and waiting line models. Not open for credit to students who have taken 451. Prerequi-site: 510 or 450 or MATH 407.

QMETH 560 Research Seminar in Operations Research (4, max. 8)

Intensive study into operations research techniques rele-vant to business analysis. Selected topics include: extensions of linear programming, solution of large systems, stochastic processes, dynamic programming, discrete programming, and network models. Prerequisite: 551 or 552.

QMETH 570 Computer Information Structures (4) Concepts of data structure and file organization typical to administrative data processing and management informa-tion systems. List structures, list processing algorithms. Sorting and searching algorithms for internal and external storage. Sequential, indexed, direct, and hash-coded file experimential, indexed, direct, and hash-coded file storage. Sequential, indexed, direct, and hash-coded inte-organizations and processing. Introduction to data-base concepts and data-base management systems. Program-ming exercises utilizing the University's central comput-ing facility. Prerequisites: 504 or equivalent, and knowledge of a computer programming language.

QMETH 571-572 Research Reports (3-3) See ACCTG 571-572 for description.

QMETH 574 System Analysis, Design, and Programming (4)

Introduction to system analysis, design, and program-ming. Emphasis on structured and modular design, integrating design processes and utilizing COBOL to imple-

ment typical data-processing applications. Planning and management of design and programming functions. Pre-requisite: 504 or equivalent.

QMETH 580 Data-Base Management System (4) Intensive investigation of data-base concepts and data-base management system software (DBMS). Hierarchic, network, and relational based DBMS. DBMS languages. Data dictionary/directory concepts. Role of the data-base administrator. Use of the University's DBMS. Prerequi-site: 504. Recommended: 570.

QMETH 599 Doctoral Seminar in Quantitative

Methods (3) Study and research in advanced topics of quantitative methods. The seminar is generally concerned with un-published areas of research and is conducted by visiting professors and departmental faculty. May be repeated for credit. For doctoral students only, Prerequisite: permission of graduate office.

QMETH 600 Independent Study or Research (*) Prerequisite: permission of graduate office.

RISK AND INSURANCE

Courses for Undergraduates

R INS 310 Fundamentals of Risk and Insurance (5) Introduction to principles of insurance. Economic and social contributions of insurance. Evolution of loss exposites faced in business and personal situations. Plan-ning to use insurance intelligently in dealing with loss ex-posures. Analysis of alternative methods. Prerequisite: junior standing or above.

R INS 420 Analysis of Insurer Operations (4) Study of basic operations common to all types of insur-ance companies. Emphasis on analysis and decision mak-ing as applied to different insurance company operating problems. Prerequisites: 310 and junior standing or above.

/R INS 480 Risk Control (4)

Control of nonmarket risks as a managerial function. Evaluation of alternative courses of action. Influence of competitive pressures and regulation of the insurance in-dustry. Prerequisites: 310 and junior standing or above.

R INS 499 Undergraduate Research (3, max. 6) Individual investigation of risk and insurance problems. Prerequisite: permission of undergraduate office.

TRANSPORTATION

Courses for Undergraduates

TRANS 310 Principles of Transportation (5) Survey of the economic organization and functioning of the transportation industries. Impact on industrial loca-tion, prices, and markets. The nature of public policy in transportation. Prerequisites: ECON 200 and junior standing or above.

TRANS 461 Logistics Theory (4) Management's responsibility for the movement of raw materials and finished products, including traffic man-agement, plant location, materials handling, distribution warehousing, inventory control, and production schedul-ing. Prerequisite: junior standing or above.

TRANS 471 Transportation Policy and Innovations (4)

(4) Appraisal from the public point of view. Content and ef-fect on decision making by carrier and shipper firms. Procedures of administrative agencies regulating trans-portation firms. Prerequisite: junior standing or above.

TRANS 481 Transportation Carrier Management

(4) Carrier problems, including financing, equipment pur-chase and utilization, labor relations, policy determina-

tion, purchasing controls, public relations, and rate negotiations. Prerequisites: 310 and junior standing or above.

TRANS 491 Logistics Management (4) Transportation problems and decisions from the buyer's viewpoint. Cases deal with analysis and selection of mode, both public and private. Costs and service considerations in assembly and distribution. Plant and ware-house location. Evaluation of market potential in view of transportation problems. Prerequisite: 461.

TRANS 499 Undergraduate Research (3, max. 9) Prerequisite: permission of undergraduate office.

Courses for Graduates Only

Approval of the graduate business program office and entry card required.

TRANS 505 Transportation Systems and Institutions (3)

Economic, social, and political aspects of the transporta-Economic, social, and political aspects of the transporta-tion industry from the standpoint of the transportation firm, the user, and the regulatory agencies. Modern physical distribution systems. The economic impact of location on transportation industries. Theoretical and pragmatic considerations in pricing transportation ser-vices. Environmental aspects of domestic and interna-tional transportation and physical distribution externs tional transportation and physical distribution systems. The socioeconomic impact of advancing technology in transportation. Prerequisite: permission of graduate office.

TRANS 520, 521 Trends and Contemporary Problems in Transportation Management, National Policy, and Regulation (3,3)

Impact of changing patterns and programs in transporta-tion on the economy and individual firms. Primary and secondary source data and the interpretation of this information in researching transportation problems and arriving at solutions. Each quarter different aspects are emphasized. Prerequisites: 505 and permission of graduate office.

TRANS 571-572 Research Reports (3-3) See ACCTG 571-572 for description.

TRANS 600 Independent Study or Research (*) Prerequisite: permission of graduate office.

URBAN DEVELOPMENT

Courses for Undergraduates

U D 310 Introduction to Urban Development (4) Introduction to real estate markets, investment, appraisal, accessibility concepts, urban history, urban research, and related topics. Offered jointly with URB P 350. Prerequisite: junior standing or above.

U D 315 Introduction to Urban Planning (3) Principles and theories of urban structure and institutions. 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 environ-mental conditions within the American political framework. Complementary nature of public and private responsibilities. Major procedures used by planners. Of-fered jointly with URB P 300. Prerequisite: junior stand-ing or permission of undergraduate office.

U D 320 Legal Aspects of Urban Development (3) Legal aspects of modern land utilization including the urban plan, zoning, and private and public ownership— with preliminary discussion of the nature of property and a brief survey of real property law. Offered jointly with URB P 381. Prerequisite: junior standing or above.

U D 395 Private Investment in Urban Development (4)

Emphasizes the role of the private sector in urban development; valuation and investment theory; techniques of investment analysis and capital allocation. Offered jointly with URB P 351. Prerequisite: junior standing or ahove

U D 405 Urban Development Location Determinants (4)

Practical workshop on empirical methods to conduct and evaluate locational studies. Offered jointly with URB P 452. Prerequisite: junior standing or above.

U D 451 Housing (3)

Survey of housing and redevelopment problems, theo-ries, standards, and practice. Development of public poli-cies, finance, technological considerations, social fac-tors, and priorities. Offered jointly with URB P 451. Prerequisite: 315 or URB P 300.

U D 496 Research in Urban Development (3)

Workshop in problems of multivariate prediction. Appli-cation and critical evaluation of multiple regression, factor analysis, and case analysis techniques. Prerequisite: permission of undergraduate office.

Courses for Graduates Only

Approval of the graduate business program office and entry card required.

U D 505 Survey of Urban Development (3) Topical survey of urban development. Objective to provide substantive information, methodology, theory, and base for additional courses and seminars in area. Topics include urban economy and determinants of land use, capital investment in urban development, land tenure, urban functions and public sector, urban development pol-icy and strategy. Offered jointly with URB P 552. Pre-requisite: permission of graduate office.

U D 515 Capital Investment in Urban

Development (3) Develops principles for evaluating opportunities to invest in urban real estate, determinants of cost of capital. In uruan rear estate, determinants of cost of capital. Investigates some problems in the application of an appropriate investment criterion, and aspects of urban renewal problems. Offered jointly with FIN 515 and URB P 553. Prerequisite: 505, URB P 552, or permis-sion of graduate office.

U D 525 Seminar in Urban Development Location **Determination (3)**

Advanced workshop on empirical methods to conduct and evaluate locational studies. Offered jointly with URB P 554. Prerequisite: one of the following: 505, 515, URB P 552, 553, FIN 515, or permission of graduate of-

U D 550 Benefit-Cost Analysis Applied to Urban Development (3)

Practical application of benefit-cost methodology to the decision-making process for urban development. 'In a workshop format, benefit-cost analysis procedures are applied to urban development projects or programs, including urban renewal as defined by legislation. Theory or methodology is utilized as necessary to determine ob-jectives to identify and to measure benefits and costs, and to specify decision criteria in terms of the public interest. Offered jointly with URB P 550.

U D 551 Allocation Processes in Urban and

Regional Planning (3)

General economic context of planning analysis and social decision-making. Priorities and public budgets. Measure-ment of collective needs. Allocative processes applied to land use. Offered jointly with URB P 551.

U D 557 Economics of Land-Use Regulation (3) Taxation, subsidy, and other means to further public purposes in land utilization and development. Open space, transfer of development rights, tax allocation financing. Resource use, distributive and market effects of controls. Offered jointly with URB P 557. Prerequisite: 551, 505, or permission of graduate office.

U D 571-572 Research Reports (3-3) See ACCTG 571-572 for description.

U D 595 Urban Development Problems (3) For advanced graduate students concerned with contem-porary problems of urban development, including prob-lem identification and measurement, research meth-odology, and techniques; historical and cultural aspects, social indicators. Prerequisites: 505, 515, and permission of graduate office.

U D 600 Independent Study or Research (*) Prerequisite: permission of graduate office.

SCHOOL OF DENTISTRY

Unless noted otherwise, all undergraduate courses are limited to students enrolled in a degree program in the School of Dentistry; courses for graduate students re-quire permission from the Office of Graduate Dental Education.

COMMUNITY DENTISTRY

COM D 201 Planning a Career in Dentistry for the Future (2) ASp

Future-oriented overview of important concepts in dental Future-oriented overview of important concepts in dental science, contemporary modes of patient treatment, and dental-care delivery systems. Provides first-hand expo-sure to the present practice of dentistry and prerequisite materials in oral anatomy, epidemiology, and other basic science subjects. Open to first-, second-, and third-year undergraduate students throughout the University.

COM D 410 Treating Special Populations: I. Dental Care for the Disabled (1) A Core course designed to provide instruction allowing stucone course designed to provide instruction allowing sub-dents to attain knowledge and skills basic to the motiva-tion for, and clinical competence in, the treatment of the disabled dental patient. Includes the special health, social, and economic problems of the disabled popula-tion; general medical characteristics and orofacial manifestations of the more prevalent disabilities; treatment planning and management techniques for the disabled; optimum use of auxiliaries; modifications in dental treat-ment and home care necessitated by specific disabilities. Offered on credit/no credit basis only. Prerequisite: thirdyear standing or permission.

COM D 411 Practicum in Management of Patient Behavior (2) W

Designed to enhance student skill in patient management.

COM D 420 Issues in the Organization and

COM D 420 Issues in the Organization and Financing of Dentistry (1) Sp Topics in health-care systems: epidemiology; health-care financing; national health insurance; demand for, and availability of, care; and consumerism.

COM D 432 Regulation of Dental Practice (2) A Mechanisms, effects, and implications of the regulation of dentistry and how they affect the working lives of den-tists and the quality of care rendered. Offered on credit/no credit basis only.

COM D 449 Directed Studies in Community Dentistry (*) AWSp Students and faculty with common academic interests

pursue them together within the curriculum by means of independent study and a tutorial student-faculty relationship. Offered on credit/no credit basis only. Prerequisite: permission of instructor.

COM D 497 Directed Studies in Community

COM D 49/ Directed studies in Community Dentistry (*) AWSp Permits students and faculty who have common academic interests to pursue them together within the curriculum by means of independent study and a tutorial student-faculty relationship. Offered on credit/no credit basis only, Prerequisite: permission of instructor.

COM D 499 Community Dentistry Extended

Learning (*) S Supplemental work in community dentistry to correct an area of student deficiency. Offered on credit/no credit basis only.

DENTAL HYGIENE

D HYG 304, 305, 306 Fundamentals of Dental Hygiene Practice (2,2,2) A,W,Sp Study of dental hygiene practice that enables student to gain knowledge of techniques and materials while devel-oping sensitivity to the oral health needs of patients. Pre-requisites: 304 for 305; 305 for 306.

D HYG 354, 355, 356 Clinical Dental Hygiene Practice I (3,3,3) A,W,Sp Clinical application of diagnostic, preventive, and thera-

peutic procedures utilized in patient care by a dental hy-gienist. Prerequisites: 354 for 355; 355 for 356.

D HYG 360 Clinical Dental Hygiene Practice I (6) S Continuation of 306, 356. Prerequisites: 306, 356, and permission of instructor.

D HYG 401 Professional Interactions (3) W

Assists students in preparing for transitions (5) w Assists students in preparing for transition to the role of a private-practice hygienist. Discussions of professional re-sponsibilities, state practice acts, professional organiza-tions, practice management, ethics, application of princi-ples of human territoriality, interpersonal communication and applied monoment tooburg for the interview and conflict management, techniques for job interview-ing, employer/employee negotiations and contracting. Offered on credit/no credit basis only.

D HYG 402 Community Dental Health (3) W

D HYG 402 Community Dental Health (3) W Field experience in community health, with emphasis on dental hygiene care in specific community health pro-grams. Includes methods of identifying community health problems, use of dental epidemiological survey techniques, elements of community analysis and organi-zation, and influence of legislation on patterns of dental-ours deliver, curtemic care delivery systems.

D HYG 403 Principles and Practices of Dental Health Education (1-1) AW

Health Education (1-1) AW Presents information in personal control of dental health; interviewing techniques; learning and teaching processes and methods; and behavior management for the normal, the sensory impaired, spinal-cord injury, and mentally retarded patients.

D HYG 404 Field Practice (2) Sp

Application of dental health principles and practices to field experience in the educational system. Includes experience in the dynamics of the interrelationships be-tween health professional and other school personnel.

D HYG 407, 408, 409 Dental Hygiene in General and Specialty Practice (2,2,2) A, W, Sp Study of dental hygiene practice, with special emphasis on principles of patient management, office management and interpersonal communication, adaptations of proce-dure for special-need patients, career responsibilities, and the legal aspects of dental hygiene practice. Prerequisites: 306; 407 for 408; 408 for 409.

D HYG 449 Directed Studies in Dental Hygiene (*, max. 14) AWSpS Students and faculty with common academic interests pursue them together within the curriculum by means of independent study and a tutorial student-faculty relationship. Offered on credit/no credit basis only.

D HYG 456 Community Dental Hygiene Practice (1-6, max. 6) WSp

Application of dental health principles and practices in hospitals or special community clinics. Includes population not normally present in student's University practice. Offered on credit/no credit basis only.

D HYG 457, 458, 459 Clinical Dental Hygiene Practice II (3,3,3) A, W, Sp Clinical application of diagnostic, preventive, and thera-peutic procedures utilized in patient care by a dental hy-gienist, with special emphasis on patient management, adaptation of procedures for special-need patients, office management and personal communication, proficiency achievements in all dental hygiene skills, and initial op-portunity to pursue special channels of interests relating to dental hygiene practice. Prerequisites: 356; 457 for 458; 458 for 459.

D HYG 460 Clinical Dental Hygiene Practice II (6)

Continuation of 409, 459. Prerequisites: 409, 459, and permission of instructor.

D HYG 465 Advanced Clinical Dental Hygiene Practice (2 or 4, max. 8) AWSpS Advanced instrumentation and clinical procedures for

recriticated dental hygienists. Seminars and clinical expe-rience. Prerequisites: certificate in dental hygiene from an accredited program and permission of instructor.

D HYG 480 Restorative Dentistry for Dental

Auxiliary Educators (2) S Designed to develop dental auxiliary faculty persons skilled in performing and teaching the following restora-tive procedures: utilization of rubber dam; placement and

removal of matrix and wedge; polishing of amalgam res-torations; application of cavity liners, bases, and varnish; torations; application of cavity liners, bases, and varmsh; placement of temporary crowns and restorations. Clinical experience with patients is required. Prerequisites: certif-icate in dental hygiene and a valid license to practice dental hygiene, or a valid certificate in dental assisting; experience as a dental auxiliary educator or pursuing edu-cation for a teaching position. Others selected after re-view of credentials and with permission of instructor.

D HYG 481 Restorative Dentistry for Dental Hygiene Educators (2) S

Designed to develop dental auxiliary faculty persons Designed to develop dental auxiliary faculty persons skilled in performing and teaching the following pro-cedures: condensing and carving of amalgam restora-tions; placement and finishing of tooth-colored restora-tive materials. Prerequisites: 480, certificate in dental hygiene, and a valid license to practice dental hygiene; experience as a dental auxiliary educator or pursuing edu-cation for a teaching position. Others selected after re-view of credentials and with permission of instructor.

D HYG 482 Local Anesthesia for Dental Hygiene Educators (3) S

Educators (3) S Comprehensive course designed to develop dental hy-giene faculty persons skilled in performing and teaching techniques of field and nerve-block anesthesia. Topics in-clude head and neck anatomy, anesthetic pharmacology, pain physiology, prevention and management of an-esthetic complications and emergencies as well as techniques administration. Clinical experience with pa-tients is required. Prerequisites: certificate in dental hy-giene and a valid license to practice dental hygiene; expe-rience as a dental hygiene educator or pursuing education for a teaching position. Others selected after review of credentials and with permission of instructor.

D HYG 483 Clinical Practice of Restorative

Dentistry for Dental Hygiene Educators (2) S Clinical application of skills learned in 481. Offered on credit/no credit basis only. Prerequisites: 480, 481, certified dental assistant or registered dental hygienist.

D HYG 491 Seminar in Dental Hygiene (2) AWSp Study of professional education, accreditation, legisla-tion, organization, and literature and responsibilities of the dental hygienist to the community. Prerequisite: permission of instructor.

D HYG 492 Readings in Current Literature in Dental Hygiene and Preventive Dentistry (2) AWSpS

Discussion of reported readings and survey of back-ground material, with emphasis on dental research and its application to dental health education. Prerequisite: per-mission of instructor.

D HYG 493 Problems in Dental Hygiene (2-4) AWSpS

Problems for study directed toward increased understanding in the selected field of practice. Presentation of research suitable for publication. Prerequisite: permission of instructor.

D HYG 494 Principles of Teaching in Dental Hygiene (2) AWSpS

Application of principles of learning to teaching methods and techniques effective in dental hygiene, with opportu-nity for course planning, demonstration, and practice teaching. Prerequisite: permission of instructor.

D HYG 497 Directed Studies in Dental Hygiene

(*, max. 14) AWSpS Elective course based on student interest in special areas of preventive dentistry or dental hygiene education. The course allows independent study and a tutorial studentfaculty relationship. Offered on credit/no credit basis only. Prerequisite: permission of instructor.

D HYG 499 Dental Hygiene Extended Learning (*)

Supplemental work in dental hygiene to correct an area of student deficiency. Offered on credit/no credit basis only.

D HYG 501 Introduction to Dental Hygiene Procedures (1) AWSp Clinical course for freshman dental students, including

objectives, techniques, and procedures for performing oral prophylaxis, with application of these procedures to patient treatment and preventive control programs.

D HYG 551 Introduction to Dental Hygiene Procedures (1) AWSp See 501 for course description.

D HYG 595 Internship in Dental Hygiene Education

3-10, max. 10) AWSpS Clinical and/or didactic teaching experience or program administration. Teaching and administration responsibiliadministration. reaching and administration responsion-ties assigned according to student's previous experience, education needs, and interest. Seminar required. Prereq-uisites: 494, status as registered dental hygienist licensed in at least one state, and permission of instructor.

DENTISTRY

DENT 400 Principles of Preventive Dentistry (2) A Nature of dental plaque and its role in dental disease. Methods of detecting, quantifying, and controlling dental plaque. Epidemiology of dental caries and the role of flu-orides in prevention. Patient-education procedures. Offered on credit/no credit basis only.

DENT 401 Normal and Abnormal Growth and **Development (2) Sp**

Normal and abnormal developmental processes and char-acteristics of key stages in the human life cycle. Lectures and observational experiences at facilities serving special populations. Offered on credit/no credit basis only.

DENT 422 Geriatric Dentistry (1) W Special needs of older persons seeking dental care: oral health; psychology of aging; socioeconomic problems; effective communications; dental management; special problems in home health care; and problems with institu-tional and long-term care. Offered on credit/no credit basis only.

DENT 431, 432, 433, 434 Vertical Group (1,1,1,1) Small groups, with representation from each dental and dental hygiene class, meet together in seminar sessions to discuss patients assigned them. In this vertical group set-ting, the goal is to achieve acceptable levels of manage-ment of patient care. Tasks are delegated to group members to achieve this goal. Offered on credit/no credit basis only.

DENT 436 Review of Patient Management in

Prediatric Dentistry (1) W Through observation, discussion, and problem solving, students develop their own approach to rapport building, interviewing, and management of routine problems (cry-ing child, struggling child, etc.). Offered on credit/no credit basis only. -

DENT 460 Orthodontic Diagnosis (2) W Principles of orthodontic diagnosis and treatment plan-ning for the pediatric patient.

DENT 461 Introduction to Clinical Pediatric Dentistry (2) Sp Emphasis on orthodontic diagnosis. Prerequisite: 460.

DENT 490 Special Studies in Dentistry (2, max. 4)

AWSpS 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 ap-plicable to all phases of dentistry, and may be applied to-ward the major requirement for the degree of Master of Science in Dentistry. Offered on credit/no credit basis only.

DENT 496 Data Entry Through SPSS (1)

Introduction to entering and managing experimental or clinical alphanumeric and numeric data through the save-file capabilities of SPSS, tutilizing SPSS control cards, data transformations, and documentation.

DENT 497 Extramurals (*) AWSpS Extramural programs arranged to provide dental students, at varying levels of their education, with opportunities to treat a wide variety of patients in the delivery systems and geographic locations in which they may eventually motion Outward on modify horis only. practice. Offered on credit/no credit basis only.

Courses for Graduate and Certificate Dental Students Only

These courses include subject material applicable to all phases of dentistry, and they may be applied toward the major requirement for the degree of Master of Science in Dentistry.

DENT 520 Biostatistics and Research Design (3) Lectures and programmed instruction in basic biostatis-tics, emphasizing the integration of statistics with research design and including measures of central ten-dency, regression, correlation, Chi-square, and com-parison of samples. Offered on credit/no credit basis only.

DENT 535 Design and Interpretation of Dental

Research (3) Basic introduction to the usage, application, and interpre-tation of nonparametric and parametric statistical tests in dental research. Statistical package for the social sciences is used to provide examples of the statistical tests discussed. Prerequisite: permission of instructor.

DENT 540 Temporomandibular Joint Diagnosis

and Treatment (2, max. 8) AWSpS Four-quarter seminar and clinic sequence for comprehensive examination, diagnosis, and treatment of completients with temporomandibular joint problems. Includes man-agement of dysfunction and morphologic alterations in associated muscles and occlusion. Prerequisite: permission of instructor.

DENT 560 Dental Photography (2) Freehe

Designed to provide the student with sufficient knowledge and experience to select and use correct photo-graphic equipment for photographing patients (facial and interoral), casts, instruments, X-rays, charts, and objects.

DENT 700 Master's Thesis (*)

ENDODONTICS

ENDO 410 Introduction to Endodontics (2) Sp Lecture course dealing with the differential diagnosis and the treatment of pulp pathosis and associated periapical pathosis.

ENDO 420 Endodontics (1) W Lecture course dealing with diagnosis and treatment of impact injuries to teeth; treatment of endodontic emergencies; surgical management of endodontic problems.

ENDO 421 Clinical Management of Endodontic Treatment Problems (1) Sp

Management of a variety of technical problems fre-quently encountered in the treatment of endodontic cases.

ENDO 448 Directed Studies in Endodontics (*) See COM D 449 for course description and prerequisite. Offered on credit/no credit basis only.

ENDO 470- Clinical Endodontics (1-, max. 7) AWSpS

The student is required to complete endodontic treatment of anterior, premolar, and molar teeth. In addition to conservative treatment of several endodontic cases, the student performs periapical surgery for one case. Student must complete at least five quarters of 470- and must complete all course requirements before any grade is awarded.

ENDO 471 Endodontic Technic (4) A

Lecture-laboratory course in root canal therapy in terms of present-day concepts, with emphasis on a definite simplified technique. Treatment of extracted teeth as practice for clinical cases.

ENDO 481 Honors Course in Endodontics (2-2) WSp

Advanced clinical work in the use of gutta-percha techniques in molar therapy, in surgical procedures, and in bleaching. Available to selected students.

ENDO 497 Directed Studies in Endodontics (*) AWSp

Avsp Course permits students and faculty who have common academic interests to pursue them together within the curriculum by means of independent study and a tutorial student-faculty relationship. Offered on credit/no credit basis only. Prerequisite: permission of instructor.

ENDO 499 Endodontics Extended Learning (*) S Supplemental work in endodontics to correct an area of student deficiency. Offered on credit/no credit basis only.

Courses for Graduates Only

ENDO 501 Advanced Endodontic Diagnosis and Treatment (2) A

Current concepts are presented and discussed relating to the diagnosis and treatment of pulpal and periapical pa-thology. Criteria for evaluation of success or failure of root canal therapy are presented.

ENDO 504 Advanced Endodontic Treatment Planning (2) W

Diagnosis and treatment of acute symptoms of dental ori-gin, surgical endodontic therapy, traumatic dental inju-ries, and the relationship between periodontal and pulpal pathology, including differential diagnosis and appropriate treatment planning are discussed.

ENDO 505 Radiographic Interpretation (2)

Various aspects of radiographic interpretation of particular relevance to endodontics, including interpreta-tion of normal structures, acquired and developmental abnormalities, infection, cysts, benign tumors, and diseases other than tumors.

ENDO 510 Advanced Radiographic Interpretation

(2) Various aspects of radiographic interpretation of particu-lar relevance to endodontics, including malignant le-sions, benign tumors, diseases other than tumors, temporomandibular joint disease, sialoliths and other soft-tissue calcifications, radiographic technique, and radiation safety. Prerequisite: 505.

ENDO 525 Physiologic Bases of Dental Science (3) Current concepts in areas of physiology related to dentis-try, including pain, taste, speech, microcirculation, oc-clusion, and calcification. Review of basic physiologic mechanismis, survey of recent literature, and design of applied dental research in each area. Offered jointly with P BIO 506. Prerequisite: permission. (Offered alternate years; offered 1981.)

ENDO 526, 527, 528, 529 Advanced Topics in Endodontics (2,2,2,2)

Use of the bacteriologic culture, resorptive phenomena, differential diagnosis of oral pain, evaluation of case success, and replantation are representative topics. Course method includes critical evaluation of presently accepted concepts and the better known literature upon which they are based, followed by study of the applicability and va-lidity of the biologic concepts involved and of the histori-cal development of present dicta.

ENDO 530 Calcification of Oral Tissues (2)

EVENUS SO Calcineation of Oral Insues (2). Present concepts of the formation of dentin, enamel, cementum, and bone; role of vitamins, PTH, Calcitonin, serum Ca⁺⁺ and PO4⁻⁻ levels, inhibitors, and phos-phatases in matrix and crystal deposition; calcification, dissolution, and repair. Prerequisite: permission of in-structor. (Offered alternate years; offered 1980.)

ENDO 531 Restoration of Endodontically Treated

Teeth (3) AWSp Clinical instruction in the various post and pin techniques used to restore endodontically treated teeth to normal function. (Four hours clinic, one hour lecture per week.)

ENDO 535 Microbiological Aspects of Endodontic Therapy (2)

Seminar discussion of areas of microbiology of particular significance to the field of endodontics. Required for endodontics graduate students. (Offered Spring Quarter 1980.)

ENDO 546, 547, 548 Clinical Endodontics (3,4,4) Clinical diagnosis and treatment of the pulpless tooth.

ENDO 549, 550, 551 Clinical Endodontics (3,4,4) Clinical diagnosis and treatment of the pulpless tooth. Prerequisites: 546, 547, 548.

ENDO 552, 553 Clinical Endodontics (4,4) Clinical diagnosis and treatment of the pulpless tooth.

ENDO 576, 577, 578 Endodontic Seminar (2,2,2), Continuous weekly seminar devoted to review of endodontic and related literature and to discussion of research methods.

ENDO 579, 580, 581 Endodontic Seminar (2,2,2) Continuous weekly seminar devoted to review of endo-dontic and related literature and to discussion of research methods.

SCHOOL OF DENTISTRY

ENDO 582, 583, 584 Treatment Planning Seminar (2.2.2)

Weekly seminar to discuss controversial treatment problems and difficult diagnostic cases.

ENDO 585, 586, 587 Treatment Planning Seminar (2, 2, 2)

Continuation of the weekly seminar to discuss controver-sial treatment problems and difficult diagnostic cases. Prerequisites: 582, 583, 584.

ENDO 591, 592, 593 Clinical Practice Teaching

(1,1,1) Closely supervised experience in teaching clinical endo-dontics to the undergraduate dental student.

ENDO 597, 598 Endodontics Teaching Seminar

(2,2) W,W Weekly seminars devoted to an examination of general problems of teaching and learning and specific problems of endodontics teaching.

ENDO 600 Independent Study or Research (*)

Investigative program in one of the basic sciences under the direction of the departmental faculty. Prerequisite: permission of graduate program adviser.

For other graduate course offerings, see individual de-partment listings.

ORAL BIOLOGY

UKALB 301 Liental Plaque and Carles (2) A Etiology, pathogenesis, histopathology, epidemiology, and principles of prevention of dental carles. Consider-able time is devoted to the formation, composition, and pathogenic potential of the dental plaque and its relation to dental carles. Required for students in dental hygiene; others by permission of instructor. ORALB 301 Dental Plaque and Caries (2) A

ORALB 334 Oral Histology (3) Sp

Development and microscopic anatomy of structures of the oral cavity. Required for dental hygiene students; others by permission of instructor. Prerequisite: B STR 301 or equivalent or more advanced course in histology

ORALB 400 Oral Histology and Embryology (5) W Development and microscopic anatomy of enamel, dentin, dental pulp, cementum, periodontal membrane, al-veolar bone, oral mucous membrane, maxillary sinus and temporomandibular articulation. Embryonic development of the head and neck with emphasis on morphodifferentiation of the face and oral structures. Prerequisite: dental student standing.

ORALB 401 Oral Flora, Dental Plaque, and Caries

(2) Sp Applies the students' background knowledge in the basic sciences to an understanding of the specific microbiology of the various niches in the oral cavity, the formation and metabolic activity of dental plaque, and the etiology, pathogenesis, histopathology, and clinical characteristics of caries. Principles involved in the prevention of cross-contamination and in the diagnosis of clinical infections.

ORALB 407 General and Oral Pathology for Dental Hygienists (4) A Study of diseases and abnormalities of the hard and soft

tissues of the oral cavity and pathologic processes that underlie disease, including inflammation, neoplasia, cel-lular alterations. Correlation of the gross, functional, and biochemical alterations.

ORALB 410 Oral Pathology (5) Sp 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. Considerable effort is expended in developing an understanding of the abnormal processes. Correlations between clinical findings, etiologic factors, and histopathologic features of each of the diseases are stressed. Attendance in the laboratory is required.

ORALB 448 Directed Studies in Oral Biology (*) AWSpS

See COM D 449 for course description and prerequisite. Offered on credit/no credit basis only.

ORALB 449 Undergraduate Research Topics in Oral Biology (*) AWSpS Individual research on topics selected in collaboration with a faculty member. Offered on credit/no credit basis only. Prerequisite: permission of instructor.

ORALB 497 Directed Studies in Oral Biology (*)

AWSpS Selected readings and seminars on a topic chosen by indi-vidual arrangement in collaboration with a faculty member. Open to undergraduates, as well as to dental and dental hygiene students. May be repeated for credit. Of-fered on credit/no credit basis only. Prerequisite: permission of instructor.

ORALB 498 Undergraduate Research Topics in Oral Biology (*) AWSpS Individual research on topics selected in collaboration

with a faculty member. Open to undergraduates, as well as to dental and dental hygiene students. May be repeated for credit. Offered on credit/no credit basis only. Prerequisite: permission of instructor.

ORALB 499 Oral Blology Extended Learning (*) S Supplemental work in oral biology to correct an area of student deficiency. Offered on credit/no credit basis only.

Courses for Graduates Only

ORALB 500 Dental Carles (2-3)

ORALB 500 Dental Carles (2-3) Series of lectures outlining the morphological, biochemi-cal, and microbiological aspects of dental plaque and car-ies with the additional requirement of participation in a seminar for purposes of review of the current literature and discussion of research in this field. Prerequisites: course in general mammalian histology, or its equivalent, and permission of instructor.

ORALB 502 Supervised Teaching in Oral Biology (1-5, max. 10) AWSpS

(1-5, max. 10) AWSpS Directed and guided experience in selected topics in teaching techniques, teaching philosophy, and course de-sign 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 direc-tor. Prerequisite: permission of instructor.

ORALB 510 Clinical Oral Pathology

(1-3, max. 10) Presentation of interesting oral lesions from the dental school and the University Hospital 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 de-signed for students with D.D.S., M.D., or D.V.M. de-grees. Prerequisite: permission of instructor.

ORALB 515 Surgical Oral Pathology

(2-4, max. 16) Students are trained to interpret microscopic slides of lestudents are trained to interplet indicatory and the solution of the student is responsible for the grossing of specimens and the preparation of histology reports. Primarily designed for students with D.D.S., M.D., or D.V.M. degrees. Prerequisite: permission of instructor.

ORALB 520 Seminar in Oral Pathology (1-3, max. 9)

Consists of in-depth studies of specific oral diseases and makes use of seminar and discussion methods. Students are required to present literature reviews and to act as discussion leaders. Primarily designed for students with D.D.S., M.D., or D.V.M. degrees. Prerequisite: permission of instructor.

ORALB 532 Clinical Stomatology (5) Diseases of the oral cavity and jaw are first presented just as the practitioner encounters it—detailed clinical picture (i.e., the complaint together with the clinical signs and symptoms). When pertinent, laboratory tests and pro-cedures deemed relevant and essential to establishing a discussion discussed Simile comparison are followed diagnosis are discussed. Similar approaches are followed when radiographic findings, the results of surgical exploration, or the consequences of treatment contribute to, or are found to be necessary for, the establishment of a radi-ographic, surgical, or therapeutic diagnosis.

ORALB 540 Orai Biology Seminar (1-3, max. 10) AWSp

Presentation and discussion of current research problems by members of the staff, investigators from other departments in the University, visiting scientists, and trainces. Prerequisite: permission of instructor.

ORALB 550 Research Techniques in Oral Biology (2-4, max. 15) Sp 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. Biochemical techniques include cell fractionation, paper and column chromatography, zone electrophoresis, and appropriate chemical and enzymatic trophoresis, and appropriate chemical and enzymatic determinations. Morphological techniques include light microscopy, electron microscopy, radioautography, his-tochemistry, and cytochemistry. The analytical tech-niques show how, even with quite limited training, a bi-ductie ten use simple mathematical methods to describe ologist can use simple mathematical methods to describe living systems and to advance biological theory. Prerequisite: permission of instructor.

ORALB 581-582-583 Secretory Process in Exocrine Glands (1-3)-(1-3)-(1-3) A,W,Sp Biostructural, physiological, and biochemical aspects of

individual secretory systems as integrated units. Faculty members with appropriate expertise participate in discus-sions and presentations during each of the three quarters.

ORALB 600 Independent Study or Research (*) AWSpS

Laboratory projects and/or conferences with individual faculty members designed to acquaint the student with research projects currently in progress within the depart-ment. Prerequisite: permission of instructor.

ORALB 700 Master's Thesis (*)

ORALB 800 Doctoral Dissertation (*)

ORAL DIAGNOSIS AND TREATMENT PLANNING

ODTP 400 Introduction to Clinical Procedures (3)

Orientation to dental examination procedures, with appropriate clinical participation by the student.

ODTP 401 Principles of Nutrition (1) Sp Principles of nutrition applied to dental practice.

ODTP 410 Introduction to Oral Diagnosis (1) A Principles involved in integrating and evaluating diagnos-tic criteria for arriving at a treatment plan are covered and applied to actual clinical examples.

ODTP 411 Internal Medicine (4-2) WSp

ODTP 413 Advanced Radiographic Interpretation

(1) A Radiographic interpretation of the structures of the head and jaws as observed by panoramic, lateral head film, and other extraoral techniques. The radiographic appear-ance of pathology as seen on extraoral films.

ODTP 415 Introduction to Laboratory Diagnosis (1)

 \overline{Sp} Laboratory procedures useful to the practicing dentist, in-cluding: the techniques of laboratory tests and analysis of data; laboratory tests conducted in the dental office; and the relationship of laboratory tests to head and neck findings.

ODTP 420 Oral Medicine (2) W Fundamental procedures in oral diagnosis; preparation for advanced instruction.

ODTP 425 Hospital Dentistry (1) Sp Introductory course presenting hospital procedures and protocol and specific patient types.

ODTP 430- Oral Medicine Clinical Conference (1-)

A Clinical course in which patients with dental treatment needs and complicating medical problems are presented. Medical history, physical findings, and laboratory tests are evaluated. Student participation through patient presentation and group discussion required.

ODTP -431- Oral Medicine Clinical Conference (-1-) W

Clinical conference restricted to patients presenting unusual symptoms of pain, oral lesions, or jaw dysfunc-tions. Participation in discussion required.

ODTP -432 Oral Medicine Clinical Conference (-1) So

Clinical conference devoted to the presentation of the radiographic findings of patients with oral disease: discussion of the radiographic appearance and variations in manifestation of the cases; student participation through questions, answers, and discussion.

ODTP 449 Directed Studies in Oral Diagnosis (*) AWSpS

Supplements the offerings of the core curriculum for qualified first- and second-year students; may include dental hygiene students. Offered on credit/no credit basis only.

ODTP 450 X-ray Techniques and Interpretation (3)

Biophysical, clinical, and interpretative aspects of dental x-ray procedures, with practical application in the com-pletion of acceptable full-mouth surveys on patients.

ODTP 470- Clinical Oral Diagnosis and Treatment Planning (1-, max. 3) AWSpS

Opportunity for examining, performing x-ray survey, and planning treatment for less involved patients. Students also participate in rendering diagnosis and emergency treatment.

ODTP 480 Advanced Clinical Oral Diagnosis and Treatment Planning (2-1) AWS

Advanced instruction in diagnosis and in the examination and handling of patients. Students are in block assign-ment and perform radiographic surveys, oral diagnosis, and treatment plans for prospective patients.

ODTP 485 Hospital Dentistry (2) AWSpS Clinical experience that puts into practice the material presented in 425. The student is involved in hospital procedures and protocol and in dental care of the hospital patient

ODTP 497 Directed Studies in Oral Diagnosis (*) AWSpS

Permits students and faculty who have common academic interests to pursue them together within the curriculum by means of independent study and a tutorial student-faculty relationship. Offered on credit/no credit basis only. Prerequisite: permission of instructor.

ODTP 499 Oral Diagnosis Extended Learning (*) S Supplemental work in oral diagnosis and treatment plan-ning to correct an area of student deficiency. Offered on credit/no credit basis only.

ORAL MEDICINE

Courses for Graduates Only

ORALM 500 Advanced Diagnostic Techniques (3)

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.

ORALM 530, 531, 532, 533, 534, 535 Rotations in Medical Disciplines (*, max. 4 each) Clinic, oriented to the hospital practice of oral medicine,

deals with examination and nonsurgical therapy of hospi-tal patients. The conditions treated include primary oral diseases, oral manifestations of systemic diseases, and oral defects resulting from medical treatment of serious systemic disease. Offered on credit/no credit basis only.

ORALM 546 Clinical Oral Medicine (*, max. 33)

AWSpS Clinic involving the diagnostic evaluation of patients with difficult and unusual oral diseases. The student di-agnoses and treats the patient. Types of therapy include medications and chemical agents, functional physical therapy, and counseling.

ORALM 548 Oral Medicine Clinical Conference (*, max. 16) AWSpS 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

ORALM 560- Oral Medicine and Therapeutics (3-, max. 6)

Lecture course directed toward the presentation and dis-cussion 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.

ORALM 576 Oral Medicine Literature Review

Seminar (2, max. 16) AWSpS Seminar analyzes the recent literature concerning the area of oral medicine, diagnosis, and therapy for oral disease.

ORALM 580 Advanced Radiographic Techniques

(2) W Seminar and clinic concerning radiographic procedures necessary for visualization of soft and hard tissue struc-tures of the maxilla, sinuses, temporomandibular joint, and mandible and soft tissue structures approximating the oral cavity. Emphasis placed on extraoral and special trachainter techniques

ORALM 585 Advanced Radiographic Interpretation (3) Sp

Interpretation (3) Sp Lecture, seminar, and clinic dealing with interpretation of routine and special radiographs of the oral and perioral region. Emphasis on the radiographic characteristics of degenerative, neoplastic, metabolic, developmental, and infectious processes. In the clinical component, the stu-dent interprets films taken of patients suspected of having radiographically apparent oral diseases.

ORALM 590, 591, 592 Clinical Oral Diagnosis Teaching (*, max. 16 each) Clinic designed to give the student experience and in-struction in the teaching of clinical oral diagnosis. Treatment of emergency dental problems as well as routine and special diagnostic procedures is emphasized.

ORALM 600 Independent Study or Research (*) Clinical research in which the student selects a clinical project dealing with the diagnosis and/or nonsurgical treatment of oral disease, develops a protocol, and, after faculty approval, completes the project.

ORAL SURGERY

O S 400. Introduction to Dental Emergencies and Techniques of Local Anesthesia (2) Sp

Development of the symptomatic treatment of dental emergencies, especially those emergencies that could be considered life threatening. Some instruction is given in the classical manner on the diagnosis of dental emergen-cies, such as syncope, hysteria, anaphylactic shock, and cardiopulmonary arrest. A portion of the material precardiopulmonary arrest. A portion of the material, pre-sented on cardiopulmonary resuscitation is made by the Medic II staff, which includes demonstration and practice on manikins. The other major portion of the course is on local anesthesia techniques and includes lectures on the pharmacology and physiology of the drugs utilized and extensive audiovisual materials demonstrating the tech-niques. Students are required to demonstrate local an-esthetic block techniques at the completion of the instruc-tion. tion.

O S 401 Introduction to Dental Emergencies and Techniques of Local Anesthesia (2) Sp

Development of the symptomatic treatment of dental emergencies, especially those that could be considered life threatening. Portion of material presented on cardio-pulmonary resuscitation by Medic II staff; includes demonstration and practice on mannequins. Other material is local anesthesia techniques, including pharmacology and physiology of drugs used.

O S 410 Dental Sedation and Pain Control (2) W An approach to the patient with respect to minimizing the discomfort of the dental procedures. Every form of seda-tion, from vocal reassurance through intravenous seda-tion, is included. Emphasis on specific drugs that have a high level of safety; practical experience with intravenous and nitrous oxide techniques; and sophisticated methods of the treatment of emergencies, especially intravenous sedation.

O S 430 Oral Surgery (3-3-3) AWSp Theory and practice of major and minor oral surgery, us-ing a mediated autotutorial approach supported by thirty clinical sessions. Self-instructional modules include: extraction of teeth, impaction surgery, preprosthetic sur-gery, medications, surgical complications and post-operative care, biopsy, infections and principles of inci-sion and drainage, bone cysts, maxillary sinus, salivary glands, treatment of facial trauma and deformities.

O S 497 Directed Studies in Oral Surgery (*)

Rotations of one to six weeks are offered at various loca-tions, including Harborview Medical Center, University Hospital, and John Peter Smith Hospital in Fort Worth, Texas. Students receive intensive instruction in oral surgery procedures and observe and assist oral and maxil-lofacial surgery in the operating room. Offered on credit/no credit basis only.

O S 499 Oral Surgery Extended Learning (*) S Supplemental work in oral surgery to correct an area of student deficiency. Offered on credit/no credit basis only.

Courses for Graduates Only

O S 560 Dental Sedation (2) ASp For graduates of the various dental specialties on the the-ory, 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. Prerequisite: dental graduate students only.

O S 600 Independent Study or Research (*) AWSp Investigative program in one of the basic or clinical sci-ences under the direction of the departmental faculty. Prerequisite: permission of instructor.

ORTHODONTICS

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ORTHO 449 Directed Studies in Orthodontics (*) AWSp See COM D 449 for course description and prerequisite.

Offered on credit/no credit basis only.

ORTHO 470- Orthodontic Clinic (1-, max. 6)

AWSpS Direct clinical application of principles of orthodontic diagnosis and treatment planning for the child/adolescent patient.

ORTHO 490 Honors Course in Beginning

Adjunctive Orthodontic Technique (3) S Honors lecture and labroatory to prepare the undergradu-ate dental student for clinical course to follow in limited adjunctive tooth movement. Includes instruction in, indications for, and techniques of, simple orthodontic tipping and periodontal therapy. Prerequisites: DENT 460, 461, and permission of instructor.

ORTHO 491 Honors Course in Clinical Adjunctive

Orthodontics (1, max. 7) AWSpS Honors clinical course in which patients are treated with simple orthodontic appliances to achieve modifications in tooth position often required in preparation for definitive restorative and/or periodontal therapy. Prerequisites: 490, DENT 460, 461, and permission of instructor.

ORTHO 492 Clinical Adjunctive Orthodontics Seminar (1) Sp

Clinical adjunctive orthodontic diagnosis and treatment. Students present diagnostic and treatment records to the class, followed by discussion of each patient. Prerequisites: 490, 491, DENT 460, 461, and permission of instructor.

ORTHO 497 Directed Studies in Orthodontics (*) AWSp

Permits students and faculty who have common academic interests to pursue them together within the curriculum by means of independent study and a tutorial student-fac-ulty relationship. Offered on credit/no credit basis only. Prerequisite: permission of instructor.

ORTHO 499 Orthodontics Extended Learning (*) S Supplemental work in orthodontics to correct an area of student deficiency. Offered on credit/no credit basis only.

SCHOOL OF DENTISTRY

Courses for Graduates Only

ORTHO 501, 502, 503, 504 Orthodontics Seminar

Methods of diagnosis, analysis, and treatment planning of malocclusion; analysis of methods and theoretical principles used in the treatment of malocclusion. The stu-dent presents a detailed case analysis and plan of treatment for each clinical patient supervised. Each course is prerequisite to the following course.

ORTHO 511, 512, 513, 514 Orthodontic Theory (2,2,2,2) A,W,Sp,S A four-quarter lecture-seminar sequence dealing with in-terpretation and application of orthodontic principles and concepts. Pertinent literature, research findings, and current orthodontic theory are analyzed in depth.

ORTHO 518 Scientific Methodology in Dental Research (2)

Review of the scientific method. Evaluation of dental literature. Discussion of proposed master's degree re-search projects. Procedure in scientific writing. Formulation and discussion of hypothetical research projects related to orthodontics.

ORTHO 520 Roentgenographic Cephalometry (2) A Basic principles, history, and techniques of roent-genographic cephalometry.

ORTHO 525 Post-Retention Seminar (1, max, 2)

WSp Each student is required to locate one or more former orthodontic patient(s) with at least ten years postretention. Complete orthodontic records must be obtained, analyzed, and discussed in the seminar. The instructor critiques the presentation and offers similar or contrasting cases for comparison.

ORTHO 540 Orofacial Biology (4, max. 12) AW Comprehensive evaluation seminar of the literature rela-tive to the growth and development of the craniofacial complex. Anthropology, embryology, morphogenesis, genetics, and anatomy are integrated to give the student an appreciation of facial development. Outside reading assignments by the student are discussed and critiqued during the seminar discussion

during the seminar discussion.

ORTHO 546, 547, 548, 549, 550, 551, 552 Clinical Orthodontics (4, *, *, *, *, *, *)Techniques of construction and manipulation of the edgewise arch mechanism; application of the techniques in the treatment of malocclusion. Treatment of patients begins in the second quarter.

ORTHO 560 Surgical Orthodontic Diagnosis and Treatment Planning (3) AWSpS Seminar and clinic for orthodontic graduate students and oral surgery residents in comprehensive, integrated diag-nosis, and treatment planning for patients with major facial deformities.

ORTHO 581 Introduction to Adjunctive Orthodontics (1) A

Ten-hour lecture series on basic principles of multidisci-plinary treatment planning, orthodontic diagnosis, biomechanics, and appliance therapy.

ORTHO 582 Orthodontic Diagnosis and Treatment Planning for the Adult Dental Patient (3) AWSpS

Seminar and clinic for orthodontic, periodontic, and restorative dentistry graduate students in comprehensive, integrated diagnosis, treatment planning, and treatment of the dental problems of the adult patient.

ORTHO 600 Independent Study or Research (*) Prerequisite: permission of instructor.

PEDODONTICS

PEDO.414 Pedodontics (1) A

Introduces the second-year dental hygiene student to the numerous aspects of pediatric dentistry, including growth and development, child management, preventive dentis-try, radiography, diagnosis, and dental anomalies.

PEDO 415 Pedodontics (1) W

Introduces the second-year dental hygiene student to nu-merous technical procedures in pediatric dentistry, in-cluding anesthesia, rubber dam, pulpal therapy, routine restorative procedures, traumatic injuries in the primary

and permanent dentition, acid-etching procedures, and space maintenance. Prerequisite: 414.

PEDO 420 Pedodontics (1) A

Introduction to clinical pedodontics, which includes be-havior management, oral diagnosis, preventive dentistry, dental anomalies, radiography, anesthesia, restorative dental procedures, pulpal therapy, interceptive orthodon-tics, and traumatic dental injuries of the child patient.

PEDO 470 Clinical Pedodontics (1-1-1) AWSp Diagnosis and examination of the child patient. Restora-tive procedures in primary and mixed dentitions.

PEDO 480 Advanced Clinical Pedodontics (1-1-1) AWSp

Awsp Diagnosis and treatment planning, with emphasis on pre-ventive dentistry. Complete operative procedures, including vital pulp therapy, construction of space maintainers, bite planes, and restoration of fractured anterior teeth.

PEDO 491 Fieldwork in Applied Principles of Dental Care for the Disabled Child (2) AWSpS Structured fieldwork provides the opportunity to develop concepts and procedures in teaching, testing, evaluating, and practicing dentistry for the disabled. Offered on credit/no credit basis only.

PEDO 497 Directed Study in Pedodontics (*) AWSD

Comprehensive treatment of the disabled child in the hos-Comprehensive treatment of the disabled child in the hos-pital environment; the role of the pediatric dental patient in general practice; and orthodonic diagnosis and treat-ment planning in the mixed-dentition patient. Offered on credit/no credit basis only.

PEDO 499 Pedodontics Extended Learning (*) S Supplemental work in pedodontics to correct an area of student deficiency. Offered on credit/no credit basis only.

Courses for Graduates Only

PEDO 500, 501, 502, 503, 504 Pedodontics

Seminar (2,2,2,2,2) Seminar on problems of tooth formation, development, calcification, and eruption in the child. Management of clinical problems of tooth development; operative procedures, pulp therapy, treatment planning, and the con-sideration of emotional factors in pedodontic practice.

PEDO 530 Pedodontic Hospital Training (*) AWSpS

Provides clinical experience in the comprehensive dental riorius cinical experience in the comprehensive dental care of hospital inpatients and outpatients. Treatment is carried out at Children's Orthopedic Hospital and Medi-cal Center. Prerequisite: admission to the postdoctoral program in pedodontics.

PEDO 546, 547, 548, 549, 550, 551, 552 Clinical

Pedodontics (*, *, *, *, *, *)Advanced clinical pediatric dentistry involved with the care of the normal or well child, or the physically, mentally, socially, or emotionally handicapped child.

PEDO 560 Medical Problems in Pedodontics (*, max. 36) AWSpS

Explores usual and extraordinary medical, mental, and emotional problems of normal and handicapped children who receive comprehensive pedodontic care.

PEDO 580-581 Dental Care for the Handicapped

PEDO 580-581 Dental Care for the manuscapped Child (*-*) W,Sp Seminar clinic concentrating on the diagnosis and the management of dental care for the handicapped child. Emphasis on the interaction of physical, intellectual, emotional, and social developmental patterns and processes.

PEDO 600 Independent Study or Research (*) Prerequisite: permission of instructor.

PERIODONTICS

PERIO 400 Introduction to Periodontics (1) S Introduction to periodontology. Designed to provide the student with understanding of the clinical, histopathologic, and radiographic features of the various periodontal diseases.

PERIO 410, 411, 412 Periodontics (1,1,1) A,W,Sp Principles of examination, treatment planning, and periodontal therapy.

PERIO 420 Periodontics (1) A Recognition, evaluation, and treatment of advanced periodontal disease

PERIO 449 Directed Studies in Periodontics (*)

AWSpS See COM D 449 for course description and prerequisite. Offered on credit/no credit basis only.

PERIO 460, 461, 462 Periodontics (1,1,1) A,W,Sp Clinical experience in examination, treatment planning, and performance of periodontal therapy.

PERIO 470, 471, 472 Periodontics (1,1,1) A,W,Sp Treatment of mild to moderate periodontal diseases.

PERIO 480 General Practice Periodontics (1-1-1) AWSD

Treatment of patients with more complex periodontal in-volvement. The development of skill in treatment planning and execution by the individual student. Concrete experiences in surgical periodontics.

PERIO 491-492-493 Senior Periodontics Elective

(2-2-2) A,W,Sp Clinic-seminar experience for selected fourth-year dental students that allows for clinical independence and indi-vidual responsibility in periodontal treatment and case analysis. Substitutes for 480.

PERIO 497 Directed Studies in Periodontics (*) AWSp

Permits students and faculty who have common academic interests to pursue them together within the curriculum by means of independent study and a tutorial student-faculty relationship. Offered on credit/no credit basis only. Prerequisite: permission of instructor.

PERIO 499 Periodontics Extended Learning (*) S

Supplemental work in periodontics to correct an area of student deficiency. Offered on credit/no credit basis only.

Courses for Graduates Only

PERIO 530 Hospital Periodontics (1) AWSpS Prepares graduate students in periodontics to practice in hospital situations. Experience in operating with nitrous oxide analgesia, general anesthesia, and intravenous premedication is offered. Hospital procedures for treating -outprisents and institute are offered. outpatients and inpatients are offered.

PERIO 546, 547, 548, 549, 550, 551, 552, 553

Clinical Periodontics (2-6, 2-6, 2-6, 2-6, 2-6, 2-6, 2-6, 2-6) Clinical experience in diagnosis and treatment of periodontal disease.

PERIO 561- Periodontal Case Management (2-, max, 6)

Didactic presentation of clinical periodontics to provide a comprehensive view of the field and a grasp of modern therapeutics.

PERIO 570 Review of Current Literature (2) Weekly seminar-discussion devoted to literature pub-lished within the past three years and confined to material not covered in previous subject matter. Prepares the graduate student for oral and written examination for certification by the American Academy of Periodontology.

PERIO 574 Oral Microbiology and the Normal Periodontium (2) A

between the general oral microbial flora, and the bacteria associated with periodontal diseases, caries, endodontic abscesses, and other dental diseases; manage-ment of asepsis in the dental office and means of control-ling dental bacterial plaque infections; normal structural, biochemical, and functional properties of the periodontal tissues, and the interaction between these structures, bacterial, and host defense mechanisms. Prerequisite: graduate standing or permission of instructor.

PERIO 575 Immunologic Aspects of Oral Diseases (2) W

Lecture course designed to acquaint graduate and quali-fied undergraduate students with the basic concepts of

immunology and immunopathology. Topics include cellular immunology and immunolation traction, complement system, immunologic mechanisms, tu-mor immunology and immunologic manifestations in mucocutaneous oral lesions as well as immunology of caries and periodontal disease. Prerequisite: graduate standing or permission of instructor.

PERIO 576 Pathogenesis of Periodontitis (2) Sp

Lecture course primarily concerned with the sequence of events that occur in the development of periodontitis. Topics include the microscopic and ultrastructural char-acteristics of the periodontal lesion, immunopathologic and other pathogenic mechanisms involved in the pro-gression of the disease, and etiologic and epidemiologic aspects of human periodontitis; and historic views of the disease as well as current research findings regarding the etiology and pathogenesis. Prerequisite: graduate stand-ing or permission of instructor.

PERIO 577 Review of Literature (2, max. 14)

Continuous weekly seminar devoted to review of perio-dontic and related literature and the discussion of teaching methods and philosophy of teaching and treatment.

PERIO 582- Periodontic Treatment Planning Seminars (1-, max. 8) Weekly seminar involved with the presentation, discus-sion, and tentative solution of moderate to complex problems in diagnosis and treatment.

PERIO 585- Periodontal Therapy Seminars

(1-, max. 8) Weekly seminar utilizing the case review method and dealing with the treatment of moderate to advanced peri-odontal disease.

PERIO 586 Longitudinal Evaluation of Periodontal Therapy (2)

Increapy (2) In-depth examination of the progress of a case from the time of initial therapy, which may go back ten to fifteen years, and its ongoing progression until the most recent maintenance visits to determine: (1) the efficacy of method, (2) the demands made upon the patient, and (3) the temporal effect of therapy and survival.

PERIO 587 Periodontal Diseases Research Seminar

PERIO 587 Periodontal Diseases Research Seminar (1, max. 12) Weekly seminar devoted to advances in periodontal re-search. Topics include research design, methodology, and data derived from recent and/or ongoing periodontal research. Offered on credit/no credit basis only.

PERIO 591 Clinical Practice Teaching (*) Supervised experience in teaching clinical periodontics to undergraduate dental students.

PERIO 592 Prescription Surgery (1-1-1)

Clinical course in periodontal surgery (n=n=1) Curved procedures are performed by graduate students on a prescription basis for patients undergoing therapy in the undergraduate dental clinic. Designed to expose the 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 between a referring dentist and the specialist.

PERIO 600 Independent Study or Research (*) An investigative program in one of the basic sciences under the direction of the departmental faculty, Prerequi-site: permission of graduate program adviser.

PROSTHODONTICS

PROS 410 Removable Partial Denture Design (2) Sp

Lectures in the basic principles of removable partial den-ture design; more advanced designs are discussed in sem-inars; certain technical aspects of design procedures are done in the classroom.

PROS 411 Introduction to Complete Dentures-Lecture (3) A Didactic course in the treatment of completely edentulous

patients. Instruction is provided in diagnostic procedures, complete denture construction, and maintenance care.

PROS 420 Management of Immediate Denture Patients (1) A

Lecture course describing and illustrating the clinical management of immediate denture patients (typical and overdenture).

PROS 421 Special Topics in Prosthodontics (1) Sp Lecture describing and illustrating the following topics: reline procedure, management of difficult patients, max-illofacial prosthesis, and quality-control problems in private practice.

PROS 449 Directed Studies in Prosthodontics (*) See COM D 449 for course description and prerequisite. Offered on credit/no credit basis only.

PROS 460 Clinical Complete Dentures (3) A Clinical course dealing with the basic principles of com-plete denture fabrication as well as the diagnosis and treatment of a completely edentulous patient.

PROS 461 Complete Denture Prosthodontics (1-1) WSp Clinical course that uses the didactic material presented

in 460. The student manages a second complete-denture patient during Winter Quarter with less supervision than in 460, and also provides follow-up care to the 460 and 461 patients during Winter Quarter and Spring Quarter.

PROS 470 Removable Partial Denture Clinical Preparatory Course (4) A Lecture-laboratory course dealing with those procedures

the dentist must perform in order to fabricate a physiolog-ically acceptable removable partial denture. The student gains experience via clinically simulated laboratory exer-cises prior to beginning prosthodontic treatment of a partially edentulous patient.

PROS 471 Clinical Prosthodontics (1-2-1) AWSp

Clinical course involving the diagnosis and management of completely edentulous and partially edentulous patients. Removable partial dentures and immediate den-tures are fabricated. Follow-up care provided for patients previously treated.

PROS 480 Clinical Prosthodontic Maintenance (1-1-1) AWSp

Clinic involving the relining or rebasing of dentures previously made.

PROS 497 Directed Studies in Prosthodontics (*) AWSpS

Permits students and faculty who have common academic interests to pursue them together within the curriculum by means of independent study and a tutorial student-faculty relationship. Offered on credit/no credit basis only. Prerequisite: permission.

PROS 499 Prosthodontics Extended Learning (*) S Supplemental work in prosthodontics to correct an area of student deficiency. Offered on credit/no credit basis only.

Courses for Graduates Only

PROS 560 Complete Dentures (4) A Comprehensive seminar-clinical course devoted to the diagnosis and treatment of the completely edentulous patient. Emphasis on management of patients with difficulties in treatment.

PROS 561 Immediate Dentures (4) W Seminar-clinical course concentrating on those factors that are peculiar to the fabrication of immediate dentures. Emphasis is placed on the management of mansition from natural to artificial dentition. This course provides an op-portunity for the application of the principles covered in 560.

PROS-562 Removable Partial Dentures (3) Seminar course devoted to diagnosis and treatment of the partially endentulous patient requiring fabrication of a removable partial denture. Also study of supporting tissues and their physiologic responses.

PROS 563 Obturators and Speech Appliances (2) Seminar-laboratory course devoted to the diagnosis and treatment of the patient with congenital or acquired de-fects of the palate and contiguous fissue. Various types of appliances are described and constructed.

PROS 564 Definitive and Adjunctive Maxillofacial Appliances (2)

Seminar-laboratory course devoted to the theories and principles in the fabrication of somatoprostheses; appli-ances for resected or traumatized mandible; vehicle and protective devices in irradiation therapy; stents, alloplas-tic prostheses; splints and other special prostheses. Vari-ous materials and types of appliances are utilized.

PROS 565- Clinical Practice Teaching (1-, max. 4) AW

Supervised experience in teaching clinical prosthodontics to the undergraduate dental student.

PROS 568 Obturators and Speech Appliances (1-1) AS

Clinical application of 563. Patients requiring the fabrication of obturators and speech appliances are treated.

PROS 569 Definitive and Adjunctive Maxillofacial

Appliances (1-1) WSp Clinical application of 564. Patients requiring the fabrica-tion of a variety of special appliances are treated.

PROS 571 Prosthodontics Seminar (2, max. 12) Continuous weekly seminar devoted to the review of prosthodontic and related literature.

PROS 574 Prosthodontic Visual Aids (1-1) SA Review of literature. Prerequisite: permission.

PROS 578 Prosthodontic Technique Practice

PROS 5/8 Prostinguistic rectangue reactive Teaching (1) ASp Designed to provide practical experience, under supervi-sion, in the teaching of technical procedures in under-graduate dental laboratory courses. The graduate student assumes an active role as instructor, being supervised by full-time faculty.

PROS 580 Prosthodontic Dental Materials (2) A

Study of common materials utilized in the fabrication of dental appliances. Emphasis on resin systems and various precious- and base-metal alloys.

PROS 585 Advanced Clinical Prosthodontics (4, max. 16) AWSpS Continuation of 560, 561, 562. Seminar-clinical course covering recent and advanced phases of prosthodontics.

PROS 600 Independent Study or Research (*)

AWSpS

Prerequisite; permission of graduate program adviser.

RESTORATIVE DENTISTRY

RES D 400, 401, 402 Oral Anatomy (1,1,1)

A,W,Sp Detailed study of the human oral and paraoral structures from the standpoint of form and function, with attention given to systematized nomenclature. Study of the deter-minants of occlusion and instruction in the examination and the modification of the occlusal patterns of an individual patient.

RES D 403, 404 Restorative Dentistry Lecture (1,1) W,Sp

Instruction in the use of various materials for the restoration of diseased or missing parts of the natural dentition. Background information relates to the operations performed in 454.

RES D 409 Dental Materials for Dental Hygiene (2) Sp

Lecture-laboratory course in dental materials science stressing biological impact, correct usage, and manipula-tion principles. Basic properties of dental materials and application of these in the laboratory. Laboratory exercises provide for self-evaluation.

RES D 410 Dental Anatomy (3) W

Lecture and laboratory exercises on the morphology and nomenclature of individual human adult and primary teeth. Introduction to function, internal tooth morphol-ogy, and the influence of tooth anatomy on selected clini-cal procedures. For junior dental hygiene students; others by permission of associate dean.

RES D 411 Restorative Dentistry Technic (3) Sp

Lecture-laboratory course offering experience in instru-mentation and manipulation of restorative materials.

COLLEGE OF EDUCATION

Special emphasis on dental amalgam and composite resin restorations. For dental hygienists. Prerequisite: 410.

RES D 412 Restorative Dentistry Technic (3) A **RES D 412** Restorative Dentistry 1 technic (3) A Lecture and laboratory with experience in instrumenta-tion and manipulation of restorative materials. Special emphasis on restoration of the proximal surface with amalgam and acid-etch resin restoration. For dental hygienists.

RES D 413 Restorative Dentistry Technic (3) W Lecture and laboratory with experience in instrumentation and manipulation of restorative materials and with special emphasis on procedures for the child patient. For dental hygienists.

RES D 414 Restorative Dentistry: Dental Hygiene Honors (3) Sp

Elective course in advanced restorative procedures for dental hygiene students. Provides instruction by means of clinical experience combined with seminar sessions and experience in technique for both peer evaluation and self-evaluation of clinical procedures. Offered on credit/no credit basis only.

RES D 415 Crown and Bridge Lecture (1-2) AW Basic background information and instruction for the res-toration of dentition with crowns and fixed bridges. Re-lated to practice operations on a teaching model in 460.

RES D 416 Operative Dentistry Lecture (1) W Taught in conjunction with the preclinical laboratory 461, Provides basic information and principles in Class V Gold Foil and Class III, IV, and V composite restora-tions. Information for amalgam and inlay restorations supplemental to that presented in 404.

RES D 417 Operative Dentistry Lecture (2) Sp Helps student make transition from preclinical to clinical activities. Clinical restorations of amalgam, composite, and cast gold alloy and clinical application of dental materials and information on clinic operation.

RES D 420, 421, 422 Restorative Dentistry (1.1.1) A,W,Sp

Lecture series closely related to 470, providing a means of communication with the class regarding clinic instruc-tion and policy. Presentation of new material relating to the operations and procedures with which they are involved clinically.

RES D 424-425 Applied Dental Practice (Personnel Management) (1-1) W,Sp Lecture, seminar, and clinical application related to com-municating with staff, delegation, scheduling, body mechanics and work position, efficient work systems, staffing; intraoffice communications. Introduced in lecture/seminar sessions with applications in a clinical set-ting designed to simulate a dental practice.

RES D 430, 431-432 Advanced Restorative Dentistry (1,1-1) A, W, Sp Discussion of various methods available for managing extensive restorative cases. Variations in anterior bridges, combinations of posterior restorations, and concepts of occlusion related to such problems.

RES D 435 Applied Dental Practices (Office Procedures) (2) A and/or S

Incorporates practice management knowledge and skill development relating to business control in the dental of-fice, development of policies/procedures, third-party payment systems, planning for facilities and equipment, managing a multiple staff office.

RES D 449 Directed Studies in Restorative

Dentistry (*) See COM D 449 for course description and prerequisite. Offered on credit/no credit basis only.

RES D 450- Dental Materials (1-1)- ASp Physical and chemical properties of dental materials.

RES D 451 Dental Anatomy (3) A Lecture and laboratory on the morphology and nomencla-ture of individual teeth of the adult human dentition. In-troduction to tooth histology and function and the influ-ence of tooth anatomy on clinical dental procedures. For first-year dental students only.

RES D 452 Introduction to Occlusion (2) W

Laboratory applies concepts to planning and waxing opposing quadrants in a cusp-to-fossa relationship; teeth

on casts mounted to an articulator are waxed to static and dynamic relations in order to produce functional, harmonious, and morphologic tooth forms.

RES D 453 Functional Analysis of Occlusion (2) Sp Provides clinical and laboratory experiences in the exam-ination and charting of a patient's occlusion, record-tak-ing for analysis of occlusion on a dental articulator, and preclinical diagnostic correction of problems of occlusion on articulated clinical casts.

RES D 454, 455 Restorative Dentistry Laboratory (3,3) W,Sp

Provides preclinical experience in basic restorative prin-ciples and procedures that are fundamental to restorative dentistry. Operations involve amalgam, composite, and cast gold restorations.

RES D 460 Crown and Bridge Technique (2-3) AW Provides preclinical experience based on restorative principles, particularly those principles used in fixed partial denture restorations. Operations involving extracoronal tooth preparations and their restorations are performed.

RES D 461 Operative Dentistry Technique (2) W Provides preclinical experience in preparing and restoring teeth, using the information and principles received in 416. Practice on Class V gold foil, Class III, IV, and V composite, Class I and II amalgam and inlay preparations and restorations.

RES D 462 Operative Dentistry Clinic (5) Sp Introduction to patient treatment in the restorative dentis-try clinic. Clinical activities limited to operative pro-cedures of a simple nature that can be finished in one or two appointments. May include amalgam, composite, and gold foil restorations.

RES D 463 Management of Problems of Occlusion

(2) A Laboratory and clinical experience in the diagnosis and treatment of patients with problems related to occlusion. Includes occlusal adjustment of articulated casts, diagnostic waxing for restorative procedures, and occlusal splint therapy.

RES D 470 Restorative Dentistry (4-4-4) AWSp Designed to provide training in the fundamental procedures required to restore teeth that have been damaged by caries or trauma. Instruction also includes the restora-tion of missing teeth with short span fixed prostheses and the treatment of occlusal discrepancies that may relate to these discrepancies.

RES D 480 Clinical Practice (3-3-3) AWSp Clinical course directed toward the integration of restorative therapy with other treatment required for the group of patients selected to fulfill the clinical graduation requirements. Includes the restoration of extensively in-volved teeth and the replacement of teeth, particularly anteriors, with fixed restorations.

RES D 497 Directed Studies in Restorative Dentistry (*) AWSpS

Permits students and faculty who have common academic interests to pursue them together within the curriculum by means of independent study and a tutorial student-fac-ulty relationship. Offered on credit/no credit basis only. Prerequisite: permission of instructor.

RES D 499 Restorative Dentistry Extended Learning (*) S

Supplemental work in restorative dentistry to correct an area of student deficiency. Offered on credit/no credit basis only.

Courses for Graduates Only

RES D 540- Oral Rehabilitation (4-, max. 32)

AWSpS 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 re-storative dentistry.

RES D 570 Review of Literature Seminar (2, max. 12) AWSpS

Continuous weekly seminar devoted to a review of re-

storative and related literature, and discussion of teaching methods, philosophy of teaching and treatment.

RES D 580- Restorative Treatment Planning

Seminar (2-, max, 16) AWSpS Continuous weekly seminar to discuss controversial treatment problems and difficult diagnostic cases selected for graduate students.

RES D 581- Comprehensive Treatment Planning

RES D 581- Comprehensive Treatment Planning (2-, max. 4) WSp Seminar devoted to the coordinated application of knowl-edge gained from both graduate and undergraduate courses to the diagnosis and treatment of comprehensive dental cases with special emphasis given to the relation-ship of periodontics to restorative dentistry. Prerequisite: graduate dental student or permission.

RES D 588 Masticatory Functional Analysis and Occlusal Adjustment (2) A ' Lecture/seminar and clinical sessions in the study of the 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 func-tional analysis and treatment of occlusally related diseases.

RES D 589 Review of Literature in Occlusion (2) W Seminar to review pertinent literature in occlusion.

RES D 590- Gnathology (2-, max. 4) AW Ten seven-hour 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 fully ad-justable articulators. Prerequisites: 588, 589.

RES D 591 Restorative Technique Practice Teaching (1, max. 4) AWSp Supervised practical experience in teaching technical procedures to undergraduates in dental laboratory courses.

RES D 592 Clinical Practice Teaching (1, max. 4) AWSp

Supervised experience in teaching clinical fixed prosthodontics to undergraduate dental students.

RES D 600 Independent Study or Research (*)

AWSpS Investigative program in one of the clinical sciences, un-der the direction of one of the departmental faculty. Pre-requisite: permission of graduate program adviser.

COLLEGE OF EDUCATION

EDUCATIONAL ADMINISTRATION

EDADM 430 Public School Administration (3) AWSpS

public schools; designed for persons who are not major-ing in educational administration. Structure of school oring in educational administration. Structure of school or-ganizations, supervision of personnel, planning problems encountered at various levels, interpretation of the school program to the public, formation of policies, decision making, administration of the instructional program, finance and business management, school housing, ap-praisal of the school system, and leadership in democra-tizing school administration.

EDADM 450 Workshop: Educational Administration Processes (1-6, max. 6) AWSpS

Reality-based materials and activities are used in a workshop situation: students have the opportunity to develop materials and share resources in a variety of current topic areas such as: selection of teachers, evaluation of teachers, supervisory techniques, administration of negotiated agreements, improvement of organizational climates, business management procedures, planning processes, evaluation of school programs, school-community rela-tionships, functioning of teachers and administrative teams.

EDADM 499 Undergraduate Research (*) For undergraduates. Registration must be accompanied by a study prospectus on a special form provided by the Office of Educational Administration, endorsed by the faculty adviser most appropriate for the project proposed and the instructor, and the form must be filed in the Of-fice of Educational Administration in Education. Stu-dents developing studies under this rubric should be ad-vised that a report of a paper setting forth the results of vised that a report or a paper setting forth the results of their investigations should be regarded as a basic part of the program. Prerequisite: permission of instructor.

EDADM 500 Field Study (*) Individual study of an educational problem in the field under the direction of a faculty member. Prerequisites: approved plan of study, and permission of the instructor filed in the Office of Educational Administration in the College of Education.

EDADM 501 Administration of School Programs (3) AWSpS

Anderson, Bolton Information and management techniques useful for set-ting priorities and goals for educational organizations, for oro iding procedures for allocation of human resources, and for evaluating educational programs. Topics include bases for educational programs, needs assessment, goal setting, administering the curriculum and school pro-grams, staff utilization and development, staff morale, and program evaluation. Prerequisite: graduate standing.

EDADM 502 Leadership in Personnel Systems in Schools (3) AWSpS

Anderson, Bolton Emphasizes the human elements of educational administration, including such topics as leadership, selection and orientation of personnel, small-group processes, supervi-sion and control processes, differences and conflict, man-agerial styles. Prerequisite: graduate standing. (Formerly 527.)

EDADM 504 Social Power in the Educational Environment (3) AWSpS Ostrander

Factors contributing to the development and use of social power: conflict between organizational expectations and individual needs; self-esteem; the dynamics of collective action. Impact of social power on administrative roles and processes. Prerequisite: graduate standing.

EDADM 505 Environmental Setting for Educational Administration (3) AWSpS Andrews

Theoretical bases and practical integration of schools within the social/environmental context. Topics include schools as complex organizations, schools as open systems interacting with other open systems, power, and consensus mechanisms. Prerequisite: graduate standing.

EDADM 507 School Finance (3) AWSpS Johnson

Objective is to aid students to acquire knowledge and understanding of the technical aspects of educational ad-ministration. Financial practices and problems, including state and federal support plans, school plant planning, school business management, resource allocation, and budgeting and educational accountability. Prerequisite: graduate standing.

EDADM 508 School Planning and Evaluation (3) AWSpS Fransson

First-hand experience in applying planning and evalua-tion methods to sample educational programs. Includes school scheduling, network planning, information sys-tems, program planning and budgeting, and enrollment projections. Each student is expected to complete prob-lem sets related to the several planning and evaluation methods covered in the course. Prerequisite: graduate standing.

EDADM 519 Laboratory and Internship in Educational Administration (1-9, max. 9) AWSpS Anderson, Andrews, Bolton, Fransson, Johnson, Ostrander

Recommended for candidates preparing for all administrative positions except superintendent, unless candidate has sufficient experience as an administrator. Half-time work in a school district or districts for one, two, or three quarters, depending upon the candidate's previous expe-rience. Supervision by staff members of the College of Education and appropriate administrators in the selected school district. Prerequisites: completion of all other re-quirements for administrator's credential and permission of instructor.

EDADM 537 . Special Problems in Educational Administration and Supervision (3, max. 9) AWSpS Anderson, Andrews, Bolton, Fransson, Johnson, Ostrander

Readings, lectures, and discussions of topics of special Relatings, fectures, and discussions of topics of special and current interest to school administrators or supervi-sors. Reports on new developments in research. Topics vary each year. Prerequisite: master's degree or permis-sion of instructor.

EDADM 551 Seminar in School Supervision (3) AWSpS

Anderson, Bolton

Anderson, bouton Theory of the process of supervising school personnel, including an analysis of the techniques of supervision, theory of leadership and group process, interpersonal re-lations, and evaluation of teacher effectiveness. Prerequisite: master's degree or permission of instructor.

EDADM 552 Seminar in School Personnel Administration (3) AWSpS Bolton

Botton Major emphasis on the analysis of factors to be consid-ered in the selection and evaluation of teachers, including determination of relevant criteria, acquisition and analy-sis of data, planning and decision processes. Less empha-sis is given to other school personnel topics. Prerequisite: master's degree or permission of instructor.

EDADM 554 School-Community Relations (3) AWSpS

Andrews, Ostrander

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 schoolcommunity power, types, and organizational influences. Offered on credit/no credit basis only. Prerequisite: mas-ter's degree or permission of instructor.

EDADM 555 The Law and Education (3) AWSpS Ostrander

Examination of court cases associated with the rights of Individuals and groups in educational organizations. At-tention is given to the understanding of administrative due process requirements and to the growing body of ad-ministrative law affecting student and personnel manage-ment. Perequisite: master's degree or permission of instructor

EDADM 556 Seminar in Conflict Management (3) AWSpS Ostrander

Examination of procedures and techniques pertinent to the management of organizational conflict. Among the areas covered are collective bargaining, grievance pro-cedures, mediation, fact finding, and arbitration. Prereq-uisite: master's degree or permission of instructor.

EDADM 557 Seminar in Administration: Finance (3) AWSpS Johnson

Johnson Current problems in school finance, including costs, abil-ity to support schools, and financial implications of edu-cational principles. The economics of public education. Problems of federal, state, and local school support. Fi-nancing capital outlay, research, and public relations. Prerequisite: master's degree or permission of instructor.

EDADM 558 Seminar in Administration: School Buildings (3) AWSpS Schneider

Schneider Survey of problems and issues faced by educational ad-ministrators that are impacting on educational facilities. Directed readings and informal discussion of the people, processes, programming, planning, and evaluation of ways and means of accommodating changes due to identifiable problems and issues. Prerequisite: master's degree or permission of instructor.

EDADM 570 Workshop in Educational Administration (2-6) AWSpS Workshop focuses on current problems facing educa-tional administration. Topics may include personnel management, supervision of personnel, professional ne-gotiations, selection and planning procedures, power re-lationships, school-community relationships. Prerequi-site: master's degree or permission of instructor.

EDADM 571 Seminar in Human Relations in Educational Administration (3) AWSpS Anderson, Bolton

Analysis of factors involved in human relations problems related to operation of public schools. Motivation, per-ception, communication, role analysis, and dynamics of groups are studied through use of cases and simulated sit-uations. Offered on credit/no credit basis only. Prerequisite: master's degree or permission of instructor.

EDADM 577 Seminar in Educational Planning and Organization (3) AWSpS

Fransson, Johnson Application of principles utilized in planning and organizing public schools. Formation of policy and pro-cedures; formal and informal organization; power, authority, and responsibility; utilization of people, time, and space. Prerequisite: master's degree or permission of instructor.

EDADM 578 Seminar in Educational Decision Making (3) AWSpS Andrews, Bolton

Analysis of nature of decisions in educational setting. Consideration of theory of decisions, social and psychological constraints, and application in simulated situa-tions. Prerequisite: master's degree or permission of instructor.

EDADM 579 Internship in Educational Administration: Superintendent (1-6, max. 6)

AWSpS

Anderson, Andrews, Bolton, Fransson, Johnson, Ostrander

Ostrander Recommended for candidates preparing for superinten-dent positions other than those having sufficient experi-ence in central offices of school districts. Half-time work in a school district or districts for one, two, or three quar-ters, depending upon the student's previous experience. Supervision by staff members of the College of Education and the superintendent of schools in the se-lected school district. Prerequisites: completion of all other requirements for superintendent's credential and reministion of instructor. permission of instructor.

EDADM 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, and which, with permission of the instructor, must be filed with the Office of Educational Administration in the College of Education. Prerequisite: permission of instructor.

EDADM 600 Independent Study or Research (*) Registration must be accompanied by a study prospectus endorsed by the appropriate faculty adviser for the work proposed and must be filed with Office of Educational Administration in the College of Education. A report or paper setting forth the results of the investigation is re-quired. Prerequisite: permission of instructor.

EDUCATIONAL CURRICULUM AND INSTRUCTION

EDC&I 132 Spanish for the Elementary School (5) Practice in the basic language skills is combined with demonstration and analysis of methods and techniques appropriate to the Foreign Languages in Elementary Schools program. Emphasis is given to the language structures and vocabulary that normally occur in elemen-tary school Spanish. Offered jointly with SPAN 128.

EDC&I 314 Business Education Clinic (1-15, max. 15)

Brown, Frerichs Business education clinic designed to develop and refine those skills that are considered to constitute basic essenthose skills that are considered to constitute basic esten-tial capabilities for beginning business education teach-ers. Instruction is largely on an individualized basis, with measurement largely by performance standards. Focus is on secretarial skills, accounting, office machines operation, and data processing. Prerequisites: basic skills in typewriting, shorthand, office machines operation, of-fice procedures, and accounting; BG&S 101 and 200; ACCTG 210 and 220; ECON 200 and 201.

COLLEGE OF EDUCATION

EDC&I 315 The Teaching of Business Education: Typewriting, Shorthand, Office Practice, and Transcription (4) Brown, Frerichs Prerequisite: EDPSY 304.

EDC&I 316 The Teaching of Business Education: Accounting, Office Machines, Business Arithmetic, and General Business (4) Prerequisites: EDPSY 304 and 9 credits in accounting.

EDC&I 317 Art in Childhood Education (3) AWSoS

Raven

Raven Provides the general elementary student with a theoretical and practical background for teaching art to children. Prerequisites: ART 200, DRAMA 200, or MUSIC 200 and admission to the Teacher Certification Program.

EDC&I 318 Drama in Childhood Education (3) AWSpS Provides the student with a theoretical and practical intro-

Autory background of fundamentals for teaching drama to children as a creative process and mode of learning. Prerequisites: ART 200, DRAMA 200, or MUSIC 200 and admission to the Teacher Certification Program.

EDC&I 319 Music in Childhood Education (3) AWSpS

Cooper Provides the student with a theoretical and practical intro-ductory background to the fundamentals of music and for teaching music to children as a creative process and mode of learning. Prerequisites: ART 200, DRAMA 200, or MUSIC 200 and admission to the Teacher Certification Program.

EDC&I 320 Organization of School Programs in Communication Disorders (3)

Study of the organization and management of school pro-grams designed to alleviate disorders of communication, K-12. Special emphasis on field experiences. Open only to majors in communication disorders. Prerequisites: EDPSY 304, SPHSC 350 and 351, or 391.

EDC&I 329 Teaching Foreign Language in the Secondary School (2)

Basic course in the methods of teaching foreign lan-guages in the secondary school. Prerequisite: EDPSY 304.

EDC&I 330, 331, 332 The Teaching of French (3,3,3)

requisites: EDPSY 304 and demonstration of language proficiency.

EDC&I 333, 334, 335 The Teaching of Spanish: Secondary Emphasis, Elementary and Junior High School Emphasis, Elementary Emphasis (3,3,3) Friedrich

Prerequisite to teaching practicum. Elementary and ju-nior high, and secondary emphases. Prerequisites: 329, EDPSY 304, and demonstration of language proficiency.

EDC&I 336 The Teaching of German in Secondary Schools (3) Rabura

Prerequisites: 329, EDPSY 304, GERM 303, or permission of instructor.

EDC&I 337 The Teaching of German in Elementary Schools (3)

Rabura

Discrives and methods of the FLES (Foreign Languages in Elementary Schools) program. Prerequisites: 329, EDPSY 304, GERM 303, or permission of instructor.

EDC&I 338 The Teaching of Russian (2) Augerot

Special methods in the teaching of Russian to acquaint prospective teachers with materials, methods, and prob-lems. Prerequisites: 329, EDPSY 304, and permission of instructor.

EDC&I 339 The Teaching of Scandinavian

EDC&I 339 The Teaching of Scandinavian (Norwegian, Swedish) (2) Special methods in the teaching of Norwegian and Swed-ish to acquaint prospective teachers with materials, meth-ods, and problems. Prerequisites: 329, EDPSY 304, and permission of instructor.

EDC&I 340 Elementary Art Education (3) Study of the stages of development in the art of the young child as expressed through his creative and mental growth.

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. Prerequisite: EDPSY 304.

EDC&I 343 Music in the Elementary School: Intermediate Grades (3)

For students majoring in elementary education (not open to music specialists). A study of music in the develop-ment of children, ages 8 to 12, with attention to musical activity and the growth of related concepts and skills. Prerequisites: EDPSY 304 and MUSIC 119.

EDC&I 344 Materials and Methods of Teaching Chinese (3)

Methods specifically pertaining to the teaching of Chi-nese language are discussed. Existing textbooks are re-viewed. Each student is required to write a lesson, draw up a teaching plan, and teach a class before the end of the quarter. Prerequisites: 329, EDPSY 304, and CHIN 313, or equivalent.

EDC&I 355 Language Arts in the Elementary School (3)

Krening, Settles

Basic course in planning and teaching elementary lan-guage arts: listening and speaking, handwriting, spelling, creative and practical writing. Prerequisites: EDPSY 304 and permission of instructor.

EDC&I 356 The Teaching of English (3) McElrov, Smith

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. Prereq-uisite: EDPSY 304.

EDC&I 357 The Teaching of Speech Communication (3) A

Staton-Spicer

Staton-Spicer Special methods course in the teaching of speech com-munication at the secondary level. Prerequisites for ma-jors in speech communication: EDPSY 304, at least 20 credits in speech communication; for nonmajors: permission of instructor.

EDC&I 360 Reading in the Elementary School (3) Krening, Monson, Sebesta, Standal Basic course in methods, techniques, and materials used

in the teaching of reading from the readiness period in the kindergarten-primary area through the study-techniques of the intermediate grades. Prerequisites: EDPSY 304 and permission of instructor.

EDC&I 361 Basic Skills in Reading (3)

Developmental readiness for reading; diagnostic teaching of reading in the classroom; reading instruction for bilin-gual learners; reading for special learners; developing the least restrictive environment; teaching functional reading and study willing and metariole and the metariole spectra to the second sec and study skills; and materials and approaches for teach-ing reading. Prerequisites: 360 and EDPSY 304.

EDC&I 365 Social Studies in the Elementary School (3)

Banks, Hunkins, Jarolimek, Kaltsounis

Basic course in the planning and teaching of social stud-ies in the elementary school. Prerequisites: EDPSY 304 and GEOG 100.

EDC&I 366 The Teaching of Social Studies in Secondary Schools (3) Guise

Application of educational principles and methods to the teaching of social studies on the junior and senior high school levels. Prerequisite: EDPSY 304.

EDC&I 370 Science in the Elementary School (3) Olstad, Smith

Basic course in the teaching of science in the elementary school with special emphasis on the nature of science as a process of inquiry. Prerequisite: EDPSY 304 and 5 credits in an approved laboratory natural science course (biology, chemistry, or physics).

EDC&I 371 Teaching Science in the Secondary School (3) Olstad

Basic course in the teaching of science in the secondary school with special emphasis on the nature of science as a process of inquiry. Prerequisite: EDPSY 304.

EDC&I 372 The Teaching of Biology (2)

Olsen Prerequisites: 371, EDPSY 304, and 25 credits in biology.

EDC&I 373 The Teaching of Chemistry (3) Ritter

Prerequisites: 371, EDPSY 304, and at least 20 credits in college chemistry.

EDC&I 375 Mathematics in the Elementary School (3)

Beal. Kersh

Examination of the learning and teaching of elementary mathematics (grades K-6), in light of recent theoretical and pedagogical developments. Prerequisites: EDPSY 304, MATH 170.

EDC&I 378 Teaching Mathematics in the Secondary School (3)

Beal, Kersh

Basic course in the teaching of mathematics in the secon-dary school for preservice teachers. Prerequisite: EDPSY 304 or permission of instructor.

EDC&I 400 Selection and Organization of Occupational and Industrial Education Subject Matter (3)

Problems, techniques, and procedures in the selection and organization of teaching content for industrial educa-tion; preparation of instructional units and evaluative devices for industrial education teachers.

EDC&I 401 The Teaching of Occupational and Industrial Education (3)

To acquaint prospective industrial education teachers with teaching aids, classroom procedures, and problems in the teaching of industrial education courses. Prerequi-site: 400 or permission of instructor.

EDC&I 402 Instructional Analysis for Industrial **Education Teachers (3)**

Study of the techniques and procedures used in analyzing instructional areas into their basic elements, and an ar-rangement of the elements into a teaching plan and sequence for industrial arts and vocational industrial education courses.

EDC&I 404 Principles and Objectives of Vocational Education (3)

Survey of vocational education, aims, objectives, and types of programs. Relationship to general and practical arts education.

EDC&I 405 Supervision of Vocational Education Programs (3)

Programs (5) Principles, problems, techniques, and methods of super-vision; planning and organizing a supervisory program, equipment and instructional materials; relationship of su-pervisors to administrators and teachers; evaluation of programs. Prerequisite: permission of instructor.

EDC&I 406 Organization and Administration of Vocational Education Programs (3)

Administrative problems involved in organizing and op-erating vocational schools and classes. Designed for suerating vocational schools and classes. Designed for su-perintendents, principals, vocational directors, supervi-sors, or other persons with direct responsibility for the administration or supervision of vocational programs.

EDC&I 410 Field Experience in Industrial Practices

(2-10, max. 10) Fred Experience in Industrial Practices (2-10, max. 10) Study of the problems of industry such as employment practices, job requirements, materials handling and pro-cessing, plant organization and management that would cessing, plant organization and management that would assist industrial arts teachers interpret industrial prac-tices. Prerequisites: teaching experience in industrial edu-cation and permission of instructor.

EDC&I 411 Principles and Problems in Distributive **Education (3)**

Editeation (5) Concerned with improvement of instruction, main-tenance of high standards in work stations, and special techniques used by experienced coordinators in the solu-tion of common problems. (Offered Summer Quarter only.)

EDC&I 413 Coordination of Cooperative Education Programs (3)

Stresses fundamentals, records and reports, the use of advisory committees, course titles, qualifications, coordinating activities, course content, and work training stations

EDC&I 415 Materials and Methods of Teaching Typewriting (3) Brown, Frerichs

Procedures and materials for developing skills in beginning and advanced typewriting. Demonstration and participation in drill techniques; testing and grading; evalua-tion of recent research findings in the development of speed and accuracy; classroom organization.

EDC&I 416 Materials and Methods of Teaching Office and Clerical Practice (3)

Brown, Frerichs Objectives and content of office practice and general clerical practice courses; plans for organizing classes and methods of teaching specific machines and subject mat-ter; laboratory study of new inventions in office ma-

chines. EDC&I 417 Materials and Methods of Teaching

Shorthand and Transcription (3) Brown, Frerichs

Recent research and experimentation in teaching short-hand and transcription are emphasized. Psychology of skill development; comparison of the various shorthand systems: evalutation of teaching materials; consideration of standards, objectives, and teaching techniques. An ad-vanced course for experienced teachers. (Offered Summer Quarter only.)

EDC&I 418 Principles and Problems of Business Education (3)

Brown, Frerichs

Dipectives, history, trends, and issues of business educa-tion; federal participation in vocational education; eco-nomic, occupational, and population trends and their im-plications in business education; leaders in business education; research and problems.

EDC&I 419 Materials and Methods of Teaching Bookkeeping and General Business Subjects (3) Brown, Frerichs

nechniques of teaching bookkeeping and general busi-ness subjects; relationship to the curriculum; standards to be achieved; content and organization of the subject mat-ter; tests and teaching materials; new trends in the field; motivational devices; visual aids.

EDC&I 420 Principles of Safety Education (3) Designed primarily for teachers and administrators inter-ested in developing a school safety program in elementary, junior, and senior high schools. Special emphasis is placed on the need for a safe school environ-ment and the role of the teacher in promoting safety.

EDC&I 424 Multiethnic Curriculum and Instruction (3) A Banks

Primarily for pre-service and in-service teachers who have little or no previous exposure to issues related to ethnicity and schooling. Designed to help teachers in better understanding the school's role in the ethnic education of students and in acquiring the insights, understandings, and skills needed to design and implement curricular and instructional strategies that reflect ethnic diversity. Prerequisite: admission to Teacher Education Program, teaching experience, or permission of instructor.

EDC&I 438 Improvement of Teaching: Latin (3) Grummel, Pascal

Examination and evaluation of the various methods of teaching Latin; audiovisual aids; testing materials; text-books; relation of Latin to other languages. Latin deriva-tives in English vocabulary. Offered jointly with LAT

EDC&I 439 Caesar for High School Teachers (3) Grummel, Pascal Interpretation of Caesar's works in the light of their his-

interpretation of Catesar's works in the light of their his-torical, political, literary, and geographical background, with special reference to the problems of high school teaching. Offered jointly with LAT 476. (Offered Sum-mer Quarter only.)

EDC&I 441 Improvement of Teaching: Art Appreciation in the Schools (3) Survey of the history of art to promote an appreciation of

the nation's cultural heritage; designed for teachers at all levels of instruction and subject matter areas. (1) Development of content in sequential or unit plan studies to incorporate art history in general studies curricula. (2) De-velopment of methods and preparation of materials for classroom presentation. Illustrated lectures. Prerequisite: teaching experience.

EDC&I 443 Improvement of Teaching: Elementary School Music (3)

Advanced studies in the teaching of music in the elementary school. Prerequisite: teaching experience.

EDC&I 445 Theory and Practice of Kindergarten and Primary Teaching (3) Hirabayashi, Krening

Systematic treatment of the content, teaching processes, and learning resources appropriate to kindergarten and primary education with particular emphasis on current research and developments. Prerequisite: EDPSY 304 or permission.

EDC&I 453 Teaching the Bilingual-Bicultural Child in the Elementary School (3) WSp Gonzales, Juarez

Educational needs of the elementary school bilingual child and the ways in which these needs can be met. The differences between the metropolitan, the rural, and the uncerness between the meturopontain, the tural, and the migrant bilingual with emphasis on the educational diffi-culties the bilingual faces in all three settings. A major component of the course is bilingual-bicultural educa-tion—research findings and special programs, materials, and methodologies. Prerequisite: concurrent registration is EDUC 300 in EDUC 302.

EDC&I 454 Teaching the Bilingual-Bicultural Student in the Secondary School (3) WSp Gonzales, Juarez

Forvides prospective secondary school teachers with the knowledge and skill to integrate bilingual-bicultural stud-ies into the curricular offerings of the secondary school. Focus on the cultural contributions of bilingual popula-tions to the American culture and the historical, social, and linguistic factors affecting the education of the bilingual. Emphasis on methods and resources for teaching separate subjects bilingually.

EDC&I 455 The Language Arts: Instructional Problems and Practices in the Elementary School (3) Settles

Study of important and recent research in elementary school language arts and consideration of its practical im-plications for teaching. Prerequisite: teaching experience.

EDC&I 456 Workshop in Instructional Improvement: Language Arts (2-6) 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)

Gonzales, Juarez Prepares preservice and inservice 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 construc-tion approaches to second language learning. Includes di-agnostic-prescriptive strategies for classroom application.

EDC&I 460 The Teaching of Reading (3) Monson, Sebesta

Improvement of teaching reading in the elementary school, including comprehension and decoding, reading in the content fields, motivation of voluntary reading. Prerequisite: teaching experience or prior course work in the teaching of reading.

EDC&I 461 Materials for Teaching Reading (3)

EDUCE1 401 Wateriais for Teaching Reading (3) Monson Designed to provide acquaintance with materials used in the teaching of reading. Basal readers, materials from content areas, recreational reading materials, and supple-mentary practice materials are examined, as are the orga-nization of learning centers and other schemes for teach-ing reading. Prerequisite: one prior course in the teaching descenters of the teaching of reading.

EDC&I 462 Reading in the Secondary School (3) Fea, Standal

Teaching of reading in the secondary schools, including

vocabulary development, comprehension, speed reading in the content fields, and organization of reading programs at the secondary level. Prerequisite: teaching experience or concurrent internship.

EDC&I 464 Educating Native American Youth (3) Rill

Assists students in understanding the North American Indian child from cultural, socioeconomic, and psychologi-cal 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 Practice (3) Banks, Jarolimek, Kaltsounis

Stresses curriculum patterns, instructional procedures, resource materials, and the selection of content in social studies. For elementary and junior high school teachers.Prerequisite: teaching experience.

EDC&I 466 Social Studies Education: Secondary School Programs and Practices (3) Guise

Stresses curriculum patterns, instructional procedures, resource materials, and a selection of content in social studies for junior and senior high school teachers. Prerequisite: teaching experience.

EDC&I 467 Geography in the Social Studies

EDC/201467 Geography in the Social Studies Curriculum (3) Discussion of the concepts and content of geography es-sential to effective social studies curricula. Offered jointly with GEOG 467.

EDC&I 468 Workshop in Instructional

Improvement: Social Studies (2-6) Individual or group study projects on the improvement of instruction in social studies.

EDC&I 469 Educating the Black Inner-City Child (3) Banks

Intensive analysis and review of the research and litera-Intensive analysis and review of the research and meri-ture, both theoretical and empirical, relevant to curricu-lum patterns and programs designed especially for Black inner-city children. Special attention is given to the im-plications of the research reviewed for devising effective instantiation of the research reviewed for devising effective teaching strategies for Black inner-city children.

EDC&I 470 Science Education: Elementary School Programs and Practices (3) Olstad, Smith

Designed for classroom teachers with reference to the

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. Prerequisite: teaching experience.

EDC&I 471 Science Education: Secondary School Programs and Practices (3) Olstad

Survey of the status and potential role of science in edu-cation; 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 forma-tion and problem solving; and organization of science programs. Prerequisite: teaching experience.

EDC&I 473 Workshop in Instructional Improvement: Science (2-6)

Individual or group study projects on the improvement of instruction in science.

EDC&I 474 Multi-Ethnic Studies: Methods, Content, and Materials (3) Banks

Designed to help preservice and inservice teachers identify content and materials and devise methods for imple-menting ethnic studies programs and for incorporating ethnic content into regular K-12 social studies, language etatis, and humanities curricula. Special attention is given to teaching about American Indians, Mexican Ameri-cans, Black Americans, Asian Americans, Puerto Rican Americans, and white ethnic groups. Precequisite: admis-sion to Teacher Education Program or teaching experiелсе.

COLLEGE OF EDUCATION

EDC&I 475 Improvement of Teaching: Elementary School Mathematics (3) Beal, Kersh

Designed for elementary teachers (grades K-6). Emphasis is placed on the contributions of research to the improvement of the teaching of mathematics in the elementary school. Prerequisite: teaching experience.

EDC&I 476 Improvement of Teaching: Junior High School Mathematics (5) Exploration of some modern mathematical concepts for

the purpose of improving the teaching of junior high school mathematics. Prerequisite: one and one-half years of high school algebra or MATH 100, 102.

EDC&I 477 Improvement of Teaching: Secondary School Mathematics (5) Exploration of some modern mathematical concepts for the purpose of improving the teaching of secondary school mathematics. Prerequisite: teaching experience.

EDC&I 478 Special Topics in Mathematics for Teachers (2-5, max. 15)

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 (2-6) Individual or group study projects on the improvement of instruction in mathematics.

EDC&I 480 Introduction to Learning Resources in Teaching (3)

Driscoll, Hawk, Torkelson Factors influencing the selection and use of learning re-sources in instruction, with special emphasis on planning for the uses of messages, message forms, and message carriers.

EDC&I 482 Still Photography in Education (3) Driscoll, Hawk

Driscou, nawk Theory and practice in producing still photographs and slides for teaching purposes; camera and darkroom tech-niques. Producing photographic materials to meet spe-cific learning problems.

EDC&I 483 Basic Motion Picture Production (4) Driscoll

Basic motion-picture techniques, emphasizing cinema-tography and editing.

EDC&I 484 Educational Film Production (3) Driscoll

Advanced film techniques, including instructional film design, narration writing, sound editing, and rerecording. Prerequisite: 483.

EDC&I 485 Workshop in Instructional Improvement: Learning Resources (2-6) Driscoll, Hawk, Torkelson

Individual or group study projects on the improvement of instruction in learning resources.

EDC&I 486 Screen Education (3) Driscoll

Workshop course in screen education for secondary school teachers and others interested in the history and esthetics of the motion picture; preparation for teaching about film as a communication medium.

EDC&I 487 Cinematic Animation Techniques (3) Driscoll

For teachers and others interested in understanding ani-mation techniques in educational television and films. Relationships of rhythm, graphic design, and sound. In addition to lecture demonstrations, opportunity is given for experimentation in simple animation and special effects cinematography.

EDC&I 488 Television in the Schools (3)

Gotfrey Television programs to supplement classroom work; the development of the American system of broadcasting; the development and significance of educational television, and the contribution schools can make to broadcasting. Open to nonmajors; not open to graduate students in communications. Offered jointly with CMU 459. Offered Summer Quarter only.

EDC&I 489 Television Production Workshop for Teachers (5)

Godfrey Working in University studios, under laboratory conditions involving production on-camera methods, teachers learn to present instructional subject matter through television. Especially for those who expect to work with tele-vision as instructors or as supervisors of school-oriented television activities. Open to nonmajors; not open to graduate students in communications or to students with credit for CMU 361. Offered jointly with CMU 463. Offered Summer Quarter only.

EDC&I 494 Workshop in Improvement of Curriculum (1-15, max. 15)

Stresses the application of procedures for curriculum de-velopment, maintenance, and evaluation. Individuals taking this workshop have opportunities to develop and perfect strategies for program development and have oc-casions to utilize the strategies in master plan and materi-als preparation for simulated or real school situations. Specific focus of workshop is determined by instructor or by arrangement with district. Prerequisite: permission of instructor.

EDC&I 495 Improvement of Teaching (3) To help teachers (1) understand the physical, psychologi-cal, emotional, and social needs of children; (2) adapt incar, emotional, and social meets of children; (2) adapt in-struction to the needs of children; (3) select the ap-proaches and instructional resources that will provide the soundest learning experiences; and (4) appraise themselves and their work. (Offered only by special arrangement with school districts.)

-EDC&I 496\ Workshop in Instructional

Improvement (2-6, max. 6)

Individual or group study projects on the improvement of instruction.

EDC&I 499 Undergraduate Research (2-5, max. 5) For undergraduates. Registration must be accompanied For undergraduates. Registration must be accompanied by a study prospectus on a special form provided by the Office of Educational Curriculum and Instruction, en-dorsed by the faculty adviser most appropriate for the project proposed and the instructor, and the form must be filed in the Office of Educational Curriculum and Instruc-tion in the College of Education. 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 (3 or 6, max. 9) Individual study of an educational problem in the field under the direction of a faculty member. Prerequisites: approved plan of study and permission of the instructor must be filed in the Office of Educational Curriculum and Instruction in the College of Education.

EDC&I 501 Curriculum for the Gifted (3) A Kersh

Investigation of curriculum and instruction appropriate for gifted students of the elementary or secondary school level. Prerequisites: teaching experience and permission.

EDC&I 510 Seminar in Industrial Arts and **Vocational Technical Education (3)**

Intensive study of current events, problems and research studies in industrial arts education, vocational and techni-cal education. Prerequisite: permission of instructor

EDC&I 514 Coordination and Supervision of Cooperative Office Education Programs (3) SW Brown. Frerichs

Practices and procedures in the initiation and sequential development of cooperative office education programs. Relevant techniques in coordinating, supervising, and Relevant techniques in coordinating, supervising, and evaluating cooperative office education programs; review of research studies, surveys, and reports; state require-ments; preparation of proposals; analysis and evaluation of techniques of recruitment, selection, placement, train-ing, and follow-up; assessment of skills and knowledge required for job clusters. Prerequisites: one year of teach-ing experience in office occupations and valid state transition destingations. vocational certificate.

EDC&I 515 Seminar in Business Education (3) Brown, Frerichs

Analysis of selected problems in business education; current research in business education; evaluation of work experience programs; developments in vocational busi-ness education. Prerequisites: 415, 418, 419.

EDC&I 520 Current Models in Early Childhood Education (3)

Education (3) Hirabayashi, Krening In-depth analysis of current program models for the edu-cation of young children, with an emphasis on specifica-tion of objectives, practices, and evaluation of model ef-fectiveness. Models emphasized are those developed in this country, but the course also includes a study of mod-ble doubled in ethes experience as they have a featured els developed in other countries as they have influenced practice here.

EDC&I 521 Problems and Issues in Early Childhood Education (3)

Hirabayashi, Krening

Study of issues currently facing the field of early child-hood education, emphasizing the rationale, impact, and management of child-care programs. Relationship of lo-cal child-care programs to state and federal agencies is included. Prerequisite: 520 or permission of instructor.

EDC&I 522 Practicum in the Training of Early **Childhood Instructional Personnel (3)**

Hirabayashi, Krening Directed experience in educational training conducted in the field. Design and implementation of a training program for early childhood education instructional personnel. Prerequisites: graduate standing and permission of instructor.

EDC&I 524 Seminar in Teacher Education (3) W Foster

Focus on recent trends, issues, and proposals for future development in teacher education and certification. Prerequisite: permission of instructor.

EDC&I 530 Seminar in Analysis of Approaches for Teaching Reading (3) AWS Monson, Sebesta

Monson, Sebesta Designed to aid experienced teachers who possess back-ground in the teaching of reading, this course presents a variety of approaches with implications of research for analyzing the effectiveness of individualized reading, in-dividually guided instruction, eclectic methodology, and others. Evaluation of pupil performance included. Pre-requisites: teaching experience and a basic course in the teaching of medium teaching of reading.

EDC&I 531 Seminar: Analysis of Reading Materials (3) SpS

Monson, Sebesta

Students formulate and apply criteria for assessing mate-rials, with emphasis on linguistic, cultural, and psycho-logical factors; instruction effectiveness, interest level; and educational objectives. Prerequisites: teaching experience and one basic course in the teaching of reading.

EDC&I 532 Seminar in Research in Reading (3) Monson, Sebesta, Standal

Primary focus on those aspects of the reading process that rimary locus on those aspects of the reading process that are of concern in a developmental reading program. Em-phasis is on research dealing with factors influencing reading ability, problems in skill development, effective-ness of various methods and approaches for teaching reading, reading in content fields, and recreational reading. Course work includes group and individual analysis of studies with attention to research design and measurement. Prerequisite: permission of instructor.

EDC&I 533 Seminar: Conducting Research in Reading (3, max. 6) SpS Monson, Sebesta

Students design and conduct original research studies in

the field of reading. Emphasis on research rationale, choice of productive research types, and reporting of re-search results and implications. Prerequisite: 532.

EDC&I 534 Seminar in the Reading of Literature (3) Monson

Reading of literature and its effect on reading skills, lan-guage development, social values, and literary judgment of children and adolescents. Emphasis on analysis of research in these areas and on the development of action re-search designed to study response to literature. Prerequisite: one 400- or 500-level educational 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) SpS Monson, Sebesta

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: 534.

EDC&I 541 Seminar in Bilingual Education: Organization and Structure (4) A Juarez

Juarez Study of the structure and organization of bilingual pro-grams. Includes study of the developmental and organi-zational factors affecting bilingual education. Assists graduate students in reviewing the historical antecedents in bilingual education and in developing a personal phi-losophy about bilingual education.

EDC&I 542 Seminar in Bilingual Education: Instructional Foundations and Issues (4) W Juarez

Study of the theoretical foundations and instructional implications of psychology and linguistics as they apply to bilingual education. Assists graduate students in explor-ing 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) Sp Juarez

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 ed-ucation and in becoming familiar with the current issues in bilingual education.

EDC&I 555 Educational Futures (3) Sp Hunkins

Concept of alternative futures, current social events affecting education, the current educational arena, and possible educational futures. Participants become ac-quainted with basic future studies methods and have opquantical with outer future stands in dealing with aspects of the educational arena. Prerequisite: prior graduate course work or experience in education.

EDC&I 556 Elementary School Curriculum (3) Foster, Hunkins, Settles

Description and analysis of current curriculum practices, with particular emphasis on the interrelationships and di-mensions of content, organization, methods, evaluation, trends, and issues. Prerequisite: teaching practicum.

EDC&I 558 Secondary School Curriculum (3) Johnson

Systematic description and analysis of the current curric-ulum practices, with particular emphasis on the factors and forces affecting secondary school curriculum.

EDC&I 559 Principles and Procedures of Curriculum Development (3)

Guise, Hunkins

Intensive study of the basic principles and procedures utilized in the development of curricula. Prerequisite: teaching practicum.

EDC&I 561 Seminar in Language Arts (3)

Study of recent research in language structure with special attention to research pertaining to the teaching of language skills: auding, speech, and written composition. Course work includes group and individual analysis of language arts studies with attention to research design and measurement. Prerequisite: permission of instructor.

EDC&I 562 Seminar in Reading and Language Arts: Secondary Emphasis (3)

Fea. Sebesta

Study of recent research in listening, oral language, read-ing, and written language, emphasizing psychological and interrelated aspects. Prerequisite: permission of instructor.

EDC&I 563 Current Issues in Language Arts Education (1-3, max. 6) Discussion of problems and issues of current interest and importance in language arts education.

EDC&I 565 Seminar in Social Studies Education: Elementary Emphasis (3) *Guise, Jarolimek, Kaltsounis* Intensive study of the social studies curriculum, with par-

ticular emphasis on current literature and research. Pre-requisite: 465 or equivalent.

EDC&I 566 Seminar in Social Studies Education: Secondary Emphasis (3) Guise, Jarolimek

Intensive study of the social studies curriculum, with parrequisite: 466 or equivalent.

EDC&I 567 Current Issues in Social Studies Education (1, max. 6)

Kaltsounis

Discussion of problems and issues of current interest and importance in social studies education.

EDC&I 569 Educating Ethnic Minority Youths (4) Sp Banks

Intensive analysis and review of the research and curricular programs related to the social, psychological, and po-litical factors that influence the school experiences of ethnic minority youths. Special attention given to in-structional and curricular programs for Afro-American, American Indian, Mexican-American, Puerto Rican-American, and Asian-American students. Prerequisite: successful completion of 464, 469, or 474, or permission of instructor.

EDC&I 570 Seminar in Science Education: [/] Elementary Emphasis (3) Olstad

Investigation of curriculum and instruction in science at / elementary school levels, with particular emphasis on current literature and research. Prerequisite: 470 or equivalent.

EDC&I 571 Seminar in Science Education: Secondary Emphasis (3) Olstad

Investigation of curriculum and instruction in science at secondary school levels, with particular emphasis on cur-rent literature and research. Prerequisite: 471 or equivalent.

EDC&I 572 Current Issues in Science Education (1, max..6)

Olstad, Smith Discussion of topics and problems of current interest and importance in science education. Prerequisite: graduate standing.

EDC&I 575 Seminar in Mathematics Education: Elementary Emphasis (3) Kersh

Investigation of curriculum and instruction in mathemat-ics at the elementary school level; review of research and preparation of proposals. Prerequisite: 475 or equivalent.

EDC&I 576 Seminar in Mathematics Education: Secondary Emphasis (3) Kersh

Investigation of curriculum and instruction in mathematics at the secondary school level; review of research and preparation of proposals. Prerequisite: 476 or 477, or couivalent.

EDC&I 577 Current Issues in Mathematics Education (1, max. 6)

Kersh Discussion of problems and issues of current interest and importance in mathematics education.

EDC&I 580 Seminar in Learning Resources (3) Driscoll, Torkelson

Advanced analysis of communications in educational settings: concepts, terminology, trends, research directions, factors affecting uses of messages, message forms, and message carriers for instructional purposes. Prerequisite: 480 or permission of instructor.

EDC&I 581 Management of Learning Resources Programs (3) Hawk

Study of factors affecting management of educational programs involving production, storage, distribution, and use of visual and auditory materials and equipment. Pre-requisite: 480 or permission of instructor.

EDC&I 582 Learning Resources Systems of Instruction (3) Torkelson

Study of principles, practices, literature, media, and their relevance to the systematic planning of self-instructional materials, and the comprehensive sequencing of instructional experiences. Students develop projects of practical use in areas of their own choice.

EDC&I 583 Learning Resources and Learning Domains (5) Driscoll, Torkelson

Research and relevant literature concerning various message forms and message carriers as these affect instruc-tional practice in achieving traditional kinds of learning goals, cognitive, affective, and perceptual-psychomotor.

EDC&I 585 Seminar: International and Cross-Cultural Education (3)

Driscoll

Treats selected instructional problems, innovation strat-egies, and the management of learning resources in various emerging countries.

EDC&I 587 Practicum in Learning Resources (3) Driscoll, Hawk, Torkelson Design and production of visual and auditory materials for teaching. Prerequisite: 480 or equivalent.

EDC&I 589 Current Issues in Educational Communications (1, max. 9) AWSp

Driscoll, Hawk, Torkelson 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. Offered on credit/no credit basis only. Prerequisite: graduate standing.

EDC&I 590 Seminar in Elementary Education (3) Foster, Settles

Exploration of the philosophy, history, purposes, curriculum, methods, school organization, and evaluation in elementary education, with emphasis on individual re-search. Prerequisites: elementary school teaching experi-ence, 556, and EDPSY 520.

EDC&I 592 Seminar in Secondary Education (3) Johnson

Research and study of secondary education. Primary focus on factors involving change in secondary school curriculum and organization. Prerequisite: 558.

EDC&I 593 Seminar in Curriculum: Theory and Practice (3)

Guise, Hunkins

Investigation of the area of curriculum theory and prac-tice. Consideration is given to the development of models to explain the relationships between various curricular variables. These theoretical models are related to curricular practices and innovations. Prerequisites: 559 and teaching experience.

EDC&I 594 Seminar in Curriculum: Issues, Systems, Models (3)

Hunkins

Emphasis, from a systems and futuristic view, on the current approaches to curriculum, curriculum innovation, and major educational issues as they affect curricular ac-tivity. Prerequisites: 559 and teaching experience.

EDC&I 595 Seminar in Analysis of Teaching (3) Guise

Exploration of the various media and types including psychological, sociological, and philosophical factors. Particular emphasis is given to research related to the variables involved in teaching. Prerequisites: EDPSY 520 and teaching experiences 520 and teaching experience.

EDC&I 596 Strategies of Instruction (3)

Guise

Exploration of the various media and types of organization relevant to the implementation of strategies based on theoretical models. Prerequisite: 595.

EDC&I 597 Curriculum Evaluation Seminar (3, max. 6) WSp Kersh, Smith

Offered each year as a two-quarter sequence. The first quarter focuses on the evaluator's roles, evaluation theory and models, and selected curricular evaluations. Ex-amples are drawn from the several disciplines commonly offered in the elementary and secondary schools. In the second quarter, 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: permission of instructor.

COLLEGE OF EDUCATION

EDC&I 598 Internship in Curriculum (3-9, max. 9)

Recommended for all doctoral candidates preparing for positions as curriculum directors in public school syspositions as curriculum directors in public school sys-tems. Half-time work in a school district or districts in proximity to the University of Washington for one, two, or three quarters, depending on the student's previous ex-perience. Supervision by staff members of the College of Education and the appropriate school staff member in charge of curriculum in the selected school district. Reg-sistration must be accommanied by a stude prospective and change of curriculum in the selected school district. Reg-istration must be accompanied by a study prospectus en-dorsed by the appropriate faculty adviser for the work proposed, and, with permission of the instructor, must be filed with the Office of Educational Curriculum and In-struction in the College of Education. Prerequisites: 559 and approved plan of study.

EDC&I 599 Independent Studies in Education (*) Independent studies or readings of specialized aspects of education. Registration must be accompanied by a study rospectus endorsed by the appropriate faculty adviser for the work proposed, and, with permission of the in-structor, must be filed with the Office of Educational Curriculum and Instruction in the College of Education. Prerequisite: permission of instructor.

EDC&I 600 Independent Study and Research (*) Registration must be accompanied by a study prospectus endorsed by the appropriate faculty adviser for the work proposed and must be filed with the Office of Educa-tional Curriculum and Instruction in the College of Education. A report or paper setting forth the results of the investigation is required. Prerequisite: permission of instructor.

EDUCATIONAL POLICY STUDIES

EDEPS 444 Constitutional Freedom and American Education (3-6, max. 6) S Morris

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 conduct of education. Specific topics on constitutional freedom include the obligation to go to school; legal con-trols over curriculum, teachers, and students; and racial integration and equal financing of public schools. Open to law students and to nonlaw students enrolled as gradu-ate students or as upper-division undergraduates. Offered jointly with LAW 444. Satisfactory/not satisfactory op-dimensional to the school as the students only tion available to nonlaw students only.

EDEPS 458 .History of American Education to 1865 (5)

Burgess Development of American education in cultural context; colonial period, influence of Enlightenment, and com-mon school movement. Offered jointly with HSTAA 458.

EDEPS 459 History of American Education Since 1865 (5) Burgess

Development of American education in cultural context: progressive education, recent criticism, continuing issues and trends. Offered jointly with HSTAA 459.

EDEPS 479 Crucial Issues in Education (3) Kerr, Staff

Designed to consider in some detail certain of the most significant and critical problems of educational policy. Prerequisite: admission to the Teacher Certification Program or permission of instructor.

EDEPS 492 History of European Education Through the Reformation (3)

Development of European education in cultural context: Greece, Rome, Middle Ages, Renaissance, and Reformation

EDEPS 493 History of European Education Since the Reformation (3) Madsen

Development of European education in cultural context: pedagogical reformers, national systems, and recent trends.

EDEPS 496 Comparative Education (3) Legiers

International efforts in education, primarily the role of the United States in overseas programs, Analysis of the relation of school and society in foreign areas, stressing social change and conflict.

EDEPS 498 Educational History and Utopian Thought (3)

Burgess Selected studies of education as a key to the good society.

EDEPS 499 Undergraduate Research (*)

EDEPS 499 Undergraduate Research (*) For undergraduates. Registration must be accompanied by a study prospectus on a special form provided by the Office of Educational Policy Studies, endorsed by the faculty adviser most appropriate for the project proposed and the instructor; and must be filed in the Office of Edu-cational Policy Studies in the College of Education. Stu-dents developing studies under this rubric should be ad-vised that on most the appropriation for the properties of the provised that a report or a paper setting forth the results of their investigations should be regarded as a basic part of the program.

EDEPS 500 Field Study (3 or 6, max. 6) Individual study of an educational problem in the field under the direction of a faculty member. Prerequisites: approved plan of study and permission of the instructor must be filed in the Office of Educational Policy Studies in the College of Education.

EDEPS 501 The Study of Educational Policies (3) Kerr

Systematic consideration of the structure and function of sourcational policies and problems of research and evalua-tion of those policies. Includes survey of resources for description of particular types of policies.

EDEPS 502 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.

EDEPS 503 History of Educational Thought (3)

Burgess, Madsen Study of educational theory and practice in Western culture.

EDEPS 504 Philosophy of Education (3) Kerr. Tostberg

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 re-garding educational policy and practice.

EDEPS 510 Seminar in Educational Sociology (3) EDERS 510 Seminar in Educational Sociology (3) Application of sociological principles to school prob-lems; individual problems and investigations. For teachers, administrators, and those using educational so-ciology as a field for advanced degrees. For

EDEPS 571, 572, 573 Public and Educational Policy Issues in the Development of Human Talent (3,3,3) A,W,Sp Wolfie Higher education and the nation's human resources;

trends, future projections, policy issues, and national and personal goals in the relations between education and the utilization of professional and specialized personnel. Of-fered jointly with PB PL 571, 572, 573. Prerequisite: permission of instructor.

EDEPS 580 Seminar: Research in History of Education (3, max. 6)

Burgess, Madsen

Study of the literature, bibliography, sources, and cri-tiques of history of education. Research methods ana-lyzed and demonstrated in seminar papers. Prerequisites: graduate standing and permission of instructor.

EDEPS 582 Seminar in Philosophy of Education: Modes of Inquiry (3, max. 6)

Tostberg Study of the various ways in which philosophers of edu-cation have conducted their inquiries and presented their findings. Prerequisites: 504 and permission of instructor.

EDEPS 583 Seminar: Research in Educational Sociology (3)

Theory, concept, and method of sociological inquiry as applied to problems in education. Prerequisite: permission of instructor.

EDEPS 586 Seminar in Educational Classics (3)

Burgess Analysis in depth and in the context of the relevant history of several major works in educational thought from Plato to Dewey. Prerequisite: permission of instructor.

EDEPS 587 **Contemporary Philosophies of Education (3)**

Kerr, Tostberg

Intensive study of the writings of selected contemporary philosophers of education. Prerequisite: graduate standing.

EDEPS 588 Analysis of Educational Concepts (3)

Tostberg Study of the application of linguistic analysis to the dis-course of education. Prerequisites: 587 and permission of instructor.

EDEPS 589 Special Topics in History, Philosophy, and Sociology of Education (3, max. 18) For advanced degree candidates majoring in history, phi-losophy, and sociology of education. Prerequisite: permission of instructor.

EDEPS 594 History of the Modern University (3) Madsen

Growth of the modern university with attention to intelchanges. Special attention is given to nine American university with attention to inter-changes. Special attention is given to nine American universities in the twentieth century. Berkeley, Chicago, Co-lumbia, Cornell, Harvard, Michigan, Stanford, Wiscon-sin, and Yale.

EDEPS 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, and, with permission of the in-structor, must be filed with the Office of Educational Pol-icy Studies. Prerequisite: permission of instructor.

EDEPS 600 Independent Study or Research (*) Registration must be accompanied by a study prospectus endorsed by the appropriate faculty adviser for the work proposed and must be filed with the Office of Educa-tional Policy Studies in the College of Education. A near of concerner acting forth the mouter of the inverties report or paper setting forth the results of the investiga-tion is required.

EDUCATIONAL PSYCHOLOGY

EDPSY 304 Educational Psychology (5) W. Brown, Nolen

W. Brown, Noten Basic undergraduate course in psychology concerned with the study of human learning in the educational set-ting. Learning motivation, technology, the cognitive pro-cess, human development and socialization, the affective processes and attitudes change, and classroom manage-ment Embergin on the disubarrant of competence in ment. Emphasis on the development of competence in manipulation of events known to influence effective classroom learning. EDUC 302 should be taken concurrently. Prerequisites: admission to a Teachers Education Program and permission of instructor.

EDPSY 308 Evaluation in Education (3)

Abbott, Brown, Mizokawa, Peckham, Sax Fundamentals of measurement, construction of achieve-ment tests, selection and administration of standardized tests and scales, and evaluation and application of test re-sults. Prerequisites: admission to a Teachers Education Program and permission of instructor.

EDPSY 400 Developmental Foundations of Early Learning (3) Gray, McCartin, Mizokawa

Study of perceptual-motor, language, and overall cogni-tive development in children from birth through primary school age. Basic learning processes and guidelines for the assessment of developmental status. Field-based course projects are arranged when appropriate, and impli-cations of active development for percenting and teacher cations of early development for parenting and teacher behavior are stressed. Prerequisite: 304 or equivalent.
EDPSY 402 Childhood Socialization and School Practice (3) Evans, McCartin

Study of the development of personal-social behavior from the preschool through the preadolescent years. Ba-sic concepts of socialization in United States culture are reviewed as is current research about American childrearing practices. The role of the school in socialization is examined with particular emphasis on socialization problems and the teacher as socialization agent. Prerequisite: 304 or equivalent.

EDPSY 403 Adolescence and Youth (3)

EDPSY 403 Adolescence and Youth (3) Evans, Gray, McCartin Overview of the adolescent period, especially for persons engaged in the helping professions—concerned with ju-nior, senior, and early-college school years. Focus is on crucial developmental processes and patterns as well as contemporary research and theoretical perspectives about adolescence. Selected educational issues and problems associated with adolescence in Western culture are also examined. Prerequisite: 304 or equivalent.

EDPSY 407 Teaching the Gifted Child (3) Freehill

The role of the teacher and the school in the identification and development of the special abilities and talents of gifted children. Prerequisite: teaching experience.

EDPSY 408 Mental Hygiene for Teachers and Administrators (3)

Administrators (5) Principles of mental health; normal personality develop-ment and functioning; relation of school environment to mental health of students, teachers, and administrators. Background in educational psychology is recommended, but is not a prerequisite.

EDPSY 421 Remedial Education (3) Nolen

Experience in, and study of, analysis of difficulties in school subjects with special reference to language arts and mathematics. Experience in, and study of, appropri-ate remedial instruction. Analysis and instruction that is considered both feasible and practical for the teacher working with individuals or with a group.

EDPSY 425 Reading Disability; Remedial Techniques (3) Nolen, Standal, Thalberg Evaluation of methods for diagnosing and minimizing reading retardation. Descriptions of in-class and clinical procedures supplemented by classroom observations. Prerequisite: EDC&I 360 or equivalent.

EDPSY 447 Principles of Guidance (3) . W. Brown, Lavelle, Williams

Study of guidance programs in elementary and secondary schools. Attention is given 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. Prospective counseling specialists should see 553.

EDPSY 449 Laboratory in Educational Psychology (2-6, max. 6)

Special studies for counselors, teachers, administrators, and others concerned with student personnel and psycho-logical services in schools and colleges. The course focuses on special topics that have either local or contem-porary significance. (Not offered every year; check quarterly *Time Schedule.*)

EDPSY 490 Basic Educational Statistics (3)

Abbott, Klockars, Peckham, Sax Measures of central tendency and variability, point and interval estimation, linear correlation, hypothesis testing.

EDPSY 499 Undergraduate Research (*) For undergraduates. Registration must be accompanied For undergraduates. Registration must be accompanied by a study prospectus on a special form provided by the Office of Educational Psychology, endorsed by the fac-ulty adviser most appropriate for the project proposed and the instructor, and the form must be filed in the Of-fice of Educational Psychology in the College of Educa-tion. Students developing studies under this rubric should be advised that a corner or a none setting forth the acculabe advised that a report or a paper setting forth the results of their investigations should be regarded as a basic part of the program.

EDPSY 500 Field Study (*) Individual study of an educational problem in the field under the direction of a faculty member. Prerequisites:

approved plan of study and permission of the instructor must be filed in the Office of Educational Psychology in the College of Education.

EDPSY 501 Seminar in Concepts and Problem Solving (3) Fea, Gray

The psychology of children's thinking. Course empha-

sizes study of research results in concept development and problem solving with application to classroom learning situations. Prerequisite: permission of instructor. EDPSY 502 Seminar in Critical and Creative

Thinking (3) Fea

The psychology of children's thinking. Course empha-sizes study of research results in critical thinking and creative thinking with application to classroom learning situations. Prerequisite: permission of instructor.

EDPSY 503 Psychology of Reading (3) Fea. Nolen

Reading and perception, work recognition, concept development and meaning in reading: psychology of reading interests and skills. Prerequisite: permission of instructor.

EDPSY 504 Verbal Instruction (3)

Fea, Mizokawa, Nolen Study of linguistics and the psychological implications of classroom and learning. Prerequisite: permission of instructor.

EDPSY 506 Instructional Theory (3) Brown, Fea, Mizokawa

Examination of cognitive theories of learning related to instructional strategies. (Offered alternate years; check quarterly Time Schedule).

EDPSY 507 Reading Disability: Etiology and

EDFSY SU/ Resumpt Diagnosts-Practicum (5) Nolen, Thalberg Theory and basic concepts underlying appraisal tech-niques and causality. Lectures and clinical practicum in administering, scoring, and evaluating each technique, and in interpreting and communicating results. Prerequi-sites: 425 and permission of instructor.

EDPSY 508 Clinical Supervision—Practicum

(2-6, max. 12) Practicum in supervising, counseling, group counseling, diagnostic activities, and remedial reading therapy. Pre-requisites: advanced graduate standing and permission of instructor.

EDPSY 510 Seminar in Educational Psychology (1-3, max. 15)

(1-5, IDDE, 15) Seminar on advanced topics in educational psychology. A critical appraisal of current research. Prerequisites: ad-vanced degree candidacy in educational psychology and permission. Check quarterly *Time Schedule* for subject listings, which vary from quarter to quarter.

EDPSY 511 Seminar in Applied Educational Psychology (1, max. 6) Designed for graduate students in educational psychol-

ogy. Selected contemporary topics relating to the application of theoretical constructs to school psychology and counseling. Prerequisite: permission of instructor.

EDPSY 513 Learning Variables of Minority Children: Instructional Implications (4) ASp Vasquez

Provides students with data base regarding (1) four variables (language/dialect, cognitive style, locus of control, and motivational systems) that affect learning among mi-nority students, and (2) teaching strategies appropriate for these cultural socioeconomic variables.

EDPSY 514 Seminar in Quantitative Methods (3, max. 15) Abbott, Klockars, Peckham, Sax

Seminar on such topics as measurement techniques, research design, psychometrics, and statistics. Prerequisite: permission of instructor.

EDPSY 515 Seminar in Development and

Socialization (3, max. 15) Evans. Grav

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. Prerequisite: permission of instruc-

EDPSY 516 Seminar in Learning and Thinking (3, max. 15)

Fea. Mizokawa, Nolen

rea, MILOKAWA, NOIEN Seminar in the psychology of learning language and lan-guage learning. Each seminar is offered with predesig-nated emphasis in one of the following topics: linguistics, phonology, pragmatics, psycholinguistics, semantics. Prerequisite: permission of instructor.

EDPSY 519 Language in Early Childhood Education (3)

Nolen

Review and critical examination of theories of language acquisition and their psychological implications for de-veloping cognition. Prerequisite: 304 or equivalent. Rec-ommended: 400, 403, and PSYCH 414.

EDPSY 520 Human Learning and Educational Practice'(3)

Evans, McCartin, Mizokawa

Systematic examination of current research about human learning and instructional psychology, including the study of motivation, human abilities, and learning, the learning process, and performance assessment. Prerequi-site: 304 or equivalent.

EDPSY 521 Educational Issues in Human Learning (3)

Freehill, Gray

Study of contemporary problems in learning with empha-sis on historical antecedents to modern view, methodological problems in the solution of the issues, relevant studies and phenomenological observation, implications and application of conclusions. Prerequisite: at least 20 quarter credits of previous work in educational psychol-ogy and/or psychology.

EDPSY 522 Reading Disability Clinic (3-5)

Freehill Supervised practicum in diagnosing and teaching chil-dren with reading disabilities. Prerequisites: 425, 507, and permission of instructor.

EDPSY 540 Individual Testing (5) Bashey, R. Brown, Gray, Meacham, Olch, Thalberg Study of intelligence testing with supervised experience. The emphasis is on the Stanford Binet and the Wechsler Intelligence Scale for Children. Prerequisites: 541 and permission of instructor.

EDPSY 541 Group Tests in Counseling (5)

Forster, Lawrence Emphasis on the utilization of objective measures in counseling. Prerequisite: 490 or equivalent.

EDPSY 542 Career Development (3) Forster, Lawrence

Emphasis on vocational development theory and re-search. Psychological, social, and economic determi-nants of vocational development and choice are examined as a basis for vocational counseling. Prerequisite: graduate standing or permission of instructor.

EDPSY 543 Seminar in Vocational Psychology (3) Forster, Lawrence

Forster, Lawrence Self-directed, shared learning experiences for persons in preparation for eventual work in certain helping profes-sions such as teaching, counseling, nursing, agency work. The scope of inquiry includes how people spend time, particularly in work and leisure time, and how the professional helping role is related to helping persons confront the problems associated with work. Prerequisite: permission of instructor.

EDPSY 544 Counseling (5)

Brammer, Lavelle, William Emphasis on the theory and practice of student counseling.

EDPSY 545 Practicum in Counseling

(3-6, max. 6) Bashey, Brammer, R. Brown, Fenner, Forster, Lavelle,

Lawrence, Thalberg, Williams Supervised practice in counseling. Prerequisites: 541, 544, and permission of instructor.

COLLEGE OF EDUCATION

EDPSY 546 Internship in Student Personnel Services (2-12, max. 12)

Supervised practice in student personnel activities for ad-vanced students. Prerequisite: permission of instructor.

EDPSY 547 Organization and Administration of Student Personnel Programs (3) Brammer

Basic considerations in planning, organizing, and operat-ing school student personnel programs; analysis of issues and problems encountered in formulating policy; su-pervising and evaluating services. Prerequisite: permission of instructor.

EDPSY 548 Educational Implications of Personality Theory (5)

Bashey, Freehill, Olch

Study of personality development and personality theories with continuous attention to the meaning of these in educational practice, testing, and counseling. Prerequisites: 15 credits of psychology and educational psychology ogý.

EDPSY 549 Seminar in Student Personnel Work (3, max. 9) Brammer

Individual problems and issues f student personnel programs at school and college levels. Prerequisite: permission of instructor.

EDPSY 550 Family Counseling (3)

R. Brown Introduction to family counseling theory and practice, emphasizing family dynamics and communication analy-sis. Prerequisite: 544 or permission of instructor. 42

EDPSY 553 Student Development Services in Higher Education (3) Branner

Survey and critical study of the philosophy and practice of student personnel work in American colleges and universities.

EDPSY 555 Seminar in Counseling Specialty (1-2, max. 6) AWSpS

Bashey, Brammer, Brown, Forster, Lavelle, Williams Driented toward the role of a counselor as a professional worker in a specific type of setting. The specific setting is designated prior to registration, and topics unique to counseling in such settings are identified, explored, and analyzed. Specialized issues and problems not covered in general courses for all counselors are covered to prepare counselors for specialized duties at predesignated settings.

EDPSY 561 Group Process Laboratory (3) Bashey, Brammer, R. Brown, Fenner, Forster, Lavelle,

Lawrence, Williams Experience in small-group process. Collateral discus-sions of process and independent study. Prerequisite: per-

mission of instructor.

EDPSY 564 Practicum in School Psychology (1-6, max. 6)

Practicum in appraisal and counseling, emphasizing diagnosis and counseling with behavior and learning dis-abilities, and focusing on techniques acquired in S40, S45, and S65. Prerequisite: permission of instructor.

EDPSY 565 Personality Appraisal (5) Brammer, R. Brown, Freehill, Gray, Meacham, Olch Study of personality evaluation with a supervised labora-tory emphasizing work with children and their families. Prerequisites: 540, 548, and permission of instructor.

EDPSY 566 Case Study Seminar (1, max. 2) Study and experience in the case method, integrating the work of specialties with emphasis on school and child problems. To be taken with 546. Prerequisite: permission of instructor.

EDPSY 570 Seminar in School and Community Psychology I (1, max. 3)

R. Brown, Gray, Freehill, McCartin, Meacham, Nolen, Olch, Thalberg

Seminar in current issues in professional psychology. Limited to master's degree students in school psychologi-cal services. Prerequisite: permission of instructor.

EDPSY 590 Computer Utilization in Education (3) W Peckham

Introduction to programming languages, computer utilization in the solution of research problems, data reduction to forms amenable to computer processing, ap-propriate framing of problems for solution by computers, utilization of program packages. Prerequisite: 490.

EDPSY 591 Methods of Educational Research (3) Abbott, Klockars, Mizokawa, Peckham, Sax

Introduction to educational research. Primary focus on hypothesis development, experimental design, use of controls, data analysis and integoretation. Prerequisites: 308, 490, and permission of instructor.

EDPSY 592 Advanced Educational Measurements (3)

Sar Theory of measurement; an examination of assumptions involved in test theory, errors of measurement, factors affecting reliability and validity, and item analysis. Taught with PSYCH 516. Prerequisites: 308, 490, and permission of instructor.

EDPSY 593 Experimental Design and Analysis (5) Klockars, Peckham

Experimental design with emphasis on the analysis of variance. Prerequisites: 490 or equivalent, and 591 or permission of instructor.

EDPSY 594 Advanced Correlational Techniques

(5) Abbott, Klockars

Multivariate analysis, including regression and multiple correlation; matrix algebra; factor analysis. Prerequisite: 490 or equivalent.

EDPSY 595 Measurement and Evaluation Practices in Early Childhood Development and Education (3) SpS Evans

Review and critical examination of measurement strat-Review and critical examination of measurement strat-egies and evaluation procedures in contemporary settings for early childhood development and education. Em-phases include a study of early childhood education eval-uation research, established and experimental measure-ment techniques, and the problems of measurement and evaluation unique to young children. Skills in the interpretation of measurements and the design of evalu-tion studies in early education. Persecutive: tion studies in early education. Prerequisite: 308 or equivalent. Recommended: 490.

EDPSY 596 Program Evaluation (3) Klockars, Peckham, Sax Advanced course in evaluation research emphasizing nontraditional designs, especially those that impose se-vere ecological constraints on the evaluators. Prerequi-sites: 593, 594, EDC&I 597, or permission of instructor.

EDPSY 597 Test Development (3)

Klockars, Sax Alocars, sat Principles of test construction, including criterion and norm-referenced tests, item writing and sampling, test administration, preparation, scoring, and item evaluation techniques; problems of scaling and norming of cognitive and affective measures. Prerequisites: 592 and 594, or permission of instructor.

EDPSY 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, and, with permission of the in-structor, the form must be filed with the Office of Educational Psychology in the College of Education. Prerequisite: permission of instructor.

EDPSY 600 Independent Study or Research (*) Registration must be accompanied by a study prospectus endorsed by the appropriate faculty adviser for the work proposed and must be filed with the Office of Educational Psychology in the College of Education. A report or paper setting forth the results of the investiga-tion is required. Prerequisite: permission of instructor.

HIGHER EDUCATION

EDHED 417 Principles and Practices of Adult and Continuing Education (3) A Murray, Williams

History and development of adult and continuing educa-tion in the United States: component parts of the field; is-sues, theory, and research; program planning for adults; professionalization of the field.

EDHED 430 Higher Education and the Ethnic Minority (3) A Morishima

Designed to provide the student with information on spe-Designed to provide the student with information on spe-cial problems in higher education (e.g., access, areas of study, financial ability, etc.) faced by the nonwhite eth-nic minority student. Special emphasis is given to the commonality of experience among the four groups. Addi-tional emphasis placed on major differences.

EDHED 496 Higher Education Programs and Problems (1-6, max. 12) 1 Individual and group study of significant topics such as planning, development, organization, operation, or eval-uation of current or emerging programs or problems in higher education. Prerequisite: permission of instructor.

EDHED 499 Undergraduate Research

(2-5, max. 15) For undergraduates. Registration must be accompanied by a study prospectus on a special form provided by the Office of Higher Education, endorsed by the faculty adviser most appropriate for the project proposed and the instructor, and the form must be filed in the Office of Higher Education in the College of Education. 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.

EDHED 501 Occupational Programs in Higher Education (3)

Schill

Analysis of occupational preparation programs in institutions of higher education, industry, business, and govern-mental agencies, with emphasis on methods of determin-ing content, on processes for evaluation, and on research.

EDHED 502 College Instruction (3)

Reitan

Analysis of various instructional modes, media, and instruments, with emphasis on current research findings and methodology.

EDHED 503 The Community College (3)

Study of the history and development, the roles, the objective, and the organizational structure of the commu-nity college and of the problems and the issues confronting the two-year college.

EDHED 504 Academic Freedom and Tenure (3) Sp Williams

Historical analysis of academic freedom and tenure issues, leading to the development and defense of individual positions on the present and future status of these issues. Special attention to the impact of collective bar-gaining on academic freedom and tenure.

EDHED 505 The American College and University (3)

Cope, Williams

Cope, Williams Introduction to contemporary United States higher educa-tion, 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.

EDHED 506 History of American Higher Education (3) Williams

Examination of the historical development of the American higher education enterprise.

EDHED 507 Training Programs in Business and Industry (3) WS

Schill

Investigations of the organization, content, methods, and funding of training programs in business and industry. Emphasis on variables that affect the decisions to establish and continue training programs versus sending em-ployees elsewhere for training.

EDHED 508 Academic Governance and Collective Bargaining in Higher Education (3) S Olswang, Schill

Explores the concept and operation of collective bargain-ing 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.

EDHED 510 Goals and the Societal Environments of Higher Education (3) A Cope, Williams

Study of the goals of higher education. Comparisons of goal priorities of universities, senior colleges, commu-nity colleges, and other institutions of higher education nity colleges, and other institutions of nigher education with the goals held for higher education by those in the environing society. Development of personal statements of, and justifications for, goal priorities for higher educa-tion, based on these comparisons.

EDHED 511 Institutions and the Activities of Higher Education (3) W

Cope, Williams

Comparison of the activities engaged in by different insti-tutions of higher education in the pursuit of their goals. Analysis of how universities, senior colleges, community colleges, and other institutions of higher education are alike or different in their approaches to curriculum, teaching, research, service, management, and governance

EDHED 512 People and the Outcomes of Higher Education (3) Sp Cope, Williams

Analysis of literature on the people associated with higher education and the outcomes they achieve. The known characteristics of students, professors, and administrators and the ways in which they do or do not change while in association with each other. Outcomes are conwhile in association with each other. Outcomes are con-ceptualized in terms of personal development, the growth of knowledge, and impacts on the environing society at-tributable to higher education.

EDHED 520 Seminar in the Administration of Community Colleges (3) For students preparing for administrative positions in community colleges. Principles and practices in organi-zation and administration of community colleges. Prerequisite: 503 or equivalent.

EDHED 521 Seminar in Occupational Programs in Higher Education (3) Schill

Analysis of current critical social and educational issues that affect occupational preparation programs in post-high-school institutions. Prerequisite: 501 or permission of instructor.

EDHED 522 Seminar in Teaching and Learning in Higher Education (3-9) Reitan

Advanced seminar devoted to a consideration of theory and practice in the area of instruction and learning. May be repeated with permission. Open to advanced doctoral students in higher education and to others at the discretion of the instructor.

EDHED 523 Seminar in Institutional Analysis and Planning (3) Cope

Study of the nature, the functions, and the techniques of study of the nature, the functions, and the definitions of analysis as they pertain to institutions of higher educa-tion. The application of computer-based information sys-tems, program budgeting, behavioral research tech-niques, and long-range planning procedures are examined as aids to assessment, planning, and change. Intended for doctoral candidates.

EDHED 524 Seminar in the History and Organization of Higher Education (3) *Williams*

Advanced seminar on special problems in the history and the organization of higher education. May be repeated for credit at the discretion of the student and the instructor. Open to advanced doctoral students in higher education and to others at the discretion of the instructor.

EDHED 525 Administering the Urban Community College (3)

Kelly Kely Examination of the community college in the context of the urban setting. Attention is given to the impact of ecol-ogy, critical events, and social action groups upon struc-ture, operations, and development of the community college.

EDHED 526 Higher Education and the Law (3) W Morishima, Olswang Legal implications of university operations and an expla-nation of the legal and constitutional rights of students, faculty, and staff within the university. Special attention

given to employment and termination decisions, student protections, and due-process rights and university liabili-ties.

EDHED 540 Internship in Higher Education (3-10, max. 10)

Field study and experience in college teaching and administration, planned by the College of Education in cooperation with selected colleges and universities. Pre-requisite: permission received one month prior to beginning of quarter.

EDHED 550 Review of Research in Higher Education (1-2)

Open seminar for all students in higher education, devoted to the mutual consideration of research in this field. May be repeated with permission of the adviser.

EDHED 554 Seminar in the Administration of Colleges and Universities (3) Cone

Study of the internal administration and organization of four-year colleges and universities with emphases on practice and theory. Instruction largely by the case or problem method.

EDHED 559 Seminar in Higher Education (3) Intensive study of selected problems and proposals for re-search in higher education. May be repeated for credit. Prerequisite: permission of instructor.

EDHED 592 Institutional Research Methods (3) A Morishima

For students planning to engage in institutional research roi suddents planning to engage in institutional research in higher education. Primary emphasis on survey re-search and data-gathering forms. Background provided on theory, format, caveats, and the like. Students ex-pected to develop forms for class critique. Prerequisite: EDPSY 591.

EDHED 600 Independent Study or Research (*) Registration must be accompanied by a study prospectus endorsed by the appropriate faculty adviser for the work proposed and must be filed with the Office of Higher Ed-ucation in the College of Education. A report or paper setting forth the results of the investigation is required.. Prerequisite: permission of instructor:

SPECIAL EDUCATION

EDSPE 404 Exceptional Children (3)

Atypical children studied from the point of view of the classroom teacher.

EDSPE 414 Integrating Handicapped With Non-Handicapped Preschool Children in the Inner City (3), Upper-division course designed for teachers and aides planning to work in inner-city preschool classrooms where handicapped children are integrated with nonhand-icapped children.

EDSPE 418 Vocational Development of Handicapped Children and Youth (3)

Handicapped Children and Youth (3) Curricular aspects of vocational training relevant to each age level in the education of handicapped children. Ap-plication of programmed instructional techniques to breaking down of the occupational task. Emphasis on familiarizing school personnel with interdisciplinary ser-vices and community resources available to assist them in facilitating the maximal vocational development of hand-icapped children and youth.

EDSPE 419 Interventions for Families of Handicapped Children (3) WS

Edgar Upper-division course for professionals and paraprofes-sionals working with families of handicapped children enrolled in special education or integrated programs.

EDSPE 435 Principles and Practice of Manual English (3) Petersen

Nature of manual communication is introduced with an Nature of manual communication is introduced with an identification of its specific modes: sign language, signed English, simultaneous method, finger spelling, and manual English. Discussions center on the linguistic structure of signs, the psycholinguistic effects of signs on young children, and a review of the perlinent literature. Laboratory sessions emphasize manual English.

EDSPE 436 Manual Communication for the Hearing Impaired (3) W Peterson

Intermediate course in manual conversation stressing fluency in both receptive and expressive manual English. Grammatical system of Ameslan introduced and prac-ticed. Prerequisite: 435 or permission of instructor.

EDSPE 475 Recreation and Leisure Activities for the Handicapped (3)

Acquaints the student with the philosophy of specialized recreation and leisure agivities for the handicapped: community, state, and national organizations providing leisure activities; adaptive devices and how to organize various activities; and the need to integrate and coordivarious activities; and the need to integrate and coordi-nate recreation, education, and service organizations working with the handicapped. Observation, practical ex-perience, guest speakers, films, and lectures. Experience or at least an interest in working with the handicapped is beneficial.

EDSPE 496 Workshop in Special Education (1-9, max. 15)

Demonstration, observation, and/or participation with groups of handicapped children in laboratory or con-trolled classroom settings.

EDSPE 499 Undergraduate Research (2-5, max. 5) For undergraduates. Registration must be accompanied For undergraduates. Registration must be accompanied by a study prospectus on a special form provided by the Office of Special Education, endorsed by the faculty ad-viser most appropriate for the project proposed and the instructor, and the form must be filed in the Office of Special Education in the College of Education. 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 more ran. program.

EDSPE 500 Field Study (3-6, max. 6) Individual study of an educational problem in the field under the direction of a faculty member. Prerequisites: approved plan of study and permission of the instructor must be filed in the Office of Special Education in the College of Education.

EDSPE 505 Educating the Mentally Retarded (3) Basic course for students preparing to teach the severely mentally retarded; organization of programs, curriculum planning, and instructional procedures and materials.

EDSPE 506 Internship in Special Education (2-10, max. 10) Supervised experiences in special education for advanced students. Prerequisite: permission of instructor.

EDSPE 507 Education of Severely Retarded Individuals With Multiple Handicaps (3)

Basic course for students preparing to teach the moder-ately to severely retarded individual and the multiple-handicapped individual. Includes community resources, implementation of instructional techniques and modification of materials for these students.

EDSPE 508 Administration of Special Education (3) Research and trends in administrative organization, pro-grams, personnel assignments, and instructional group-ings for the education of exceptional children as these relate to the total school program, pupil personnel ser-vices, community agency services, and state and federal localetics legislation.

EDSPE 509 Seminar in Mental Retardation (3) Interdisciplinary approach to the advanced study of se-lected research topics in mental retardation. Designed for teachers, psychologists, social workers, and related professional personnel.

EDSPE 510 Behavioral Measurement and Management in the Classroom (3) Lovitt, White

Response measurement in the classroom; use of data analysis for instructional decisions and behavior management; instructional programming for handicapped children.

EDSPE 511 Applied Behavior Analysis (3)

Lovitt, White Lovitt, White Characteristics of applied behavior analysis are pre-sented: direct, daily measurement, and the systematic investigation of important variables. Representative stud-ies from various applied situations are discussed in terms

of dependent and independent variables, research design, reliability, validity, and data analysis. Prerequisite: 510.

EDSPE 512 Evaluation of Instructional Materials

for Exceptional Children (3) Introduction to techniques of determining the quality of instructional materials in terms of (1) the systems of spe-cific subject matter organization and (2) specified instructional outcomes.

EDSPE 513 Clinical Appraisal of Exceptional Children (3) Ryckman

Diagnostic instruments used in the clinical appraisal of exceptional children. Theoretical considerations are used to buttress practical experiences in appraisal related to intervention.

EDSPE 514 Fundamentals of Reading for Handicapped Children (3)

Handicapped Children (3) Preservice course. Emphasis on basic prereading and reading skills, such as phonics and structural analysis, specifically for the handicapped child. Acquisition of comprehension skills by the handicapped. Diagnosis of reading problems; published materials appropriate for handicapped; material modification.

EDSPE 515 Problems and Issues in Special Education (3, max. 9)

Lowenbraun

Intensive examination of the issues pertinent to all of spe-cial education, such as legislation, interdisciplinary func-tion, and the role of special education in general education and placement practices. Prerequisite: permission of instructor.

EDSPE 516 Developing Instructional Materials for Exceptional Children (3) Theory and basic concepts underlying the writing of in-structional materials for exceptional children. The course involves a basic review of the literature in programming research and methodology. Students write, field test, and rewrite a unit of instructional materials for a specific population of exceptional children. Prerequisite: 512.

EDSPE 517 Practicum in Research Design and Analysis in Special Education (3) Critical analysis of current research practices in special education serves as background to a student carrying out a small independent research project. Projects are evalu-ated in seminar discussion. Prerequisites: EDPSY 490 and 591 or equivalent, or permission of instructor.

EDPSE 518 Seminar in Special Education Research (1, max. 3)

Affleck, Haring

Agrees, Haring Designed for doctoral students in special education dur-ing their year of residency. Each candidate selects a dis-sertation 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.

EDSPE 520 Seminar in Applied Special Education (1-12, max. 12) A

Designed for graduate students in special education. Focus on contemporary topics relating to the application of the theoretical constructs to special education. Prerequisite: permission of instructor.

EDSPE 521 Classroom Strategies for Developing Communication in Exceptional Children (3) Rittenhouse

Discussion centers on the theory and models of commu-nication. Neurophysiological bases of communication are then explored with reference to different types of excep-tional children. Offered to advanced undergraduates and graduates with permission of instructor; an introductory course in psychology and special education is desirable.

EDSPE 522 Seminar on the Education of the Severely/Profoundly Handicapped (3) Haring

Advanced graduate seminar arranged to study and discuss the essential components of providing a comprehensive approach to the intervention and education of the se-verely/profoundly handicapped infant, child, adolescent, or young adult. Prerequisite: permission of instructor.

EDSPE 525 Educating Autistic and Severely Behavior Disordered Children (3) A Neel

Consideration of the diagnoses, etiology, education, and prognoses of autistic and severely behavior disordered children. Prerequisite: permission of instructor.

EDSPE 530 The Hearing Impaired (3) Lowenbraun, Rittenhouse

Consideration of problems of the deaf from social, economic, and educational point of view; history of deaf ed-ucation. Prerequisite: 512.

EDSPE 531 Aural-Oral Communication for the Hearing Impaired: Part I (3) Lowenbraun

Develops competencies in teaching receptive language skills through children's use of residual hearing, utiliza-tion of appropriate amplification, and speech reading. Emphasis on acquisition of related knowledge and dem-onstration of knowledge with children in individual or group settings.

EDSPE 532 · Aural-Oral Communication for the Hearing Impaired: Part II (3) W Lowenbraun

Techniques of developing oral communication in hear-ing-impaired children. Emphasis on the synthetic ap-proach, utilizing residual hearing whenever possible. An-alytic speech correction techniques and traditional orthographic systems. Prerequisite: 531.

EDSPE 533 Teaching Language to the Hearing Impaired (3) A Rittenhouse

Methods for instructing hearing-impaired students with language acquisition problems. Analysis of currently available curriculum and instructional materials. Skills in diagnosis, evaluation, and program development. Prerequisite: 521.

EDSPE 534 Teaching the Hearing Impaired (3) A Rittenhouse

Methods for instructing hearing-impaired students in regular school subjects. Skills in educational diagnosis, construction of instructional materials, and program development. Prerequisite: 512.

EDSPE 541 Education of the Emotionally Disturbed (3) Neel

Analysis of major theoretical approaches to the education of emotionally disturbed children. Adaptation of various approaches to various educational settings.

EDSPE 542 Mental Retardation (3) Ryckman

Introductory course on mental retardation and the prob-lems it presents to parents, the mentally retarded, the community, the schools, and society.

EDSPE 543 Learning Disabilities (3) Ryckmar

Analysis of major theoretical approaches to the study of children with learning disabilities. Adaptation of various approaches to various educational settings.

EDSPE 545 Instructional Modifications for the Education of the Mildly Handicapped (3)

In-depth analysis and application of several modifications of instructional techniques necessary for the education of the mildly handicapped.

EDSPE 546 Seminar in Educating the Socially and . Emotionally Disturbed (3) Neel

Advanced-level seminar that analyzes the classical and contemporary research in the intervention of behavior disorders; reviews intervention procedures, applied in a variety of classroom administrative organizations, and prepares a scholarly manuscript for dissemination.

EDSPE 548 Seminar in the Education of Children With Learning Disabilities (3) SpS Lovitt, Ryckmann

Lovin, Ryckmann In-depth analysis of empirical findings in the specialty of learning disabilities with focus on the synthesis of re-search findings and their application to educational envi-ronment. A paper suitable for publication required. Pro-requisite: course in learning theory, introductory course in learning disabilities, or permission of instructor.

EDSPE 565 Seminar: Early Childhood Education for the Handicapped (3) W Edear

Advanced seminar on early childhood education for the handicapped. Historical and current research from appropriate specialties in special education reviewed; research from related fields is reviewed in terms of its application to the education of young handicapped children.

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, and, with permission of the in-structor, the form must be filed with the Office of Special Education in the College of Education.

EDSPE 600 Independent Study or Research (*) Registration must be accompanied by a study prospectus endorsed by the appropriate faculty adviser for the work proposed and must be filed with the Office of Special Ed-ucation in the College of Education. A report or paper setting forth the results of the investigation is required.

INDEPENDENT STUDY, **RESEARCH, AND FIELD EXPERIENCES**

(Teaching Practicum)

EDUC 301 Introductory Practicum in Community Service Activity (3) Dimmitt

Opportunity is provided for initial tutoring and teaching Opportunity is provided for initial tutoring and teaching experiences in a specific community service organiza-tion, placement made according to participant interests and needs. Approximately sixty hours of participation on a prearranged schedule plus scheduled seminars are re-quired. Prerequisites: application during quarter prior to participation and permission of instructor.

EDUC 302 Introductory Practicum in Classroom Teaching and Management (3-6, max. 9) Briggs, Dimmitt

Opportunity is provided for initial participation experi-ence in classroom teaching and management. Assignment is for twenty hours per credit in a specific school situation, level as requested. Scheduled seminars re-quired. Prerequisites: application during quarter prior to participation and permission of instructor.

EDUC 401 Practicum in Community Service Activity (3-18)

Dimmitt

Opportunity is provided for tutoring and teaching experi-ences in a specific community service organization, placement made according to participant interests and practiment induce according to participant interests and needs. Approximately twenty hours of participation on a predetermined schedule plus scheduled seminars are re-quired for each credit earned. Participants wishing to uti-lize community service experience to satisfy, in part, certification requirements should make arrangements prior to enrollment with the director of field experiences. Prerequisites: application during quarter prior to partici-pation and permission of instructor.

EDUC 402 Practicum in Classroom Teaching and Management: Early Childhood, Kindergarten, Primary (Through Grade 3) (5-36)

Dimmiti

Dimmit Teaching practicum is completed in an assigned school. Approximately twenty hours of participation on a prede-termined schedule plus scheduled seminars are required for each credit earned. Placement is approved through the Office of Field Experiences. Prerequisites: EDPSY 304, 308, and permission of instructor. (20 credits required for certification) certification.)

EDUC 403 Practicum in Classroom Teaching and Management: Intermediate Grades, Middle School (5-36) Dimmitt

Diminit Teaching practicum is completed in an assigned school. Approximately twenty hours of participation on a prede-termined schedule plus scheduled seminars are required for each credit earned. Placement is approved through the Office of Field Experiences. Prerequisites: EDPSY 304, 308, and permission of instructor. (20 credits required for certification.)

EDUC 404 Practicum in Classroom Teaching and Management: Secondary School (5-36) (Grades 7-12) Dimmin

Teaching practicum is completed in an assigned school. Approximately twenty hours of participation on a prede-termined schedule plus scheduled seminars are required for each credit earned. Placement is approved through the Office of Field Experiences. Prerequisites: EDPSY 304, 308, and permission of instructor. (20 credits required for certification.)

EDUC 501 Advanced Practicum in Community Service Activity (3-18) Dimmitt

Opportunity is provided postbaccalaureate students with selective, in-depth participation, and teaching experiences in a specific community service organization. Ap-proximately twenty hours of participation plus scheduled seminars are required for each credit earned. Participants wishing to use advanced community service experience to satisfy, in part, graduate program requirements should make such arrangements prior to enrollment with their adviser and the director of field experiences. Prerequisites: application during quarter prior to participation and permission of instructor.

EDUC 502 Advanced Practicum in Classroom Teaching and Management (3-18) Dimmitt

Designed to provide certificated teachers with selective, in-depth classroom participation experiences. Activities include, for example, specialized reading instruction, as-sessment of learning disabilities, remedial or specialized teaching, experimental approaches to learning, etc. Par-ticipants wishing to use the advanced teaching practicum to satisfy, in part, graduate program requirements should make such arrangements prior to enrollment with their adviser and the director of field experiences. Prerequisites: application during quarter prior to participation and permission of instructor.

EDUC 700 Master's Thesis (*)

Research for the master's thesis, including research preparatory or related thereto. Limited to premaster graduate paratory or related thereto. Limited to premaster graduate students (i.e., those who have not yet completed the mas-ter's degree requirements in their major field at the University of Washington). Name of faculty member re-sponsible for supervising the student should be indicated on the Program of Studies. Prerequisite: permission of supervisory committee chairperson or graduate program adviser adviser.

EDUC 800 Doctoral Dissertation (*) Research for the doctoral dissertation and research preparatory or related thereto. Limited to graduate students paratory or related thereto. Limited to graduate students who have completed the master's degree or the equiva-lent or Candidate-level graduate students. Premaster stu-dents initiating doctoral dissertation research should register for 600. Name of faculty member responsible for supervising the student should be indicated on the Pro-gram of Studies. Prerequisite: permission of Supervisory Committee chairperson or graduate program adviser.

COLLEGE OF ENGINEERING

COLLEGE COURSES

Courses for Undergraduates

FUNCTIONAL TECHNIQUES

ENGR 123 Graphical Analysis (1-8, max. 8) AWSpS

Macartney

Designed for a range of students from those with little or no drawing experience to those with considerable graphical background. Taught by individualized instructional units. Approximately thirty units cover the following: technique of freehand and instrument drawing; develop-ment of orthographic view relationships; reading and interpreting drawings; design drawing; selected topics in applied descriptive geometry and graphical statics; practical applications in graphical calculus, empirical equations, and nomography. Starting unit determined by previous experience. Subject matter covered determined by student's interests and major.

ENGR 130 Introduction to Technical Communication (3) AWSpS

Conev Fundamental principles of organizing, developing, and expressing technical ideas. Types of writing that students will do during the course of their professional education.

ENGR 140 Measurement and Experimentation (4) AWSp

Solution of problems in engineering measurements, sta-tistics, probability, and unit systems. Design of experi-ments. Collection of data in several laboratories in the college. Recommended: MATH 124.

ENGR 141 Introductory FORTRAN Programming (4) AWSpS Ness

Computer programming using FORTRAN language. In-cludes use of one-, two-, and three-dimensional arrays and subroutines. Emphasizes problem-solving techniques and subroutnes. Emphasizes problem-solving techniques using structured or modular programming concepts. Some sections use engineering-type problems; others use general problems for programming practice. Prerequisite: MATH 105 or permission of adviser.

ENGR 150 Introduction to Design (2) AWSp Chalk

Chaik Design groups of three to five students attack problems assigned to give students as authentic an experience in engineering as possible. Lectures, discussions, and read-ing focus on the design process steps such as defining the problem, thinking creatively, generating alternative solu-tions, and communicating final solutions. Open to nonen-nication cuttants gineering students.

ENGR 199 Special Projects (1-3, max. 3) AWSpS 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 therapy, hospital, industry, government, etc. Corrobora-tion by an engineering faculty member is required. Proj-ect suggestions are available.

ENGR 331 Scientific and Technical Reporting (3) AWSpS

AWSPS Concy, Souther, Trimble, White Principles of presenting technical material logically, concisely, and effectively to meet the requirements of various situations and audiences. For majors in engineer-ing and similar professional programs, and for those in the natural, social, and health sciences. Concentrates on the binde of unitient promited for preferices in the rest. the kinds of writing required of professionals in these technical fields. Prerequisite: junior standing or permission of instructor.

ENGINEERING SCIENCES

ENGR 170 Fundamentals of Materials Science (4) AWSpS Archbold

Elementary principles underlying the structure and properties of materials tillized in the practice of engineering. The properties of inorganic and organic materials are re-lated to atomic, molecular, and crystalline structure. Metals, ceramics, multiphase systems, and natural and synthetic polymeric materials are included. Mechanical stress, electromagnetic fields, irradiation, and thermal and chemical changes are considered with respect to their influences on mechanical, electrical, and chemical properties. For advanced freshmen and sophomores, Prerequisite: CHEM 150 or permission of adviser.

ENGR 171 Materials Science Laboratory (1) AWSpS

Awsps Experiments in materials science designed to illustrate fundamentals related to the structure and the properties of engineering materials; optical microscopy, X-ray diffrac-tion, mechanical properties, electrical conductivity, crys-tal growth, solid-state reactions. Prerequisite: 170, which much be determents. may be taken concurrently.

ENGR 190 Introduction to Logical System Design (4) AWSpS Johnson

Introduction to concepts of logical design of specific

classes of systems primarily observed in digital logics. Representation, conversion, and arithmetics of number systems related to logical systems. Boolean algebra fun-damentals and operations. Topological representation of logical combinational functions, complexity reduction, optimization criteria. Time-dependent sequential logics using memory, representations, minimization, and im-plementation. Register transfer concepts. Three hours lecture weekly. Twelve hours self-paced laboratory.

ENGR 210 Engineering Statics (4) AWSpS Sherrer

Principles of statics, basic concepts, parallelogram law, Newton's law, resultants, force-couple relationships, equilibrium diagrams, equilibrium analysis, three-dimen-sional structures, two-dimensional frames, trusses, beams, and friction. Vector algebra used throughout the course. Prerequisites: MATH 126, PHYS 121. Recommended: graphics background.

ENGR 220 Introduction to Mechanics of Materials (4) AWSpS Hartz

Introduction to the concepts of stress, deformation, and strain in solid materials. Development of basic relationships between loads on structural and machine elements such as rods, shafts, beams, and columns, and the stresses, deflections, and load-carrying capacity of these elements under tension, compression, torsion, bending, and shear forces, or combinations thereof. Not recom-mended for students who have taken 240. Prerequisites: 210, MATH 126, which may be taken concurrently.

ENGR 230 Kinematics and Dynamics (4) AWSpS Merchant

Dynamics, rectilinear motion, vector calculus, kinematics and kinetics of a particle, statics, friction, vibration, impulse, momentum, work and energy, conservation laws, moving references, central force motion, systems of particles, rigid-body mechanics. Prerequisites: 210, MÅTH 126.

ENGR 240 Introduction to Continuum Mechanics (4) ASp Holsapple

Basic principles in the study of continuous media. Intro-duction to various field quantities, such as stress, mass density, and temperature, and to the basic balance laws to which these fields are subject. Specific constitutive equa-tions are developed with applications drawn primarily from the areas of fluid mechanics and solid mechanics. Prerequisites: 210, MATH 126, and PHYS 121.

ENGR 251 Analog and Digital Electronics (4) AWSpS

Potter

Introduction to basic electronic devices and their applica-tions in analog and digital circuits. Includes concepts of direct-current circuit analysis, circuit models for elec-tronic devices, sinusoids, and power. Introduces electronic devices; diodes, transitors, and o amps, and their uses in analog and digital applications such as amplifiers, gates, and counters. Two laboratory projects. Pre-requisites: MATH 126, which may be taken concur-rently, and PHYS 122, or permission of instructor.

ENGR 260 Thermodynamics (4) AWSpS Depew

Introduction to the basic principles of thermodynamics, from a predominantly macroscopic point of view. Devel-opment of the basic laws of thermodynamics, together with this illustration by application to energy transforma-tions and state changes in engineering problems. Prereq-uisites: MATH 126, 100-level physics and chemistry courses.

ELECTIVES

ENGR 110 Career Planning I (1) AW Mueller

Meets weekly in both large sections and small sections. The large sections are primarily devoted to an introduc-tion to the College of Engineering, curricular options, fields of engineering, interdisciplinary programs, and in-formation of general interest. The small sections provide an opportunity for students to become acquainted with an engineering faculty member and a time to ask questions and to obtain assistance in preparing their career and edu-cational goals. Offered on credit/no credit basis only.

ENGR 161 Plane Surveying (3) AWSpS Plane surveying methods; use of the engineer's level, transit, and tape; computations of bearings, plane coordi-

nate systems, areas, stadia surveying, public land system. Prerequisite: trigonometry.

ENGR 305 Environmental Radioactivity (3-4) Sp Woodruff Study of the nature of the various sources of radioactivity

encountered today and to be expected in the future. Top-ics covered include: natural radioactivity; radiation from nuclear weapons, from nuclear power plants and fuel reprocessing plants, and from medical diagnosis; radia-tion effects on plants and animals; radiation therapy and other useful applications and methods of detection.

ENGR 307 Energy Controversies (5) ASp

Albrech, Garlid Description and analysis of crucial questions; nontechni-cal and technical, concerning energy supplies and con-sumption. Consideration is given to energy sources and requirements on global, national, and regional scales; fundamentals of energy generation, conversion, and dis-tribution; resulting pollution and environmental effects; controversies between environmentalists and growth proponents. All forms of energy are considered, but electri-cal energy production and use are emphasized. The course is designed to illuminate the conflicts involved in choosing optimal energy policies. Prerequisite: junior standing.

ENGR 310 Social Constraints on Engineering Design (3) WS Bereano, Lauritzen Examines cases of engineering designs and identifies ways in which social goals affect engineering design de-cisions. As part of this examination, social values and public policy issues that generate design criteria are ex-plored. Appropriate course for students from any disci-pline. Offered on credit/no credit basis only. Offered jointly with SMT 310. Prerequisite: junior standing or permission of instructor. permission of instructor.

ENGR 341 Computer Applications of Numerical Methods (3) AWSpS Marshall

Development and application of numerical methods and Development and application of numerical interaction and a algorithms to solve problems in engineering. Simultane-ous equations, curve fitting, root-finding algorithms, Taylor series analysis, numerical integration, ordinary differential equations. Prerequisites: 141 or equivalent and MATH 238, which may be taken concurrently.

ENGR 345 Advanced Topics in Digital Computing (3) AWSpS Redeker

The concept of the higher level language. Advanced FORTRAN techniques used to construct an interpreter, including the full set of FORTRAN IV statements, the machine-dependent features of the CDC 6400, real and integer binumber conversion stuffing and unstuffing, object-time formatting, introduction to use of control cards, and Polish notation. Several programs in addition to the interpreter are written and executed. Prerequisite: 141 or equivalent.

ENGR 346 Assembly Language Programming (3) AWSpS Redeker

Redeker The central processor assembler language, COMPASS, of the CDC 6400 computer, including program structure and organization, COMPASS language instructions, pseudoinstruction, and macroprogramming techniques. Integer and floating-point conversion, character manipu-lation, simple and nested loops, array accessing, COM-PASS-FORTRAN subroutine linkage, and instruction timing. Programs are coded and executed on the com-puter. Prerequisite: 141 or equivalent.

ENGR 351 Inventions and Patents (1) Sp Seed

Law and procedures for patenting inventions, employer-employee relationship and trademarks. Primarily for en-gineering students. Prerequisite: junior standing.

ENGR 360 Introductory Acoustics (3) Sp Chalupnik, Fyfe, Sigelmann

Inistorical development of acoustics; the terminology and units employed. Sound sources in engineering systems. The wave equation, traveling and standing waves. The analysis of vibrating systems. Helmholtz resonators, wave transmission, and reflection. Ultrasonics and in-strumentation. For advanced sophomores and juniors. Prerequisite: 12 credits of engineering sciences or permission of instructor.

ENGR 401 Analytical Methods in Engineering I (3) Acquisition of technique and experience in application of areas of mathematics encountered in science and engineering; illustrated by case studies from many fields. Apneering; infustrated by case studies from many netos. Ap-propriate for seniors and graduate students in engineering and science who require a survey of techniques, but who are not prepared for, or do not seek, advanced material at the 500 level. Applications of first-order and linear ordinary differential equations, systems of differential equations, phase plane, stability and power series solu-tions of differential equations and Laplace transforma-tion. Offered jointly with AMATH 401. Prerequisite: MATH 238. MATH 238.

ENGR 402 Analytical Methods in Engineering II (3) See 401. Applications of linear algebra-vectors and maand surface integrals, complex functions, power series, Taylor and Laurent series and integrations by methods of residues. Offered jointly with AMATH 402. Prerequisite: MATH 238.

ENGR 403 Analytical Methods in Engineering III

See 401. Application of Fourier series and integrals, par-tial differential equations, probability and statistics. Of-fered jointly with AMATH 403. Prerequisite: MATH 238

ENGR 498 Special Topics in Engineering (1-5, max. 6) AWSpS

ENGR 499 Special Projects in Engineering (1-3, max. 6) AWSpS

COOPERATIVE EDUCATION

ENGR 321- Engineering Cooperative Education (2-, max. 16) AWSpS Kieling

Engineering practicum; the integration of classroom the-ory with on-the-job training. Periods of work alternate with periods of study. Open only to students who have been admitted to the Engineering Cooperative Education Program. Offered on credit/no credit basis only.

ENGR -322 Engineering Cooperative Education Postwork Seminar (-1, max. 4) AWSpS Kieling

Reporting and evaluation of coop work experience, and discussion of current topics in engineering. To be taken during the first quarter in school following each work session. Offered on credit/no credit basis only.

ENGR 323- Engineering Internship (2-, max. 10) AWSpS Kieling

Engineering practicum; integration of classroom theory with on-the-job training. Open only to students who meet the requirements of the Engineering Cooperative Educa-tion Program but are of junior or senior standing and thus too late in the college careers to complete the two sixmonth work sessions required of coop students. Offered on credit/no credit basis only.

ENGR -324 Engineering Internship Postwork Seminar (-1, max. 4) AWSpS Kieling

Reporting and evaluation of internship work experience and discussion of current topics in engineering. To be taken during the first quarter in school following the work session. Offered on credit/no credit basis only.

AERONAUTICS AND ASTRONAUTICS

Courses for Undergraduates

A A 300 Aerodynamics I (4) A Decher, Joppa, Rae Aerodynamics as applied to the problems of performance of flight vehicles in the atmosphere. Prerequisite: junior charding or premieric standing or permission.

A A 301, 302 Aerodynamics II, III (4,4) W,Sp

Kinematics and dynamics of flow fields; incompressible flow about bodies. Thin airfoil theory; finite wing theory. Compressible fluids; one-dimensional compressible flow; two-dimensional supersonic flow. Viscous flows; bound-

ary layers. Prerequisites: MATH 238 and ENGR 260 for 301; 301 for 302.

A A 311 Orbital and Atmospheric Flight Mechanics (3) W Fyfe, Kevorkian, Ness, Vagners

Review of kinematics and particle dynamics. Dynamics of systems of particles. Gravitational field of the earth. Keplerian motion. Application to orbital transfer prob-lems. Rigid-body dynamics. Application to constrained rigid bodies and flight mechanics. Prerequisite: ENGR 230.

A A 312 Dynamics of Flight Vehicles (3) Sp

A A 312 Dynamics of Flight Vehicles (3) Sp Bollard, Fyfe, Ness Vibration theory. Characteristics of single and multide-gree of freedom linear systems with forced inputs. Ap-proximate methods for determining principal frequencies and mode shapes. Application to simple aeroelastic prob-lems. Prerequisite: 311.

A A 320, 321, 322 Junior Laboratory I, II, III (2,2,2) A,W,Sp Bruckner

Theory, calibration, and use of instruments. Measure-ment techniques, analysis of data, report writing. Laboratory experiments on subsonic aerodynamics, supersonic flow, material properties, structures, vibrations. Recom-mended: ENGR 140 or PHYS 131, 132, 133.

A A 330, 331, 332 Structural Analysis I, II, III (4,4,4) A,W,Sp Bollard, Holsapple, Parmerter Development of the equations of elasticity, viscoelas-ticity, and plasticity. Plane stress, plane strain; torsion, bending, and stability of rods and beams; virtual work, potential energy, Castigliano's theorem; statically inde-terminate structures; bending of plates and shells. Prereq-uisite: 331 for 332. Recommended: ENGR 240.

A A 370 Introduction to Applied Analysis (3) Holsapple, Pearson, Street

Holsappie, Pearson, siree Advanced calculus, from applications point of view, Re-view of ordinary differential equations. Finite differ-ences. Fourier series and integrals. Laplace transforma-tion. Bessel functions, Legendre polynominals. Review of vector analysis. Line, surface, and volume integrals. Prerequisite: MATH 238.

А А 400, 401, 402 Gas Dynamics I, П, Ш (3,3,3) A,W,Sp Christiansen, Russell

Review of thermodynamics. Introduction to kinetic the-ory and free molecule flow. One-dimensional gas dynam-ics, one-dimensional wave motion, waves in supersonic flow, flow in ducts and wind tunnels. Measurements in fluid dynamics. Inviscid equations of motion, incompresfund dynamics, invision equations of inducts, incompres-sible potential flows, vortex flows, small perturbation flows, bodies of revolution, similarity laws. Transonic flow. Method of characteristics. Equations with viscosity and heat conductivity. Boundary layer flows. Prerequi-sites: 302 and ENGR 260, or permission of instructor.

A A 410, 411, 412 Aircraft Design I, II, III (3,3,3) A,W,Sp Joppa, Ness, Rae Preliminary design of a modern airplane to satisfy a given

retininary design of a noteth any and to satisfy a given set of requirements. Estimation of size, selection of con-figuration, weight and balance, and performance. Satis-faction of stability, control, and handling qualities requirements. FAA load requirements, loads analysis, structural design of components. Prerequisites: 302 for 410; 410 for 411; 411 for 412.

A A 420 Spacecraft and Space Systems Design I (3) Expanding role of space has created a new technology with unique components and systems. The methodology will be developed for treating the special power, trans-portation, attitude control, etc., systems required for cur-rent and anticipated spacecraft. Applications extend from communications to solar power from space. Prerequisite: serior standing senior standing.

A A 424 Environmental Aspects of Energy Conversion and Heat Engines (3) W

Conversion and Heat Engines (3) W Decher, Hertzberg Considerations of ecological constraints on the design of heat engines. Thermal pollution of air and water, and pollution by electrical power plants. Advanced methods of power production and of waste heat elimination. Chemistry and kinetics of high-temperature gases. Chem-ical emission by automotive engines, gas turbines, and hybrid engines. Prerequisites: CHEM 140, ENGR 260, or permission. or permission.

A A 430 Finite Element Structural Analysis (3) Holsapple Introduction to the finite element method. Applications to

trusses, beams, frames, box beams, plane stress, and heat transfer. Prerequisite: 332.

A A 431 Plates and Shells (3) W

A A 431 Flates and sheats (5) v Holsapple, Parmerter Introduction to the theory of plates and shells. Membrane theory of shells of revolution, cylindrical, and conical shells. Axisymmetric bending of shells of revolution. Stability of structures. Prerequisite: 332.

A A 432 Structural Design (3) Sp

Bollard, Holsapple, Parmerter

Design of aircraft structural components. Methods of pre-liminary design. Arrangement of members. Selection of materials and member sizes. Practical design of selected components. Prerequisite: 331.

A A 440, 441, 442 Flight Mechanics I, II, III (3,3,3) A,W,Sp

Bossi, Joppa

Calculation of aerodynamic coefficients and stability de-rivatives. Prediction of performance, stability, and con-trol characterisitics of a specified aircraft. Vehicle equations of motion near a flat earth; the performance problem within the atmosphere; an introduction into the dynamic stability of vehicles subject to aerodynamic forces. Wind tunnel tests of an aircraft model to deternores, which tunnel tests of all alternat mode to deter-mine performance and stability parameters; comparison of wind tunnel and derived aerodynamic characteristics. Determination in flight of performance, stability, and control characteristics; and comparison with predicted and wind tunnel results. Prerequisites: 302 for 440; 440 for 441; 441 for 442.

A A 450, 451, 452 Space Mechanics I, II, III (3,3,3)

A,W,Sp Bossi, Kevorkian, Vagners Review of kinematics. Review of particle dynamics. Dy-namics of a system of particles. Stability of motion. namics of a system of particles. Stability of motion. Rigid-body motion. Universal law of gravitation. The two-body problem. Orbit transfer problems. Linearized orbit investigations. Effect of air drag on orbits. Varia-tion of parameters for continuous orbit perturbation. Planetary potentials. Change of orbit elements due to oblateness. Elementary three-particle problem. Rigid-body motion of space vehicles. Elements of orbit deter-mination. Recommended: MATH 238.

A A 460, 461, 462 Propulsion I, II, III (3,3,3) A,W,Sp Decher, Oates

Study of the aerodynamics and the chemistry of rockets Socket vehicles, staging. Introduction to space propul-sion. Air-breathing engines as propulsion systems. Turbojets, turbofans, turboprops, ramjets, hybrid en-gines. Aerodynamics of gas-turbine engine components. Prerequisites: 302 and ENGR 260.

A A 470 Analytical Problems in Aeronautics (3) W Street

Numerical methods for algebraic and differential equa-tions. Transforms. Introduction to perturbations, ei-genvalues, nonlinearities. Probability and statistics. Variational idea. Prerequisites: MATH 238 and ENGR 141.

A A 476 Introduction to Design With Brittle Materials (3) W

Materials (3) W Properties and behavior of ceramic materials are related to their use in advanced technology structures. Analytical and numerical methods required for probabilistic design and current case studies utilized. Offered jointly with CER E 476, CESM 476, M E 476, and MET E 476.

AA 480 Systems Dynamics (3) A Bollard, Fyfe

Equations of motion and solutions for selected problems; natural frequencies and mode shapes; response of simple systems to applied loads. Prerequisite: senior standing.

A A 481 Elementary Aeroelasticity (3) W Bollard

Discussion of aeroelastic problems in aircraft design; ele-mentary development of static and dynamic aeroelastic problems. Prerequisite: 480.

A A 482 Aeronautical Acoustics (3) Sp

Fy/e Noise generated by boundary layers, jets, rockets, sonic booms, propeller and helicopter blades. Atmospheric

propagation, acoustically excited structures, acoustic fatigue. Noise suppression, damping of jet-excited struc-tures. Assessment of aircraft noise. Prerequisite: senior standing.

A A 499 Special Projects (2-5, max. 10) AWSp Investigation on a special project by the student under the supervision of a faculty member. Prerequisite: senior standing.

Courses for Graduates Only

A A 501, 502, 503 Physical Gas Dynamics I, II, III

(3,3,3) W,Sp,A Christiansen, Hertzberg, Street Chemical thermodynamics; thermodynamic properties derived from quantum statistical mechanics, reacting gas mixtures. Introduction to nonequilibrium physics and mixtures. Introduction to nonequinorum physics and fluid flow with application to a variety of research and development areas such as high-temperature aspects of energy systems and gas lasers. Problems in vibrational relaxation, chemical kinetics, radiative transfer, molecu-lar transport, and kinetic theory. Each topic alternates be-tween introductory physics and application. 503 is a post-master's course with 502, or equivalent, as a prerequisite.

A A 504 Fluid Mechanics I (3) A Christiansen, Decher, Oates, Russell, Street 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. Highly viscous flows. Prerequisite: 567, which may be taken concurrently, or permission of instructor.

A A 505, 506 Fluid Mechanics II, III (3,3) W,Sp Christiansen, Decher, Oates, Russell, Street

Sound waves, surface waves. Ideal incompressible and compressible flows; transonic flow, hypersonic flow, combustion. Prerequisite: 504 or equivalent. (Offered even-numbered years.)

A A 507, 508, 509 Aerodynamics of Viscous Fluids I, II, III (3,3,3) W,Sp,A Oates, Russell, Street

Oates, Russell, Street Introduction to viscous flow; exact solutions of the lami-nar equations of motion; approximate equations. Exact solutions for laminar boundary layers. Approximate methods for general laminar boundary layers. The phe-nomena of turbulence, transition prediction, Reynolds stresses, turbulent boundary layer equations. Free turbu-lent flows; approximate methods for turbulent boundary layers. Special topics. 509 is a post-master's course, with 508, or equivalent, as a prerequisite. (Offered odd-num-bered years.) bered years.)

A 511 Unsteady Aerodynamics (3) W

A A 511 Unsteady Aerodynamics (3) W Oscillating airfoils at subsonic and supersonic speeds; consideration of wings and bodies in unsteady flow. (Offered odd-numbered years.)

A A 513 Gas Laser Theory and Practice (3) Sp Christiansen, Hertzberg, Russell Study of the physics and fluid mechanics of high-power

study of the physics and mutual mechanics of migh-power lasers with emphasis directed to the performance of mod-ern gas dynamic lasers, flowing chemical lasers, and gaseous electric lasers. Techniques of obtaining popula-tion inversions, power extraction, basic thermodynamics, and the interaction of optical radiation with matter are part of the study training. Due to the relationship of the subject matter to the energy problems, applications of high-power lasers also are emphasized.

A A 516, 517 Stability and Control I, II (3,3) A,W Joppa

Aerodynamics of control; the general problem of dy-namic stability; the influence of aerodynamic parameters on flying characteristics. Response of airplane to actua-tion of control; automatic stability and control. Prerequi-site: 516 for 517.

A A 518 Stability and Control III (3) Sp

Joppa Study of recent work in stability and control of aircraft, with special attention to handling qualities and automatic

A A 523 Special Topics in Fluid Physics (3) AWSp

A A 524, 525 Aerothermodynamics of Aircraft Gas Turbine Engines I, II (3,3) W,Sp Decher, Qates

Aircraft gas turbine cycle analysis, off design performance. Component performances. Inlets, descrip-tion of flow distortion, effects of moisture. Aerodynamics of compressors and turbines. Throughflow theory, ac-tuator disk theory, the cascade transformation. Nozzles, compound flow theory, behavior of mixers. (Offered even-numbered years.)

A A 526 Aerothermodynamics of Aircraft Gas Turbine Engines III (3) A Decher, Oates

Aircraft engine noise. Description and measurement of noise, correlation functions, power spectra. Elementary duct acoustics, rotor-stator interaction, effect of design blade loading. Turbine noise, core noise, acoustic lin-ings. Jet noise, Lighthill theory, scaling laws. (Offered even-numbered years.)

A A 527, 528 Energy Conversion I, II (3,3) W,Sp Decher, Oates Analysis of cycles for space and low-pollution commer-cial power generation. Gas-cooled nuclear reactors, very high temperature cycles, direct conversion of heat to electricity, solar collection. Energy storage systems. (Of-fered odd-numbered years.)

A A 529 Space Propulsion (3) A Decher, Oates Nucleonics, and heat transfer of nuclear heated rock- ets. Electrothermal, electromagnetic, and electrostatic thrusters. Prerequisite: permission. (Offered odd-numbered years.)

A A 530, 531, 532 Mechanics of Solids I, II, III (3,3,3) A,W,Sp Bollard, Fyfe, Holsapple, Parmerter Linear theory of elasticity, viscoelasticity, and plasticity. Variational and extremum theorems. Three-dimensional problems. Plane stress. Plane strain. Wave propagation in solids. Applications to structural design.

A A 535 Analysis of Shells (3) Sp

Parmerter Nonlinear equations of thin shells. Solution of the linearized equations for shells of revolution and other shapes. Buckling of shells. Postbuckling deformation of shells.

A A 540, 541 Finite Element Analysis I, II (3,3) W,Sp Fyfe, Holsapple General theory of the finite element method and its appli-

cation to engineering problems.

A A 545 Bioastronautics (3) Sp

Bollard

Study of the application of the principles of engineering science to specific biosystems; to acquaint the student with the principles of structure and function of the human organism.

A A 547 Engineering Aspects of the Fluid Mechanics of the Human Body (3) W Oates

Outer Engineering background to the many flow regimes exist-ing in the human body. Specific examples of flow prob-lems such as cardiovascular, bronchial, microcapillary, urethral, etc. Offered jointly with BIOEN 547. Offered on credit/no credit basis only. Prerequisite: permission of instructor. (Offered odd-numbered years.)

A A 553 Vibrations of Aerospace Systems (3) W Bollard, Fyfe Natural frequencies and modes of vibrations of linear systems; forced vibrations and motion dependent forces; Lagrange's equations and Hamilton's principle; matrix methods for discrete and continuous systems; nonlinear oscillations, parametric oscillations.

A A 555 Special Topics in Aerospace Systems (3) AWSp

A A 556 Aeroelasticity (3) Sp Bollard

Concept of functional diagrams and aeroelastic operators; quasi-static lifting-surface deformations and stability; control surface effectiveness; nonstationary lifting-sur-face deformations and stability; general dynamics of aerodynamic, structural, and control system interactions. Prerequisites: 481, 553.

A A 560 Optimization in Dynamic Systems (3) W Vagrees Review of parameter optimization, extrema of real func-tions, constraints and accessory conditions, neighboring tions, constraints and accessory conditions, neignboring optimal solutions, Lagrange multipliers. Dynamic op-timization, problems of Mayer, Bolza, and Lagrange, necessary conditions, path constraints, corner conditions, Pontryagin's minimum principle. Extremal fields, suffi-ciency conditions. Hamilton-Jacobi theory, dynamic pro-gramming, singular arcs, distributed parameter systems. Elements of differential games. Emphasis on problem formulation and motivation of mathematical ideas rather than riscorus mathematical development (Offered eventhan rigorous mathematical development. (Offered evennumbered years.)

A A 561 Techniques of Nonlinear Optimization (3)

Sp Vagners Selected computational techniques; advanced linear pro-gramming, duality and Lagrange multipliers in linear and nonlinear programming, search techniques, penalty tech-niques, gradient techniques, dynamic programming, neighboring extremal methods. (Offered even-numbered vears.)

A A 562, 563, 564 Methods of Partial Differential Equations I, II, III (3,3,3) A,W,Sp Kevorkian

First-order partial differential equations: characteristics, conservation laws, shocks, applications to geometrical optics and Hamilton-Jacobi theory. Elliptic equations: fundamental solution, Green's function, conformal mapping, boundary-value problems. Parabolic equations. Hyperbolic equations: characteristics, shocks, examples from fluid dynamics, approximate methods. Post-mas-ter's sequence. Offered jointly with AMATH 562, 563, 564. Prerequisite: 569. (Offered odd-numbered years.)

A A 567 Analysis in Engineering I (3) A Algebra and calculus of vector and tensor fields. Linear mappings, matrices, finite dimensional eigenvalue prob-lems. Curvilinear/coordinates. Complex variables, con-tour integration, conformal mappings. Offered jointly with AMATH 567.

A A 568 Analysis in Engineering II (3) W Survey of properties and practical techniques for ordinary differential equations. Series expansions. Eigenvalue problems. Laplace transforms and applications. Varia-tional methods. Asymptotic expansions. Perturbations, regular and singular. Difference equations. Numerical procedures. Offered jointly with AMATH 568. Recom-mended: 567 mended: 567.

A A 569 Partial Differential Equations (3) Sp Kevorkian, Pearson, Vagners Properties of diffusion, wave, and Laplace-type equa-tions. Initial and boundary value problems. Series expan-sions, transform methods. Singularities, Green's func-tions. Classification of second-order equations; theory and applications of the determination. and applications of method of characteristics. Numeri-cal techniques. Offered jointly with MATH 569 and AMATH 569. Prerequisite: 568 or MATH 428.

A A 571 Principles of Dynamics (3) A

Fyfe, Kevorkian, Pearson, Vagners Pyte, Revortian, Pearson, Vagners Review of rigid-body dynamics; calculus of variations. Lagrangian mechanics. The canonical equations of Ham-ilton; canonical transformations. Hamilton-Jacobi theorem; Hamiltonian perturbation theory. Periodic and quasi-periodic motion. Stability of dynamical systems; resonance in dynamical systems.

A A 575 Thermo- and Electrodynamics of Continua (3) W Holsapple General formulation of the fundamental concepts of mo-

tion, stress, energy, and electromagnetism for a continuum. General equations of conservation of mass, balance of momentum, balance of energy. Phenomenological the-ory of thermodynamics. Maxwell's electromagnetic field theory. Elastic and viscous materials.

A A 576, 577, 578 Perturbation Theory I, II, III (3,3,3) A,W,Sp Kevorkian

Revortian Basic concepts of asymptotic expansions with applica-tions to linear partial differential equations. Singular per-turbations: matched asymptotic expansions, boundary layers, shock-layers, uniformly valid solutions, the method of multiple scales, weakly nonlinear wave propa-gation problems and resonance phenomena; nonlinear wave propagation in fluid, solid, and particle mechanics.

ost-master's sequence. Offered jointly with AMATH 576, 577, 578. (Offered even-numbered years.)

A A 580 General Theory of Continuous Media (3)

Holsapple General continuum theory of mechanics and thermody-namics of materials. Theory of materials with fading memory. Rate independent materials. Recommended: 575

A A 583 Special Topics in Solid Mechanics (3) AWSn

A A 584, 585, 586 Approximate and Numerical Analysis I, II, III (3,3,3) A,W,Sp Pearson, Street

Approximation theory, curve-fitting. Numerical differen-tiation and integration. Linear and nonlinear algebraic equation systems. Ordinary differential equation methods. Asymptotic expansions. Perturbation methods. Maods. Asymptonic expansions. retrurbation methods. Ma-trix iterative techniques. Numerical methods for elliptic, parabolic, hyperbolic partial differential equations. Vari-ational methods. Eigenvalue problems: Nonlinearities. Applications to practical problems in fluid flow, stress analysis, acoustics, electromagnetism. Offered jointly with AMATH 584, 585, 586. Prerequisites: 567, 568, 569. (Offered odd-numbered years.)

A A 587, 588, 589 Techniques of Applied Analysis I, II, III (3,3,3) A,W,Sp Pearson, Street

Review of complex variable. Series expansions, contour Review of complex variable. Series expansions, contour integration, generating functions, conformal mapping. Differential equations in the complex plane. Special functions. Asymptotic methods (saddle point, stationary phase, WKB, and others). Fourier and related trans-forms. Radiation condition, signal propagation, singular inversions. Green's functions. Applications to problems in engineering and physics. Integral equations. Wiener-Hopf, and other special techniques. Post-master's se-quence. Offered jointly with AMATH 587, 588, 589. Prerequisites: 567, 568, 569 or equivalent. (Offered even-numbered years.)

A A 590 Special Topics in Applied Analysis (3) AWSp

A A 594 Waves in Geophysics and Engineering (3)

Sp Fyfe Examination of the fundamental concepts and mathemati-tecorintions of wave propagation; group and phase cal descriptions of wave propagation; group and phase velocity, dispersion, effects of boundaries, normal mode and progressive wave descriptions; waves in elastic sol-ids, acoustic waves, electromagnetic waves; sources of waves; waves in inhomogeneous media; applications to acoustics, seismology, and earthquake engineering. Of-fered jointly with CESM 594 and GPHYS 594.

A A 599 Special Projects (1-5, max. 15) AWSp Investigation on a special project by the student under the supervision of a faculty member.

A A 600 Independent Study or Research (*) AWSp

A A 700 Master's Thesis (*) AWSp

A A 800 Doctoral Dissertation (*)

BIOENGINEERING

See Interschool or Intercollege Programs.

CHEMICAL ENGINEERING

Courses for Undergraduates

CH E 198 Career Planning II (1) Professional field of chemical engineering is defined and illustrated by examples chosen from industry. Careers in this profession are evaluated.

CH E 200 Introduction to Chemical Engineering (3) The engineering design process: conception, analysis, process and equipment design, operation; familiarization with the techniques of design. Prerequisites: CHEM 150, calculus, and sophomore standing or permission of instructor.

CH E 310 Material and Energy Balances (4) A Chemical and physical process calculations: steady and unsteady state material and energy balances with specific examples in vapor-liquid contact operations and multi-phase extraction, and introductory thermochemistry. Prerequisite: ENGR 260, which may be taken concurrently, although inadvisable.

CH E 326 Chemical Engineering Thermodynamics (4) W

Phase equilibria and chemical equilibria in multicompo-nent systems; theories of solution; chemical reaction analysis. Prerequisites: 310; CHEM 456 or ENGR 260.

CH E 330 Transport Processes I (4) W Diffusive transport of momentum, heat and mass; general aspects of fluid flow; the Navier-Stokes equations; one-dimensional flow with engineering applications. Prereq-uisites: 310 and MATH 238, which may be taken concurrently.

CH E 340 Transport Processes II (4) Sp Heat transfer, basic principles, and applications. Conduc-tion, convection, and radiation. Prerequisite: 330.

CH E 400 Survey of Chemical Engineering (15) S For chemistry graduates planning graduate study in chemical engineering. Intensive, short-term coverage of major subject areas in material and energy balances, staged operations, and all of the sub-areas of transport processes. Laboratory experience included. Not accept-able for graduate credit. Prerequisites: baccalaureate degree in chemistry and permission of department Chairperson.

CH E 410 Computer Analysis of Chemical Processes (3) A

Finlayson

Application of the computer to the design process: mass and energy balances for chemical processes, evaluation of alternative designs, process optimization, energy con-servation in processes. Emphasis is placed on the creative aspects of design, and the computer is used as a calculation tool. Prerequisites: 310 and ENGR 141.

CH E 435 Transport Processes III (4) A

Mass transfer, basic principles, and applications to equip-ment design. Physical separation processes. Pre-requisites: 310, 326, 330, and 340.

CH E 436 Chemical Engineering Laboratory I (3) ASp

Lectures on statistical analysis of data, instrumentation, and report writing; laboratory experiments on transport phenomena. Emphasis on experimental methods and re-port writing. Prerequisites: 326 and 330.

CH E 437 Chemical Engineering Laboratory II (3)

Continuation of 436. Laboratory investigation of chemical engineering principles applied to equipment design with emphasis on heat transfer and mass transfer operations. Prerequisites: 340, 435, and 436.

CH E 461 Electrochemistry (3)

Fundamentals of electrochemistry (o) batteries and industrial processes. Emphasis is on obtaining a basic working knowledge in the field. Offered jointly with E E 461. Prerequisite: senior standing in engineering or chemistry.

CH E 465 Reactor Design (3) W

Application of principles of chemical kinetics to the de-sign of commercial-scale chemical reactors; characteriza-tion of batch and flow reactors in homogeneous and heterogeneous systems. Prerequisites: 310, 326, 330, and

CH E 470 Chemistry of Wood (3) A Chemical and physical properties of cellulose, lignin, hemicellulose, and extractives; wood as a raw material for the chemical industry. Prerequisite: CHEM 102 or 220 or exercision 232 or permission.

CH E 471 Pulping and Bleaching Technology (3) W Sarkanen

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 FOR P 476.

CH E 472 · Papermaking Technology (3) Sp Fiber sources and properties. Secondary fibers. Stock preparation, sheet forming, water removal, finishing, Coating, lamination, and printing. Paper products. Of-fered jointly with FOR P 477.

CHE 473 Pulp and Paper Laboratory (2) Sp Laboratory experiments in the pulping of wood, fiber technology, and the physical and chemical characterization of paper and pulp. Offered jointly with FOR P 478. Prerequisite: 471.

CH E 480 Process Dynamics and Control (3) A

Analysis of the dynamics of simple chemical process units and systems; applications to stability, control, and instrumentation of such processes. Prerequisites: 310, 326, 330, and 340.

CH E 481 Process Optimization (3) Sp

Concepts and techniques of optimizing chemical engi-neering processes and systems including classical and direct methods of search, linear and nonlinear programming, dynamic programming, statistical experimental design, and evolutionary operation. Prerequisites: 435 and 485.

CHE 485 Process Design I (3) W Applied economics in chemical engineering design and operations; market survey and plant location; introduc-tion to plant and process design. Prerequisite: 435.

CHE 486 Process Design II (5) Sp Comprehensive design of a specific process, including economic feasibility studies, utilization of market survey optimization, and overall plant integration and layout. Prerequisites: 435, 465, and 485.

CH E 487 Industrial Waste Management (3)

Application of chemical engineering concepts to indus-trial-waste management and to the analysis of constraints and criteria encountered in such application. Includes de-sign of biological and physical control systems, as well as nontreatment alternatives. Prerequisite: permission of instructor.

CH E 490 Engineering Materials for Biomedical Applications (3) W Hoffman

Combined application of the principles of physical chem-istry, biochemistry, materials engineering, mass transfer, and fluid mechanics to biomedical problems. Case stud-ies include considerations of the selection of materials, tes 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. Prerequisite: organic chemistry or permis-sion of instructor. (Offered even-numbered years.)

CH E 491 Controlled Release Systems-Principles and Applications (3) W

Hoffman Mechanisms for controlled release of active agents and the development of useful systems for this purpose. Re-lease mechanisms include diffusive, convective, or erosive driving forces. Applications to the biomedical, agri-cultural, forestry, and oceanography fields. Some special case studies covered in detail. Offered jointly with BIOEN 491. Prerequisite: permission of instructor. (Of-fered odd-numbered years.)

CH E 498 Special Topics in Chemical Engineering

(1-4, max. 6) Special topics in chemical engineering offered as a lec-ture and/or laboratory course. Prerequisite: permission of instructor.

CH E. 499- Undergraduate Research (1-6-, max. 12) AWSp Independent research projects in chemical engineering. Prerequisite: permission of instructor.

Courses for Graduates Only

CH E 523 Seminar in Chemical Engineering

(1, max. 20) AWSp Topics of current interest in chemical engineering. Offered on credit/no credit basis only.

CH E 525 Chemical Engineering Thermodynamics

(4) A Review of principles of thermodynamics. Applications to problems in multiphase and multicomponent systems;

theories of solutions. Prerequisite: undergraduate thermodynamics.

CH E 526 Topics in Thermodynamics (3)

Classical and molecular thermodynamics of solutions; polymer configurations, distributions; solutions, and elastic properties; electrolytes and ion exchange; mem-branes; chromatography. Theory and industrial applica-tions, especially relating to pulp and paper industry. Pre-requisite: 525 or permission of instructor.

CH E 530 Momentum, Heat, and Mass Transfer I

(4) A Derivation of the differential equations for mass, energy, and momentum transport. Principles of fluid mechanics; creeping flow, turbulence, boundary layer theory.

CHE 531 Momentum, Heat, and Mass Transfer II (4)

Continuation of 530. flows of fluid-particle systems; convective heat transfer, natural convection. Prerequisite: 530

CH E 532 Momentum, Heat, and Mass Transfer III (3) Molecular diffusion of mass; transfer across interfaces;

radial and axial dispersion in flow systems; applications to engineering equipment design; continuous contact and stagewise operations; characteristics of contact equipment.

CH E 543, 544 Fluid Turbulence (3,3) A,W Gesmer, Sleicher

Statistical and phenomenological theories of turbulence. Introductory concepts, velocity correlations, the energy spectrum, the decay of turbulence, scalar fields, turbulent transport, shear turbulence, wall turbulence, phenomenotransport, shear turbulence, will turbulence, pieromeno-logical theories of energy transport, turbulent modeling instrumentation, recent literature. Offered jointly with M E 543, 544. Prerequisite: 6 credits in graduate fluid mechanics. (Offered Autumn Quarter in odd-numbered years, Winter Quarter in even-numbered years.)

CH E 555 Interfacial Phenomena (4) Sp

Berg Surface tension, capillary statics, wetting and spreading phenomena; thermodynamics of capillary systems, ad-sorption, surfactant monolayers and micellar solutions; capillary hydrodynamics, interfacial turbulence and applications in distillation, absorption, and extraction. Pre-requisites: 525, 530, or permission of instructor. (Offered even-numbered years.)

CH E 556 Principles and Applications of Colloidal Materials (4) Sp Berg, Hoffman

Preparation, stabilization, properties and destruction of important colloidal materials. The theory and structure of the electrical double layer, electrokinetics. Includes se-lected case studies pertinent to air and water pollution, biological fluids, industrial processes. (Offered oddnumbered years.)

CH E 564 Fundamentals of Chemical Kinetics (3)

Krieger Techniques for describing complex kinetic and thermo-dynamic systems as well as modern experimental techniques for elucidating rate coefficients and mechanisms. Coupling of transport processes and reaction rates, inter-molecular energy transfer, free radical rates, intermolecular energy transfer, free radical and chain reac-tion kinetics. Emphasis on engineering applications to combustion, plasmas, atmospheric chemical systems, pyrolysis of solids and liquids.

CH E 565 Kinetics and Catalysis (3)

Finlayson, Hager, Johanson, Krieger Homogeneous and heterogeneous systems with emphasis on chemical engineering principles applied to industrial reactor design. Prerequisite: 525.

CH E 570 Chemistry of High Polymers (3, max. 6) Allan

Auton 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 relation-ship between molecular structure and plastic film and the contention of the properties of the properties of the pro-ting of the properties of the properties of the pro-ting of the properties of the pro-ting of the profiber properties of various polymers. Prerequisite: an un-dergraduate sequence in organic chemistry.

CH E 571 Polymer Physics and Engineering (3) Sp Seferis Description and analysis of methods for processing

polymeric materials. Introduction to solid polymer physpolyment materials. Introduction to solid polymer phys-ics with emphasis on the coupling of structure morphol-ogy and properties. Development of structure-property models for quantitative description and control of proper-ties in synthetic and natural polymers and composite materials.

CH E 574 Celluose and Lignin (3) W Sarkanen

Chemistry and technology of cellulose, lignin, and re-lated substances. Preview of the chemistry of conversion of wood to pulp, paper, and by-products. Prerequisite: 470.

CH E 575 Nonlinear Analysis in Chemical Engineering (3) Sp

Finlayson

Comparison of numerical techniques: similarity, pertur-bation, finite difference, Gaterkin, orthogonal colloca-tion methods as applied to nonlinear chemical engineer-ing problems. (Offered odd-numbered years.)

CH E 578 Environmental Protection in the Pulp and Paper Industry (2) Sp Sarkanen

Nature and sources of air and water pollution in the pulp and paper industry. Methods to remove pollutants from aqueous and gaseous effiuents. Reduction of effluent volume by recycling of water and chemicals and by the volume by recycling of water and venerations and by the manufacture of by-products. Novel pulping and bleach-ing techniques to reduce the formation of pollutants. Of-fered jointly with FOR P 578. Available to seniors. Pre-requisites: 470, 471, or permission of instructor. (Offered alternate years; offered 1981-82.)

CH 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 con-straints. Prerequisite: undergraduate chemical engi-neering design, admission to chemical engineering nonthesis master's program, or permission of instructor.

CH 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.

CH E 600 Independent Study or Research (*) AWSpS

CH E 700 Master's Thesis (*) AWSpS

CH E 800 Doctoral Dissertation (*) AWSpS

CIVIL ENGINEERING

CORE COURSES

Courses for Undergraduates

CIVE 306 Construction Engineering I (3) AWSpS Hoag, Terrel

Introduction to construction engineering, planning, scheduling, methods, contracts, and specifications. Production estimates; equipment selection; ownership and operating costs; role of the engineer in construction. Pre-requisite: upper-division standing in civil engineering.

CIVE 316 Geometronics (4) ASpS Colcord, Veress

Introduction to geodetic and photogrammetric concepts and their applications to engineering surveys. Errors. Measurement of position with modern techniques including use of tacheometric, optical, and electronic instrujustments. Reduction to plane coordinates. Analysis and ad-justment of measurements. Prerequisites: ENGR 141 or permission and 18 credits in mathematics.

CIVE 320 Transportation Engineering I (3) AWSpS Sawhill, Staff

Introduction to the historical development of trans-portation with important legislation. Review of operating

characteristics of transportation modes, review of methods used to predict travel demand and capacity sup-ply; study of basic geometric fundamentals and their rela-tionship to design with emphasis on highways, concepts of administration and management of transportation sys-tems. Prerequisite: upper-division standing in civil upper-division standing in civil engineering.

CIVE 342 Fluid Mechanics (4) AWSpS

Nece, Staff

Elementary mechanics of incompressible fluids. Hy-drostatics. Continuity, energy, and momentum equa-tions. Introduction to potential flow. Resistance phe-nomena for laminar and turbulent flows. Dynamic similitude. Prerequisite: upper-division standing in civil engineering.

CIVE 345 Hydraulic Engineering (4) AWSpS

Richey, Staff

Extension and application of fluid mechanics principles to hydraulic engineering problems. Diffusion and mixing processes, surface-water and groundwater hydrology, open channel flow, pipeline systems, turbomachinery. Prerequisite: 342.

CIVE 350 Environmental Engineering—Water and Air Quality (4) AWSpS Ferguson, Seabloom, Spyridakis, Welch Physical, chemical, and biological properties of natural water systems, the atmosphere, soils, and natural cycles of concern to the civil engineer; how man has used these resources, and the alterations he has produced in their properties; significance of these properties to the engi-neer/scientist and to society. Laboratory sessions stress significance and techniques of measurement, accuracy and precision, sampling, and design of surveillance sys-tems. Prerequisite: CHEM 140. Recommended: CHEM 150, BIOL 210, or ENV S 204.

CIVE 351 Water Supply and Waste Management (3) AWSpS

Benjamin, Bogan, Ferguson, Seabloom Fundamentals of water supply: surface and ground water sources, demand, and system design. Municipal sewersources, bernand, and system design. Multicipal sever-age systems: whiste water quantity and quality, and fun-damentals of engineering design for collection, treat-ment, and disposal. Solid wastes: characteristics and quantities, collection, treatment, and disposal. Prerequi-sites: 345, which may be taken concurrently, and 350.

CIVE 363 Constructional Materials (4) AWSpS Miller, Staff

General treatment of physical and mechanical properties and engineering behavior of metallic and nonmetallic materials. Steel, aluminum, concrete, wood. Laboratory testing, instrumentation, and investigation into macrobehavior. Correlation with microstructure and various aspects of materials science. Prerequisite: ENGR 220.

CIVE 366 Basic Soil Mechanics (4) AWSpS Meese, Sherif

Introduction to basic soil properties, soil classification, volumetric relationships, compaction, consolidation, soil theology, shear strength, bearing capacity, and lateral stresses against retaining structures. Prerequisite: ENGR

CIVE 379 Mechanics of Structural Elements (3) AWSpS Elias, Hartz

Review of engineering theory of beams, combined stresses, beam deflections and influence lines, indeterminate beams; principle of virtual work, application to beams; unsymmetrical bending, shear center, torsion of open and closed thin-walled sections; composite beams; inelastic bending of beams; elastic stability, beam-col-umns, column design formulas. Credit cannot be earned for 379 if 393 has been taken for credit. Prerequisite: ENGR 220.

CIVE 380 Analysis of Elastic Structures (3) AWSpS Evans, Hartz

Introduction to matrix structural analysis. Classification and idealization of structures. Matrix formulation of virtual work. Matrix formulation of equations of equilibrium, geometry and force-deformation for struc-tural members and for truss and frame structural systems, including structures of sevents a systems. including redundant systems. Computer solutions of ma-trix equations for statically determinate and indeterminate structural systems for deflections and member forces, using force and displacement (flexibility and stiffness) formulations. Introduction to moment distribution. Prerequisite: 379.

CIVE 381 Concepts of Structural Design (3) AWSpS

Brown, Hawkins

Planning, design, and constructional aspects of struc-tures. Criteria for structural adequacy and efficiency. Ex-amination of the design process. Introduction to design of components. Prerequisites: 363, 379.

CIVE 390 Civil Engineering Systems (3) AWSpS Brown, Burges, Nihan, Palmei

Introduction to civil engineering system processes. Deci-sion methods, economic considerations, linear graphs, optimization and linear programming. Examples illustrat-ing quantitative and subjective aspects of civil engineering practice. Prerequisite: junior standing.

CIVE 423 Heritage of Civil Engineering (3 or 4) Sp Brown, Colcord, Strausser

Contribution of civil engineering to civilization based on the lives and projects of prominent engineers and cul-tures. 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. Subject matter varies with each instructor. Offered jointly with HSS 423. Prerequisite: junior standing.

CIVE 491 Deterministic Systems (3) ASp Mar, Palmer

Development of scientific methods for the tasks of probler definition, goal setting, system synthesis, system analysis, and decision making necessary in the application of the system approach to complex environmental problems. These methods consider social, political, and institutional factors as part of the system. Prerequisite: 390 or permission of instructor.

CIVE 492 Stochastic Systems (3) W

Burges, Nihan, Palmer Introduction to probability distributions and statistics use Introduction to probability distributions and status takes the ful 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, structural and infor-mation systems. Prerequisite: 491 or permission of instructor.

Courses for Graduates Only

CIVE 504 Public Works—Finance, Policy, and Programming (3) W Horwood

Research seminar in the study of public works planning

and evaluation systems, particularly emphasizing pro-gramming and review processes and social, political, and environmental concerns. Students select topics in their areas of public works interest.

CIVE 505 Economic Analysis of Public Works (3) Sp Hoag, Horwood

The use of benefit-cost ratio, rate of return, and max-imization of benefits as criteria in project justification, cost allocation, and selection among engineering alterna-tives in the design and construction of public works. Top-ics vary from year to year. Offered jointly with URB P 598.

CIVE 506 Theory of Design (3) Sp

Brown

becision processes in design. Resolution of dichotomy between owner and society. Study of input data, analyti-cal procedures, and subsequent response. Safety, reliability, and durability measures. Paradigms in design. Prerequisite: graduate standing.

CIVE 540, 541, 542 Social Management of Technology I, II, III (3,3,3) A,W,Sp Wenk

Analysis of the interaction of technology and society through general principles and case studies of contem-porary issues and public policy: the nature of the techno-logical enterprise, its scientific base, ingredients of capi-tal, specialized manpower, organizational structure and management; employment of public and private institutions; policy planning to generate, utilize, and manage technology so as to maximize opportunities and minimize

unwanted consequences; institutional conflicts: developunwanted consequences; institutional contricts; develop-ment of goals, strategies, program priorities, and poli-cies; legal and economic considerations; process of pub-lic decision making. Offered jointly with SMT 540, 541, 542, and PB PL 540, 541, 542. Prerequisites: permission of instructor for 540; 540 for 541; 541 for 542.

CIVE 543 Marine Technology Affairs I (3) W Wenk

Case studies in marine legislation, fishery conventions, Case studies in marine legislation, fishery conventions, coastal pollution, oil and gas extraction, environmental observations, planning for international exploration of the sea, federal organizations, etc., to identify compo-nents in the marine technology enterprise, dynamics of interrelationships, externalities, policy planning and in-stitutional conflicts in setting goals, priorities, and pro-gram strategies. Offered jointly with O ENG 503. Pre-requisite: 540.

CIVE 544 Marine Technology Affairs II (3) Sp Wenk

Class-generated group research on a contemporary marine issue in Washington State leading to specific pol-icy proposals. Offered jointly with O ENG 504. Prereq-uisite: 543.

CIVE 700 Master's Thesis (*) AWSpS

CIVE 800 Doctoral Dissertation (*) AWSpS

STRUCTURAL ENGINEERING AND ENGINEERING MECHANICS

Courses for Undergraduates

CESM 365 Soils Engineering in Building Construction (4) W Meese

Mechanical properties and identification of soils. Use of soils maps, compaction, stabilization, shoring loads, groundwater control, and protection of adjoining prop-erty. Not open to majors in civil engineering. Prerequi-site: ARCH 321 or ENGR 220.

CESM 431 Seismology and Earthquake

Engineering (3) A Evans, Hartz, Smith

Presents an overview of earthquake processes and details of the characteristics of destructive ground motion; illustrates the effects of such motion on engineering structures; roviews current practice in estimating earthquake hazards for important structures such as nuclear power plants. Offered jointly with GPHYS 431. Prerequisite: MATH 238 or permission of instructor.

CESM 463 Structure of Materials (3) Sp

Miller

Exploration and development of those aspects of material science applicable to civil engineering. The nature of metals. Laboratory investigation into microbehavior. Metallurgy of fracture and fatigue. Prerequisite: CIVE 363.

CESM 466 Foundation Design (3) Sp Messe, Sherif 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. Prerequisite: **CIVE 366.**

CESM 467 Soil Mechanics (3) ASp Meese

Slope stability and elementary seepage theory. Founda-tion and earthwork engineering problems. Prerequisite: CIVE 366.

CESM 470 Advanced Mechanics of Materials (3) AW

Brown

General theory of torsion and bending of straight and curved beams; beams on elastic foundations and beam-columns. Prerequisite: CIVE 379 or permission of instructor.

CESM 472 Stability and Plastic Analysis (3) Sp Stanton

Elements of structural stability and plastic analysis. Stability of columns and beam-columns in the elastic and inelastic ranges. Stiffness and flexibility matrices and their applications to buckling. The basic hypotheses of simple plastic analysis, upper- and lower-bound solu-tions, interaction diagrams, and the effects of incremental loading and geometry changes. Prerequisite: CIVE 380.

CESM 477 Structural Design Through Model Studies (3) W

Albrecht, Mattock

Theory of models, dimensional analysis, direct model analysis; studies employing specific materials, tech-niques of testing and measurement. Offered jointly with ARCH 521. Prerequisite: permission of instructor.

CESM 481 Bridge Design (3) W

Hawkins Hawkins Design of highway bridges. Design considerations; plan-ning; characteristics of different types, economy, esthet-ics, loading, vibration, deflection, distribution of loads to slabs and girders. Design of typical slab and beam bridge in accordance with AASHO specifications. Prerequisites: senior standing and CIVE 381.

CESM 482 Prestressed Concrete Design (3) W Birkeland, Hawkins, Mattock

Analysis, design, and construction of reinforced and prestressed concrete structures. Prerequisite: 484 or graduate standing.

CESM 483 Design of Steel Structures (3) AWSp Roeder

Design of steel structures, structural steels, manufactured products, and fabrication methods. The design of mem-bers and structural systems for various load conditions accepted in practice. Prerequisite: CIVE 381.

CESM 484 Design of Reinforced Concrete Structures (3) AWSp Hawkins, Mattock, Stanton

Fundamentals of design of buildings in reinforced concrete in accordance with current codes and practices. Prerequisite: CIVE 381.

CESM 485 Applied Structural Analysis (3) A Roeder

Classical and matrix methods of structural analysis for static loading. Introduction to the dynamic analysis of structures. Prerequisite: CIVE 380.

CESM 486 Design of Timber Structures (3) ASp Evans

The design and construction of timber structures, using elements made of sawn wood, glued-laminated wood, and plywood. Prerequisite: CIVE 381.

CESM 487 Structural Unit Masonry (3) Sp Lebert, Mattock

Structural behavior and design of reinforced brick, tile, and unit concrete masonry structures. Offered jointly with ARCH 426. Prerequisite: CIVE 381 or permission of instructor.

CESM 498 Special Topics: Structures and Mechanics (1-5, max. 12) AWSpS

Special topics in civil engineering offered as course with lecture and/or laboratory. Maximum of 6 credits may be applied toward an undergraduate degree. Prerequisite: permission of department Chairperson.

CESM 499 Special Projects: Structures and Mechanics (1-5, max. 12) AWSpS Individual undergraduate research projects. Maximum of

6 credits may be applied toward an undergraduate degree. Prerequisite: permission of department Chairperson.

Courses for Graduates Only

CESM 520 · Seminar (1, max-6) AWSp Required for doctoral students. Prerequisite: permission of thesis supervisor.

CESM 561 Engineering Properties of Clay (3) A Sheri

Shear strength, consolidation characteristics, structural concepts, rheological behavior, and related properties of clay. Prerequisite: CIVE 366.

CESM 562 Stresses in Earth Masses (3) W

Sherif Stress function. Stress-strain analysis within elastic range with emphasis on soil/water systems. Stress distribution under various loadings. Prerequisite: 467 or permission of instructor.

CESM 563 Seepage and Slope Stability (3) W Meese

Analysis of groundwater flow, using relaxation, matrix and finite-element methods, slope stability analysis, con-sidering seepage forces and pore-water pressures. Prereq-uisite: 467.

CESM 564 Applied Soil Mechanics (3) Sp Meese

Messe Passive pressure and bearing capacity theories. Founda-tion soils engineering project to develop design rec-ommendations and performance estimates for deep and shallow foundation schemes. Prerequisite: 467 or permission of instructor.

CESM 565 Case Studies in Geotechnical Engineering I (2) A

Case studies in geotechnical engineering, including sta-bility of reservoir slopes and performance of dams, dy-namic soil properties under dynamic and static loading, instrumentation. Prerequisite: graduate standing or permission of instructor.

CESM 566 Case Studies in Geotechnical Engineering II (2) W

Case studies in geotechnical engineering, including siting and design of nuclear reactor foundations, case studies, instrumentation and performance evaluation. Prerequi-site: graduate standing or permission of instructor.

CESM 567 Case Studies in Geotechnical Engineering III (2) Sp

Case studies in geotechnical engineering, including static and dynamic foundation design in cold regions, case studies, instrumentation and performance evaluation. Prerequisite: graduate standing or permission of instruc-

CESM 571 Plates: Theory and Applications (3) W Flins

Bending of plates. Analytical methods. Design methods for plates and reinforced concrete slabs. Prerequisite: 470 or permission of instructor. (Alternates every other year with 576.)

CESM 572 Stability of Structures (3) AW Brown, Stanton

Theory of elastic stability of columns, frames, and arches. Introduction to inelastic stabilility. Buckling of frameworks. Lateral and torsional buckling of beams. Stability of plates and shells. Prerequisite: 470 or permis-sion of instructor.

CESM 573 Matrix Structural Analysis (3) AS

Elias, Evans, Hartz Matrix methods in structural mechanics. Review of basic structural theory. Principle of virtual work. Development of basic matrix force (flexibility) and displacement (stiffness) methods of structural analysis. Prerequisite: gradu-ate standing or permission of instructor.

CESM 574 Structural Dynamics (3) W Elias, Evans, Hartz

Dynamic response of structures using mode superposition and matrix methods. Lumped and distributed parameter systems. Application to earthquake, moving and blast loads. Approximate and numerical methods. Prerequi-site: 573 or permission of instructor.

CESM 575 Variational Methods in Structural Mechanics (3) A

Elias, Hartz

Variational and energy methods in structural and solid mechanics. Application of calculus of variations and minimal principles of mechanics to nonlinear structural analysis, elastic stability, theory of elasticity, plates and shells, and vibrations. Prerequisite: 574 or permission of instructor. (Offered alternate years.)

CESM 576 Shells: Theory and Applications (3) W Elias

General theory of thin shells. Membrane and bending be-haviors. Application to the design of dome, cylindrical, and translational roof shells. Prerequisite: 470 or permis-sion of instructor. (Alternates every other year with 571.)

CESM 577 Finite Element Methods in Structural Mechanics (3) Sp Elias. Hartz

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 conver-gence and bounding and extension to investigation of stability and finite deformations. Prerequisite: 573 or permission of instructor.

CESM 580 Strain Measurements and Instrumentation (3) W Hartz

Experimental determination of strain under static and dynamic loads; strain gauges; transducers for displacement velocity and acceleration; photoelasticity, britle coating and other methods; problems of instrumentation, data collection and analysis of data; use of modern IC electronic components and computers or microprocessors for data collection and analysis. Offered jointly with O ENG 580. Prerequisite: graduate standing or permission of instructor.

CESM 582 Advanced Structures II (3) W

requisite: 573 or permission of instructor.

Evans, Vasarhelyi Analysis of trussed structures. Deflections and secondary stresses. Influence lines. Strain energy theorems, flexi-bility matrix, specialized or computer programs. Pre-

CESM 584 Plastic Design of Steel Structures (3) A

Roeder, Vasarhelyi Plastic (inelastic) behavior of structural steels. Applications to the design of structural members and sys Upper- and lower-bound theorems, minimum weight de-sign. Limitations and economy of the procedure. Prerequisite: graduate standing or permission of instructor.

CESM 585 Advanced Design of Concrete Structures (3) Sp Hawkins, Mattock

Hawkins, Mailock Advanced topics in the design of reinforced and pre-stressed concrete structures. Design of cast-in-place and precast statically indeterminate prestressed concrete structures. Design of prestressed concrete flat plate struc-tures. Unusual design problems in reinforced concrete structures (e.g., combined torsion, bending, and shear, etc.). Prerequisites: 482, 484, or similar basic courses in design of prestressed and reinforced concrete.

CESM 586 Structural Materials and Design (3) W Brown, Hawkins

Critical review and discussion of the mechanical properties of structural steel, structural aluminum alloy, and reinforced concrete that affect structural design. Fatigue and impact in metal structures. Failure of structures and structural members. Prerequisite: graduate standing in civil engineering.

CESM 587 Advanced Design of Steel Structures (3) Sp

Sp Roeder, Vasarhelyi Broad review of the factors influencing the function of a structure, such as material properties and fabrication methods. Welded, riveted, and bolted connections. Par-ticular problems of welded structures. Design projects. Prerequisite: 586 or permission of instructor.

CESM 588 Behavior of Concrete Members (3) A Mattock

Behavior of structural concrete members subject to long-or short-term loading by axial force, bending, shear, and torsion. Prerequisite: 484 or permission of instructor.

CESM 589 Behavior of Concrete Structures (3) W Mattock

Behavior under load of concrete structures, continuous beams, frames, and slabs. Effect of creep and shrinkage on the behavior of structures. Prerequisite: 588 or permission of instructor.

CESM 590 Wind, Wave, and Earthquake Response of Structures (3) Sp Harty

Fundamental principles governing the static or dynamic response of suspended structures, transmission lines, tall stacks, and other flexible structures subject to deflection, overturning, or oscillation as a result of wind, wave, and earthquake action. Offered jointly with O ENG 590. Prerequisite: graduate standing in engineering.

CESM 591 Theory of Elasticity I (3) Sp Brown, Evans

Brown, Evans Elementary formulation of linear elasticity using indicial notation. Use of Airy stress function for solution of plane elasticity problems in rectangular and polar coordinates. Saint Venant's theory of torsion. Elementary treatment of thermal stress problems. Energy methods. Prerequisite: graduate standing in engineering. (Offered alternate venant) years.)

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CESM 592 Theory of Elasticity II (3) A Brown, Evans

Rigorous formulations of classical theory making use of Cartesian tensor analysis. Stress functions. Use of potental theory to obtain solutions in terms of Papkovitch functions. Prerequisite: 591, A A 530 or M E 551, or permission of instructor. (Offered alternate years.)

CESM 594 Waves in Geophysics and Engineering (3) Sp Evans. Fyfe

Examination of the fundamental concepts and mathematical descriptions of wave propagation; group and phase velocity, dispersion, effects of boundaries, normal mode and progressive wave descriptions; waves in elastic solids, acoustic waves, electromagnetic waves; sources of waves; waves in inhomogeneous media; applications to acoustics, seismology, and earthquake engineering. Of-fered jointly with A A 594 and GPHYS 594.

CESM.599 Special Topics: Structures and Mechanics (2-5, max. 15) AWSpS Prerequisites: permission of instructor and department Chairperson.

CESM 600 Independent Study or Research: Structures and Mechanics (*) AWSpS

SPECIAL PROGRAM IN THE DESIGN OF BRITTLE CERAMIC MATERIALS

CESM 476 Introduction to Design With Brittle Materials (3) W

Properties and behavior of ceramic materials are related to their use in advanced technology structures. Analytical and numerical methods required for probabilistic design and current case studies utilized. Offered jointly with A A 476, CER E 476, M E 476, and MET E 476.

CESM 496 Brittle Material Design Project (3) Sp Application of appropriate criteria and the interdiscipli-nary team approach in the design of structural compo-nents utilizing brittle (ceramic) materials. Offered jointly with CER E 496, MET E 496, and M E 496. Prerequisite: 476

CESM 536 Brittle Material Design Problem

(3, max. 9) ASpS. Interdisciplinary team approach in design of structural component utilizing brittle (ceramic) material. Offered jointly with CER E 536 and MET E 536. Prerequisite: 496

TRANSPORTATION, CONSTRUCTION, AND GEOMETRONICS ENGINEERING

Courses for Undergraduates

CETC 400 Transportation Safety-Introduction Seminar (2) W

Sawhill .

General review of all aspects of transportation safety, re-flecting federal, state, and local safety programs; motor vehicle and driver administration, enforcement, courts, traffic engineering, insurance, and public support. Pre-requisite: senior standing or permission of instructor.

CETC 405 Critical Path Methods of Project Scheduling (3) AWSpS

Dunn, Hoag, Staff Precedence analysis of project activities; critical path methods (CPM); computer applications. CPM project; PERT and PRECEDENCE techniques. No auditors.

CETC 406 Construction Engineering II (3) A Hoag, Terrel

Construction engineering, with emphasis on heavy con-struction. Includes selection of equipment, work analy-sis, methods, schedules, and labor cost. Prerequisite: CIVE 306 or permission of instructor.

CETC 407 Contracts and Specifications (3) Sp Specification writing and the elements of contract law re-lating to heavy construction and engineering services. Prerequisite: junior standing.

CETC 410 Traffic Engineering—Fundamentals (3) Sawhill

General review of scope and functions of traffic engi-

neering including its relation to urban planning, municipal engineering, motor vehicle registration, safety, and administration. Prerequisite: senior or graduate standing in engineering or permission of instructor.

CETC 413 Highway Canacity and Traffic Flow Theory (3) W Sawhill

Modern practices in the estimation of street and highway capacity; mathematical models; application of queuing theory to traffic events. Prerequisites: CIVE 320 and senior or graduate standing in engineering.

CETC 415 Photogrammetry (3) A

Veress

Veress Geometrical characteristics of photographs. Planning and control considerations for mapping. Theory of stereos-copy, parallax measurement, interior and exterior orien-tation. Photogrammetric instrumentation (production of maps, orthophotos, and cross sections.) Evaluation of ac-curacies and error sources. Prerequisite: CIVE 316 or remulsion of instrumentation of instrumentation of acpermission of instructor.

CETC 417 Cadastral Surveys (3) WS Colcord

System of public lands; boundaries; adverse and riparian rights. Legal cases, testimony, and professional ethics. Multipurpose cadastre concepts. Subdivision design and site planning. Prerequisite: CIVE 316 or permission of instructor.

CETC 418 Urban Surveying and Mapping (3) Sp Colcord

Colcord Survey specifications. Urban projection systems and de-sign of horizontal and vertical control for engineering, utility and city maps, and photogrammetric projects. Azi-muth determination. Surveying and mapping data banks. Ground and hydrographic map design project. Prerequi-site: CIVE 316 or permission of instructor.

CETC 421 Transportation Engineering II (3) W

Terrel, Staff Design, construction, and performance of the physical el-ements of transportation facilities. Topics may include site location, drainage, roadbed, airfield pavement, railways, waterways, pipelines, and other design compo-nents of transportation systems. Prerequisites: CIVE 320 and senior or graduate standing in civil engineering.

CETC 424 Pavement Design (3) W

Terrel

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. Perfor-mance evaluation for maintenance and overlay design. Prerequisite: senior or graduate standing in civil engineering.

CETC 425 Introduction to Urban Transportation (3) A Horwood, Staff

Identification of the framework, central concepts, con-straints, and issues of urban transportation planning. Of-fered jointly with URB P 430.

CETC 429 Online Planning of Urban Systems (3) W

Schneider, Staff Survey of online planning applications; use of various online systems to solve urban systems design problems; investigations of hardware/software tradeoffs; human factors in man-computer systems design theory as it re-lates to problem-solving activity. Offered jointly with URB P 429. Prerequisite: CIVE 390 or permission of instructor.

CETC 464 Construction Materials II (4-6) A Hawkins, Terrel

Types, sources, uses, and performance behavior from a construction point of view of aggregates, asphalt prod-ucts and mixtures, portland cement and concrete, and se-lected other materials. Emphasis is on those materials for lected other materials. Emphasis is on those materials for which the civil engineer has responsibility for selection and manufacture on the job site. All students take the lec-ture (3 credits) with optional independent (1 credit each) asphalt laboratory, concrete laboratory, or special topics in testing materials using standard recommended practice in the industry. Prerequisites: CIVE 363 or equivalent and senior standing in engineering or architecture.

CETC 498 Special Topics: Transportation, Construction, and Geometronics (1-5, max. 12) AWSpS

Special topics in civil engineering offered as course with

lecture and/or laboratory. May be repeated for credit. A maximum of 6 credits may be applied toward an under-graduate degree. Prerequisite: permission of department Chairperson.

CETC 499 Special Projects: Transportation, Construction, and Geometronics (1-5, max. 12) AWSoS

Individual undergraduate research projects. May be re-peated for credit. A maximum of 6 credits may be applied toward an undergraduate degree. Prerequisite: per-mission of department Chairperson.

Courses for Graduates Only

CETC 507 Heavy Construction Estimating (3)'W Hoag, Terrel

Principles and procedures for estimating and bidding heavy construction projects. Project reconnaissance, site investigation, methods analysis, breakdown of project into common construction operations, programming, cost analysis, cost distribution, cost summarization, and bid preparation. Prerequisites: 406 and graduate standing, or permission of instructor.

CETC 508 Construction Administration (3) Sp Hoag

Administration and management of construction opera-Administration and management of construction opera-tions from the viewpoint of the contractor. Forms of ownership; organization; staffing, planning, and control; bidding; contracts; bonding; insurance; project cost ac-counting; labor law; labor relations; project safety. Pre-requisite: graduate standing or permission of instructor.

CETC 510 Traffic Engineering-Analysis (3) A Sawhill

Measurement and evaluation of characteristics of vehicular volume, speed, travel time, delays, and travel desires. Parking studies and computer analysis of traffic engineering studies. Prerequisite: 410 or permission of instructor.

CETC 511 Traffic Engineering—Administration and Safety (2) W Sawhill, Staff Comprehensive review of Uniform Vehicle Code and

manuals on uniform vehicle control devices. Warrants and uses of signs, signals, markings, and channelization. Traffic engineering administration, federal, state, county, and municipal. Prerequisite: 410 or permission of instructor.

CETC 512 Urban Traffic Planning (3) Sp Sawhill

General review of studies and data associated with planning and preliminary design for access facilities serving downtown areas and special generators, such as shopping centers, universities, stadiums, parking structures, etc. An urban design team project course. Prerequisite: senior or graduate standing in engineering or urban planning.

CETC 513 Highway and Traffic Engineering-Geometric Design (3) Sp

Sawhill

Factors and elements in the geometric design of arterials, freeways, intersections, interchanges, and parking facilities. Special design studies and reports. Prerequisite: senior or graduate standing in engineering.

CETC 515 Stereo-Photogrammetry (3) W

Veress

Theory of orientation; mathematical concept of relative and absolute orientation for vertical and convergent pho-tography. Errot propagation and corrections. Accuracy element of orientation. Critical surfaces, Standard resid-ual V. preprinting the provided with the statematic statematic statematic statematic statematic statematics. ual Y-parallaxes. Prerequisites: 415, 530.

CETC 516 Analytical Photogrammetry (3) W Veress

Veress Basic principle of analytical photogrammetry. Stereo comparators and the analytical photter. Reduction of plate coordinates. Perspectivity. Collinearity, coplanarity, space coordinate systems, transformations. Space inter-section and resection and their adjustments. Solutions using high-speed electronic computers. Prerequisites: 415, 530.

CETC 518 Aerial Triangulation (3) Sp

Veress

Radial aerotriangulation; instrumental aerial triangulation by independent pairs, aeropolygon, aeroleveling and in-dependent geodetic control methods. Semianalytical aerotriangulation. Mathematical strip and block adjustment. Analytical aerotriangulation methods, Prerequi-sites: 515, 516.

CETC 520 Seminar (1, max. 6) AWSp Prerequisite: permission of thesis supervisor.

CETC 522 Methodology of Transportation Systems Analysis (3) W *Nihan*

Application of the systems approach and historical approaches to transportation planning problems. Basic transportation system relations. Characteristics of supplydematic system relations, characteristics of sup-plydematic systems evaluation, philosophy, and methodologies. Prerequisite: graduate standing or permission of instructor.

CETC 524 Rapid Transit (3) W

Horwood Engineering problems in the mass movement of people in metropolitan areas. Demand in relation to level of ser-vice. Equipment. Route selection. Running time. Station spacing. Prerequisite: graduate standing in engineering or permission of instructor.

CETC 525 Land Use Planning Models (3) A Schneider

Review of theoretical basis of several existing models used to forecast urban growth patterns and their associ-ated 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 URB P 530.

CETC 526 Transportation Studies, Model Calibration, and Network Flow (3) Sp Nihan

Review of the organization of regional transportation studies, including the functions of engineers, planners, and others. Examination of transportation and land-use models as applied to transportation studies and analysis of current models. Application of technology of traffic assignment to transportation networks, with problems of tree building, network flow, restrictions and system op-timization by computer. Prerequisite: graduate standing or permission of instructor.

CETC 527 Data Resources and Use Technology for Urban Analysis and Planning (3) A Horwood

Data resources, structure, access, and use technology for urban geographic, planning, and transportation analysis. United States census geography, content, and automated United States census geography, content, and automated products. The urban region geographic base file, geocod-ing, and geoprocessing. Data-base development in local agencies. Use of packaged computer programs, but not basic programming instruction. Offered jointly with URB P 527 and GEOG 527.

CETC 528 Automated Mapping and Graphing (3) w

Youngmann

Computer applications to statistical and areal analysis. Laboratory problems adapted to specialized interests of students. Offered jointly with GEOG 528 and URB P 528. Prerequisite: 527, basic statistics or permission of

CETC 529 Information Systems Applications to Urban and Regional Analysis (3) Sp Horwood, Staff

Logical design of information systems for analysis, pol-Logical design of information systems for analysis, pol-icy development, planning, and plan monitoring in the context of land-use planning, environmental studies, land-resource management, and general public agency planning purposes. Data confidentiality considerations, case studies, and critical analyses of current information systems programs. Offered jointly with GEOG 529 and URB P 529. Prerequisite: graduate standing.

CETC 530 Adjustment Computations (4) A Veress

Two- and multi-dimensional distributions and concept of rwo and multi-dimensional distributions and contects of errors, variances, covariances, weight and error propaga-tion. Least square adjustment by variation of parameters and other methods. Adjustments of hybrid systems using matrix notation inversion by high-speed computers. Pre-requisite: permission of instructor.

CETC 531 Geodesy (4) A ' Colcord

Concepts of geometric, gravimetric, and astrogeodesy. Computation of geodetic position; gravity observation and reduction and positional astronomy. Introduction to satellite and inertial survey systems. Prerequisite: permission of instructor.

CETC 535 Airport Systems Planning (3) W or Sp Shinn

Investigation of environmental, sociopolitical, and eco-nomic features of air transportation system planning. Emerging technologies. Intermodal relationships. The decision-making process for resource allocation, land-use planning, programming, and organization. Scenarios of anticipated conflict and resolution problems. Offered jointly with URB P 534. Prerequisite: 425 or permission of instructor.

CETC 537 Electronic Surveying (4) W

Veress Veress Modern EDM instrumentation theory and applications; hydrographic and navigation systems; chart and map de-signs, application of lasers in surveying; long line reduc-tion and trilateration adjustment. Prerequisite: 530.

CETC 564 Soil and Site Improvement (3) Sp Terrel

Development, improvement, and utilization of marginal natural earth materials through compaction and stabiliza-tion using chemicals, portland cement, lime, asphalt, salt, and others. Includes discussion, design, and evaluation of foundation soil treatment, as well as surface materials for pavement subgrades, slope protection, dust palliation, and general site improvement. Prerequisites: 424, 464

CETC 565 Remote Sensing of Environment (3) W Colcord

Use of aerial photographs, multispectral and IR imagery, and other sensors for object evaluation and environment studies (satellite and aerial image acquisitions). Factors in system and target signature evaluation and analysis. Prerequisite: permission of instructor.

CETC 599 Special Topics: Transportation, Construction, and Geometronics (2-5, max. 15)

AWSpS Prerequisites: permission of instructor and department Chairperson.

CETC 600 Independent Study or Research (*) AWSpS

WATER AND AIR RESOURCES

Courses for Undergraduates

CEWA 434 Ecological Effects of Waste Water (3 or 5) A Welch

Wetch Principles of aquatic ecology with emphasis on aspects related to water quality problems and methods of measur-ing associated biological changes. Topics include: intro-duction to aquatic ecology, distribution of chemicals and their role in metabolism, nutrient cycles and effects of natural and man-caused changes in environmental factors: a consult alart and enimel computation. Offend distribuon aquatic plant and animal communities. Offered jointly with FISH 434. Prerequisite: senior or graduate standing in engineering.

CEWA 435 Physiological Effects of Water Pollutants (3) Sp

Brown, Welch

Physiological effects of water pollutants on economically important or endangered fishes, especially with respect to waste water. Types of industrial, urban, and agricultural entities that contribute wastes to natural waters. Monitoring procedures and assessment of changes in fisheries as a consequence of waste effluents. Offered jointly with FISH 435. Prerequisites: upper-division or graduate standing, organic chemistry, and some background in any of the following: general physiology, cell biology, biochemistry, chemical biology, sanitary engineering.

CEWA 442 Introdúction to Hydraulics in Water Resources (3) A Nece

Introduction to the physics of water movements in natural freshwater bodies and inshore marine waters. Brief review of some essential fluid mechanics. Flow in rivers

and streams; surface water hydrology. Motions in lakes, reservoirs, and estuaries as related to water and heat budgets. Some aspects of diffusion. Instrumentation and pro-cedures for obtaining field data. Not open to students with undergraduate civil engineering backgrounds. Prorequisites: senior or graduate standing and permission of instructor.

CEWA 444 Coastal Engineering I (3) AW-

Richey Linear theory of water waves, wave transformations due . to boundary conditions, sediment motion, elementary tidal theory; applications, scatther motor, certaining it ments and selected case histories. Offered jointly with O ENG 444. Prerequisite: CIVE 342.

CEWA 445 Hydraulic Transients (3) A Strausse

Application of hydraulic principles to the design and function of hydraulic machinery, with emphasis on cen-trifugal pumps. Hydraulic transients in penstocks and force mains, including use of digital computer in analyz-ing such conditions. Prerequisite: CIVE 345.

CEWA 446 Analysis Techniques for Groundwater Flow (3) W

Flow (3) with the set of the set

CEWA 447 Physical Hydrology (3) A

Burges Global water picture, data sources and data homogeneity, precipitation, evapotranspiration, flow to wells, hydro-graphs, storm and snowmelt runoff, streamflow routing, unit hydrographs, frequency studies. Hydrologic design: and the optimized of the state

CEWA 448 Open-Channel Engineering (3) WSp Strausser

The transportation of water by gravity flow. Analysis and design of canals, transitions, energy dissipators, and similar structures. Analysis of surface profiles and effect of nonlinear alignment on flow. Design-oriented problems in open-channel hydraulics. Prerequisite: CIVE 345.

CEWA 450 Man and the Pollution of His

Environment (5) A Burges, Nece, Pilat, Seabloom, Welch

Growing problems of air, water, and land pollution that the engineer must define and solve if the quality of man's environment is to be maintained. The quantity and qual-ity of present production of wastes; their known environ-mental effects; practical methods of control; prospects for mental effects; practical methods of control; prospects for the future. Team approach to these engineering problems is stressed, noting the interrelationship of physical, chemical, and biological causes and effects. Primarily for nonengineering students. Prerequisites: junior standing and a course in either biology, chemistry, physics, or oceanography from the "A" list.

CEWA 451 Environmental Engineering Design (3)

Bogan, Seabloom

Bogan, Scabloom Introduction to the theory and the practice of planning and design of urban water supply, sewerage, solid wastes, and drainage collection systems. Evaluation of service areas and service requirements and their relation-ships to urban and regional planning activities. Engineer-ing methods and computer programs for designing basic system elements. Prerequisite: CIVE 351.

CEWA 453 Water and Waste-Water Treatment (3) Sp

Bogan Objectives of water and waste-water treatment; associ-ated physical, chemical, and biological phenomena; design of common treatment systems. Prerequisite: CIVE 351 or permission of instructor.

CEWA 454 Sanitary Engineering Design Studies (3)

Bogan Individual and group design studies involving local com-munities. Application of the principles and methods pre-sented in 451. Preparation of comprehensive plans and of

preliminary design and cost studies for urban water sup-ply, severage and drainage, and solid-waste collection systems. Presentation of engineering reports dealing with selected design problems. Prerequisite: 451, which may be taken concurrently.

CEWA 456 The Chemistry of Natural Water Systems (3) ASp

Benjamin; Ferguson, Spyridakis Principles of chemical equilibrium relevant to natural wa-ter systems; the nature and effect of chemical interactions of domestic and industrial waste effluents on natural wa-ter systems; chemical principles involved in the treatment of water and waste waters. Prerequisite: one year of general chemistry or equivalent.

CEWA 457 Water Quality Analysis (3) W

Spyridadis Laboratory evaluation of chemical quality of natural and Endergy and application of instrumentation used in water-quality measurement.

CEWA 458 Introduction to Air Chemistry (4) A

Charlson, Waggoner The atmosphere as a chemical system; the analytical and physical chemistry of trace atmospheric constituents, both natural and man-made. Offered jointly with ATM S 458. Prerequisite: CHEM 160.

CEWA 461 Air Pollution Dynamics and Control (3) A

Rossano

Pundamental concepts of air pollution. Systems analysis approach to an analysis of the dynamic interrelationship between the essential factors of emission sources, meteobetween the essential factors of emission sources, meteo-rology, topography and adverse effects on sensitive re-ceptors. Review of the principles of air-pollution control, with emphasis on engineering approaches. Prerequisite: CIVE 350 or equivalent, or permission of instructor.

CEWA 466 Air Pollution Control (4) W Pilat

Overall approach for controlling air pollution. Definition of the problem, including identification of air pollutants, atmospheric dilution capacity, emission sources, and atmospheric initial effects. Factors involved in air resources, and detrimental effects. Factors involved in air resources en-gineering: legal aspects, air pollution control legislation and regulation, processes and equipment for controlling emissions of gascous and particulate air pollutants. Case studies of specific air pollution problems. Primarily for nonengineering students. Prerequisite; junior standing.

CEWA 467 Air Pollution Source Testing and Equipment Evaluation (3) Sp Pilat

Engineering evaluation of air pollutant sources and air pollution control equipment. Air pollutant source testing and stack sampling. Analysis of equipment performance and source emissions in the field and in the laboratory. Prerequisites: junior standing and permission of instructor.

CEWA 468 Air Pollution Control Equipment Design (3) W Pilat

Design of equipment to control emissions of air pollu-tants from stationary sources. Procedures for calculating tains from stantomary sources. Proceedings for calculating the design and operating parameters and sizes of air pol-lution control equipment. Fundamental mechanisms and processes of gaseous and particulate control equipment. Control equipment for absorption and adsorption of gase-ous pollutants and scrubbing electrostatic precipitation and filtration of particulate pollutants. Case studies of ac-tual air pollution control systems on coal-fired power electre method with a submitter preduction entert plants, pulp mills, aluminum reduction plants, metal smelters, and other industrial processes. Prerequisites: 461, CIVE 345 and 350, senior standing in engineering; or equivalent or permission of instructor.

CEWA 470 Solid Waste Disposal (3) A Seabloom

Section Elective for undergraduate and graduate engineers and urban planners covering the sources and the handling of industrial, municipal, and agricultural solid wastes, with examination of processing, by-product recovery, and dis-posal methods. The roles of urban and industrial planning and of collection and transportation aspects in solid-waste production and disposal are discussed, especially as ro-lated to community location and planning and to methods of haviling and controlling wastes concentration and of hauling and controlling wastes concentration and utilization.

CEWA 485 Sampling Techniques for Water Quality-(3) Sp Perkins, Welch

Collection and analysis of water for selected abiotic and Concertion and analysis of water for selected abiotic and biotic characteristics in lakes, rivers, and estuaries. Em-phasis is placed on the natural variability of water quality characteristics as determined by application of appropri-ate field sampling techniques and data analysis with the objective of designing adequate sampling programs. Pre-requisite: 457 or permission of instructor.

CEWA 498 Special Topics—Water and Air Resources (1-5, max. 12) AWSpS Special topics in civil engineering offered as course with lecture and/or laboratory. Maximum of 6 credits may be applied toward an undergraduate degree. Prerequisite: permission of department Chairperson.

CEWA 499 Special Projects—Water and Air Resources (1.5, max. 12) AWSpS Individual undergraduate research projects: Maximum of 6 credits may be applied toward an undergraduate de-gree. Prerequisite: permission of department Chairperson.

Courses for Graduates Only

CEWA 520 Seminar (1, max. 6) AWSp Required of all graduate students in the Water and Air Resources Division each quarter.

CEWA 525 Seminar in Atmospheric Problems Associated With Air Pollution (2) W Badgley, Charlson, Harrison

Daugicy, Charlson, Harrison Seminar for both engineers and atmospheric scientists in the atmospheric problems related to air pollution. A wide variety of topics is covered. Faculty lectures and student participation. Offered jointly with ATM S 525. Prerequi-site: ATM S 301 or permission of instructor.

CEWA 528 Acoustics of Environmental Noise (4) A Chalupnik, Merchant

Measurement and evaluation of environmental noise. Measurement and evaluation of environmental noise. Covers mathematical, physical, and psychological as-pects of community noise; sources, scales for rating, propagation, and control of noise. Laboratory demonstra-tion of lecture principles. Offered jointly with M E 528. Prerequisite: permission of instructor.

CEWA 541 Hydrodynamics in Water Quality (3) W Nece

Theoretical, field study, and laboratory model approaches to diffusion in problems of concern to water re-sources engineers. Offered jointly with O ENG 544. Prerequisite: CIVE 342 or permission of instructor.

CEWA 542 Hydrodynamics I (3) A Nece

Fundamentals of fluid potential motion. Two- and threedimensional flow examples, including free surface flows. Conformal mapping, other solution techniques. Prerequi-site: CIVE 342 or equivalent.

CEWA 543 Hydrodynamics II (3) Sp

Nece Fundamentals of the flow of real fluids. Viscous flows; Fundamentals of the how of real fluids. Viscous hows; the Navier-Stokes equations, and some exact solutions. Boundary layer theory. Introduction to turbulence. Some aspects of stratified and two-fluid flows. Prerequisite: 542 or permission of instructor.

CEWA 544 Coastal Hydraulics (3) Sp Christensen, Richey

Christensen, Aucrey Nonlinear water waves and structural loadings analyzed by stream function theory: random waves and structural responses analyzed by time series techniques. Offered jointly with O ENG 544. Prerequisite: familiarity with linear wave theory.

CEWA 547 Advanced Hydrology (3) W Burges

Detailed treatment of statistical methods used in hydrologic analysis. Stochastic hydrology, detailed examina-tion and use of a deterministic watershed model (Stanford Watershed Model). Economic aspects of hydrologic de-sign. Prerequisite: graduate standing or permission of instructor.

CEWA 550 Biological Waste Treatment (3) A

Ferguson Biological treatment processes and systems used in water-quality control. Biological and engineering con-

siderations of waste water treatment, including theory, purpose, evaluation, and design of secondary and tertiary processes. Prerequisite: CIVE 350 or equivalent or permission of instructor.

CEWA 551 Sanitary Engineering Unit Operations (3) W

Bogan, Ferguson

Major unit operations employed in water and waste treat-ment, including solids separations, filtration, chemical coagulation, ion exchange, and gas transfer and adsorption. Theory and basic principles. Development of math-ematical models and evaluation of current design criteria and methods. Prerequisite: 456 or permission of instruc-

CEWA 552 Design of Water and Waste Treatment Processes (3) Sp Bogan

Selection and functional design of water and waste treatment processes to satisfy specific requirements. Comprehensive design of a specific process selected by Completensive design of a specific process selected by the student, including process equipment selection, plant layout, site development, and cost studies. Introduction to the use of mathematical models, computer simulation techniques and systems analysis methods in the design of treatment processes. Prerequisite: 551.

CEWA 553 Topics in Ecological Effects of Waste Water (3) W

Welch

Application of ecological concepts for analysis and inter-pretation of bioenvironmental problems and data from in-land and coastal waters. Students participate in presenta-tion and discussion of current research on selected topics. Prerequisites: 434, 456, or permission of instructor.

CEWA 554 Advanced Process Chemistry for

Sanitary Engineers (3) Sp Ferguson, Spyridakis Properties of colloidal systems, natural, and synthetic organic materials encountered in water and waste-water treatment, and laboratory methods for their analysis. Pre-requisite: 456 or permission of instructor.

CEWA 556 Industrial Waste Treatment (3) Sp

Sanitary engineering problems relating to biological and biochemical systems influencing man's environment. Bi-ological treatment of industrial wastes and advanced waste treatment processes: Prerequisite: 550 or permission of instructor

CEWA 557 Water Resources Management (3) W Mar

Engineering, social, and economic factors involved in water resource development and management; water pol-icies, programs, and administration; use relationships and conflicts; considerations for regional water resource systems.

CEWA 558 Water Quality Management (3) Sp Mar

Water quality control objectives, methods and philoso-Water characteristics; dispersion and behavior of pol-lutants; treatment required for various water usages. Prerequisites: 434, 456, or permission of instructor.

CEWA 559 Water Resources System Management (3) A

Burges, Mar, Palmer

Application of advanced quantitative methods to the anal-Approximation of advanced quantitative metricols to the anal-ysis and management of water resources. Includes quan-titative policy analysis of water quantity and quality is-sues 'in specific regions, emphasizing interactions. Prerequisites: 557, 558, or permission of instructor.

CEWA 560 Topics in Environmental Health (3) A Rossano

Rossano Introduction to human biology, including physiology, ep-idemiology, and toxicology. Study of contemporary en-vironmental health problems and practices as they refate to radiological health, solid-waste disposal, food- and water-borne diseases, occupational health, biometeorol-ogy, and bioengineering.

CEWA 562 Industrial Sources of Air Pollution (3) w

Rossano

Rostano Study in depth of the major sources of air pollution, in-cluding analysis of flow diagrams, raw materials, off-streams, pollution control facilities, and environmental impact. Field trips to representative plants; trip reports

and term paper. Prerequisite: 461 or permission of in-

CEWA 563 Air Resources Management (3) Sp Rossano

The atmosphere as a vital natural resource. Clean-air strategies. Administrative and legal aspects of air conser-vation; air quality criteria and standards; controversial is-Sues; design of area-wide surveys; long-range planning. Prerequisite: 461 or permission of instructor.

CEWA 564 Aerosol Science and Technology I (3) W Charlson, Waggoner

Topics related to suspended particulate matter in a gase-ous medium. Statistics, mechanics, and physical chemistry of aerosols. Particular reference to particulate matter in air, to experimental methods, Brownian movement, diffusion, coagulation, and light scattering. Prerequisite: permission of instructor.

CEWA 565 Aerosol Science and Technology II (3)

Sp Charlson, Waggoner Sequel to 564; focusing on current research with regard to atmospheric aerosols. Prerequisite: permission of instructor

CEWA 566 Control of Gaseous Air Pollutants (3) A Pilat

Pilat Principles and designs of the physical and chemical pro-cesses employed in the removal of gaseous pollutants. Use of absorption towers (packed and spray), adsorption beds, and flame incinerators for controlling gaseous air pollutant emissions. Discussion of the various processes for controlling emissions of suffur oxides and nitrogen cuides form athioarus courses. Case actuales of actual oxides from stationary sources. Case studies of actual gaseous air-pollutant control systems on sources such as coal-fired power plants, copper smelters, pulp mills, alu-minum refineries, etc. Prerequisite: MATH 238 or permission of instructor.

CEWA 567 Control of Particulate Air Pollutants (4) Pilat

Pilat Principles and designs of processes used to control the emissions of particulate air pollutants. Use of settling chambers, cyclones, filters, wet scrubbers, and elec-trostatic precipitators for controlling emissions of aerosol particles. Case studies of particulate air-pollutant control systems on emissions from kraft pulp mills, sulfite pulp mills, hog fuel boilers, coal-fired boilers, aluminum re-fineries, etc. Discussion of particulate control pilot plant studies conducted by the University of Washington, EPA, etc. Prerequisite: MATH 238 or permission of in-structor. structor.

CEWA 599 Special Topics: Water and Air Resources (2-5, max. 15) AWSpS

Prerequisites: permission of instructor and department Chairperson.

CEWA 600 Independent Study or Research-Water and Air Resources (*) AWSpS

COMPUTER SCIENCE

See Interschool or Intercollege Programs.

ELECTRICAL ENGINEERING

Courses for Undergraduates

E E 231 Introduction to Electrical Circuits and Systems (4) AWSpS Introduction to the basic principles of modern circuits

introduction to the basic principles of modern circuits and systems theory and the use of digital computer tech-niques in circuit analysis. Coverage includes resistors, sources, and simple circuits, resistance networks; capaci-tors and inductors, first-order circuits; second- and higher-order circuits; solutions of linear differential equations representing equilibrium equations of networks by time-domain techniques. Prerequisite: ENGR 251 or per-mission of department Chairperson.

E E 299 Special Topics in Electrical Engineering (1-5) AWSpS

New and experimental approaches to basic electrical en-gineering. May include design and construction projects. Prerequisite: permission of department Chairperson.

E E 306 Elements of Electrical Engineering (3-6) AWSpS

For nonmajors, an introduction to electrical engineering. The 3-credit course is contained in eight units. The first three units and three laboratories cover background; dealing with the basic rules, active and passive elements and their ideal models used in the remainder of the course. The laboratories concentrate on the operation and appli-cation of the more frequently used electronic instruments (e.g., oscilloscope and vacuum tube voltmeter). The next two units and two laboratories deal with semiconductor diodes and transistors, their theory and operation. The three units and one laboratory, which complete the 3-credit course, cover electronic amplifiers, op amps, and feedback circuits. Up to 3 additional credits are available. 1 credit for two units and two laboratories, which is a basic introduction to electrical machinery (re quired for mechanical engineering students). I credit for two units and one laboratory, which details digital logic circuits and AM/FM modulation. A final credit for two units and two laboratories, which go further into elec-tronic instrumentation. This portion can be tailored to student's individual interests, such as thermocouples, structure individual interests, such as intermocoupies, strain gauges, bridges. Lectures are given covering 4 credits. The last 2 credits do not have lectures, but are covered by lecture notes and consultation with instructor. Prerequisites: PHYS 122, MATH 126, or permission of department Chairperson.

applications, such as regulated power supplies, multipli-ers, operational amplifiers, and oscillators. Prerequisite: ENGR 251.

E E 312 Electrophysics Laboratory (2) AWSpS One three-hour laboratory period each week; experiments on solid-state devices, properties of materials, generation and guiding of electromagnetic waves. Prerequisites: 310 and 383, both of which may be taken concurrently.

E E 333 Circuits and Systems II (4) AWSpS Continuation of 231. System functions, complex fre-quency, and pole-zero properties. The sinusoidal steady-state. Energy and power. Frequency response of systems. Fourier series and introduction to Fourier integral transform. Prerequisites: 231, MATH 238.

E E 335 Linear Systems Analysis I (4) AWSp Analysis of linear systems using Fourier series, the Four-ier integral, Laplace transforms, and the convolution inier integral, Laplace transforms, and the convolution in-tegral. Fourier series expansion of periodic signals. Re-sponse of linear systems to periodic nonsinusoidal inputs. The Fourier transform and its inverse. The impulse response, the convolution integral, and linear time-in-variant systems. Response of linear systems to a periodic input. One-sided and two-sided Laplace transforms, in-verse Laplace transform. Response via the Laplace trans-form system transfer function. Frequency response. Prerequisite: 333 or permission of department Chairper-son. son.

E E 344 Electric Power Engineering (4) AWSp Introduction to the theory and methods of analysis in-volved in the use of typical apparatus to generate, transmit, and utilize energy in electrical form. Includes conventions of circuit description, balanced polyphase circuits, the complex power concept, the transformer, transmission lines, the per-unit system, fundamentals of electromechanical energy conversion and practical syn-chronous, induction, and commutator machines. Prereq-uisites: 333 and 381.

E E 355 Electronics I: Introduction to Digital and Analog Electronics (4) AWSpS Characteristics of bipolar and MOS transistors, character-

sitics of logic gates, small-signal analysis of amplifiers, differential amplifier design; some digital and analog ap-plications. Prerequisites: 231 and ENGR 190, 251 and E E 310 and 333, which may be taken prior or concurrently.

E E 356 Electronics II: Analog Integrated Circuits

(3) AWSpS Analog integrated circuit (IC) technology; emitter-cou-pled amplifiers, current sources, IC output stages; fre-quency response and stability of feedback amplifiers; ap-plications. Prerequisites: 333, 355.

E E 371 Fundamentals of Computer Operation and

E E 371 Fundamentals of Computer Operation and Organization (3) AWSp Organization and operating principles of digital computers. Representation of information, processor components, machine operation, and data transfers. Levels of computer systems (microprogramming, ma-chine, assembly, and system). Laboratory exercises dem-onstrate computational principles. Interfacing and the re-lation of computer design to programming and computer applications. Prerequisites: 355, ENGR 190.

E E 372 Computer Engineering Laboratory I (2)

E E 372 Computer Engineering Laboratory = (-, AWSp Digital computer laboratory exploring the computer at the assembly language level and illustrating concepts of cen-tral processor architecture, memory organization, in-put/output and interrupts. Assembly language program-ming concepts applied to the solution of various lab-oratory problems. Hands-on microprocessor stations are used. Prerequisite: 371, which may be taken concur-rently rently.

E E 373 Data Structures and Algorithms (3) ASp

E E 573 Data Structures and Algorithms (3) ASp Fundamental algorithms, and data structures for their im-plementation. Techniques for solving problems by pro-gramming. Sorting, searching, linked lists, binary search trees, balanced trees, hashing. Offered jointly with C SCI 373. Prerequisite: C SCI 241 or 445, or equivalent knowledge of Pascal.

E E 381 Electrophysics I (4) AWSpS Electromagnetic fields and polarization; Maxwell's equa-tions and electromagnetic waves in linear media; some effects of boundaries; transmission lines; radiation of a dipole antenna. Prerequisites: 335 taken concurrently, and PHYS 123, MATH 238.

E E 383 Electrophysics II (4) AWSpS Waves in bounded regions; reflection, normal modes. The Fourier transform in three dimensions; uncertainty relations, particle density waves. Equilibrium energy dis-tribution. Elementary electromagnetic properties of materials; conductivity in metals and semiconductors, dielec-tric and magnetic properties; pn junctions. Prerequisite:

E E 399 Special Topics in Electrical Engineering (1-5) AWSpS

New and experimental approaches to current electrical engineering problems. May include design and construc-tion projects. Prerequisite: permission of department Chaimerson.

E E 401 Introduction to Assemblers and Compilers

(3) W Fundamentals of assemblers, compilers, and interpreters. Symbol tables. Macroprocessing. Lexical analysis, syn tax analysis, semantic analysis, and code generation for general-purpose programming languages. Offered jointly with C SCI 401. Prerequisite: 371 or 373 or C SCI 373 or 378.

E E 411 Introductory Network Synthesis (3) A Network representations in the complex frequency do-main, realizability criteria for driving-point and transfer functions, canonical forms, and application of the digital computer in synthesis procedures. Prerequisites: 333 and senior standing.

E E 415 Computer-Alded System Analysis (3) Sp Concepts, principles, and techniques concerned with the design, testing, and application of general-purpose prob-lem-oriented computer programs for analyzing large-scale systems. Specific attention to implementation on computers. Prerequisites: ENGR 141 and senior stand-ice ing.

E E 417, 418 Introductory Communication Theory I, II (4,3) W,Sp Techniques of analog and digital communications. Ele-mentary concepts of probability, random variables, and processes. Signals, spectra, random signals, and noise. Baseband communication by digital and analog methods. Modulation techniques including AM, FM, PM, PAM, PCM, etc. Information theory, channel capacity, and er-ror-control coding. Prerequisite: 335 or permission of de-partment Chairnerson. partment Chairperson.

E E 421 Electroacoustics (4) A Fundamentals of acoustics and the electroacoustical as-pects of electromechanical systems. Characteristics of transducers. Synthesis of systems. Includes laboratory to be arranged. Prerequisite: 383 or permission of depart-ment Chairperson.

E E 433 Electronic Circuit Design (4) ASp

Electronic circuit design using modern electronic de-vices. Topics include application of integrated-circuit amplifiers and multipliers, design of solid-state amplifi-ers for low noise, wide bandwidth, high frequency, high to not not not the application of modulation theory to modern systems. The design aspect of solid-state elec-tronic circuitry is emphasized. Prerequisite: 356.

E E 436 Medical Instrumentation (4) Sp Spelman

Introductory course in the application of instrumentation to medicine. Topics include transducers, signal-condi-tioning amplifiers, electrodes and electrochemistry. tioning amplifiers, electrodes and electrochemistry, ultrasound systems, electrical safety, and the design of clinical electronics. Laboratory included. Offered jointly with BIOEN 436. For upper-division and first-year graduate students who are preparing for careers in bioen-gineering—both research and industrial. Prerequisites: some knowledge of human physiology and electronics or instrumentation or permission of department Chairper-son. Recommended: BIOEN 402.

E E 440 Linear Systems Analysis II (3) A

Analysis of linear systems using transform methods. One-sided and two-sided Laplace transforms, inverse Laplace transform. Discrete time linear systems, solution of difference equations, the z-transform and its inverse, digital filters. State variable analysis of linear systems, assignment of state variables, state equations, time do-main solution of state equations, state transition matrix, impulse response matrix, frequency domain solution of state equations. Selected applications of the Fourier integral, multidimensional transforms. Prerequisite: 335 or permission of department Chairperson.

E E 442 Digital Signals and Filtering (3) W

E E 442 Digital Signals and Filtering (3) W Methods and techniques for digital signal processing. Re-view of sampling theorems, A/D and D/A converters. Demodulation by quadrature sampling. Z-transform methods, system functions, linear shift-invariant sys-tems, difference equations. Signal flow graphs for digital networks, canonical forms. Design of digital filters, prac-tical considerations, IIR and FIR filters. Digital Flourier transforms and FFT techniques. Prerequisite: 440 or per-mission of department Chairperson.

E E 445 Nonlinear Systems Analysis (4) A

E E 445 Nominear Systems Analysis (4) A Dynamic analysis of nonlinear circuits and of other simple systems. Exact methods, graphical methods, ap-proximate methods, including linearization and numeri-cal and analog computer solutions. Stability. Forced vi-brations. Prerequisite: 333 or permission of department Chairperson.

E E 446 Control System Analysis I (4) AWSp

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. Prerequisite: 335 or permission of department Chairperson.

E E 447 Control System Analysis II (3) Sp State-space formulation of multivariable feedbac ack control State-space formulation of multivariable feedback control system problems. Dynamic performance, including sta-bility evaluation, by vector-matrix methods. Application of discrete time methods of feedback control problems. Elements of nonlinear feedback system analysis includ-ing state-space methods, Lyapunov stability theory, and describing functions. Prerequisite: 446 or permission of desartment Chairmerson. department Chairperson.

E E 449 Electrical Machinery (5) A Polyphase circuits and classical theory of rotating electri-cal machines and transformers for electrical utility and industrial explications. Synchronous machines, induction machines, and d-c machines. Single-phase and polyphase transformer connections. Operating characteristics, loss mechanisms, thermal characteristics, and principles of rating. Steady-state and transient behavior. Includes one three-hour laboratory per week. Prerequisite: 344.

E E 450 Energy Transmission (4) A High-energy transmission lines; lumped and distributed parameter evaluation: equivalent circuits, time and fre quency domain analysis; wave propagation; loading; and high-frequency transmission lines. Prerequisite: 344.

E E 454 Power System Analysis (4) W Polyphase circuits in balanced and unbalanced cases. Symmetrical and related components. System im-pedances. Fault computations. Load flow computations.

System stability in steady-state and transient cases. Introduction to economic operation of power systems. Prerequisite: 344.

E E 455 Power Systems Analysis II (4) Sp Steady-state power system analysis: Y_{BUS} and Z_{BUS} ma-trix description of large-scale power systems, load flow studies, economic dispatch and unit commitment, voltage and complex power control, symmetrical components and unbalanced faults, and Z_{BUS} matrix application to fault studies. Prerequisite: 454 or permission of department Chairperson.

E E 456 Numerical Methods in Power Systems (3) Sp

Operation of a bulk power distribution network depends upon the solution of a few basic network problems and other special problems on a digital computer. Student gains experience in writing and working with the com-puter programs and a more thorough understanding of the dynamics and operation of large power networks. Prereq-uisite: 454 or permission of department Chairperson.

E E 460 Waves in Bioengineering (3) Sp

Auth, Sigelmann Ultrasonic, electromagnetic, and optical wave effects in biological materials. Applications to biomedical uses in diagnosis, therapy, and surgery. Offered jointly with BIOEN 460. Prerequisite: 381 or other course in wave propagation as approved by instructor.

E E 461 Electrochemistry (3) Sp Fundamentals of electrochemistry with applications to batteries and industrial processes. Emphasis is on obtain-ing a basic working knowledge in the field. Offered jointly with CH E 461. Prerequisite: senior standing in engineering or permission of department Chairperson.

E E 467 Introduction to Radio Science (3) Sp Introduction to radio astronomy, including radio tele-scope antennas and interferometry, radio telescope re-ceivers, nature of radio sources. Remote sensing of the earth's surface in meteorology and ocean and land sur-face applications, including mapping of agricultural areas and natural resources. Sensing of the propagation medium by passive (radiometric) and active (scattering, acoustic sounding) techniques, ionosphere, and magneto-sphere. Prerequisite: 383 or permission of department Chairperson.

E E 468 Applied Optics (4) W Pundamentals of optical image formation, data process-ing, holography, interferometry, laser principles, optical detection, material interactions, scattering, and fiber op-tical Description 282 tics. Prerequisite: 383.

E E 469 Boundary Value Problems and Wave Fundamentals (4) A

Fundamentals (4) Å Wave propagation in varying types of material media of practical importance, including ionized, lossy, layered, anisotropic. Techniques for the solution of boundary value problems, including wave guides and other passive elements of microwave systems. Emphasis on electro-magnetics problem-solving methods, together with their relevance to modern optics, bioengineering, and radio science. Prerequisite: 383. Recommended: senior stand-ine ing.

E E 473 Wave Shaping (4) WSp Generation and transmission of special waveforms, in-cluding pulses, square waves, and linear ramps; clipping, clamping, and d-c restoration; astable, monostable, and bistable multivibrators; applications to analog and digital systems. Includes one four-hour laboratory on alternate waves preservisities 256. weeks. Prerequisite: 356.

E E 474 Real-Time Computer Laboratory (4) AW Zick

Zick Laboratory with major emphasis on real-time computer systems. Topics include: interrupts structure, context switching, software device handlers, system error detec-tion and recovery. A structured approach to the solution of real-time systems problems in the areas of data acqui-sition, analysis, control, and automation. Prerequisites: 371 and 373 or permission of department Chairperson.

E E 475 Digital Electronics and Microprocessors (4) AWSp Hardware-oriented course concerned with synthesis of

digital systems, integrated circuit logic, digital code con-version, and analog to digital conversion. Emphasis on microprocessor hardware, MPU operation, addressing modes, data loaders and storage, memories, and interface

operation and equipment. One four-hour laboratory on al-ternate weeks. Prerequisite: 371.

E E 476 Logical Design of Digital Devices (3) WSp Number theory of formal and informal systems, transla-tion, error detection characteristics. Arithmetic operations. Boolean algebra, algebraic manipulation and simplification. Topological methods. Switching and logic applications. Analysis and synthesis of sequential logic, minimization criteria. Systems design. Prerequi-site: 371.

E E 477 Digital Computer Applications (4) ASp Advanced topics in numerical analysis and their applica-tion to the solution of engineering problems using digital computers. Includes general numerical methods for solv-ing nth order nonlinear differential equations; least squares approximation; Chebyshev approximation; fast Fourier transform and application to digital signal pro-cessing. Prerequisites: FORTRAN and ENGR 341, or permission of department Chairperson.

E E 479 Microcomputer System Design (5) WSp Moritz

Moritz Intensive course covering microprocessor architecture and operation, assembly language instructions and pro-gramming, system design criteria and techniques for in-tegrating hardware and software into actual systems. Principal emphasis on system design and documentation. Weekly laboratory and a design project included. Prereq-uisites: 371; 475 recommended, which may be taken con-currently, and permission of department Chairperson.

E E 481 Fundamentals of Microwaves (4) Sp

Microwave incuit elements, waveguides and resonators; microwave measurement techniques; beam-type and solid-state amplifiers. Microwave system concepts; mi-crowave integrated circuit. Includes one three-hour labo-ratory per week. Prerequisites: 356, 383.

E E 485 Semiconductor Devices (4) AW

Physics of p-h junctions and semiconductor surfaces; oprupsics of perjunctions and semiconductor surfaces, op-erating principles of various semiconductor devices. Development of small-signal and switching circuit mod-els. Includes junction transistors, controlled rectifiers, field effect transistors, microwave and integrated circuit devices. Prerequisite: 383 or equivalent.

E E 488 Laser Systems and Devices (4) Sp

Elementary theory of the interaction of high-frequency and optical radiation with atomic and molecular systems. Practical design technology of gaseous and solid-state stimulated emission devices. Laser system materials and components. Use of lasers for communications, recording, and engineering measurement. Prerequisite; 383 or permission of department Chairperson.

E E 498 Control System Components and

E E 498 Control System Components and Measurements (3) Sp Study of control system components and formulation of their mathematical models. Amplifiers, servomotors, synchros, gyroscopes, and fluid-power devices. Experi-mental determination of dynamic parameters, and be-havior of closed-loop systems. Two three-hour laborato-ries per week. Prerequisite: 446, which must be taken concurrently, or permission of department Chairperson.

E E 499 Special Projects (2-5, max. 10) AWSpS Assigned construction or design projects carried out un-der the supervision of the instructor. Prerequisite: permis-sion of department Chairperson.

Courses for Graduates Only

E E 503 Real-Time Computer System Design (3) W Zick Engineering aspects of the development of real-time

computer systems. Investigates the use and implementacomputer systems. Investigates the use and implementa-tion of real-time computers in practical applications. Topics include system architecture, system software, in-ternetwork and intersystem communications, man-ma-chine interaction and system debugging. Emphasis in three areas: the structured approach to design of the over-all system, defensive interfacing to ensure reliability and maintainability, and communication standards and proto-cols including IEEE-488, CAMAC, and SDLC. Prereq-uisites: 371 and 474 or 479, or permission of department Chairnerson. Chairperson.

E E 505 Introduction to Probability and Random Processes (4) A Lytle, Martin

Probability theory; discrete and continuous random vari-

ables; stochastic process. Spectral analysis of random signals and noise. Prerequisite: graduate standing.

E E 506, 507 Communication Theory I, II (3,3) W,Sp Lytle, Martin

Lytle, Martin Review of stochastic processes. Communication system models. Channel noise and capacity. Optimum detection, modulation and coding, convolutional coders and decod-ers. Typical channels, random and fading channels. Waveform communication, optimum filters. Prerequisite: 505 or equivalent.

E E 508 Stochastic Processes (3) W

E E 508 Stochastic Processes (3) w Lytle, Martin 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 pro-cesses. Stochastic integrals and differential equations. Prerequisite: 505 or permission of department Chairperson.

E E 509 Engineering Applications of Linear Graphs (3) W

Andersen

Andersen Elementary theory of linear graphs, incidence, cut-set and circuit matrices, matrix formulation of loop, node, and state equations, topological analysis and synthesis of networks, signal flow graphs, applications to switching circuits, automata and communication nets. Prerequisite: graduate standing or permission of department Chairper-con

E E 510 Mathematical Foundations of Systems Theory (4) A Damborg, Lytle, Martin

Mathematical foundations for system theory are premaintenance in contraints for system uncov are pie-sented from an engineering viewpoint. Topics include set theory, functions and inverse functions, metric spaces, finite dimensional linear spaces, linear operators on finite dimensional spaces. Applications to engineering systems are stressed. Prerequisite: graduate standing or permission of department Chairperson.

E E 511 Principles of Network Synthesis (3) W Network representation in the complex frequency domain, realizability criteria, synthesis of driving point and transfer impedance and coupling networks for pre-scribed transfer characteristics, canonical forms, and net-work equivalents, frequency and time domain aspects of approximating response functions. Prerequisite: 411.

E E 513 Active Circuit Theory (3) Sp

Andersen Principles of analysis and synthesis of linear active cir-cuits. Emphasis on general principles, including con-servation theorems, invariants, performance limitations in the presence of parasitic elements and realizability conditions. Illustrative applications related to negative re-sistance amplifiers, feedback amplifiers, and active fil-ters. Prerequisite: 335 or permission of department Chair-nerson. person.

E E 517 Introduction to System Optimization (3) W Hsu

Hsu Systems engineering and optimization; classical op-timization techniques; equality constraints and inequality constraints; Kuhn-Tucker conditions; linear inequalities and linear programming; nonlinear optimization and pro-gramming; Fibonacci, Golden-section, and minimax search; gradient search; method of Davidson, Fletcher, and Bunylin anthod of conjunct prodicative dements of and Powell; method of conjugate gradients; elements of quadratic and geometric programming; applications to engineering systems. Prerequisite: 510 or permission of department Chairperson.

E E 518 Digital Signal Processing (4) Sp Digital representation of analog signals. Frequency do-main and Z-transforms of digital signals and systems, Design of digital systems; IIR and FIR filter design tech-niques, fast Fourier transform algorithms. Sources of er-ror in digital systems. Analysis of noise in digital sys-tems. Offered jointly with C SCI 518. Prerequisites: knowledge of Fourier analysis techniques and graduate standing, or permission of department Chairperson.

EE 519 Data Analysis (3) A Martin

Marin Techniques of exploratory data analysis; plotting and dis-play techniques. QQ and PP plots; parameter estimation and confidence intervals; data transformations, Box-Cox transformations; techniques for multivariate samples, estimating correlations, high-dimensional plots, principal

components; two-way tables; regression, regression residuals analysis, regression diagnostics for outlier detection; smoothing; clustering; introduction to robust-re-sistant techniques for parameter estimation, confidence intervals, regression and smoothing. Offered jointly with BIOST 519. Prerequisite: 505 or equivalent.

E E 520 Spectral Analysis (3) Sp Martin

Estimation of spectral densities for single and multiple time series. Basic theory for nonparametric estimation of spectral density, cross-spectral density and coherency for spectral density, cross-spectral density and concretely ind stationary time series, real and complex spectrum tech-niques. Bispectrum. Digital filtering techniques. Alias-ing, prewhitening. Choice of lag windows and data win-dows. Use of the fast Fourier transform in spectral estimation and computation of correlation functions. The estimation and computation of correlation functions. The parametric autoregressive spectral density estimate for single and multiple stationary time series. Spectral analy-sis of nonstationary random processes, and for randomly sampled processes. Techniques of robust spectral analy-sis. Prerequisite: SO5, SO8, or 519 or equivalent, or per-mission of department Chairperson.

E E 525 Acoustics in Engineering I (3) W' Chalupnik, Ishimaru, Merchant, Sigelmann Acoustic wave transmission, reflection, refraction, and diffraction in solids, liquids, and gases. Includes review of continuum mechanics and gases. Includes review of continuum mechanics and examples from electrome-chanical systems. Offered jointly with M E 525. Prereq-uisite: graduate standing in electrical or mechanical engi-neering or permission of department Chairperson.

E E 526 Acoustics in Engineering II (3) Sp Auth, Chalupnik, Merchani, Sigelmann Continuation of 525. Material differs each year, covering such topics as scattering, moving media, ultrasonics, acoustic holography, optoacoustics, transfucer propaga-tion in anisotropic medium, etc. Offered jointly with ME 526. Prerequisite: 525 or permission of department Chairperson.

E E 529 Optical Electronics (4) A Auth

Radiation coupling to microsystems. Theory of laser os-cillation. Design and characterization of laser sources. Tensor formulation of optical constants. Nonlinear optics and parametric amplifiers. Electro-optic and acousto-optic modulation. Photodetectors. Modern applications. Prerequisite: 383 or equivalent.

E E 530 Electromagnetic Properties of Materials (4) w

Auth, Bjorkstam, Yee

Matrix formulation of quantum theory, perturbation theory, Dirac matrix formulation of quantum theory, Dirac notation. Semiclassical theory of the interaction between electromagnetic radiation and matter. Lattice vibrations and their quantization. Optical properties of materials. Prerequisite: 383 or permission of department Chairperson.

E E 531 Topics in Engineering Optics (4) Sp

E E 531 Topics in Engineering Optics (4) Sp Content changes from year to year. Guest lecturers or regular faculty present material in the general areas of op-tics, laser applications, optical processing, optical com-munications, and light interaction with materials. Emerg-ing technology emphasized. May be repeated for credit. Prerequisites: 468, 488 or 529, or permission of depart-ment Chairperson.

E E 532 Engineering Quantum Electrodynamics (4) Sp Bjorkstam, Yee

Electromagnetic field quantization; coherent and incoherent states of the radiation field. Fully quantum theory of the interaction between electromagnetic radia-tion and matter. Quantum theory of the laser. Photon counting, correlation and noise. Parametric conversion; Raman and Brillouin scattering. Prerequisite: 530 or per-mission of department Chairperson.

E E 533 Advanced Semiconductor Devices (3) W

Analysis of selected devices with heavy emphasis on ex-treme operating conditions of bias, temperature, and fre-quency; includes p-n junctions. Schottky barriers, microwave devices; recent developments from the cur-rent literature. Prerequisite: 485 or permission of depart-ment Chairperson. (Offered odd-numbered years.)

E E 534 Power Electronics (3) A Lauritzen

Application of thyristors and power transistors to energy

conversion and control circuits; including ac/dc converters, dc/ac inverters, frequency changers, motor controls, switching regulators, voltage multipliers, includes, integrated circuit controllers, semiconductor device pro-tection, and performance limitations. Prerequisites: 344, 473, or permission of department Chairperson.

E E 535 Digital Integrated Circuits (3) Sp Analysis and design of digital integrated circuits. Empha-sis on MOS and bipolar LSI technology and devices in-cluding static and dynamic MOS and I²L bipolar logic. Circuits include basic logic elements, shift registers, memories, microprocessors, and programmed logic ar-rays. Prerequisite: 485 or permission of department Chairperson.

Charperson. E E 537 Electronic Amplification Devices and Applications (3) W Helms, Reynolds Present state-of-the-art linear amplification devices and circuits are reviewed and forseeable future developments anticipated, with the objective of providing a timely in-troduction to analog circuit design at the graduate level. Focus is on both the internal design and operation of inte-grated devices to prompt understanding of limitations, and the application of standardized modules to electronic systems design. Prerequisite: graduate standing or per-mission of department Chairperson.

E E 538 Topics in Electronic Circuit Design (1-5) AW

AW Guilford, Helms, Lauritzen, Reynolds Topics of current interest in electronic circuit and system design. Course content varies from year to year, and is based on current professional interests of the faculty member in charge. May be repeated for credit by permis-sion. Prerequisite: permission of department Chairperson.

E E 539 Advanced Topics in Solid-State Electronics (1-5, max. 5) AWSp

(1-5, max. 5) AWSP Auth, Bjorkstam, Yee Lectures or discussions of topics of current interest in the field of solid-state electronics for advanced graduate stu-dents having adequate preparation in solid-state theory. Subject matter may vary according to the interests of stu-dents and faculty. Prerequisite: permission of department Chairperson.

E E 546 Advanced Topics in Control System Theory (3) AWSp Topics of current interest in control system theory, for

advanced graduate students having adequate preparation in linear and nonlinear system theory. Prerequisite: per-mission of department Chairperson. (Offered when ade-quate enrollment develops prior to close of advance registration.)

E E 547 Neural Communication and Control in Biological Systems (3) W

Pinter

Conveys quantitative knowledge of the means by which electrochemical events generate, modulate, and demodu-late neuronal signals and noise, and the manner in which these signals interact in the nervous system. The con-straints placed on transmission of information in the ner-vous system are discussed, together with perturbed and ples, such as the visual system. Prerequisite: advanced graduate standing or permission of department Chairperson

E E 548 Optimal Control (3) A Hsu

Variation calculus and optimal control, the Pontryagian minimum principle, Bellman's principle of optimality and dynamic programming, optimum control of distributed parameter systems, sensitivity in optimum control of distribu-ted parameter systems, sensitivity in optimum control, quasi-linearization and computational methods for opti-mal control. Prerequisite: advanced graduate standing or permission of department Chairperson.

E E 551 Power System Control and Protection (3) Sp Bergseth

Dynamics of power system behavior, including the ef-fects of the governor loop and the voltage regulator loop. System models in the small-signal and nonlinear cases. System faults and protection by relays and circuit break-ers. Prerequisites: 454, 446.

E E 565 Data-Communication Networks (3) Sp

Meditch Analysis and design of data-communication networks. Queuing theory and computer time-sharing systems.

Computer-communication networks; packet switching; message time delay. Network optimization via capacity and flow assignment; topological considerations. Ran-dom access techniques; the ALOHA system. Prerequi-site: 508 or permission of department Chairperson.

E E 570 Antenna Theory and Design (3) A

Peden, Reynolds, Swarm Theory of radiation; impedance characteristics and radia-tion patterns of thin linear antenna elements; antenna arrays; pattern synthesis; aperture antennas. Prerequisite: graduate standing or permission of department Chairperson.

E E 572 Electromagnetic Theory and Applications I (4) A Ishimaru, Sigelmann

Electromagnetic waves in layered medium; complex waves, leaky and slow waves, waves in periodic struc-tures, optical fibers, ionosphere and other guiding structures; transients and dispersive medium; waveguides and cavities; eigenfunctions and eigenvalues. Prerequisite: graduate standing or permission of department Chairper-

E E 573 Electromagnetic Theory and Applications II (4) W Ishimaru, Sigelmann

Scattering and absorption of electromagnetic waves, Rayleigh scattering, Born approximations, Green's func-tions, integral equations, numerical techniques and moment method, high-frequency and low-frequency approximations, saddle point method, and variational principle. Prerequisite: 572 or permission of department Chairperson.

E E 574 Electromagnetic Theory and Applications III (4) Sp Ishimaru, Sigelmann

Geometric theory of diffraction, wave fluctuations, antenna noise temperature, data-processing antennas, re-mote-sensing techniques and tomography applications, diffraction and scattering, discontinuities. Prerequisite: 573 or permission of department Chairperson.

E E 575 Waves in Random Media (4) A

Ishimaru, Sigelmann

Ishimaru, Sigumann Propagation and scattering of electromagnetic, optical, and acoustic waves in turbulence and random media, and scattering from rough surfaces and randomly distributed particles. Examples include atmospheric turbulence, fog, rain, smog, clear-air turbulence detection, scattering from blood cells and tissues, and scattering by ocean waves. Applications to atmospheric sciences, bioengistanding or permission of department Chairperson.

E E 579 Radio Propagation (3) Sp Helms, Reynolds, Swarm

Propagation of radio waves in the ionosphere and be-yond. The structure and phenomena of the ionosphere and magnetosphere of the earth is related to the overall and ingneouspice of the earth is related to the overall solar system environment with topics that include plas-masphere diagnostics using Whistler waves, natural VLF emission mechanisms, polar cap absorption, and mag-netic storms. Prerequisite: graduate standing or permis-sion of department Chairperson.

E E 582 Stochastic Control Systems (3) W Alexandro, Hsu, Pinter

Performance measure and minimization techniques; continuous and discrete random processes in control systems; optimal design of systems having stochastic signals and noise; application of the Wiener-Hopf method to control system design; the Wiener-Kalman filter and its applica-tion in stochastic control systems. Prerequisites: 505, 584.

E E 583 Nonlinear Control Systems (4) Sp Noges

Dynamic analysis of nonlinear control systems. Analytical, graphical, numerical, and simulation techniques for solving nonlinear control system problems. Lyapunov functions, phase space and describing functions. Introduction to contraction mapping methods. Prerequisite: 584

E E 584 Continuous and Discrete State Variable Methods (3) AW Alexandro, Clark, Hsu Matrices and linear spaces, quadratic forms; system rep-resentation in state variable form; selection and transfor-mation of state variables; controllability and observability

of multivariable control systems; state transition matrix for continuous and discrete time systems; difference equations and Z-transform; application of state-space ap-proach to control system design. Prerequisite: graduate standing or permission of department Chairperson.

E E 585 Digital and Sampled-Data Systems (3) Sp Alexandro; Hsu

Sampling process and data holds, state variables and state Sampling process and data indus, state variables and state transition equations for sampled-data systems, frequency domain and time domain analysis of sampled-data sys-tems, stability of sampled-data systems, digital compen-sation of sampled-data systems. Prerequisite: 584.

E E 586 Advanced Computer Applications I (3) A Holden

Basic analytical methods related to man-machine communication by voice and vision. State-of-the-art review of speech and image understanding systems. Each stu-dent does a self-chosen project. Prerequisite: graduate standing or permission of department Chairperson.

E E 587 Advanced Computer Applications II (3) W Johnson

Lecture/seminar examining classic and contemporary pa-pers. State-of-the-art approaches to such subjects as fault tolerant computation, optimization, adaptive or learning models, heuristic problem solving, system reduction. Prerequisite: 586 or equivalent experience.

E E 588 Advanced Logical Design of Digital Computers I (3) Sp Johnson

Advanced concepts of combinational circuit design, mul-tiple output logics, logical completeness, classes of com-binational functions. Advanced concepts of sequential machines, limitations, reduction, state assignment. ROMs and array logics. Bubble memories and logics. Universal logic modules, cellular logics. Prerequisite: 476 or equivalent.

E E 589 Advanced Logical Design of Digital Computers II (3) A Johnson

Jonison Lecture/seminar dealing with classic papers and state-of-the-art developments in areas of design such as modular design, high-speed memories, state assignment, array logics, advanced concepts in asynchronous machines. Prerequisite: 588 or equivalent.

E E 590 Advanced Topics in Digital Computers (2-5, max. 15) AWSp Golde, Holden, Johnson, Zick Lectures or discussions of topics of current interest in the field of digital computers. Subject matter may vary from year to year. Prerequisite: permission of department Chairnerson.

Chairperson. E E 595 Advanced Topics in Communication Theory (3) AWSp Lytle, Martin

AWSpS

Extension of 507, 508, 518, 519, 520. Material differs each year, covering such topics as: detection theory, de-cision theory, game theory, adaptive communication sys-tems, nonlinear random processes, etc. May be repeated for credit by permission. Prerequisite: permission of de-partment Charperson.

E E 599 Selected Topics in Electrical Engineering

(*) AWSpS Prerequisite: permission of department Chairperson.

E E 600 Jndependent Study or Research (*)

E E 700 Master's Thesis (*) AWSpS

E E 800 Doctoral Dissertation (*) AWSpS

HUMANISTIC-SOCIAL STUDIES

Courses for Undergraduates

HSS 300 Practice in Technical Reporting (1) Souther, White Application of the fundamentals of technical reporting to

representation of the functional section of the specific reporting to the specific reporting activity of students who are en-rolled in a laboratory, project, or other designated course in the College of Engineering.

HSS 301 Creating the Future (5) ASp Douthwaite

Examines the concept of alternative individual and socie-Examines the concept of alternative individual and socie-tal futures and the opportunities for creating them. Sev-eral aspects of thinking about alternative futures are considered, including the determinants and nature of change, notions of time, the perception of present reality and development of visions of the future, and the impli-ctions of future them where a determinants and many sectors. cations of alternative values and assumptions. A number of scenarios for the future are explored, and several methods of forecasting investigated. Offered jointly with SMT 301.

HSS 304 Introduction to Scientific and Technical Communication for Foreign Students (4) Trimble

Scientific and technical writing and reading for foreign students well grounded in oral English. Concentration on (1) application of rhetorical concepts most frequently (1) used in scientific and technical concepts most medicinity analysis in areas traditionally difficult for foreign stu-dents, and (3) grammatical-metorical analysis of scien-tific and technical discourse. Offered jointly with ENGL 304. Offered on credit/no credit basis only

HSS 305 Scientific and Technical Report Writing for Foreign Students (4) *Trimble*

Application of the problem-solving approach to scientific and technical writing. Concentration on (1) undergradu-ate laboratory reports, (2) advanced grammatical analysis in areas traditionally difficult for foreign students, and (3) advanced grammatical-rhetorical analysis of scientific advanced grammatical-rhetorical analysis of scientific or ENGL 304 or permission of instructor.

HSS 307 Advanced English Grammar for Foreign Students (3) ASp Trimble

Advanced grammatical analysis for foreign students well grounded in oral English. Areas of English grammar that are usually difficult for advanced foreign students are se-lected for study in context. Offered jointly with ENGL 307. Offered on credit/no credit basis only. Prerequisite: ENGL 303 or permission of instructor.

HSS 310 Self, Symbol, and Society (3) Skeels

Anthropological concepts of social institutions and psy-chological concepts of the self are used for the interpreta-tion of myth and literature from one or more historical cultures, and for the comparison of these with the indi-vidual, his symbolic creations, and his situation in today's world.

HSS 320 Development of Western Cultural Institutions (3)

Highee

The growth of modern institutions and of the ideas underlying them during the periods of the Renaissance, the Protestant Revolt, the Commercial Revolution, the En-lightenment, and the Industrial Revolution. Major em-phasis is on political, economic, religious, and intellectual change.

HSS 351 The Human Image in Medieval and

Renaissance Literature (3) Selected literary figures and works of Western civiliza-tion in the Middle Ages and the Renaissance.

HSS 407 Thesis Guidance for Foreign Students (1, max. 3) AWSp

Trimble

Individual tutorial assistance in writing problems for the foreign student preparing to write or writing a thesis in one of the engineering disciplines. Offered on credit/no credit basis only. Prerequisite: permission of instructor.

HSS 410 Contemporary Political and Social Problems (3) Higbee

Twentieth-century background and development of con-temporary political and social problems; comparison of competing political philosophies and systems; current in-ternational and national events and issues.

HSS 419 Technology's Impact on the Modern West: 1750-1950 (5)

Botting Examines significant innovations of technology from the Industrial Revolution to the mid-twentieth century and explores the social consequences of these innovations, as well as the social reactions to them.

HSS 420 Technology in Contemporary Western Culture (5) Botting

Examines the nature of technology, its relationship to culture and to the physical environment; treats with the problems and issues created by the impact of technology on society, including the relationship between technology and social change, effects of technology on economic and political organizations, and the relationship among technology, human values, and the individual; examines implications of future technological development for man and his culture.

HSS 421 Socioeconomic Consequences of Technology (3) Douthwaite

Dournware Overview of the role of technology in forming public pol-icies and in determining personal alternatives. A non-mathematical exposition of engineering objectives, prac-mathematical exposition of engineering objectives. tices, capabilities, and constraints, and an appraisal of the need for developing an informed public opinion in a technology-dependent society if there is to be democratic participation in the decision-making process.

HSS 422 Contemporary Case Studies in Technology (3)

Douthwaite Case studies in the social impact of contemporary technology and the present and possible future responses of industry and governmental agencies to technologically induced problems. Prerequisite: 420 or 421 or permission of instructor.

HSS 423 Heritage of Civil Engineering (3 or 4) Sp

Brown, Colcord, Strausser Contribution of civil, as opposed to military, engineering to civilization based on the lives and projects of prominent engineers and cultures. Incidents and individuals nent engineers and cultures. Incidents and individuals from prehistory to the nineteenth century give the student an awareness of the profession and its influence on soci-ety. Industrial archaeology and historic sites are consid-ered. An additional 1 credit may be earned by participat-ing in a special project. Emphasis on the control of elements and the methodology, planning, objectives, and reasons for the project. Subject matter varies with each instructor. Offered jointly with CIVE 423. Prerequisite: junior standing. junior standing.

HSS 425 Technology in Developing Countries (5) Botting

Analyzes the alterations in societies of the developing countries resulting from the impact of technology on them, focusing on social change, values, and institutions. Treats in general the phenomenon of technological transfer.

HSS 431 Human Rights and the Governmental Process (3) Higbee

Analysis of governmental actions (particularly antidis-Analysis of governmental activits (particularly antum-crimination legislation) designed to reduce discrimination on account of race, color, religious creed, national ori-gin, and, more recently, age and sex in various sectors of American life. The attendant issues, problems, and administrative solutions to leading cases are examined. Prerequisite: upper-division standing.

HSS 435 Impact of Technology on Human Rights (4) Higbee

The impact of technology on human rights, ranging from its safeguarding of these rights to its incursions on them and associated constitutional processes. Particular atten-tion is given to secret surveillance technology, indiscrim-instant data terrese and articular attended by the background tion is given to server and retrieval, and other technologies ranging through those of the mass media to bioengineer-ing. The institutionalized and impersonal aspects of tech-nology are examined, and possible remedies are ex-plored. Recommended: upper-division standing.

HSS 450 The Human Image (5) AWS

Leahy Relationship between technology and human values in traditional cultures. Literature and art selected from various areas, including Asia, Latin America, Near East, and Africa. Prerequisite: upper-division standing.

HSS 451 The Living Theater (3) AW Leahy

Introduction to the art of theatrical performance by reading, attending, and discussing plays offered currently in theatres on campus and in the community. Offered on credit/no credit basis only.

HSS 461 Experience in the Arts (1) W Informal experiences with the arts through attendance at theatres, concerts, art exhibits, etc.; through discussions with creative artists; and through personal attempts at producing a work of art. Offered jointly with CER E 442.

HSS 465 Aesthetic Value and Technology (3)

Coney Role of esthetics in a world profoundly changed by the processes, machines, and structures of the Industrial Revolution. Prerequisite: upper-division standing.

HSS 471 Introduction to the Folktale Among Literate Peoples (3) Skeels

Techniques of classification, geographic-historical distri-bution, theories of origin and interpretation, and related areas of investigation of the oral prose folk narrative of literate peoples. Offered jointly with ENGL 415.

HSS 472 Introduction to American Folklore (5) Skeels

Study of different kinds of folklore inherited from America's past and to be found in America today. The cultiva-tion of an awareness of authentic folklore and how to collect it. Offered jointly with ENGL 416.

HSS 480 Science Fiction and Fantasy: Prophecy and Symbol (3) AWSp Skeels, White

Science fiction is compared with forecasts of the future by authorities in science and technology. Categories of by administration activities and technology. Caligories of prophecy and degrees of departure from the probable to the fantastic are determined. The faction is analyzed in terms of depth of meaning and of the particular stylistic qualities and abilities of the authors.

HSS 498 Special Topics (1-5, max. 10) Special topics in humanities and social sciences to be offered occasionally by permanent or visiting faculty. May be repeated for credit.

HSS 499 Special Projects (1-5, max. 5) AWSp Work on a special projects (1-5, max. 5) AWSp Work on a special project by a student under the supervi-sion of an instructor. Prerequisites: upper-division stand-ing and permission of the instructor and the department Chairperson.

SCIENTIFIC AND TECHNICAL COMMUNICATION

STC 401 Scientific and Technical Writing (4) ASp Souther

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. Required of stu-dents taking an interdisciplinary degree in scientific and technical communication. Prerequisite: junior standing or permission of instructor. (Formerly HSS 401.)

STC 402 · Scientific and Technical Editing (4) W White, Williams

While, withdriss Editorial responsibilities and practice in the communica-tion of scientific and technical information; the editor's role both as editor and as supervisor of publication groups. Required of students taking an interdisciplinary degree in scientific and technical communication. Prereq-uisite: 401 or permission of instructor. (Formerly HSS 402.)

STC 403 Managing Technical Publication (4) Sp White

Responsibilities and practice in managing publications units for the communication of scientific and technical information. Required of students taking an interdiscipli-nary degree in scientific and technical communication. Prerequisite: 402 or permission of instructor. (Formerly HSS 403.)

STC 408 Preparing Proposals and Environmental Impact Statements (3) W Souther

Preparing proposals and environmental impact statements for scientific, technical, and community projects: exami-No scientification of the state of the st

STC 409 Writing for Publication (3) Sp Souther

Writing for professional and trade periodicals in science, wrung for professional and trade periodicals in science, engineering, and technology: examination of the publica-tion process, including the roles of author, editor, and reviewer, selecting the appropriate periodical; organizing and writing the article. Prerequisite: upper-division standing or permission of instructor. (Formerly HSS 409.)

STC 415 Production Editing (4) Sp Williams

Williams The editorial role in the preparation of scientific and tech-nical materials for production (typesetting, layout, print-ing, binding, distribution). The editor's responsibilities and prerogatives as they relate to those of other profes-sionals in the production phase of the publications field. Offered jointly with CMU 415. Prerequisite: 402 or per-mission of the instructor.

STC 499 Professional Practice (3-5, max. 10) AWSpS

Souther, White

Source, while Supervised internship in a working publications organiza-tion approved by the faculty adviser. A minimum of one internship is required of students taking an interdiscipli-nary degree in scientific and technical communication. Offered on a credit/no credit basis only. Prerequisites: 401 and 402 or permission of instructor and approval of faculty sponsor.

INDUSTRIAL ENGINEERING

See Mechanical Engineering Industrial Engineering un-der Mechanical Engineering.

MECHANICAL ENGINEERING

MECHANICAL ENGINEERING

Courses for Undergraduates

M E 303 Metal Machining (2) A

Anderson Introduction to basic machining methods used in metal processing; fundamental concepts of machine tools, layout methods, and measuring tools. Primarily for students majoring in industrial education or industrial design. Lec-ture and laboratory.

M E 304 Manufacturing Processes (3) AWSpS

Ford Study of manufacturing processes, including interrela-tionships between the properties of the material, the parts. Prerequisite: 343.

M E 320 Thermodynamics (4) AWSp

Waibler Introduction to classical macroscopic thermodynamics, including development of the basic laws applicable to en-ergy transformations, with reference to engineering ap-plications. Prerequisites: MATH 126 and CHEM 140.

M E 323 Thermodynamics and Heat Transfer (4) AWSp

Applications of thermodynamic principles: properties of pure substances from an advanced point of view, non-reactive gas mixtures, energy analysis of reactive mixtures, chemical equilibria, combustion, power, and refrigeration cycle analysis. Prerequisite: 320 or ENGR 260.

M E 331 Introduction to Heat Transfer (4) AWSp McFeron

Study of heat transfer by conduction, radiation, and convection; elementary heat-exchanger design. Prerequisites: 320 or ENGR 260, and 333 or CIVE 342.

M E 333 Introduction to Fluid Mechanics (4) AWSo Gessner

Introduction to the basic fluid laws and their application. Conservation equations, dynamic similarity, potential flow, boundary layer concepts, effects of friction, com-pressible flow, fluid machinery, measurement tech-niques. Prerequisites: 320 or ENGR 260, and MATH 238.

M E 342 Industrial Materials and Processes (3) Sp Ford

Properties, mechanics, and behavior of materials to provide a logical basis for material selection in design. Lecture and laboratory. Prerequisite: junior standing in in-dustrial design or permission. (Offered odd-numbered years.)

M E 343 Behavior of Engineering Materials (3) AWSpS Taggari

Study of the nature, properties, and behavior of engineering materials, involving strength, deformation, fracture, impact, creep, fatigue, and corrosion. Lecture and labo-ratory. Prerequisite: 352 or permission of instructor. Rec-ommended: ENGR 170

M E 352 Introduction to Mechanics of Solids (4) AWSp Sherrer

Development of relationships among loads, stresses, and deformations, in the elastic behavior of machine or structural elements in tension, bending, or torsion. Prerequisites: MATH 126 and ENGR 210.

M E 353 Machine Design Analysis (4) AWSpS Kieling

Analysis, design, and selection of mechanical subsys-tems and elements, such as gears, linkages, cams, and bearings. Lecture and laboratory. Prerequisites: 343, 352

M E 373 Introduction to System Dynamics (4) AWSp

Jorgensen

Introduction to mathematical modeling and analysis of physical dynamic systems involving energy storage and transfer, by lumped parameter linear elements. Time do-main response and stability of linear systems via analyti-cal methods and computer applications. Prerequisites: MATH 238, ENGR 230.

M E 374 Systems Dynamic Analysis and Laboratory (3) AWSp Jorgensen

Extension of 373, frequency response analysis, general-ized impedance concepts and applications, Fourier series analysis and Laplace transform techniques. Introduction to nonlinear modeling. Laboratory experiments and com-puter exercises. Prerequisite: 373.

M E 401 Metal Casting Theory and Design (3) Sp Ford

Physical phenomena involved in metal casting processes and their effects on casting quality. Principles of casting design. Lecture and laboratory. Prerequisites: 304 and 343, or permission of instructor.

M E 403 Material-Removal Processes (3) A Wolak

Votax Cuting and noncutting processes for material removal in the shaping of manufactured products. Study of forces and of power consumption in the various processes, and relative costs. Prerequisites: 304 and 343, or permission of instructor.

M E 404 Theory of Welding (3) W

Holt Theory of arc welding and flame cutting of metals. Pre-requisites: 304 and 343, or permission of instructor.

M E 405 Introduction to Plastic Metal Forming (3) A Wolak

Plastic behavior of metals; energy of deformation; esti-mates of working loads for wire drawing and extrusions. Introduction to slip-line and velocity fields with applications to indentation, extrusion, and drawing the rough axisymmetric dies. Principles of tube making; rolling of flat slabs; friction and lubrication in metal working. Prerequisite: 343 or equivalent.

M E 406 Corrosion and Surface Treatment of Materials (3) W Sandwith

Sanawin Corrosion fundamentals and forms (galvanic, crevice, pitting, stress corrosion, erosion, hydrogen and leach-ing). Principles of design, materials selection, cathodic protection and surface treatments (coatings, carburizing, inicidized being buffet to be a surface treatment of the surfac nitriding and plating) applied to reduce corrosion. Failure analysis applied to case studies.

M E 422 Microscopic Thermodynamics (4) W Roberts

Introduction to kinetic theory and statistical thermodynamics. A preliminary treatment of transport phenomena, mathematical probability statistics and relevant mathematical procedures. Prerequisite: 320 or ENGR 260. (Of-fered odd-numbered years.)

M E 425 Air Conditioning (3) Sp

Topics in air conditioning, heating, and ventilating of buildings. Human comfort characterization, dynamic load calculations, air-distribution systems, simultaneous heat and mass transfer devices. Project studies. Prerequisites: 331, 333.

M E 428 Noise Control (3) W Chalupnik

Introduction to design for noise control. Includes sum-mary of acoustical phenomena as they pertain to noise control and measurement. Noise rating schemes, particularly in relation to machine noise in the work environment. Prerequisite: junior standing in engineering.

M E 430 Thermal Environmental Engineering (3) Depew

Fundamentals of thermodynamics, heat transfer, and fluid mechanics are reviewed and applied to practical en-gineering situations. Applications include: absorption refrigeration, cryogenics, solar energy, and effects of hu-man thermal environment. Prerequisites: 323, 331.

M E 432 Gas Dynamics (3) Sp

Childs

Dynamic and thermodynamic relationships for the flow of a gas. Application of thermodynamic processes in-volving nozzles, diffusers, compressors, and turbines. Prerequisites: 320 or ENGR 260, and 333 or CIVE 342.

M E 433 Turbomachinery (4) W

Waibler Basic principles of turbomachinery operation, design, and testing, Prerequisite: 333.

M E 434 Advanced Mechanical Engineering Laboratory (3) AWSp

Introduction to engineering measurement problems and techniques, including interpretation of experimental data, based upon the theories of probability and statistics. Ex-periments in all areas of mechnical engineering using single-component and multicomponent systems. Prerequi-sites: 323, 331, 333, 343, 374, and MEIE 315.

M E 436 Friction and Lubrication (3) A

Love

Fundamental principles of friction and lubrication with applications to rolling and hydrodynamic bearing design. Prerequisites: 333, 353, or permission of instructor.

M E 440 Mechanical Behavior of Solids (3) W Wolak

Mechanics of deformable bodies; transformation of stress and strain; yield criteria; equations of compatibility; elas-tic constants of crystalline and polycrystalline solids. Ap-plication to design and manufacturing. Prerequisite: 343 or permission of instructor.

M E 445 Fracture of Engineering Materials (3) A Taggart

Deformation processes leading to fracture, and the basic mechanics of materials fracture from microscopic and macroscopic viewpoints. Principles of design and testing for fracture resistance. Lecture and laboratory. Prerequi-site: 343 or permission of instructor.

M E 460 Kinematics and Linkage Design (3) W

Kieling Synthesis of linkage-type mechanisms, using graphical and computer methods. Prerequisite: senior standing in engineering or permission of instructor.

M E 465 Welding Design (3) Sp

Holt Theory of joint design, sequence, fixturing, and dimen-sional control in fusion welding. Prerequisite: senior standing in mechanical engineering or permission of instructor.

M E 469 Applications of Dynamics in Engineering (3) AWSp Sherrer

Application of the principles of dynamics to selected en-

gineering problems, such as suspension systems, gyroscopes, electromechanical devices. Includes introduction to energy methods and wave propagation in fluids and solids. Prerequisites: ENGR 230 and 373 or permission of instructor.

M E 470 Mechanical Vibrations (3) Sp Merchant

Single-degree-of-freedom linear systems techniques, Matix techniques for multi-degree-of-freedom linear sys-tems. Applications in vibration isolation, transmission, and absorption problems and instrumentation. Prerequi-site: 373 or permission of instructor.

M E 471 Automatic Control (3) A Galle

Engineering analysis of automatic control systems. Dyangine system modeling; system error; performance and stability analysis by Routh, root locus, and frequency re-sponse techniques; computer simulation. Lecture and lab-oratory. Prerequisite: 374 or permission of instructor.

M E 473 Instrumentation (3) W Galle

Principles and practice of industrial measurement. Dynamics of instrument response; theory of transducers for temperature, pressure, flow, and other measurements. Lecture and laboratory. Prerequisite: 374 or permission of instructor.

ME 474 Systems Modeling and Simulation (3) W Balise

Unified approach to modeling of systems, and computer simulation of systems behavior. Selecting system vari-ables; writing state, loop, and node equations; modal re-sponse and state transition response; system functions and convolution; analogs. Applications to control, vibra-tions, and other problems. Prerequisite: 374.

M E 476 Introduction to Design With Brittle Materials (3) W

Properties and behavior of ceramic materials are related Properties and behavior of certainic materials are related to their use in advanced technology structures. Analytical and numerical methods required for probabilistic design and current case studies utilized. Offered jointly with A A 476, CER E 476, CESM 476, and MET E 476.

M E 481 Internal Combustion Engine Principles (3) ASp Guidan

Study of Otto and Diesel cycles; fuels, carburetion, ignition, combustion, and engine performance characteris-tics. Prerequisite: 323 or permission of instructor.

M E 482 Internal Combustion Engine Applications (4) W Guidon

Principles of engine selection and design to meet load re-quirements, economic requirements, and emission regu-lations. Prerequisite: 481 or permission of instructor.

M E 490 Naval Architecture (3) A Adee

Theory of naval architecture; ship's lines, hydrostatic curves, intact and damaged stability, launching. Offered jointly with O ENG 490. Prerequisite: junior standing in engineering or permission of instructor.

M E 491 Naval Architecture (3) W

Adee Theory of naval architecture; strength, A.B.S. rules, water waves, ship and platform motions. Offered jointly with O ENG 491. Prerequisite: junior standing in engi-neering or permission of instructor.

M E 492 Naval Architecture (3) Sp

Adee Theory of naval architecture; dimensional analysis, resistance, model testing, propellers, steering. Offered jointly with O ENG 492. Prerequisite: junior standing in engi-neering or permission of instructor.

M E 495 Mechanical Engineering Design (3) AWSp Love

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. Prerequisites: 353 and senior standing in mechanical engineering.

ME 496 Brittle Material Design Project (3) Sp Application of appropriate criteria and the interdiscipli-

nary team approach in the design of structural components utilizing brittle (ceramic) materials. Offered jointly with CER E 496, CESM 496, and MET E 496. Prerequisite: 476 or 479.

M E 498 Special Topics in Mechanical Engineering

(1-5, max. 6) AWSP Lecture and/or laboratory. Maximum of 6 credits may be applied toward an undergraduate degree. Prerequisite: permission of instructor.

M E 499 Special Projects (2-5, max. 9) AWSpS Prerequisite: permission of department Chairperson.

Courses for Graduates Only

M E 502 Plastic Metal Forming (3) Sp Wolak

Stress-strain and stress-strain-rate relations in metal Suess-suant and suess-suant-rate features in intera forming; plastic instability. Work of deformation. The slip-line field. Load bounding. Metal characteristics and forming. Applications to basic metal forming processes. Prerequisite: 552 or permission of instructor. (Offered even-numbered years.)

M E 506 Friction and Wear (3) Sp

Firey, Wola

Nature of the processes of friction and wear. Tempera-ture rise at contact surfaces during sliding, and resulting wear. Boundary friction. Friction and antifriction materials. Prerequisite: graduate standing in engineering or permission of instructor.

M E 518-519-520 Seminar (0-0-1, max. 6) Offered on credit/no credit basis only.

M E 521 Thermodynamics (3) A Depew, Emery, Waibler

Fundamental concepts of temperature, thermodynamic properties, and systems. The first, second, and combined laws. Development of the relations of classical thermodynamics. Prerequisites: 323 and graduate standing in me-chanical engineering or permission of instructor.

M E 522 Thermodynamics (3) W

Corlett, Depew, Emery, Roberts, Waibler 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: 521 or permission of instructor. (Offered odd-numbered years.)

M E 524 Combustion (3) Sp Corlett. Malte

Cortett, Matte Chemical and physical processes of combustion with ap-plications to design of combustors, fuel selection, and consideration of environmental effects. Prerequisite: graduate standing in mechanical engineering or permis-sion of instructor. (Offered even-numbered years.)

M E 525 Acoustics in Engineering I (3) W Chalupnik, Ishimaru, Merchant, Sigelmann

Acoustic wave transmission, reflection, refraction, and diffraction. Review of continuum mechanics and examples from electromechanical systems. Offered jointly with E E 525. Prerequisite: graduate standing in mechan-ical or electrical engineering, or permission of instructor.

M E 526 Acoustics in Engineering II (3) Sp Auth, Chalupnik, Merchant, Sigelmann Continuation of 525. Material differs each year, covering such topics as scattering, moving media, ultrasonics, acoustic holography, optoacoustics, transducer propaga-tion in anisotropic medium, etc. Offered jointly with E E 526. Prerequisite: 525 or permission of instructor.

M E 528 Acoustics of Environmental Noise (4) A Chalupnik, Merchant

Measurement and evaluation of environmental noise. Mathematical, physical, and psychological aspects of community noise; sources, scales for rating, propagation, and control of noise. Laboratory demonstration of lecture principles. Offered jointly with CEWA 528. Prerequisite: permission of instructor.

M E 530 Radiative Heat Transfer (3) Sp

For the second s

M E 531 Conductive Heat Transfer (3) Sp Corlett, Depew, Emery, McFeron, Waibler

Analysis of steady-state and transient heat conduction in single and multidimensional systems by mathematical, graphical, numerical, and analogical methods. Prerequi-site: graduate standing in mechanical engineering or per-mission of instructor. (Offered odd-numbered years.)

M E 532 Convective Heat Transfer (3) W

Depew, Emery, Waibler Introduction to fluid flow and boundary layer theory as applicable to forced- and natural-convection heat trans-fer. Condensation and boiling heat transfer. Prerequisite: graduate standing or permission of instructor.

M E 533, 534 Fluid Mechanics (3,3) A,W Bodoia, Corlett, Gessner

Basic conservation laws and kinematics of fluid flow, two-dimensional inviscid flow, wave motion and shock waves in inviscid compressible flow, exact solutions and boundary layer analyses of laminar and turbulent viscous flow, analysis of non-Newtonian flow, applications. Pre-requisite: 533 or permission of instructor for 534.

M E 535 Computational Techniques in Heat Transfer (3) A

Corlett, Depew, Emery, Kippenhan, McFeron, Waibler

Advanced heat transfer studies of interest to mechanical engineers. Subject coverage varies from year to year. Prerequisite: permission of instructor.

M E 537 Topics in Fluid Mechanics (3) Sp Bodoia, Corlett, Gessner

Selected fluid mechanics research topics relevant to cur-Selected fluid mechanics research topics relevant to cur-rent advances in mechanical engineering practice are ex-plored in depth on the basis of literature reading and classroom discussion. Topics selected vary with faculty and student interest, but are drawn predominantly from the general areas of energy conversion, energy manage-ment, and manufacturing processes. Applicability of re-search results to the resolution of design and develop-ment problems, and delineation of new research appropriate to this end. (Offered odd-numbered years.)

M E 538 Turbulent Boundary Layer Theory (3) A Bodoia, Childs, Gessner Characteristic features of turbulent boundary layers; de-

velopment 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-numbered years.)

M E 541 Advanced Engineering Materials (3) W

Daly, Taggart Behavior of engineering materials as affected by various conditions of loading and environment. Lecture, labora-tory. Prerequisite: graduate standing in mechanical engi-neering or permission of instructor.

M E 542 Topics in Engineering Materials (3) Sp Daly, Taggart

Selected topics of current importance concerning the na-ture and behavior of engineering materials. Lecture, laboratory. Prerequisite: 541 or permission of instructor. (Offered odd-numbered years.)

M E 543, 544 Fluid Turbulence (3,3) A,W Gessner, Sleicher

Statistical and phenomenological theories of turbulence. Introductory concepts, velocity correlations, the energy spectrum, the decay of turbulence, scalar fields, turbulent transport, shear turbulence, wall turbulence, phenomenological theories of energy transport, urbulent modeling, instrumentation, recent literature. Offered jointly with CH E 543, 544. Prerequisite: 538 or 6 credits in graduate fluid mechanics. (Offered even-numbered years.)

M E 551 Applied Elasticity (3) A Kobayashi, Sherrer, Wolak

General equilibrium and stress-strain relations in homo-geneous, isotropic, elastic materials. Elastic stress distri-butions in machine components; plane-stress and plane-strain problems. Prerequisite: graduate standing in me-chanical engineering or permission of instructor.

M E 552 Applied Plasticity (3) W Kobayashi, Wolak. Elastic-plastic stress distributions in machine com-ponents; stress-strain relations in the plastic range; yield

in thick-walled pressure vessels, rotating cylinders and disks; torsion and bending of machine members; ther-mal stresses in shells, rotating disks, and plates. Prerequisite: 551 or permission of instructor.

M E 553 Applied Viscoelasticity (3) Sp

Daly, Emery, Kobayashi, Sherrer Time-dependent aspects of stress and strain, and stability in mechanical engineering design. Stress analysis in the presence of creep and stress relaxation. Cyclic variation of load and temperature. Prerequisite: 551 or permission of instructor.

M E 555 Thermoelasticity (3) W

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 stabil-ity. Prerequisite: 551 or permission of instructor. (Offered even-numbered years.)

M E 556 Experimental Stress Analysis (3) A Dav

Theory and practice of experimental techniques including photoelasticity; brittle coatings; birefringent coatings, and interferometry. Lecture and laboratory. Prerequisite: graduate standing or permission of instructor.

M E 557 Experimental Stress Analysis (3) W

Dav Continuation of 556 with extended applications and theory of experimental mechanics techniques. Holography; residual stress analysis methods; moire; three-dimen-sional photoelasticity; acoustoelasticity. Lecture and lab-oratory. Prerequisite: 556 or permission of instructor.

M E 558 Experimental Stress Analysis (3) Sp

Day Seminar and individual research on special problems in experimental mechanics. Prerequisite: 557 or permission of instructor. (Offered odd-numbered years.)

ME 559 Applied Fracture Mechanics (3) W Kobayashi

Applications of linear fracture mechanics to failure analysis and fracture control based on actual case studies. initiation and propagation fatigue testing techniques, crack initiation and propagation fatigue life prediction of me-chanical components subjected to environmental effects.

M E 560 Advanced Theory of Fracture (3) Sp Kobayashi

Theories of linear fracture mechanics, fracture dynamics, facture of mixed nature inclusions, nature of mixed mode fracture. Discussion of advanced topics from recent literature. Prerequisite: 559 or permission of instructor.

M E 564 Mechanical Engineering Analysis (3) A Balise, Galle, Jorgensen

Application of mathematical methods to the description and analysis of systems in mechanical engineering. Anal-ogies in heat transfer, fluid flow, stress distribution, dy-namics, and feedback control. Prerequisite: graduate standing in mechanical engineering or permission of instructor.

ME 565 Mechanical Engineering Analysis (3) W

Balise, Galle, Jorgensen 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.

M E 571 Servomechanisms (3) W

Balise, Galle, Jorgensen

Linear and introductory nonlinear (eedback system analy-sis and design. Prerequisite: 471 or permission of instruc-

M E 572 Servomechanisms (3) Sp

Balise, Galle, Jorgensen Continuation of 571, to include topics of current importance. Purther study of nonlinear control, statistical analysis of feedback systems, sampled-data methods, self-adaptive systems. Prerequisite: 571 or permission of instructor.

M E 575 Systems Theory (3) Sp Balise, Garbini

State variable approach as applied to multivariable sys-tems. Continuous and discrete variables, system vectors

and matrices, distinct and multiple eigenvalues, controllability and observability, computer algorithms. Geomet-rical and physical interpretations of the mathematical models. Prerequisite: 474 or permission of instructor.

ME 579 Fluid Power Systems (3) W

Garbini, Jorgensen

Design, analysis, and control of fluid power systems. Steady state analysis of valves, actuators, and transmis-sions. Dynamic modeling, response, stability, and con-trol analysis via linear element representation and computer simulation. Prerequisite: graduate standing in mechanical engineering or permission of instructor.

M E 584 Gas Turbines (3) Sp Corlett, Malte

Applications of the gas turbine; gas turbine cycles; com-Applications of the gas turbine; gas turbine cycles; com-pressors; turbines; combustion systems, gas turbine power plant materials; plant performance. Prerequisite: graduate standing in engineering or permission of instruc-tor. (Offered even-numbered years.)

M E 588 Dynamics and Vibrations (3) A

Chalupnik, Merchant, Sherrer Variational techniques, Hamilton's principle, Lagrange's equations applied to dynamics of particles and rigid bod-ies. Vibration analysis of multi-degree-of-freedom and continuous systems. Prerequisite: graduate standing in engineering or permission of instructor.

M E 589, 590 Vibrations (3,3) W,Sp

Chalupnik, Merchant, Sherrer Study of systems with nonlinear damping and restoring forces excited by deterministic or random inputs. Applications in measurement, testing, and design of mechani-cal systems. Nonlinear systems are emphasized in 589 and random inputs in 590. Prerequisite: 588 or permis-sion of instructor. (Offered even-numbered years.)

M E 598 Topics in Research (1) AWSp Doctoral seminar. May be repeated for credit. Offered on credit/no credit basis only.

M E 599 Special Projects (1-5, max. 9) AWSpS Written report required. Prerequisite: permission of de-partment Chairperson.

M E 600 Independent Study or Research (*) AWSpS Written report required.

M E 700 Master's Thesis (*) AWSpS

M E 800 Doctoral Dissertation (*) AWSpS

MECHANICAL ENGINEERING INDUSTRIAL ENGINEERING

Courses for Undergraduates

MEIE 313 Engineering Operations Research (4) WSp

Marshall Introduction to the major tools and techniques to operations research as used by industrial engineers and man-agement scientists. Topics include linear, dynamic, and agement scremuss. topics menute linear, dynamic, and integer programming, as well as the theories of games, inventory, and queuing. Laboratory sessions stress cur-rent practice by plant visits, projects in industry, and case studies. Prerequisites: 315, ENGR 141.

MEIE 315 Statistical Analysis of Engineering Measurements (3) AWSpS Roberts

Application of probability theory and statistics to engi-neering problems, distribution theory and discussion of particular distribution of interest in engineering, statisti-cal estimation and data analysis. Illustrative statistical applications may include quality control, linear regression, analysis of variance, and experimental design. Prerequi-site: MATH 238.

MEIE 317 Work Systems Design (4) AW Drui

Work design and measurement principles; time utilization, flow and operations studies, principles of motion economy, time study principles and practices, physiological and psychological aspects of work. Lec-tures and studies in local industry as laboratory. Corequisite: HSS 300.

MEIE 351 Human Factors in Design (3) WSp Drui

Engineering considerations of the abilities and limitations of the human aspect in the design of operational systems and components. Functional, psychological, physiologi-cal, and environmental considerations. Prerequisite: 315.

MEIE 408 Manufacturing Optimization (3) AW Ford

Design and optimization of manufacturing systems. Computer-assisted manufacture. Sensing and control methods for efficient use of automation. Managing the automated factory. Tool and production planning, Labo-ratory exercises and applications in local industrial plants. Prerequisite: M E 304 or permission of instructor.

MEIE 410. Industrial Organization and Management (3) AWSpS

Drui

Overview of the operations of an industrial organization, interrelationship of functions, and fundamental principles of management that lead toward effective coordination and control. Lectures and case studies in industry.

MEIE 411 Engineering Economy (3) AWSpS Ford

The evaluation of engineering alternatives. Use of inter-est computations, valuation, depreciation, and cost esti-mates to predict the economic result of the application of engineering products or processes.

MEIE 412 Industrial Cost Analysis (4) AW Drui

Examination of systems that provide economic and performance data for management decisions. Use of quantified information from standard cost systems, inventory costs, product cost budgeting, overhead and cost accounting.

MEIE 414 Industrial Safety (2) Sp Anderson

Recognition of hazards; analysis of industrial accidents, their costs, and fundamentals of prevention; organization of safety programs; personnel training for safety. OSHA and WISHA standards.

MEIE 419 Work Environment Design (3) WSp Drui

Design of new or expanding facilities. Considers layout, heating, ventilation, power, acoustics, sanitation, illumi-nation, protection, and other environmental factors. Lec-tures and local industry as laboratory.

MEIE 420 System Safety and Reliability Engineering (4) ASp Roberts

Applications of statistical and algebraic techniques to system reliability. Derivation and discussion of failure distributions; quality control; analysis of reliability test data; maintenance policies and Monte Carlo simulation techniques, Prerequisite: 315.

Courses for Graduates Only

MEIE 511 Management Decision Models (3) Sp Drui, Ford, Marshall

A quantitative approach, using decision models, for engi-neering and management problems in increasing the out-put per hour of work. Concepts of management decisions, deterministic models, probabilistic models, and in-depth study of an actual work situation. Capacity measures, allocation and scheduling resources, and time-measure suburition of alternative measurements with of money evaluation of alternatives recognizing risk. Of-fered on credit/no credit basis only. Prerequisites: 315 and 411, or equivalent, or permission of instructor.

MEIE 513 Advanced Topics in Operations Research (3) A. Marshall

Revised simplex and decomposition methods for computer management of large-scale linear programming problems; stochastic models in queuing theory and in in-ventory theory; introduction to methods used in nonlinear programming; simulation modeling. Prerequisite: 313 or equivalent.

MEIE 516 Advanced Topics in Engineering Statistics (3) W

Marshall, Roberts

Topics are flexible and tailored to the needs of the particular student group involved. Topics usually consid-ered: regression, correlation, experimental design, Monte Carlo techniques, Markov processes, extreme value the-ory, time-series analysis. Prerequisite: graduate standing or permission of instructor.

MEIE 599 Special Projects in Industrial Engineering (1-5, max. 9) AWSpS Prerequisite: permisson of department Chairperson.

MINING, METALLURGICAL, AND CERAMIC ENGINEERING

CERAMIC ENGINEERING

Courses for Undergraduates

CER E 198 Career Planning II (1) WSp

Mueller Career opportunities in ceramic engineering and the re-quired educational curricular planning. Offered on credit/no credit basis only.

CER E 199 Materials Analysis (1) AWSpS

Practical use of optical and electron microscopy, x-ray diffraction, x-ray spectroscopy, electron microprobe, and scanning electron microscopy in the analysis of common engineering materials. Offered on credit/no credit basis only.

CER E 202 Ceramic Engineering I (2) W

Mueller Scope of ceramic materials and ceramic industries; use of ceramics as engineering materials; economic importance.

CER E 203 Ceramic Engineering II (2) Sp Mueller

Theory and methods used in measuring properties of ceramic materials; control of ceramic processes.

CER E 300 Introduction to Ceramic Engineering (5) A Mueller

Introduction to ceramic engineering materials and processes; standards, testing, and evaluation; types of indus-try and employment; career and curricular planning. Not open to students who have received credit in 202, 203.

CER E 301 Ceramic Raw Materials (4) A Miller

Natural and synthetic materials used in ceramic products; their mineralogy, physical properties, compositions, and sources.

CER E 302 Ceramic Processing I: Transport (3) W Miller

fransport in ceramic processing systems; fluid flow, heat flow, mixing, and applications of drying and firing.

CER E 303 Ceramic Processing II: Methods (5) Sp Whittemore

Technology of ceramic fabrication processes. Material characterization at processing stages for control. Laboratory study of all operations in the manufacture of selected ceramic products.

CER E 306 Ceramic Engineering Excursion (1) A Campbell

Plant inspection trip. Prerequisite: junior standing.

CER E 307 Ceramic Engineering Excursion (1) A Campbell

Plant inspection trip. Prerequisite: senior standing.

CER E 311 Physical Ceramics I: Equilibria (3) W Scott

Phase diagrams, thermodynamics of heterogeneous equi-librium, nonequilibrium processes, and the interpretation of three component diagrams.

CER E 312 Physical Ceramics II: Microstructure and Kinetics (4) Sp Fischbach

Crystalline and glassy state; defects, diffusion, and phys-ical-chemical reactions in ceramic materials.

CER E 322 Microscopy of Ceramics (3) A Scott

The use of optical and electron microscopes in the interpretation of ceramic microstructures; thin-section petrography, polished sections, quantitative microscopy, and the use of replicas in the electron microscope.

CER E 323 Instrumental Analysis (3) W Mueller

Theory and application of x-ray diffraction and spectroscopic techniques.

CER E 399 Introduction to Research and Design (1) Sp Scott

Research planning, library search techniques, the engi-neering design problem, and structural material design problems are introduced to facilitate student selection of senior year research or design options in ceramic engineering. Prerequisite: junior standing.

CER E 400 Ceramic Materials (3) W Scott

Nature and properties of ceramic materials and their relation to ceramics in engineering design. The atomic, microstructure, and macrostructure of ceramics related to their stability in electrical, mechanical, and thermal environments. For nonmajors only.

CER E 401 Equipment and Plant Design (3) A Whittemore

The design process and its application in ceramic engineering. Design projects. Prerequisite: 302.

CER E 402 Ceramic Engineering Design I (3) W Campbell

Inclusive design of a specific plant or process, including materials, equipment, layout, feasibility, and optimiza-tion. To be taken in sequence with 403. Prerequisite: 401.

CER E 403 Ceramic Engineering Design II (2) Sp Campbell

Continuation of 402.

CER E 404 Ceramic Process Analysis (3) Sp Whittemore

Case histories of ceramic industrial facilities. Plant visits. Economic factors and overall process integration, including raw materials, processes, fuels; personnel, distribu-tion. Prerequisite: junior standing.

CER E 409 Ceramic Materials Laboratory (1) W Scott

Concurrent registration in 400 required.

CER E 411 Vitreous State (4) A

Fischbach Chemistry and physics of glass, glazes, and porcelain enamels; structure and properties of vitreous materials. Prerequisite: 312 or permission of instructor.

CER E 413 Physical Ceramics III: Thermal and Mechanical Properties (4) A Scott

Physical models for heat capacity, thermal expansion, and thermal conductivity of ceramic materials; validity and utility of models; elastic and plastic deformation; nature of strength and failure with emphasis on the brittle mode; statistical nature of strength of brittle materials; elements of life prediction; thermal gradient stresses; com-position gradient stresses; thermal shock and thermal compositional strengthening. Prerequisites: 311, 312.

CER E 414 Physical Ceramics IV: Electromagnetic Properties (4) W *Miller*

Optical properties. Ionic and electronic conduction in crystalline and noncrystalline inorganic solids. Dielectric and ferroelectric behavior. Magnetic properties of ferrimagnetic materials. Prerequisite: 413.

CER E 420 Colloidal Ceramics (3) Whittemore

Properties and surface chemistry of ceramic colloids. Topics include absorption, adsorption, gels and their con-tributions to cementitious bonding, ion exchange, rheological properties, and analytical techniques applicable to these studies.

CER E 422 Electronic Ceramics (3)

Miller, Scott, Stoebe Principles and theory of conductive, ferromagnetic, piezoelectric, thermoelectric, and electroluminescent materials

CER E 423 Special Composite Materials (3) Theory, properties, and practice in fibrous composite materials. Micromechanics of load transfer from matrix to fiber; properties of individual phases; properties of the interfacial region; elastic and failure properties of com-posite; composite fabrication. Emphasis on glass and car-bon fibers in polymer and metal matrices. Prerequisite: ENGR 170 or permission of instructor.

CER E 441 Undergraduate Seminar (1) A Miller

Employment selection. Resume writing and correspon-dence, personnel contacts, interview planning and job se-lection campaign. Offered on credit/no credit basis only.

CER E 442 Experience in the Arts (1) W

Leahy, Mueller Informal experiences with the arts through attendance at theatres, concerts, art exhibits, etc.; through discussions with creative artists; and through personal attempts at producing a work of art. Offered jointly with HSS 461.

CER E 443 Undergraduate Seminar (1) Sp

Campbell Discussion of research and problems.

CER E 450 Introduction to Carbon Materials (3)

Sp Fischbach

Nature and capabilities of crystalline and disordered forms of pure carbon as engineering materials. Influence of structure on behavior. Preparation methods, structure and properties of diamond; synthetic and natural graph-ites; glassy, coke, pyrolytic, black, and fiber carbons.

CER E 455 Research Techniques (3) A

Fischbach, Stoebe Philosophy of experimentation; error analysis; vacuum technique; production and measurement of high tempera-tures; selected topics in advanced experimental tech-niques. Meets with MET E 455.

CER E 460 Ceramic-Metal Systems (3) W Campbell

Vitreous and crystalline coatings for metals; ceramicmetal composites.

CER E 470 Refractories (3) W

Whittemore Chemical and mineralogical composition; processing methods; thermal, physical, and chemical properties and tests; application.

CER E 476 Introduction to Design With Brittle Materials (3) W Properties and behavior of ceramic materials are related

to their use in advanced technology structures. Analytical and numerical methods required for probabilistic design and current case studies utilized. Offered jointly with A A 476, CESM 476, M E 476, and MET E 476.

CER E 490 Survey of Ceramic Engineering (15) S CER E 490 Survey of Ceramic Engineering (15) S For physical science or engineering graduate students planning graduate study in ceramic engineering, or those in other engineering programs desiring a concentrated course in ceramic engineering. Intensive, short-term cov-erage of reaction kinetics and equilibria, processing, mi-crostructure, and 'properties of ceramics as engineering materials. Laboratory. Not acceptable for graduate de-gree credit in ceramic engineering. Prerequisites: bacca-laureate degree in physical science or ensineering and laureate degree in physical science or engineering and permission of instructor.

CER E 496 Brittle Material Design Project (3) Sp Application of appropriate criteria and the interdiscipli-nary team approach in the design of structural components utilizing brittle (ceramic) materials. Offered jointly with CESM 496, M E 496, and MET E 496. Prerequisite: 476.

CER E 498 Special Topics (1-5, max. 6) AWSpS Special topics in ceramic engineering offered as a course with lectures, conferences, or laboratory. Prerequisite: permission of division head

CER E 499 Special Projects (1-4, max. 4) AWSp Problems in ceramics; laboratory investigations and bibliographic research.

Courses for Graduates Only

CER E 501 Process Ceramics I (3) W

Whittemore Technology of ceramic fabrication processes. Characterization of ceramic materials at stages of processing.

CER E 511 Advanced Physical Ceramics I (3) W Theories and principles of diffusion in solids; phenomenological and atomistic concepts; equilibrium defects; impurity, chemical potential gradient, grain boundary and dislocation effects in metals and nonmetals.

CER E 513 Kinetics and Mechanisms of Reactions and Transformations (3)

Kinetics, mechanisms of reactions, and transformations, Homogeneous reactions. Heterogeneous reactions. Reaction rate theory and activation energy. Nucleation and growth. Diffusion controlled reactions. Oxidation. Diffusionless (martensitic) reactions. Thermodynamics of irreversible processes. Capillarity and surface phenomena: grain growth, sintering, Ostwald ripening. Recovery, re-crystallization, and grain growth. Polymorphic changes. Spinodal decomposition.

CER E 514 Thermodynamic Topics in Ceramics (3) Scott

Applications of thermodynamics to predict behavior of materials at high temperature. Techniques of measure-ment and estimation of high-temperature thermodynamic properties, use of estimated values for thermodynamic calculations.

CER E 520 Seminar (1, max. 6) AWSp

Registration required for all graduate students. Offered on credit/no credit basis only.

CER E 521 Mechanical Behavior of Ceramics (3) Sp

Scott Dislocation structures in ceramics; influence of dislocations on the deformation and fracture of single crystals and polycrystalline ceramics; brittle fracture and theoretical strength. Prerequisite: 511 or permission of instructor.

CER E 536 Brittle Material Design Problem (3, max. 9) ASpS

component utilizing brittle (ceramic) material. Offered jointly with CESM 536 and MET E 536. Prerequisite: 496.

CER E 590	Industrial Minerals Research (*) AWSp
CER E 599	Special Topics in Ceramics (*) AWSp
CER E 600 AWSp	Independent Study or Research (*)
CER E 700	Master's Thesis (*) AWSD

CER E 800 Doctoral Dissertation (*)

MATERIALS ENGINEERING

Course for Undergraduates

MTL E 444 Nuclear Materials (3) Sp Miller

Structure, properties, and performance of materials in nuclear reactor applications; engineering requirements and selection of materials for reactors; technology of materi-als for reactor fuels, moderators, shields, control elewhen the structural components; convolution and oxidation; effects of radiation on the structure and prop-erties of materials. Offered jointly with NUC E 444. Prerequisite: ENGR 170 or equivalent.

METALLURGICAL ENGINEERING

Courses for Undergraduates

MET E 198 Career Planning in Metallurgy (1) WSp Lynch, Stoebe

Introduction to the field of metallurgical engineering. Includes interdisciplinary aspects of the field, lecture-demonstrations, introduction to laboratory tools and techniques, and discussions of curriculum and career opportunities with current students.

MET E 202 Special Projects (1-3) AWSpS

Projects on topics of current interest in metallurgical engineering. Prerequisite: permission of instructor.

MET E 301 Metallurgical Systems and

Instrumentation (3) A Archbold, Stoebe

Instrumentation, equipment, and laboratory techniques in

metallurgical engineering. Metallographic laboratory practice, mechanical property measurements, alloy system principles, heat generation and control, vacuum methods. Laboratory experiments designed to illustrate basic metallurgical principles.

MET E 322 Metallurgical Thermodynamics (3) A Rao

Quantitative application of thermodynamics to systems of interest to metallurgists. A detailed review of thermo-dynamic quantities and equations of state.

MET E 323 Metallurgical Transport Phenomena (4)

Introduction to the principles of momentum, heat, and mass transfer. Review of the principles of chemical kinetics. Application of transport phenomena to systems of metallurgical interest. Prerequisite: 322.

MET E 325 Extractive Metallurgy I (4) W Rao

Physical and chemical principles of mineral preparation and concentration. Comminution: classification, thickening, filtering of mineral suspensions; sampling; transport; and related physical processes. Physical and chemical theory applied to concentration processes; surface phesolution, and precipitation. Laboratory illustrates funda-mental principles.

MET E 326 Process Metallurgy (3) Sp

Lynch

Application of transport theory to metal process engineer-ing. Prerequisite: CER E 302.

MET E 361 Structure of Solids (4) A Archbold

Elements of crystallography and the structure of metals and alloys, intermediate phases, superlattices. Theory and application of X-ray and electron diffraction for the determination of crystal structure. Laboratory experiments related to these principles.

MET E 362 Properties of Solids (4) W

Stang Physical, mechanical, and transport properties of solids; crystal defects and their influence on physical and mechanical properties. Introduction to transport properties and the theory of atomic diffusion. Laboratory experi-ments related to the measurement of the properties of en-gineering solids. Prerequisite: 361.

MET E 363 Reactions in Solids (4) Sp Polonis

Polonis Application of elementary kinetics and thermodynamics to solid-state reactions. Theories of nucleation and growth and their application to diffusional and diffusion-less transformations. Recovery and recrystallization. Heat treatment of alloy systems and relations between properties and microstructure. Laboratory experiments political to these tories. Descentivity 262 related to these topics. Prerequisite: 362.

MET E 402 Educational Projects in Materials Science (1-5) AWSpS

Stoebe In-depth study of special topics in materials science with special seminars and lectures; participation in materials science research projects or curriculum development projects involving science or industrial arts classes. May be repeated for credit. Prerequisite: permission of instructor.

MET E 421 Thermodynamics of Solids (3) W Rao

Applications of thermodynamics to the solid state. Statis-tical interpretation of entropy. Heterogeneous equilibria. Theories of solutions. Thermodynamics of surfaces and of defects in solids. Prerequisite: 322 or equivalent.

MET E 423 Corrosion of Engineering Materials (3) Sp

Archbold, Stoebe

Applications of physical chemical principles to the reac-tion of materials with their environments. Prevention and control of corrosion and oxidation processes. Corrosion problems in materials applications including chemical process industries, nuclear engineering, and marine envifonments.

MET E 426 Extractive Metallurgy II (4) A Application of physical and chemical principles to high-temperature and electrolytic extraction and refining of metals. Descriptions of processes and unit operations,

with emphasis on the thermodynamic and kinetic aspects involved. Prerequisites: 322, 325, and metallurgical science requirement.

MET E 455 Metallurgical Experimental Techniques (3) A Fischbach, Stoebe

Philosophy of experimentation; error analysis; vacuum technique; production and measurement of high tempera-tures; selected topics in advanced experimental techniques. Meets with CER E 455.

MET E 461 Engineering Physical Metallurgy (3) A Polonis

Stress and strain relationships, combined stresses, me-chanical modeling of materials, ductile flow and fracture, brittle fracture, elements of fracture mechanics, design considerations. Influence of microstructure on mechani-cal behavior. For majors and nonmajors. Prerequisite: 363 or M E 343, or permission of instructor.

MET E 462 Deformation and Mechanical Behavior of Metallic Systems (3) Sp Stang

Theories of elastic and plastic behavior of solids. Role of imperfections in mechanical behavior. Yielding, work hardening, strengthening mechanisms, creep, fatigue, and fracture. Prerequisite: 362.

MET E 463 Reliability and Design in Metallurgical Systems (3) W

Archbold Properties of commercially important engineering alloys. Metallurgical design problems and failure analysis. Prerequisite: 363.

MET E 466 Theory of Metals (3) W Stoebe

Introduction to elementary solid-state concepts in materials. Atom bonding, statistical mechanics, free electron and band theories. Application of principles to conduc-tion in metals, insulators, semiconductors, and to magnetic and optical processes in solids.

MET E 468 Undergraduate Seminar (1, max. 3) AWSp

Offered on credit/no credit basis only.

MET E 471 Hydrometallurgy (3) Sp Rao

Thermodynamics of aqueous solutions, Eh-Ph diagrams, mass-transfer factors in leaching, kinetics of dissolution of ore particles, analysis of modern hydrometallurgical processes, ion exchange, and solvent extraction. Prerequisite: 325 or equivalent.

MET E 473 Mineral Process Plant Design (2) General arrangement planning and design calculations on a project basis. Prerequisite: 325.

MET E 475 Pollution Control of Metallurgical Plants (3)

Current topics related to the causes and control of pollution in metallurgical extraction and processing plants. Analysis of environmental pollution in terms of plant sys-tems and processes involving solids, liquids, and gases; the importance of the fundamental properties of these phases in control techniques. Current research and plant design are discussed. design are discussed.

MET E 476 Introduction to Design With Brittle Materials (3) W

Properties and behavior of ceramic materials are related Properties and behavior or ceramic materials are related to their use in advanced technology structures. Analytical and numerical methods required for probabilistic design and current case studies utilized. Offered jointly with A A 476, CER E 476, CESM 476, and M E 476.

MET E 496 Brittle Material Design Project (3) Sp Application of appropriate criteria and the interdiscipli-nary team approach in the design of structural compo-nents utilizing brittle (ceramic) materials. Offered jointly with CER E 496, M E 496, and MET E 496. Prerequisite: 476.

MET E 498 Topics in Metallurgical Engineering (*, max. 6) AWSpS Special topics in metallurgical engineering, including

lectures, conferences, and/or laboratories. Not applicable toward graduate credit. Prerequisite: permission of division head.

MET E 499 Special Projects (*, max. 5) AWSpS Laboratory investigation of a metallurgical problem on an

independent basis. Maximum of 5 credits may be counted toward graduation.

Courses for Graduates Only

MET E 511 Advanced Theory of X-ray Diffraction (3) W Archbold

Use of the reciprocal lattice concept and Fourier analysis in the study of atomic arrangements in crystals. Line shape and diffuse scattering analysis. Analytical interpretation of diffraction patterns. Prerequisite: 361 or equivalent.

MET E 512 Transmission Electron Microscopy (3) Sp Archbold

Fundamentals of electron optics as applied to microscopy. Applications of contrast theory and electron diffraction with emphasis on defect and multiphase struc-tures in crystalline solids. Prerequisite: 511 or equivalent.

MET E 520 Seminar (1) AWSp

Review of research problems and recent literature. Re-quired for all graduate students. Offered on credit/no credit basis only.

MET E 523 Advanced Extractive Metallurgy (3) A Rao

Physical chemistry of metals, mattes, fused salts, and slags. Discussion of papers from current literature. Prerequisite: basic course in thermodynamics or physical chemistry or permission of instructor.

MET E 524 Applied Rate Phenomena (3) A Lvnch. Rao

Lyncn, Rao Application of reaction rate and diffusion theories to met-allurgical processes; solid/gas reactions as in calcining, roasting, sintering, and reduction; liquid/gas reactions as in refining and solid/liquid reactions as in leaching. Pre-requisite: basic course in transport phenomena or permission of instructor.

MET E 525 Thermodynamic Topics in Metallurgy

(3) Sp Selected topics in application of classical and statistical thermodynamics to systems of current metallurgical intereșt.

MET E 526 Dynamic Behavior of Metallurgical Systems (3) W

Lynch

Interpretation of the behavior of metallurgical systems by application of the methods of process analysis and control theory; modeling of systems, exploration of their characteristics by stimulus-response, and review of cur-rent industrial control processes. Prerequisite: graduate standing in engineering or permission of instructor.

MET E 531 Advanced Metallurgy (*) AWSp Study of selected problems, with particular attention to recent publications and scientific applications in physical or extractive metallurgy.

MET E 536 Brittle Material Design Problem (3, max. 9) ASpS Interdisciplinary team approach in design of structural component utilizing brittle (ceramic) material. Offered jointly with CER E 536 and CESM 536. Prerequisite: 496.

MET E 541 Theoretical Structural Metallurgy I (3)

Detailed study of the general properties of dislocations; elastic theory; glide motion of dislocations; vacancies, interstitial atoms, and dislocation climb; imperfect dislocations. Prerequisite: 363.

MET E 542 Theoretical Structural Metallurgy II (3) Sp

Siang

Dislocation arrays in crystals and their plastic properties; the elastic and plastic properties of real crystals; cold work, annealing, polygonization, recrystallization and grain boundaries; creep; cleavage. Prerequisite: \$41.

MET E 561 Phase Transformations in Metals and Alloys I (3) W Polonis

Thermodynamics and kinetics of solid-state reactions in metals, phase stability, theories of nucleation and growth, precipitation from solid solutions, applications to specific metal and alloy transformations.

MET E 566 Magnetic Materials and Phenomena (3) So Stoebe

Theories of magnetic phenomena, including diamagne-tism, paramagnetism, ferromagnetism, and ferrimagnetism. Details of magnetization processes in materials; an-isotropy, magnetostriction; domain energies and configurations; applications to magnetic materials. Prerequisite: 466.

MET E 567 Electronic Processes in Materials (3) Sp Stoebe

Lattice dynamics, including vibrational modes and pho-non effects. Brillouin zone theory, and fermi surfaces with applications in the theory of electrical conduction and in the semiconduction theory. Optical properties of solids, including color centers and luminescence. Prerequisite: 466.

MET E 599 Special Topics in Metallurgy (*) AWSpS

MET E 600 Independent Study of Research (*) AWSpS

MET E 700 Master's Thesis (*) AWSpS

MET E 800 Doctoral Dissertation (*) AWSpS

MINING ENGINEERING

Courses for Undergraduates

MIN E 221 Explosives and Rock Drilling (2) W Anderson

Principles of rock breaking and characteristics of explosives. Theory of fragmentation; design of blast and ex-plosive loading patterns; nuclear explosives in industry; safe practices, and elements of costs. Applications in tunneling and surface work.

MIN E 306 Mine Excursion (1, max. 2) Sp Five-day trip to a neighboring mining region. Required in junior and senior years during spring vacation, or as scheduled.

MIN E 325 Mineral Land Valuation (2) W

Anderson Sampling methods in mines and placers; drill hole and coring methods; geological aspects; estimation of depos-its and reserves; use of computers in ore reserve calculations; metallic and nonmetallic depletion and financial calculations; reports. Prerequisite: 350 or permission of instructor.

MIN E 330 Mine Surveying (3) Sp

Anderson Practice in underground methods, use of special instruments, stope measurements, shaft surveying, solar obser-vations, and carrying of meridian underground; produc-tion of working and geologic maps and sections.

MIN E 333 The Environmental Impact of Mining (3) ASp Anderson

Physical and chemical nature of mineral deposits in their natural setting, including metallic and nonmetallic miner-als, coal, sand, and gravel. Surface mining: waste-ore ra-tio; effect of removing overburden and its disposal; ultimate disposal of waste rock and its toxic and nontoxic characteristics; acid-generating capabilities of waste and mine site. Underground mining: waste rock and tailings disposal; construction and use of tailings dams; disposal of mine water, acidic and nonacidic; provisions for termination of operations; stabilization of waste rock and tail-ings sites; revegetation of mined land and mine dumps; general economics of land rehabilitation. Prerequisites: 350, GEOL 101, or permission of instructor.

MIN E 350 Mineral Resource Development, Production, and Valuation (5) A Anderson

Underground and surface excavation of rock; theory of Underground and surface excavation of rock; meory of fragmentation and use of explosives as applied to tunnels and surface mining. Principles of mineral production, in-cluding delineation of ore bodies; underground and sur-face planning; production costs, including labor and pro-ductivity studies. Mineral land valuation; geologic aspects; estimation or ore reserves by sampling, core drilling; financial calculations. Prerequisite: GEOL 101 or 205 or ENGR 140 or permission of instructor.

MIN E 426 Exploration and Development of Mineral Deposits (4) Sp Anderson

Mining geology; procurement of data by geologic map-ping and drilling; solution of mine structural and fault problems; physiographic, mineralogical, and structural guides to ore applied to mine exploration; exploration and development programs; evaluation of prospects. A feasibility report is required after field study of a mineral deposit. Prerequisites: 350, GEOL 485, or permission of instructor.

MIN E 432 Mine Plant Design (5) Sp

Anderso Principles and application; design of transport systems; air compression practice and distribution; pumping plant and mine water handling; electrical equipment and distribution systems in mines; plant design and construction. Prerequisite: 350.

MIN E 433 Environmental Control in Mines (3) A Anderson

principles and practices. Physical and chemical aspects of mine atmosphere, gases, and dusts; physiological con-siderations; air flow and measurement; mechanical ventilation and air-conditioning equipment and systems. Prerequisite: 350

MIN E 481 Mineral Industry Economics (4) W

Anderson World mineral resources, their distribution, exploitation, and depletion; social, economic, and political effects; international control and trade, industrial organization, government policies, taxation, tariffs, marketing, and pricing; elements of production costs. Offered jointly with GEOL 481. Prerequisites: 350, GEOL 205, or permission of instructor.

MIN E 499 Special Projects (*, max. 5) AWSp Problems in mining or mineral processing; field or laboratory investigations on an independent basis.

Courses for Graduates Only

MIN E 520 Seminar (1, max. 6) AWSp Lectures and discussions; review of research problems and recent literature. Required for all graduate students.

MIN E 521 Mining Systems (*) AWSp Anderson

Production methods; mining control; support; applied ef-ficiency methods; administration; equipment and machinery; health and safety; special problems. Arranged in accordance with student's major interest.

MIN E 551 Special Topics (3-5, max. 15) AWSp Topics of current interest and importance in the mineral industries or individual study on a subject of special interest.

MIN E 600 Independent Study or Research (*) AWSp

MIN E 700 Master's Thesis (*) AWSpS

NUCLEAR ENGINEERING

Courses for Undergraduates

NUC E 444 Nuclear Materials (3) W Miller

Structure, properties, and performance of materials in nuclear reactor applications; engineering requirements and selection of materials for reactors; technology of materials for reactor fuels, moderators, shields, control elements, and structural components; contout ele-ments, and structural components; corrosion and oxidation; effects of radiation on the structure and prop-erties of materials. Offered jointly with MTL E 444. Pre-requisite: ENGR 170 or equivalent or permission of instructor.

NUC E 484 Introduction to Nuclear Engineering (4) ... Vlases, Woodruff

Introductory course in nuclear engineering for seniors, graduate students, and practicing engineers. The course is designed to demonstrate the application of the princi-

ples of nuclear science to the processes associated with the release, control, and utilization of all forms of energy from nuclear sources, including nuclear reactors; elementary nuclear reactor theory; control of nuclear reactors; thermonuclear reactions. Prerequisite: MATH 238 or permission of instructor.

NUC E 485 Nuclear Instruments (3) W Chalk, Woodruff

Principles, measurements, and detection of various types of radiations encountered in nuclear energy systems. Demonstrations include the use of Geiger, proportional, and scintillation detectors; ionization chambers; analogdigital data logging equipment; and multichannel analyz-ers. Sources of radiation include the University of Wash-ington nuclear reactor and pulsed neutron generators. Prerequisite: junior standing.

NUC E 486 Nuclear Power Plants (3) Sp Rahh

Applications of nuclear energy to power generation. Dis-cussions of various types of nuclear reactor systems include pressurized water, boiling water, high temperature clude pressurized water, boiling water, high temperature gas cooled, sodium graphite, as well as advanced converter and breeder reactors. Particular attention is given the problem of world energy resources and the United States and world views of the availability and consumption of nuclear fuels. Various design concepts including radiation shielding and materials selection are considered. Licensing and safety aspects of nuclear steam supply systems are discussed in some detail. The eco-nomics of nuclear power is emphasized throughout the course. Prerequisite: senior standing. Recommended: 484. 484.

NUC E 488 Nuclear Systems Design I (4) A Chalk

Design laboratory involving the synthesis of nuclear systems, engineering analysis, material specifications, and economics to meet the design specifications for modern nuclear industry applications. Prerequisite: 484 or permission of instructor.

NUC E 490 Reliability and Decision Analysis (3) W McCormick

Emphasis on the principles of reliability and safety analy-Examples and problems are for applications in nuclear engineering. Prerequisite: senior standing in engineering or permission of instructor.

NUC E 498 Special Topics in Nuclear Engineering (1-6, max. 6) AWSpS

Discussions, conferences, and lectures on topics of cur-rent interest in nuclear fission and fusion engineering. Prerequisite: permission of department Chairperson.

NUC E 499 Undergraduate Research Projects (1-6, max. 6) AWSpS Independent research projects in nuclear engineering. Prerequisite: permission of department Chairperson.

Courses for Graduates Only

NUC E 500 Nuclear Reactor Theory (4) A Albrecht, McCormick Covers the angle-independent transport equation and re-duction to specialized forms; multigroup, multiregion diffusion theory; calculations of eta, thermal utilization, and resonance escape probability; reactor kinetics; pertur-bation theory. Prerequisite: permission of departmental activity. adviser.

NUC E 506 Nuclear Engineering Laboratory (4) Sp Chalk, Woodruff

Advanced laboratory course in which experimental re-search is conducted. Selected experiments are performed that involve the use of such equipment as the reactor as a neutron and gamma ray source, pulsed neutron generator, helical neutron monochrometer, neutron diffraction spec-trometer, pile oscillator, pile-noise analysis equipment, time-of-fight equipment, and analog and digital comput-ers. Prerequisite: 485 or permission of instructor.

NUC E 510 Nuclear Reactor Engineering (3) A

Babb Advanced course in engineering analysis of nuclear reactor systems. The course covers core design methods; heat generation and distribution in nuclear reactor systems; the removal and utilization of heat for power production; fuel cycles; shielding of nuclear radiations, safety analysis

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and licensing procedures. Prerequisite: 500, which may be taken concurrently, or permission of instructor.

NUC E 512 Nuclear System Design (4) W Babb, Ribe, Woodruff Design laboratory involving the synthesis of reactor the-ory, engineering analysis, material specifications, and economics in the conceptual and preliminary designs of systems, facilities, or processes associated with nuclear fission and fusion devices. Projects are selected from topics of current interest, and one usually engaged by team effort, Prerequisite: 510 or permission of departmental advier

NUC E 521, 522, 523 Graduate Seminar (1.1.1) A,W,Sp Offered on credit/no credit basis only.

NUC E 524 Seminar in Nuclear Systems Analysis (1) AWSp

Studies of recent advances in nuclear systems analysis with students, faculty, and visiting scientists and engi-neers reporting on recent research and publications. Only open to students having a master's degree or equivalent. Offered on credit/no credit basis only.

NUC E 530 Nuclear Reactor Statics (4) Sp McCormick

Benphasis on methods for calculation of neutron and gamma-ray distributions in nuclear reactors and shields. Covers the linear Boltzmann equation and the spherical harmonics, discrete ordinate, and Monte Carlo tech-niques. Explicit solutions to simple transfort problems are obtained. Prerequisite: 500 or permission of instructor.

NUC E 540, 541 Nuclear Energy, Man, and His Environment I, II (3,3) W,Sp Robkin

For majors and nonmajors interested in evaluating the For majors and nonmajors interested in evaluating the impact of nuclear power technology on man and his envi-ronment. Studies of modern nuclear power cycles, nu-clear reactor safeguards, thermal effects, control of ra-dioactivity releases, biological response to radiation, environmental monitoring, evaluation of new energy sources and energy conversion systems. Offered jointly with RAD S 540, 541.

NUC E 556 Introduction to Plasma Theory (4) W

Ribe, Vlases Introduces plasma theory and lays the foundation for ap-Infrontices plasma theory and lays the foundation for ap-plication to a variety of research and development areas. Topics covered include dynamics of charged particles in electromagnetic fields, plasma kinetic theory, transport phenomena, development of various fluid models, and waves in plasma.

NUC E 557 Plasmas and Controlled Fusion (3) Sp Ribe, Vlases

Emphasis on the problem of controlled thermonuclear fusion. After an introduction to the general problem, the basic principles of magnetic confinement, stability, and laser fusion are discussed. Final section deals with a re-view of current research in this field, including status of national fusion program devices. Prerequisite: 556.

NUC E 558 Advanced Plasma Theory (3) A Ribe, Vlases

Ribe, Vlases Emphasis on the main topics of theoretical plasma phys-ics that apply to fusion research. Focus on equilibria, in-stabilities, and waves using the descriptions of the magnetohydrodynamic, two-fluid, Vlasov-kinetic, and mixed fluid-kinetic models. Prerequisites: 556, 557, or permission of instructor.

NUC E 560 Nuclear Reactor Dynamics I (4) W Albrecht

Nuclear reactor dynamic equations, delayed neutron rep-Nuclear reactor dynamic equations, delayed neuron rep-resentations, response of reactors to various perturba-tions, operational techniques of system analysis, feed-back mechanisms, stability criteria, power coefficients. Prerequisites: 500, MATH 427, 428, or permission of in-

NUC E 561 Nuclear Reactor Dynamics II (3) Sp. Albrecht

Experimental nuclear reactor dynamics, oscillators, pulsed neutrons, stochastic processes; dynamics of heat removal system components, analysis of closed loop sys-tem, space-dependent dynamics. Prerequisite: 560.

NUC E 565 Fusion Reactor Fundamentals (3) A Woodruff

Introductory course covering the basic engineering fea-

tures of thermonuclear-driven power plants. After a brief description of the fundamental physics underlying fusion processes, the emphasis is on those areas currently presenting the greatest technological obstacles to development of economic fusion power, such as materials problems, magnet design, and nuclear heating. Prerequi-site: PHYS 327 or permission of instructor.

NUC E 566 Fusion Reactor Engineering (3) Emphasis on the technological and physical aspects of large fusion experiments and reactors based on mainline concepts (Tokamak, magnetic mirror, etc.). Topics in-clude superconducting magnets, neutral-beam injection, tritium systems, power handling, and fusion-fission hy-brid applications. Prerequisites: 556, 565 or permission of instructor.

NUC E 588 Nuclear Fuel Management (3) A Garlid

Technical and economic principles for management of nuclear fuels including; energy resources, fuel cycle schemes, fuel cycle neutronics, fuel cycle economics, irradiated fuel processing, isotopic separations, utilization of fission products and other radioactive isotopes. Prereq-uisite: 484 or permission of instructor.

NUC E 600 Independent Study or Research (*) AWSpS

NUC E 700 Master's Thesis (*) AWSpS Offered on credit/no credit basis only.

NUC E 800 Doctoral Dissertation (*) AWSpS Offered on credit/no credit basis only.

OCEAN ENGINEERING

O ENG 401 Introduction to Ocean Engineering (3)

Adee, Richey

Special design considerations for the ocean environment, including corrosion, biological encrustation, hyperbaric loading, wave, current and tidal forces, as well as various sea floor and coastal conditions. Selected examples of major ocean engineering projects are reviewed with at-tention given not only to technical function but also to safety and the environmental and social implications of operational failure. Students carry out a project requiring special ocean engineering considerations in design, oper-ation, and maintenance. Prerequisite: MATH 238 or permission of instructor.

O ENG 425 Introduction to Underwater Acoustics (3) A Ehrenberg, Lytle

Introduction to acoustic propagation, refraction, and re-flection in the ocean. Characteristics of transducers, time and frequency representation of acoustic signals, sources and characteristics of acoustic noise and acoustic signalprocessing systems. Prerequisite: senior standing in engi-neering, MATH 238, or permission of instructor.

O ENG 444 Coastal Engineering I (3) WSp Richey

Linear theory of water waves, wave transformations due to boundary conditions, sediment motion, elementary ti-dal theory; applications illustrated by laboratory experiments and selected case histories. Offered jointly with CEWA 444. Prerequisite: CIVE 342.

O ENG 450 Marine Corrosion and Its Prevention (3) Sp Sandwith

Causes and prevention of corrosion damage by marine environments (immersed, tidal, atmospheric). Behavior (pitting, rusting, cracking, fatigue, and fracture) of engi-neering materials (metals, plastics, and ceramics) in the ocean. Case studies are used to understand methods of reocean. Case studies are used to inderstand methods of re-ducing corrosion damage by design, materials selection, cathodic protection, coatings, and maintenance. Techni-cal report(s) to be prepared. Prerequisites: senior standing in engineering and M E 343 or equivalent materials course.

O ENG 490 Naval Architecture (3) A Adee

Theory of naval architecture; ship's lines, hydrostatic curves, intact and damaged stability, launching. Offered jointly with M E 490. Prerequisite: junior standing in engineering or permission of instructor.

O ENG 491 Naval Architecture (3) W Ādee

Theory of naval architecture; strength, A.B.S. rules, wa-ter waves, ship and platform motions. Offered jointly with M E 491. Prerequisite: junior standing in engineering or permission of instructor.

O ENG 492 Naval Architecture (3) Sp Adee

Acce Theory of naval architecture; dimensional analysis, resis-tance, model testing, propellers, steering. Offered jointly with M E 492. Prerequisite: junior standing in engineer-ing or permission of instructor.

O ENG 498 Special Topics in Ocean Engineering (1-5, max. 6)

Special topics in ocean engineering offered with lecture and/or laboratory. Prerequisite: permission of ocean engineering adviser.

Courses for Graduates Only

O ENG 503 Marine Technology Affairs I (3) W Wenk

Case studies in marine legislation, fishery conventions, coastal pollution, oil and gas extraction, environmental observations, planning for international exploration of the sea, federal organizations, etc., to identify compo-nents in the marine technology enterprise, dynamics of interrelationships, externalities, policy planning and in-stitutional conflicts in setting goals, priorities, and pro-gram strategies. Offered jointly with CIVE 543. Prereq-uisite: permission of instructor.

O ENG 504 Marine Technology Affairs II (3) Sp Wenk

Class-generated group research on a contemporary marine issue in Washington State leading to specific pol-icy proposals. Offered jointly with CIVE 544. Prerequi-site: 503 or permission of adviser.

O ENG 541 Hydrodynamics in Water Quality (3) W Nece

Theoretical, field study, and laboratory model ap-proaches to diffusion and dispersion in problems of concern to water resources engineers. Offered jointly with CEWA 541. Prerequisite: CIVE 342 or permission of instructor.

O ENG 544 Coastal Hydraulics (3) Sp Hartz, Richey

Nonlinear water waves and structural loadings analyzed by stream function theory; random waves and structural responses analyzed by time series techniques. Offered jointly with CEWA 544. Prerequisite: familiarity with linear wave theory.

O ENG 551, 552 Ocean Engineering Systems Design I, II (3,3) W,Sp

Vesper

Interdisciplinary ocean systems design, choice of system motivated by problems of current interest; participation by students and faculty from engineering, law, oceanog-raphy, business, etc., in order to study complete system; preliminary design and analysis of engineering hardwar, direct interaction with government and industry con-cerned with chosen problem. Offered jointly with IMS 551, 552. Prerequisites: graduate standing; 551 for 552.

O ENG 580 Strain Measurements and Instrumentation (3). W

Hartz

Experimental determination of strain under static and dy-Experimental occurmination of strain under static and dy-namic loads; strain gauges; transducers for displacement velocity and acceleration; photoelasticity, brittle coating and other methods; problems of instrumentation, data collection, and analysis of data; use of modern IC elec-tronic components and computers or microprocessors for data collection and analysis. Offered jointly with CESM 580. Prerequisite: graduate standing or permission of in-structor. structor.

O ENG 590 Wind, Wave, and Earthquake Response of Structures (3) Sp Hartz

Harz Fundamental principles governing the static or dynamic response of suspended structures, transmission lines, tall stacks, and other flexible structures subject to deflection, overturning, or oscillation as a result of wind, wave, and earthquake action. Offered jointly with CESM 590. Prerequisite: graduate standing in engineering.

O ENG 599 Special Topics in Ocean Engineering (1-5, max. 9) AWSpS Adee, Richey

Prerequisite: permission of ocean engineering adviser.

COLLEGE OF FISHERIES

FISHERIES

Courses for Undergraduates

FISH 101 Introduction to Fisheries Science (5) AS Salo

Identification, distribution, and life histories of selected fish and shellfish; commercial and recreational fishing; utilization of fisheries products; problems faced in fish-eries conservation and management. Recommended for both majors and nonmajors.

FISH 311 Functional Anatomy of Fish and Shellfish (4) ASpS Smith

Functional capabilities and limitations of fish and shell-fish as reflected in their anatomy, biology, and ecology. The laboratory portion of the course includes dissection of representative species of economically and ecologi-cally important fish and shellfish. Prerequisite: 10 credits in biological science.

FISH 314 Methods and Instruments for Fishery Investigations (3) WSp Hansen

Theory and practice of instrumentation and sampling in fisheries; shipboard experience with equipment, collecting and recording data from biological samples, and the physical environment. Prerequisite: 5 credits in fisheries.

FISH 340 Applications of Digital Computers to Biological Problems (5) AW Bevan

Methods and procedures for processing biological and natural resource data by means of digital computers; problem analysis, elementary programming, use of pack-age programs for statistical analysis. No credit if Q SCI 340 has been taken. Prerequisite: Q SCI 281 or 381 or equivalent.

FISH 352 Fundamentals in Fisheries Biochemistry (3) A

Brown Occurrence and role of carbohydrates, lipids, proteins, amino acids, vitamins, nucleic acids, and other com-pounds in fishes and other aquatic organisms. Topics include respiration, digestion, absorption, growth, repro-duction, excretion, body fluids, general metabolism, intermediate metabolism, energy metabolism, and de-toxification. Emphasis on biochemistry as it relates to nutrition and fish. Prerequisites: organic chemistry and 10 credits of biology.

FISH 367 Recreational Fisheries (4) Sp Pauley

History of recreational fishing; present trends in sport fishing and prediction of future trends; types and charac-teristics of recreational fisheries; value of recreational tensities of rectantional mineries; value of rectantional fisheries; habitat requirements; coology and behavior that are important considerations in management; manage-ment philosophy and techniques. Recommended for ma-jors and nonmajors. Field trips. Prerequisite: 10 credits of biological science.

FISH 379 Fisheries of the World (3) A Gunderson

Cunderson Review of aquatic living resources; other resources of the sea; present and future of world's fisheries; estimation of potential harvest and problems of development; law of the sea and international arrangements for fisheries; sta-tus of the United States fishing industry; prospects of aquaculture.

FISH 395 Literature Search in Fisheries and Food Science (3) AWSp

Training in methods of searching fisheries and food science literature with emphasis on organizing and communicating the material. Prerequisites: public speaking and advanced expository writing.

FISH 401 Ichthyology (5) ASp Pietsch

Concepts of systematics and organic evolution as applied to current problems in the phylogeny of fishes; classifica-tion of fishes of the world by habitat; geographic distribution and ichthyozoogeography. Prerequisites: 10 credits in biological science and junior standing or above.

FISH 405 Economically Important Mollusca (5) Sp Chew

Classifications, life histories, distribution, methods of cultivation, and economic importance of oysters, clams, scallops, abalones, cephalopods, and other mollusca. Mandatory laboratory fee. Prerequisite: 10 credits in biological science.

FISH 406 Economically Important Crustacea (5) W

Armstrong Classifications, life histories, distribution, methods of capture, and economic importance of crabs, shrimps, lobsters, crayfish, and the smaller Crustacea. Mandatory laboratory fee. Prerequisite: 10 credits in biological science.

FISH 415 Principles of Fish Physiology (3) W Smith

Survey of the functions of the organ systems of teleost fishes, emphasizing salmonids. Prerequisite: 10 credits in biological science.

FISH 416 Fish Physiology Laboratory (2) W

Smith

Exercises and projects in fish physiology. To be taken concurrently with or following 415.

FISH 425 Life History of Marine Fishes (5) W Miller

Fecundity, spawning, incubation, and hatching of marine fishes; identification and survival of larvae and juveniles; aging; food and feeding of adults; migration; recognition of subpopulations. Prerequisites: 401 and major status or permission.

FISH 430 Biological Problems in Water Pollution (5) W

Biological and ecological changes in the aquatic environ-ment resulting from domestic, industrial, radioactive, and agricultural wastes and methods for their evaluation. Prerequisite: major status or permission of instructor.

FISH 434 Ecological Effects of Waste Water (3 or 5) A Welch

Principles of aquatic ecology with emphasis on aspects-related to water-quality problems and methods of measur-ing associated biological changes. Topics include: introduction to aquatic ecology, distribution of chemicals and their role in metabolism, nutrient cycles and effects of natural and man-caused changes in environmental factors on aquatic plant and animal communities. Offered jointly with CEWA 434.

FISH 435 Physiological Effects of Water Pollutants (3) Sp Brown

Physiological effects of water pollutants on economically important or endangered fishes, especially with respect to waste water. Types of industrial, urban, and agricultural entities that contribute wastes to natural waters. Monitorentities that contribute wastes to natural waters. Monitor-ing proceedures and assessment of changes in fisheries as a consequence of waste effluents. Offered jointly with CEWA 435. Prerequisites: upper-division or graduate standing, organic chemistry, and some background in any of the following: general physiology, cell biology, biochemistry, chemical biology, sanitary engineering.

FISH 444 Fisheries Genetics (3) A

Hershberge Survey of principles and practices in the field of genetics that can be applied to fisheries biology, with emphasis placed on the qualitative and quantitative aspects of vari-ability in aquatic species, natural and artificial selection, and genetic analysis of fish populations. Prerequisite: and genetic analysis or n GENET 451 or equivalent.

FISH 450 Salmonid Behavior and Life History (3) A Brannor

Marine distribution, homing migration, and spawning behavior of adult salmon: incubation, emergence, mi-gration, and residence of fry; fingerling distribution and residence with reference to species interaction and population evolution. Prerequisites: 401 and 15 credits in biology.

FISH 451 Reproduction of Salmonid Fishes (3) A

Artificial spawning and incubation of salmon; embryology and development rates of different species; practical exposure to artificial spawning techniques, egg handling, and care, alevin hatching and treatment. Prerequisites: 401 and 15 credits in biology.

FISH 452 Fish Nutrition (3) W Haiver

Nutritional requirements of fish; importance and role of carbohydrates, lipids, proteins, vitamins, and minerals in fish nutrition; essential and nonessential classification of nutrients; nutritional diseases. Prerequisites: 352, organic chemistry, 10 credits in biology.

FISH 453 Salmonid Culture Technology and Enhancement (4) Sp

Brannon

Design of fish production facilities; methods of incubation, rearing, and handling of fish; problems encountered in hatchery water supplies. Management goals and strat-egy; assessment of production; stocking; impact on natu-ral populations. Prerequisites: 451, 452, or permission of instructor.

FISH 454 Communicable Diseases of Fishes (3) A Landolt

Organisms causing diseases in fishes; prevention and known treatments of fish diseases. Prerequisites: 10 credits in biology and 10 credits in chemistry.

FISH 455 Communicable Diseases of Fishes Laboratory (2) A

Landolt

Laboratories to study bacteria, viruses, and parasites that cause diseases of fishes and to study diagnostic techniques. Prerequisite: permission of instructor.

FISH 456 Aquatic Entomology (5) Sp Laboratory and field course dealing with the taxonomy, ecology, and life history of selected aquatic insects, with special reference to the impact of man on stream systems. Offered irregularly. Prerequisite: ZOOL 331 or permission of instructor.

FISH 457 Management of Exploited Animal Populations I (4) W

Mathews

Equilibrium yield model; spawner-recruit models, management methods; use of catch-effort statistics in estimaagement intendos; use of catch-entory statistics in estima-tion and management, computer simulation in manage-ment decisions. Offered jointly with Q SCI 457. Prerequisites: Q SCI 281, 292; BIOL 210 or FISH 425, or permission of instructor.

FISH 458 Management of Exploited Animal Populations II (4) Sp Gallucci

Extension of principles and practices of 457. Estimating Extension of principes and practices of 477. Estimating catch and effort and analyzing catch-per-effort statistics. Standardizing effort, gear selectivity, recruitment, mod-els of exploited fishery populations with management ap-plications. Introduction to simulation of fish and wildlife populations, emphasis on applications using current data from fishery and game organizations. Offered jointly with Q SCI 458

FISH 459 Aquatic Food Chains (5) W

Taub

Survey of the sources and nutritional values of foods for fisheries resources. Efficiencies, rates of transfer through the food chain, pollution effects, and the potential for us-ing pollution are considered. Prerequisite: major status or permission of instructor.

FISH 460 Water Management and Hydrology (4)

ASD Brannon, Kent, Schell

Nomenclature water cycles and soil retention, water flow measurements in streams, flow in pipes and channels, de-termination of pressure in open and closed systems, screening of water diversions, upstream and downstream fish passage. Prerequisities: 401, MATH 105, and phys-ics, or permission of instructor.

FISH 461 Culture and Reproduction of Temperate Warm Water Fishes (3) Sp

Brannon, Congelton, Pauley

History of pond fishes, reproduction, and culture of carp,

COLLEGE OF FOREST RESOURCES

catfish, bass, perch, and tilopia species; pond construc-tion and pond management; polyculture. Prerequisite: 459 or permission of instructor

FISH 462 Feeds and Diet Formulation (3) W

Brannon, Halver, Staff

Brannon, Halver, Staff Feed terminology and classification, nutritive characteris-tics; effect of processing on food value, influence of stor-age on nutrient stability, nonnutritive feed additives; ex-posure to the fish feed industry, Prerequisite: 452.

FISH 463 Principles of Resource Assessment (5) Sp Mathisen

Theory and methods of conducting resource assessment surveys, including survey planning, survey execution and data acquisition, analysis, interpretation, and presenta-tion. Emphasis on the use of survey techniques to understand the status of fishery resources. Prerequisites: 314, 340, Q SCI 281, or permission of instructor.

FISH 465 Marine Fish Biology (9) S Taxonomy, ecology, and life history of the fishes of the San Juan Islands and northeast Pacific. Prerequisite: per-mission of instructor. (Offered at Friday Harbor Laboratories Summer Quarter only.) Offered alternate years.

FISH 467 Fisheries Management (5) Sp Whitney

Principles and practice of the management of commercial and recreational fisheries. Emphasis is on concepts. A field exercise provides practical experience. Guest lectur-ers from international, federal, and state agencies discuss ero from international, teteral, and state agencies discuss the need to take into account factors other than biological in making management decisions. Students interested in a more quantitative emphasis should take Q SCI 456, 457, 458. Prerequisite: Q SCI 281 or 381. Recommended: 340.

FISH 472 Aquatic Radioecology I (3) W

Sevmour

Nature, detection, and measurement of ionizing radiation. The use of radionuclides for aquatic ecological studies. Prerequisites: 10 credits in chemistry and 10 credits in biological sciences.

FISH 473 Aquatic Radioecology II (3) Sp

Seymour Natural and artificial radionuclides in the aquatic environ-ment and their impact on man and other organisms. Prerequisites: 10 credits in chemistry and 10 credits in biological sciences.

FISH 475 Marine Mammalogy (3) Sp

Lecture in marine mammalogy: the evolution, taxonomy, physiology, life history, and behavior of marine mam-mals; the techniques of studying and the management and conservation of them. Offered jointly with WLF S 475. Prerequisite: junior or senior standing.

FISH 476 Laboratory c* Marine Mammalogy (2) So

Laboratory in marine mammatogy; the evolution, taxon-omy, physiology, life history, and behavior of marine mammals; the techniques of studying them and the man-agement and conservation of them. Offered jointly with WLF S 476. Prerequisite: 15 credits in biology. Recom-mended, warthersts anatomy and physiology. mended: vertebrate anatomy and physiology.

Aquatic Environment (3) Sp Scheli FISH 477 Applied Chemical Techniques in the

Procedures for obtaining representative samples for chemical analysis of biological materials in the food chains: procedures for initial treatment and wet chemical comparative methods for analysis in pollution-related problems; comparative methods for analysis of different sample types; sample collection in the field; analysis of biologi-cal material and water. Prerequisites: general inorganic (quantitative analysis), organic chemistry, CHEM 167, and 232 or 236 and permission of instructor.

FISH 478 Applied Chemical Techniques in the Aquatic Environment Laboratory (2) Sp Schell

Methods in practical field sampling and analysis for pol-lution-related contaminants. Shipboard procedures and new chemical methods are used on special problems se-lected by the students. Sediment, biota, and water samples collected are measured by instrumental analysis methods, including neutron activation, atomic absorp-tion, and gas chromatography. 477 may be taken concur-rently with 478. Prerequisites: CHEM 167, and 232 or alvsis . 236

FISH 499 Undergraduate Research (1-5, max. 9) AWSpS

Individual research within the College of Fisheries or onthe-job training in governmental or industrial fisheries or-ganizations. Prerequisite: permission. A. Guest lecture series. B. Special problems. C. Special course in fisheries.

Courses for Graduates Only

FISH 501 On-the-Job Training (1-5, max. 5 for M.S., 9 for Ph.D.) AWSpS Guided on-the-job training in governmental or industrial fisheries organizations. Prerequisite: permission of instructor.

FISH 503 Advanced Ichthyology (3) Sp Pietsch

biosystematic theory and practical application in ichthy-ology; analysis of recent advances and current problems in phylogeny and zoogeography. Prerequisite: 401 or equivalent.

FISH 504 Invertebrate Pathology (5) W

FIST 304 Inverteurate ratio ogy (5) w Landolt, Pauley Pathological effects and communicable diseases in inver-tebrates. The discussion is phylogenetic and compara-tive. Juniors and seniors may take the course, but must have course prerequisites. Prerequisites: 454 and invertebrate zoology or equivalent, or permission.

FISH 507 Special Problems in Fisheries

(1-5, max. 15) AWSp Classroom, laboratory, or field studies on problems of current interest. A maximum of 6 credits of 507 is permitted to apply to a master's degree program. Prerequisite: permission. A. Guest lecture series. B. Special problems. C. Special course in fisheries.

FISH 515 Topics in Fish Physiology (3) Sp Smith

Analysis of recent advances in salmonid physiology with detailed coverage on selected organ systems having greatest importance to class members. Prerequisite: 415 or permission of instructor.

FISH 516 Fish Physiology Laboratory (2) Sp

Smith Selected experimental techniques in fish physiology. Prerequisite: 515 or concurrent registration.

FISH 520 Graduate Seminar (1) A Introduction to research in fisheries. Offered on credit/no credit basis only.

FISH 522 Graduate Seminar in Fisheries (1, max. 2) WSp Lectures and discussions of current problems and current research in fisheries. Offered on credit/no credit basis only.

FISH 525 Ecology of Marine Fishes (3) Sp Miller

Spawning, growth, survival, and distribution of fish in relation to physical, chemical, and biological factors; diel and seasonal migration; emphasis is on fishes of the near-shore environment. Prerequisites: 401 or equivalent, and permission of instructor.

FISH 527 Aquatic Microcosms (3) Sp

Taub Taub Use of microcosms to evaluate biosphere processes. Stu-dents select a limited topic, such as a type of microcosm or a process; critically examine the original research re-ports; and share their findings by written and oral reports. Focus is on laboratory microcosms such as pesticide biomagnification and degradation in terrestrial-aquatic microcorne: nutrient outles in source; belaced errorie microcosms; nutrient cycles in aquaria; balanced aquaria (myth or reality?); closed ecological systems; leaf node microcosms; photosynthesis/respiration/biomass relationships in maturing aquatic communities; gnotobiotic eco-systems; artificial substrates in natural communities; predator-prey interactions in continuous cultures and nat-ural communities studied as microcosms (e.g., watersheds, streams, ponds, marine upwelling systems). Recommended background: an ecology course and lim-nology or biological oceanography. (Offered alternate years; offered 1980-81.)

FISH 535 Metabolic Effects of Chemical Pollutants (4) W Brown

Physiological and biochemical effects of industrial, ur-

ban, and agricultural chemicals on aquatic biota; specific metabolic effects of various poisonous and inhibitory substances; modes of inhibition of enzyme systems of aquatic organisms. Prerequisites: upper-division or graduate standing, organic chemistry, general physiol-ogy, biochemistry, or cell physiology, or equivalent. (Offered alternate years.)

FISH 540 Application of Digital Computers to Problems in Aquatic Ecology (3) AW Bevan

Laboratory problems adapted to special interests of the student. Consideration of the simulation of aquatic communities, analysis of aquatic populations, and ecological changes. Prerequisite: permission of instructor.

FISH 544 Genetics in Fish Management and Production (3) W Hershberger

Study of the possible changes in genetic characteristics and response of populations with the current types and levels of fisheries resource manipulation. Includes genetic considerations in population models, quantitative genetics and breeding, and use of genetic markers for population analysis. Prerequisites: 444, 451, Q SCI 382, 383, and upper-division or graduate standing.

FISH 556 Introduction to Quantitative Population Dynamics (3) A Fletcher

Simple analytic approaches to population management; applications of parent-progeny models and logistic mod-els; biological and economic yields of natural popula-tions; analysis of population data on high-speed digital computers. Prerequisites: Q SCI 291, 292, 383, 457, or permission of instructor.

FISH 557 Theoretical Models of Exploited Animal Populations (3) W

Fletcher

Mathematical representation of basic population processes such as growth, mortality, natality, and mobility; application of optimization technique to yield models. Laboratory work on digital computer. Prerequisite: 556 or permission of instructor.

FISH 558 Estimation of Population Parameters (3) Sp Fletcher

Statistical analysis of population data; design and analy-sis of mark-recapture experiments on natural populations; laboratory work on digital computer. Prerequisite; 557 or permission of instructor.

FISH 560 Methods of Stock Assessment (3) Sp Mathisen

Theory and implementation of processing of fish target signals. Application for estimation of fish stocks and the statistical properties of the estimation procedure. (Offered alternate years; offered 1980-81.)

FISH 575 Principles of Ecology as Applied to Fishes (3) A Zaret

Theoretical ecology as applied to fishes. Includes fish vi-sion, color pattern determinants, adaptive radiation, com-petition and predation, fish behavior, reproductive patterns, community organization, and species diversity. Offered jointly with ZOOL 575. Prerequisite: graduate standing or permission of instructor.

FISH 600 Independent Study or Research (*) AWSpS Offered on credit/no credit basis only.

FISH 700 Master's Thesis (*) AWSpS Offered on credit/no credit basis only.

FISH 800 Doctoral Dissertation (*) AWSpS Offered on credit/no credit basis only.

FOOD SCIENCE

Courses for Undergraduates

FD SC 102 Food-The Technological Challenge (5) A Liston, Pigott

Reviews the scientific and technological developments leading to the present food supply and food industry.

Outlines principles of food science related to preserva-Considers additives, the att and organic foods, preserva-tives, food-borne illness, and other topical concerns re-lated to foods in terms of technological function, utility, and safety. Present and impending technological devel-opments to resolve the problem of providing a safe; wholesome, and adequate food supply for the increasing world population are discussed. Designed for nonmajors with minimal science background.

FD SC 350 Food Components (3) A

Matches

Classification of foods and food ingredients. Chemical Classification of foods and food ingredients. Chemical components of foods: lipids, proteins, carbohydrates, pigments, and small molecule components. Major food classes, including their chemical structures and changes resulting from handling and processing.

FD SC 378 Principles of Fishing Gear and Vessel Development (3) A Pigott

Principles of fishing techniques used in the major com-mercial fisheries related to vessel design, instrumentation and facilities required in the operation and handling of specialized fishing gear, and shipboard processing.

FD SC 380 Principles of Fisheries Technology (3) W Liston

Composition of fish; blochemical and microbiological changes in fish-postmortem; nature and effects of pro-cessing procedures, analytical control procedures; current technological developments. Prerequisite: CHEM 102 or 160

FD SC 381 Environment, Food, and Technology (3) Sp Pigott

Principles of seafood processing operations as related to control of pollution problems arising from food process-ing wastes through total utilization of raw materials.

FD SC 385 Food Engineering I (3) W Pigott

Application of physical laws to the physical and chemical changes that occur in food during harvesting, transporting, processing, storage, packaging, and marketing. Given particular emphasis in the student assignments are problems in industrial stoichiometry as applied to material and energy relationships during these changes. Food science majors must take 385 concurrently with 395. Pre-requisite: major status or permission of instructor.

FD SC 395 Food Engineering I Laboratory (1) W

Pigott Laboratory demonstrations of basic food engineering principles that are studied in 385. Food science majors must take 395 concurrently with 385.

FD SC 441 Safety and Quality in Food Processing and Handling (4) Sp Matches

Study of food science as it relates to food quality, food safety and food laws; the microbiological aspects of food spoilage, food-borne illnesses, and food processing; ef-fects of food handling on nutrient retention. Offered jointly with NUTR 441. Prerequisite: senior standing in coordinated undergraduate program in clinical dietetics or permission of instructor.

FD SC 442 Laboratory for Safety and Quality in Food Processing and Handling (1) Sp

Matches Laboratory experiences emphasizing the microbiological aspects of food spoilage and food-processing techniques. Field trips to food service establishments and food-pro-

stess and plants. Offered jointly with NUTR 442. Prerequi-sites: concurrent or previous registration in 441 or NUTR 441, and permission of instructor.

FD SC 481 Introduction to Food Technology (4) Sp Liston

Chemical and biological properties of foods; principles of processing, storage, distribution, and spoilage. Food sci-ence majors must take 491 concurrently with 481. Prerequisite: permission of instructor.

FD SC 482 Food Chemistry (3) A

Iwaoka Iwaoka Chemical composition, structure, and properties of foods and some of the chemical changes they undergo. Compo-nents of formulated foods, including additives and natu-rally occurring toxins. Prerequisite: BIOC 406 or permis-elan of instructor. sion of instructor.

FD SC 483 Food Analysis (3) W Iwaoka

Methods of proximate analysis. Principles of separation and identification of food components by physical, chemical, and spectrophotometric methods. Prerequisite: 482

FD SC 484 Food Microbiology (3) A Liston, Matches

Numbers, types, and significance of micro-organisms in foods. Charges resulting from micro-organisms' growth and activity. Fermentation and other microbiological pro-cesses in foods. Food science majors must take 494 concurrently with 484. Prerequisites: 481 and major status, or permission of instructor.

FD SC 485 Food Engineering II (3) W Pigott

Unit operations in food processing, emphasizing engi-neering and technological bases of food operations. Majors must take 495 concurrently. Prerequisites: 385 and 395, or permission of instructor.

FD SC 486 Deteriorative Processes in Foods (3) Sp Iwaoka, Matches

Iwaaka, Matches Biochemical, microbiological, physical, and chemical changes occurring in foods. Food science majors must take 496 concurrently with 486. Prerequisites: 483, 485 or permission of instructor.

FD SC 491 Introduction to Food Technology Laboratory (1) Sp

Liston Laboratories and field trips to local food-processing plants to see and study important food-processing opera-tions such as freezing, milling, canning, brewing, milk processing, and spice processing. Food science majors must take 491 concurrently with 481.

FD SC 492 Food Chemistry Laboratory (2) A

Iwaoka

Experiments in qualitative and quantitative analysis for components of foods, using physical and chemical tech-niques. Food science majors must take 492 concurrently with 482.

FD SC 493 Food Analysis Laboratory (2) W Iwaoka

Experiments in proximate analysis, chromatography, and other methods of separation and identification of food components. Food science majors must take 493 concurrently with 483.

FD SC 494 Food Microbiology Laboratory (3) A Liston, Matches

Selected experiments on the enumeration and identification of micro-organisms in food, fermentation processe and the changes in microbial populations as a result of handling, storing, and processing. Food science majors must take 494 concurrently with 484.

FD SC 495 Food Engineering II Laboratory (2) W

Pigott Laboratory investigations and demonstrations concerned with the application of modern engineering principles to efficient commercial processing of food with maximum retention of nurrient properties. Food science majors must take 495 concurrently with 485.

FD SC 496 Deteriorative Processes in Foods Laboratory (2) Sp Matches

Selected experimental problems in food deterioration. Food science majors must take 496 concurrently with 486.

FD SC 498 Undergraduate Thesis (2-6, max. 6) AWSpS

Prerequisite: permission of instructor.

Courses for Graduates Only

FD SC 504 Principles of Technological Research in Food (3, max. 6) AWSp Liston

Designed to familiarize graduate students with the meth-ods used in technological research. Prerequisite: permission of instructor.

FD SC 521 Graduate Seminar in Food Science (1, max. 3) AWSp Lectures and discussions of current problems and current

research in food science. Offered on credit/no credit basis only. Prerequisite: permission of instructor.

FD SC 522 Advanced Food Chemistry (3, max. 9) Sp Iwaoka

Lecture and/or laboratory dealing with special or current topics in food chemistry and food analysis. Prerequisite: graduate standing or permission of instructor. (Offered alternate years; offered 1981-82.)

FD SC 523 Advanced Marine Food Processes (5) S Liston, Pigott

Principles and laboratory studies of advanced processes used in the extraction, concentration, and preservation of food from fish and other marine animals. Prerequisite: graduate standing in food science or equivalent.

FD SC 524 Micro-organisms in Foods (3) W Liston. Matches

Occurrence and activity of micro-organisms important in foods as agents of spoilage, fermentation, and food-borne disease; relationship to food or food process; control and detection. Food science majors must take 534 concur-rently with 524. Prerequisite: graduate standing in food science or equivalent.

FD SC 525 Advanced Unit Operations in Food Processing (3) Sp

Pigott

Application of modern engineering principles to opera-tions such as evaporation, drying, distillation, pumping, and heat transfer in the handling, processing, and pack-aging of foods. To be taken concurrently with 526. Prerequisite: permission of instructor.

FD SC 526 Advanced Unit Operations in Food Processing Laboratory (3) Sp

Pigott Laboratory investigations concerned with the engineering of food processes and processing facilities. To be taken concurrently with 525.

FD SC 534 Micro-organisms in Foods Laboratory ·(1) W

Special projects or selected experiments designed to study micro-organisms in foods. Food science majors must take 534 concurrently with 524.

FD SC 600 Independent Study or Research (*) AWSpS

FD SC 700 Master's Thesis (*) AWSpS

QUANTITATIVE SCIENCE

See Interschool or Intercollege Programs.

WILDLIFE SCIENCE

See Interschool or Intercollege Programs.

COLLEGE OF FOREST RESOURCES

The presence of B, M, or P following the prefix FOR indicates the division within the college respon-sible for teaching the courses: FOR B-Biological Sciences Division, FOR M-Management and Social Sciences Division, FOR P-Physical Sciences Division.

BIOLOGICAL SCIENCES

Courses for Undergraduates

Students taking undergraduate and graduate courses, structured or unstructured, that require field trips,

COLLEGE OF FOREST RESOURCES

special laboratory supplies, or special material du-plications are required to pay appropriate amounts to cover such expenses. If a student fails to pay, the transcript may be withheld and the degree may not be conferred.

FOR B 202 The Conservation Movement—Past, Present, and Future (2)

Brubaker

Origins of the conservation movement, factors that have shifted its direction, and directions it may take in the near future. Principles relating conservation to society are discussed.

FOR B 203 Crisis in the Quality of the Forest Environment (2)

Zasoski

The forest is an essential component of the total environ-ment in a number of essential ways. The facts and falla-cies of this relationship are discussed, both in terms of natural processes and of those processes initiated by man.

FOR B 206 Pesticides in the Environment (2) Gara

Biological analysis of short-term benefits and costs to the ecosystem through use of pesticides. Considerations of control alternatives and their consequences to manage-ment objectives. Presentation of new trends in insect manipulation.

FOR B 210 Introductory Soils (3) Cole, Edmonds, Ugolini, Zasoski

Introductory course in basic soils explores the physical, chemical, and biological properties that affect distribution and use patterns of this importate cosystem component. Includes soil morphology and genesis, plant nutrition and nutrient cycling, soilwater, microbial soil processes, and the application of soil properties to environmental con-cerns. One optional Saturday field trip is scheduled.

FOR B 211 Introductory Soil Laboratory (1) Ugolini, Zasoski

Chemical, biological, and physical properties that affect soil use and management. Field and laboratory expenses. Prerequisite: 210, which may be taken concurrently.

FOR B 300 Dendrology (4)

Brubaker, Stettler

Concepts of taxonomy, genetics, and organic evolution as applied to the classification of major tree genera of North America; lectures, laboratory demonstrations, and field exercises. Prerequisite: introductory biology.

FOR B 301 Forests in the Life of Man (3) Gessel

Gessel Forest as a unique ecosystem from a historical and biolog-ical perspective. Present forest ecosystems throughout the world and locally are discussed, and past use is related to present and future problems. Modern forest management in relationship to the ecological basis of continual forest production and use of the forest by man. The nature and function of trees, communities of trees making up forest ecosystems forther that affect trees and forest ecosystem. ecosystems, factors that affect trees and forest ecosys-tems, forests of the world, the relationship of man to forests, history of land use in relationship to forests and various products of the forest. No credit for forest resources majors except as a substitute for FOR M 100 for upper-division transfer students.

FOR B 302 Practicum in Forest Soils, Plants, Diseases, and Insects (3)

Field examination and identification of the interrelationships of soils, plants, diseases, and insects. Taught at Pack Forest only. Prerequisites: 210, 300.

FOR B 310 Forest Soils (4)

Ugolini, Zasoski Physical, chemical, and biological properties of forest soil; soil development and classification; and soils in relation to use of forest resources. Prerequisite: 5 credits of geology or equivalent.

FOR B 311 Soils and Land Use (3) Cole

Intended for students who are concerned with environ-mental problems in the Puget Sound basin, as well as 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 im-portant in making land-planning decisions.

FOR B 320 Forest Community Ecology (3) Oliver, Scott

Forest community dynamics as related to environmental variation, particularly plant succession and vegetation zo-nation. Study of techniques of vegetation quantifications. Taught at Pack Forest only. Prerequisites: 300, BIOL 101-102, O SCI 281.

FOR B 321 Silvics (3)

Oliver, Scott

Anatomy, morphology, and physiology of forest tree spe-cies underlying ecological patterns of behavior, Prerequisite: 320.

FOR B 322 Silvicultural Methods (3)

Oliver, Scott

The theory and technique of applying silvical knowledge in controlling establishment, composition, and growth of forest stands. Includes reproduction methods and intermediate cuttings. Prerequisites: 321, FOR M 360.

FOR B 323 Forest Biology I (3)

Brubaker

Systematics, genetics, evolution, and identification of forest trees as related to structure and environment. No credit given if FOR B 300 has been taken for credit.

FOR B 324 Forest Biology II (3)

Gara Theory and applied aspects of forest pathology and ento-mology. Introduction to the forest ecosystem as related to forest development, soils, and tree water relationships. Introduction to silviculture. Prerequisite: junior standing.

FOR B 325 Forest Ecology (5)

Scott Introductory course in ecology for majors in outdoor rec-reation only. Lectures and field exercises on: organismal interactions as related to environment; ecological characteristics of trees; structure pattern and successional dy-namics of forest communities. Prerequisites: statistics, 10 credits in biology, and permission of instructor.

FOR B 326 Range and Wildlife Habitat (3) Driver

Theory and practice of range ecology as the basis for studying (1) the effects of domestic animals and wildlife use on plant habitats and (2) man's control on these plant community effects from the past, present, and future of natural resources management points of view.

FOR B 327 Field Studies in Range and Wildlife Habitats (2) Driver

Four weekend field trips related to range and wildlife habitats of Washington with application of materials pre-sented in 326. For majors in wildlife science and forest management only. Prerequisite: permission of instructor.

FOR B 329 Microclimatology (3)

Edmonds, Fritschen Study of the interaction of biological and meteorological processes with applications to forestry, recreation, wildprocesses with applications to forestry, recreation, wild-life, landscape design, and architecture. Surface energy balances in terms of evaporation, radiation exchange, air and soil temperature, wind speed, and humidity in the lower layer of the atmosphere. Effects of plane, concave, and convex surfaces, vegetal coverings, temperature, and wind distribution. Offered jointly with ATM S 329. Pre-requisite: ATM S 101 or 201 or 301.

FOR B 333 Forest Protection (4)

Driver, Edmonds, Gara, Pickford

General aspects of protecting forests from diseases, in-sects, and fire. Applications of protection technologies to resource arrangement activities. Prerequisite: 302.

FOR B 410 Forest Soil Microbiology (4) Edmonds

Types and numbers of micro-organisms in forest soils. Growth and survival in relation to environmental conditions. Quantitative methods in soil microbiology. Impor-tance of microflora and microfauna in decomposition and nutrient cycling in natural and manipulated forest eco-systems. Integration and modeling of decomposition processes. Prerequisite; 310 or permission of instructor.

FOR B 412 Soli Genesis (5)

Ugolini Soil, the excited skin of the earth. Processes of soil formation and weathering distribution of major soils in the world. Prerequisites: CHEM 145, GEOG 205.

FOR B 413 Soil Distribution and Classification (4)

Ugolini Study of the distribution, morphology, and classification of soils in relation to environmental factors. Lectures and more service and service an field trips to illustrate the properties and processes of the soils throughout the unique terrestrial ecosystems of the state of Washington. A soil survey exercise is included.

FOR B 414 Forest Soil Fertility and Chemistry (3) Zasoski

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. Prerequisite: 310.

FOR B 415 Applied Forest Hydrology (4) Schiess, Wooldridge

Study of fundamental aspects of hydrology as influenced by silvicultural and timber harvest methods. Includes soil erosion, water quality, and manipulation of the forest stands for altered water yield. Prerequisite: senior stand-

FOR B 416 Micrometeorological Measurements and Instrumentation (5)

Fritschen

Principles and theories of biometeorological instrumenta-tion. Accuracy, measuring solar and thermal radiation, heat flux, air and soil temperature, atmospheric moisture content, wind. Prerequisites: MATH 126, PHYS 123.

FOR B 417 Environmental Biophysics (3) Fritschen

Introduction to the physical environment concerning the transfer of heat, mass, and momentum in nature. Principal emphasis on the movement of water in the soil-plantatmospheric continuum and methods of estimation. Prerequisite: 329.

FOR B 420 Forest Chemicals (3) Covers all aspects of the use of forest chemicals in for-Covers an aspects of the use of forest chemicals in for-estry: laws, safety, application techniques, and biological effects. Specific chemicals are discussed as to formulations, toxicity, timing, application rates, carriers, and unique safety problems. Prerequisite; junior standing in forest resources curriculum or permission of instructor.

FOR B 421 Dendrochronology (4) Brubaker

Brubaker Analysis of important physiological and environmental factors controlling annual tree-ring growth and a critical review of the applications of tree-ring analysis to study forest productivity, watershed hydrology, forest fires, in-sect epidemics, etc., in relation to yearly weather condi-tions. Laboratory and field exercises construct tree-ring chronologies to study environmental histories of selected forest study. Perspecification in bottomy and ca forest stands. Prerequisites: introductory botany and se-nior or graduate standing.

FOR B 422 Reproduction Methods in Silviculture

Advanced silviculture course that examines the character-istics of natural and artificial methods of regenerating forest stands. Emphasis on methods used in the Pacific Northwest; however, attention is given to problems and techniques of other forested regions. Lectures and weekly field trips. Prerequisite: 322 or equivalent.

FOR B 423 Advanced Forest Ecology (3)

Oliver, Scott

Seminar in forest ecology for advanced undergraduates or graduates. Topics selected for relevance to the interests of the participants; field trips required. Prerequisite: previous course work in forest ecology.

FOR B 424 Selected Topics in Silviculture (3) Oliver, Scott

Seminar in silviculture for advanced undergraduate and graduate students. Topics selected for relevance to the interest of the participants and current practice in the Pa-cific Northwest; field trips required. Prerequisite: previous course work in silviculture.

FOR B 426 Forest Autecology (4)

Brubaker, Oliver

The morphological, anatomical, and physiological responses of forest trees to the natural environment. Includes growth forms, seasonal and life-cycle changes, food relations, hormones, nutrients, and regeneration. Prerequisite: 320.

FOR B 427 Forest Genetics (3) Stettler

Genetic theory as applied to the biological manipulation of forest trees. Principles of genetics and organic evolu-tion are discussed and related to management strategy and silvicultural practices. Prerequisite: 300.

FOR B 428 Forest Community Ecology (4) Brubaker, Oliver Advanced course in forest community ecology for under-graduate and graduate students. Includes organismal in-teraction, community structure and classification, and forest resultation duraming and productivity as inforest population dynamics and productivity as in-fluenced by environmental changes. Prerequisites: 320 or equivalent and permission of instructor.

FOR B 429 Intermediate Operations in Silviculture (3) Oliver, Scott

For advanced undergraduate and graduate students in sil-viculture. Includes those operations designed to direct an existing forest into the desired form such as cleaning, weeding, thinning, irrigating, and fertilizing; all-day field trips required. Prerequisite: 322 or equivalent.

FOR B 430 Silvicultural Methods for Special Uses (3)

Scott

Theory and techniques of applying forest ecological knowledge in controlling the reproduction and develop-ment of forest ecosystems for social values other than wood. Prerequisite: 322.

FOR B 431 Ecological Aspects of Forest Fires (3) Agee

Agee Description of natural role of fire and ecosystem impacts from various fire frequencies and intensities. Examples from other regions are included but emphasis is on Pa-cific Northwest forests. Ecological perspectives on fire behavior and fuel dynamics. Techniques and effects of fire used for hazard reduction, site preparation, wildlife production, stand structure control, and wilderness fire management. Field trips required. Prerequisite: FOR M 430 or permission of instructor. 430 or permission of instructor.

FOR B 432 Forest Pathology (4)

Driver, Edmonds

Studies on the biology and management alternatives of major diseases of trees of Pacific Northwest forests. Emphasis on the impact of forest diseases on forest ecosys-tems relative to man's use. Prerequisite: 333.

FOR B 433 Biology of Forest Diseases (5) Edmonds

Detailed studies on the biology of host-pathogen relation-ships exhibited by certain forest diseases. Prerequisite: 432. (Offered alternate years; offered 1981.)

FOR B 435 Forest Entomology (3)

Gara Infroduction to general entomology, characteristics, life histories, ecological relations, prevention, and control of forest insects.

FOR B 436 Laboratory in Forest Entomology (2) Gara

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FOR B 437 Ecology of Forest Insects (4) Gara

Host-insect interactions, introduction to population dynamenasci metacuons, introduction to population dy-namics, research technique, and pertinent forest entomo-logical literature. One field trip required. Prerequisite: permission of instructor. (Offered alternate years; offered 1981.)

FOR B 440 Soil Physics (4)

Fritschen

Physical properties of soil and water. Thermodynamic properties of soil water mixtures and osmotic effects. Darcy's law and application to the movement of the wa-ter table. Horizontal and vertical unsaturated flows: rain the rotation influration, capillary rise, soil evaporation, water redis-tribution and hysteresis, heterogeneous soils and instabil-ity. Soil-plant-atmosphere continuum: water balance in the root zone; movement through the plant. Prerequisite: integral and differential calculus.

FOR B 444 Forest Tree Physiology (3) Introduction to basic processes of tree physiology, in-

cluding such topics as seed dormancy; seedling growth; cold hardiness; nutrient storage and cycling; hormonal regulation in trees; long-distance transport of water and nutrients; photosynthetic reactions of Northwest forest species; reproductive physiology; senescence. Prerequi-site: 10 credits in biology; CHEM 102 or equivalent recommended.

FOR B 490 Undergraduate Studies (1-5)

FOR B 491 Undergraduate Studies (1-5)

FOR B 492 Undergraduate Studies (1-5) Individual tutorial study of topics for which there is not sufficient demand to warrant the organization of regular classes. The courses are offered in all quarters, and credits can vary from 1 to 5, and, with the permission of the instructor, each course may be repeated for credit. Credits are individually arranged for each course. Entry card required.

FOR B 493 Ecology of the Northwest I (2) Gara, Ugolini

Interdisciplinary seminar series. Topics of discussion em-phasize the environmental history of the Pacific North-west; ecological relationships associated with present-day environmental conditions; interaction of past and present social systems; and aspects of resource management.

FOR B 494 Ecology of the Northwest II (2) Gara, Ugolini

Interdisciplinary seminar series. Topics of discussion em-phasize the environmental history of the Pacific North-west; ecological relationships associated with present-day environmmental conditions; interaction of past and present social systems; and aspects of resource management.

Courses for Graduates Only

FOR B 500 Graduate Seminar (2)

Bethel, Gessel, Stettler Discussion of current issues and problems in forestry and forestry research.

FOR B 511 Mineral Cycling in Forest Ecosystems (3) Cole, Gessel

Significance of mineral cycling in the ecology and management of forest ecosystems: basic programs involved; strategies of cycling that have been observed; and various studies that have been completed in this field. Prerequi-site: 210 or 310 or equivalent.

FOR B 512 Topics in Soil Chemistry (3)

Zasoski Topics in soil chemistry; surface chemistry of soil colloids, exchange and sorption phenomena, micronutrient and trace metal soil solution chemistry. Prerequisite: permission of instructor. (Offered alternate years; offered 1981.)

FOR B 513 Soll Classification and Survey (3) Historical and modern soil classification with respect to forest and wildland areas. Survey procedures examined by field trips to local soil areas. Emphasis on application to forest land use and planning.

FOR B 514 Forest Influences (4)

Wooldridge Study of the interacting effects of climate, soil, and plants as a basis for understanding the hydrologic cycle. Places special emphasis on disposition and movement of Places special emphasis on disposition and movement of water in forest ecosystems. Prerequisite: graduate standing.

FOR B 517 Soil Plant-Atmospheric Relations (3) Fritschen

Principles of mass and energy exchange between the earth and the atmosphere with special emphasis on the state and movement of water in soils, energy balance of the vegetated surface and individual leaves, and methods of evapotranspiration determination. Prerequisites: MATH 126, PHYS 123, ATM S 329.

FOR B 518 Weathering of Minerals in Soil (5)

Ugolini Mineral weathering is the chemical changes and transfor-mations of soil inorganic material under the influence of the atmosphere, hydrosphere, and biosphere. These changes and transformations can be quantitatively esti-mated by analytical techniques and explained by invok-ing geochemical and pedological principles. For students in forestry, geology, engineering, and oceanography. Prerequisites: mineralogy, chemistry, including physical chemistry and soils.

FOR B 519 Forest Soils Seminar (1) Gessel

Discussion by invited speakers on current research re-lated to forest soils, plant nutrition, and mineral cycling. Offered on credit/no credit basis only.

FOR B 521 Current Problems in Forest Ecology (3) Scott

Consideration of current literature and topics in forest ecology and tree physiology. Entry card required.

FOR B 522 Current Problems in Silviculture (3) Scott

Detailed study of the literature dealing with recent applications of silviculture in world forestry. Entry card reauired.

FOR B 527 Advanced Forest Genetics (3) Stettler

Discussion course relating concepts of quantitative and population genetics to forest-tree populations, both natu-ral and artificial. Offered on credit/nos credit basis only. Prerequisite: GENET 451, or equivalent. (Offered alter-nate years; offered 1980.)

FOR B 528 Silvicultural Prescription Preparation (4) Scott

Advanced course in silviculture as applied to purposes other than wood production and in the preparation of silvicultural prescriptions. (For mid-career students.)

FOR B 529 Review of Forest Autecology (4)

Hinckley, Stettler Review of concepts of soil formation, soil fertility, mi-

coroclimate, hydrology, tree anatomy and morphology, physiology, water relations, mineral nutrition, and genetic and evolutionary mechanisms, as they relate to the adaptation and manipulation of forest-tree popula-tions. (For mid-career students.)

FOR B 533 Investigations of Forest Diseases (5) Driver

Studies on concepts and experimental procedures used in forest microbiological research. Prerequisites: 433 and permission. (Offered alternate years; offered 1980.)

FOR B 557 Topics in Forest Zoology (3) Graduate seminar considering applied and basic zoologi-cal topics relating to the forest environment. Different topics are selected each year. May be repeated for credit. Participants submit short papers and give oral presentations.

FOR B 590 Graduate Studies (1-5)

Study in fields for which there is not sufficient demand to warrant the organization of regular courses. Entry card required.

FOR B 600 Independent Study or Research (*)

FOR B 700 Master's Thesis (*)

FOR B 800 Doctoral Dissertation (*)

TUTORIAL STUDY

Tutorial study designed to meet individual requirements is available to graduate students in the graduate studies courses listed below. Such study may include literature review and field and laboratory work. The courses are offered in all quarters, and credits can vary from 1 to 5, and, with the permission of the instructor, each course may be repeated for credit. Credits are individually ar-ranged for each course. ranged for each course. Prerequisites include graduate standing and permission.

FORB 510 Graduate Studies in Forest Soils (1-5) Cole, Gessel, Ugolini

FOR B 515 Graduate Studies in Forest Influences (1-5)

Fritschen, Wooldridge

FOR B 516 Graduate Studies in Forest Meteorology (1.5) Fritschen

COLLEGE OF FOREST RESOURCES

FOR B 520 Graduate Studies in Forest Ecology and Silviculture (1-5) Scott

FOR B 523 Graduate Studies in Range and Wildlife Habitats (1-5) AWSpS Driver, Gessel, Manuwal, Taber Prerequisite: 326 or permission.

FOR B 526 Graduate Studies in Forest Genetics (1-5) Hatheway, Stettler

FOR B 534 Graduate Studies in Forest Pathology (1-5) Driver

FOR B 535 Graduate Studies in Forest Entomology (1-5) Gara

FOR B 555 Graduate Studies in Wildlife Management (1-5) Manuwal, Taber

FOR B 556 Graduate Studies in Forest Zoology (1-5)

MANAGEMENT AND SOCIAL SCIENCES

Students taking undergraduate and graduate courses, structured or unstructured, that require field trips, spe-cial laboratory supplies, or special material duplications are required to pay appropriate amounts to cover such expenses. If a student fails to pay, the transcript may be withheld and the degree may not be conferred.

Courses for Undergraduates

FOR M 100. Introduction to Forest Resources Management (5) Thomas

Survey of man's use of forest resources and the impact of social and cultural institutions on resource management. The history and the development of forest conservation and forest utilization practices and policies in the United States. Changing patterns of resource use and methods of resolving conflicts among management alternatives.

FOR M 201 Conflicts in Forest Resource Use (2) Dowdle, Waggener

Dowdle, Waggener Analysis of resource management policies, with particu-lar emphasis on the social, political, economic, and re-source implications of conflicting resource uses. Exami-nation of major policies and practices designed to deal with conflicting uses, including critical review of opera-tional criteria for resource allocation.

FOR M 250 Computer Programming (3) Introduction to computer programming using BASIC and FORTRAN languages. Applications to forestry problems.

FOR M 252 Introduction to Natural Resources Sociology (3) Field

Sociological aspects of natural resource management and use. Study of man's values and the nature of human communities, with special emphasis on community structures dependent upon primary use of forest resources. Case ex-amples drawn from resource communities.

FOR M 307 Environmental Impact Assessment and Regulation in Forest Resource Management (3) Bradley, Waggener

Current environmental, forest resource, and land-use leg-islation affecting resource management; origin and evolution of federal, state, and local legislation and their relationship to forest resource planning and management; environmental impact assessment and its relationship to forest practices. Selected case studies of prepared forest land use plans and environmental impact statements.

FOR M 320 Multiple Forest Uses (2) Introduction to the theory and technique of producing and using forest goods and services, and of integrating differ-ent patterns of use through coordinated managerial plan-ning. Taught at Pack Forest only. Prerequisites: 100, BIOL 101-102.

FOR M 350 Field Studies in Outdoor Recreation (3) Bradley, Sharpe Studies of outdoor recreation in action. Introduction to

the problems of managing large recreation complexes or private, county, state, or federal lands. A 2½-week field trip beginning after Labor Day. Prerequisite: outdoor recreation major.

FOR M 351 Introduction to Outdoor Recreation (5) Sharpe

History and philosophy of outdoor recreation development as it pertains to the natural environment. A survey of visitor needs and preferences, trends in use, and objec-tives of outdoor recreation in a modern society. Emphasis on county, state, and national levels.

FOR M 353 Interpreting the Environment (5) Sharpe

Role of interpretive specialist in heritage and natural resource areas. Increasing visitor enjoyment, encourag-ing thoughtful use to reduce human impact, and promoting public understanding of agency programs. Interpresupporting activities, and professional development. Prerequisite: permission of instructor.

FOR M 354 Introduction to Management of Recreation Areas (3) Odegaard, Sharpe

Acquaints the student with the problems of administration and management of large recreational land areas. In-cludes control of public use, protection of environmental quality, determining carrying capacity, organization structure, and other administrative details.

FOR M 355 Resource Planning Processes (3) Related processes in the formulation of forest resource Related processes in the formulation of forest resource programs; planning process as a systematic method for the identification of goals, information requirements, an-alytical methods, and implementation techniques in the development and implementation of forest resource plans and policies; evaluation of selected forest resource planning examples.

FOR M 357 Outdoor Recreation Internship (5) Bradley, Sharpe

Comprehensive examination of a recreation agency or or-ganization's policies, procedures, and operations, in the park or forest setting. Preparation of professional assess-ment report and internship seminar based on internship experience in recreation management, planning, and in-terpretation. Prerequisites: completion of one cooperative education work experience, senior standing, and permission of instructor.

FOR M 360 Field Studies in Forest Mensuration (3) Rustagi, Turnbull

Introduction to the field aspects of forest measurements. Use of instruments, individual tree measurement, sample plot measurement, site estimation, timber inventory techniques, log scaling, and regeneration surveys. Taught at Pack Forest only. Prerequisite: completion of lower-division requirements.

FOR M 361 Forest Measurements (4) Rustagi, Turnbull

rustage, turnout Evaluation of information needs for decision making by forest manager. Study of geometry, sampling design, and estimation processes applied to forestry. Measuring in-struments and procedures. Inventory management. Laboratory and field exercises to study contents and growth of tree and forest stand. Prerequisites: Q SCI 281, 450.

FOR M 362 Aerial Photos in Forestry (3) Schreuder

Schreider Photo interpretation and photogrammetry with applica-tions to forest and land management. Uses of pan-chromatic, infrared, color, and false color photos; remote sensing. Simple map making.

FOR M 365 Forest Economics (5) Dowdle, Schreuder, Waggener Basic concepts of supply and demand, investment, and capital theory, and their application to the management of forested properties. Prerequisites: ECON 200 and 0.5CI 2010 accession text. O SCI 291 or equivalent.

FOR M 366 Quantitative Methods in Forest Resource Management (3) Bare, Rustagi

Basic concepts of management science applied to forest resource management problems, including linear pro-

gramming, multiobjective programming techniques, computer simulation, decision theory, and statistical forecasting. Offered jointly with Q SCI 370. Prerequi-sites: 250 and Q SCI 281 or equivalent.

FOR M 368 Forest Regulation (3) Bare

Traditional concepts of sustained yield used in forest management, contemporary even-flow variants, and analytical approaches to their implementation. Prerequisites: 250 and 366.

FOR M 370 Forest Policy, Law, and Planning (5) Bradley, Burns

Focus on the origin, content, and implementation of pro-Focus on the origin, content, and implementation or pro-grams related to the use of public and private forest re-sources in the United States. Emphasis on the integrated framework in which the policy-making, legal, and planning processes function in forest resource- manage-ment and administration. Current issues illustrate the ba-sic concepts in forest policy, law, and planning. Prereq-uisite: junior standing in forest resources management or memicing of instructor. permission of instructor.

FOR M 417 Forest Soil Management (3) Gessel, Zasoski

Consideration of physical, chemical, and biological properties of forest soils. Forest fertility and fertilization. Use of soil maps to guide land-management activities. Provides a practical and working knowledge of soil in the practice of forestry. Prerequisite: senior standing in silvi-culture and protection, timber management and timber harvesting options, or permission of instructor.

FOR M 430 Introduction to Wildland Fire Management (3)

Pickford

Forest fire behavior; fire and ecology; organization and management of forest fire control systems; economics of fire control; use of fire in forest land management. Meteorological and thermophysical bases for forest fire be-havior. Prerequisite: senior standing in forest resources or permission of instructor.

FOR M 431 Forest Fire Behavior (3)

Pickford Basic combustion and heat transfer in wildland fires. In-fluence of fuels, weather, and topography on growth and intensity of wildland fires. Use of mathematical models of fire spread. Based on, and uses, the interagency S-390 Intermediate Fire Behavior training course. Prerequisites: 430, fire suppression experience, and permission of instructor.

FOR M 432 Wildland Fuels and Fuel Management (3) Pickford

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Progora Origin of forest fuel complexes; physical and chemical properties of fuel particles and fuel beds; fuel types and fuel succession in North America; fuel inventory classifi-cation and hazard evaluation; fuel treatment methods and site effects; economics of fuel management. Intended for forest management majors specializing in forest protec-tion. Prerequisite: 430, 431, or permission of instructor.

FOR M 448 Timber Harvesting Case Studies (5) Field aspects of road location, timber harvest unit layout, and timber sale appraisal. Familiarization indivest with legal re-quirements, road reconnaissance, grade lines, curve layout, road survey, design and construction staking. Ob-servation of road harvesting machinery operation and ca-pabilities. Road construction techniques, drainage, and maintenance. Timber sale volume estimation, appraisal, and sale. Prerequisite: junior standing in timber harvest-ing option of forest resources management curriculum, or permission of instructor.

FOR M 450 Law Enforcement for Outdoor Recreation Professionals (2) Burns

Burns Nature and methods of dealing with criminal conduct in recreational settings; survey of criminal laws and pro-cedures; civil rights of citizens; rules and procedures for dealing with evidentiary material; role of recreation pro-fessional as a witness. Prerequisite: permission of in-structor. (Offered alternate years.)

FOR M 451 Outdoor Recreation Economics (3) Dowdle

Downe The application of economic principles to outdoor recreation problems. The elements of demand for outdoor recreation opportunities, the evaluation of recreation al-ternatives, and the allocation of resources for recreational

use on public and private lands. Prerequisite: 365 or ECON 201.

FOR M 452 Sociology of Leisure and Outdoor Recreation (3)

Field

Focuses upon an understanding of human behavior in leisure settings. An examination of basic sociological concepts as well as contemporary theories concerning leisure behavior; research techniques and problems of mea-surement in leisure research. Implications for the management of recreational areas provide an applied orientation and integration of substantive material. Prerequi-_site: SOC 110.

FOR M 453 Advanced Environmental Interpretation (5)

Sharpe

Interpretive management and planning. Includes inde-pendent study projects in selected park and recreation areas. A practical approach to interpretive inventory, planning, and programming. Prerequisite: 353.

FOR M 454 Park Maintenance Management (2) Sharpe

Examination of principles of park maintenance management, including: organization, standards, scheduling, contracts; budgeting for personnel, equipment, and mate-rials; environmental protection; minimizing user conflict. Prerequisite: 351. (Offered alternate years.)

FOR M 455 Advanced Outdoor Recreation Planning: Regional (5)

Bradley

Integrated consideration of resource base, social factors, and management objectives in providing regional recre-ation opportunities. Emphasis on forecasting recreational demand, development of environmental information systems, and allocation of recreational use, based on user-resource requirements. Case study approach. Prerequisite: 355.

FOR M 456 Wilderness Preservation and Management (3)

Review of American wilderness philosophies, concepts, and values. Development of the Wilderness Act. Exami-nation of current wilderness-management policies, prob-lems, trends in use, issues and controversies, wilderness research, social costs, and benefits of wilderness. Prerequisite: permission of instructor.

FOR M 457 Advanced Outdoor Recreation Internship (10) Bradley, Sharpe Application of professional field experience to develop proficiency in one of three subject areas: park interpreta-tion, park planning, or park management. Advanced field-related course given in conjunction with a recreation agency. Preparation of evaluation of professional intern-ship experience. Prerequisites: 357, senior standing in outdoor recreation, or premission of instructor. outdoor recreation, or permission of instructor.

FOR M 458 Advanced Outdoor Recreation Planning: Site (5)

Integrated consideration of resource base, social factors, management objectives, and design considerations in providing recreation opportunities at site level. Emphasis on site analysis and development process. Case study ap-proach. Prerequisite: 455.

FOR M 459 Case Studies in Outdoor Recreation (5) Bradley, Sharpe

Application of social, economic, and biological princi-Approximation of social, economic, and biological principles in the formulation and solution of outdoor recreation problems. Utilization of the case study methodology in approaching selected problems. Particular emphasis placed on the development of solutions to problems in a placed on the development of solutions to problems in the placed on the placed on the p outdoor recreation, integrating planning, design, inter-pretive, and management techniques for the enhancement of recreation user benefit. Prerequisites: 351, 353, 354, 355

FOR M 461 Advanced Forest Mensuration (3) Turnbull

Forest tree and stand models. Studies of forest tree and stand parameters. Estimation processes. Growth and yield analysis. Prerequisites: 360, Q SCI 281 or STAT 311.

FOR M 463 Contemporary Problems in Forest Land Use (3) Waggenei

Current conflicts among competing uses for forest land;

trends in forest land use; impact of public policy on growth and development of forest products industries.

FOR M 464 Economics of the Forest Products Industries (3)

Greulich Market structure of major forest-related industries. Sup-ply and demand aspects of commercial forests on a world scale. Economic factors affecting distribution and mar-keting of forest products, including international, inter-regional, and intraregional competition. Prerequisite: 365 or ECON 201.

FOR M 466 Economics of Timber Production (3) Schreuder, Waggener Application of basic economic concepts to the production

of timber as a commercial land use. Analysis of timber investments, alternative management programs, and regulation models. Prerequisite: 365.

FOR M 467 Economics of Forest Land Use (3) Dowdle, Waggener

Application of economic concepts to use of forest lands and the allocation of land to alternate forest uses. Role of physical and biological factors as determinants of land value. Considerations of institutional factors affecting forest land allocation and land-use decisions. Prerequisite: 365 or ECON 201.

FOR M 468 Timber Resources Management Case Studies (5) Rustagi

Application of case study methodology to selected prob-lems of forest land management. Specifically related to field aspects of operational forestry. Forest inventories and their use in management planning. Regeneration and stocking control decisions. Description of the target for-est. Timber sale layout, planning, and sale. Prerequisite: senior standing in silviculture or timber management option, or permission.

FOR M 469 Forest Resources Management Case Studies (5) Bare

Resource management today is rarely single-product oriented. Planners must function in an environment consisting of market and nonmarket goods and services, as well as a multiplicity of economic, biological, legal, social, and political constraints, Designed to familiarize students with the complexity of modern-day decision making. Emphasis on the creation of a problem situation that en-courages students to function as members of a multiresource planning team and to appreciate the skills and values of persons trained in other areas of specialization. The objective is to formulate a multiple-use plan for an actual forest area.

FOR M 470 Computer Applications to Forestry Problems (3)

Advanced study of computer programming solutions to forestry problems using BASIC on NOVA computer and FORTRAN on University of Washington Academic com-puting systems. Problem organization and flows, data management and manipulation. Prerequisite: permission of instructor.

FOR M 482 Forest Land-Use Case Studies (4)

Bradley Social, administrative, and biological principles applied Social, administrative, and biological principles applied to the formulation, evaluation, and implementation of forest land-use plans and policies. Application of case study methodology to selected problems of forest land-use planning, with particular emphasis on the evaluation of alternative solutions to contemporary planning prob-lems. Prerequisite: senior standing in forest land-use planning or permission of instructor planning or permission of instructor.

FOR M 484 Urban Forestry Case Study (5) Application of social, administrative, and biological prin-ciples to the formulation and solution of urban forestry problems. Application of case-study methodology to se-lected problems of urban forest planning, administration, and management. Prerequisite: senior standing in urban forestry or permission of instructor.

FOR M 488 Case Studies in Forest Recreation (5) FOR M 488 Case Studies in Forest Recreation (5) Consideration of the natural resources bases, social fac-tors, and management objectives in providing regional forest recreation opportunities. Emphasis on the forecast-ing of recreation demands, the development of environ-mental information systems, and the allocation of recrea-tional use based on user-resource requirements. Case study approach. Prerequisite: senior standing in forest memories or aeruising of instructor. recreation or permission of instructor. .

FOR M 490 Undergraduate Studies (1-5)

FOR M 491 Undergraduate Studies (1-5)

FOR M 492 Undergraduate Studies (1-5) Individual tutorial study of topics for which there is not sufficient demand to warrant the organization of regular classes. The courses are offered in all quarters, and credits can vary from 1 to 5, and, with the permission of the instructor, each course may be repeated for credit. Credits are individually arranged for each course. Entry card required.

Courses for Graduates Only

FOR M 524 Tropical Forests (3) Bethel

Comparative study of the forests of temperate and tropical regions. Diversity in tropical ecosystems. Compari-sons among tropical forest biomes. The structure and properties of tropical forest trees and woods. Problems in the utilization of tropical woods basic to the development of tropical forestry management practices. Forest land use practices and problems in the tropical regions of the world. Entry card required.

FOR M 531 Forest Fire Science Seminar (2) Pickford

Presentation and discussion of current issues in forest fire prevention, control, use, and discussion of ongoing fire research. Offered on credit/no credit basis only. Prerequisite: permission of instructor.

FOR M 532 Planning, Management, and Analysis of Forest Fire Control Systems (3) Pickford

The forest fire control system. Study of plans, service, finance, line and command functions. Forest fire control and production economics, techniques of operations re-search and computer sciences applicable to planning and analyzing forest fire control systems. Prerequisites: 430, 471 or equivalent, Q SCI 370, and permission of instructor.

FOR M 538 Forest Fire Thermophysics (3) A Principles of combustion and heat transfer. Basic processes of ignition and flame spread; high-intensity fires. Emphasis is on free-burning fires in cellulose fuels. Offered on credit/no credit basis only. Prerequisites: MATH 105, PHYS 114, 115, or permission. (Offered alternate years; offered 1981).

FOR M 540 Forest Statistics (4) W Schreuder

Uses of probability distributions, tests of hypothesis, in-Uses of probability distributions, tests of hypomesis, in-terval estimation, regression analysis, experimental de-signs, and sampling techniques in forestry. Applications stressed in depth include: growth, and yield models, individual tree versus whole stand models; regeneration survey methods such as stock quadrat and random sam-pling techniques; sampling for fuels over time and space; concepts of productivity; data collection and analysis techniques und for neurishor methods such as anilytis techniques used for nontimber products such as wildlife and recreation; quality control models for monitoring en-vironmental impacts and forest industry operations. (For mid-career students.) Prerequisite: Q SCI 281 or 381.

FOR M 551 Current Problems in Outdoor Recreation (3)

Sharpe

Seminar approach to investigating, examining, and discussing contemporary issues and controversies in outdoor recreation. Prerequisites: graduate standing and permission of instructor.

FOR M 552 Outdoor Recreation Research Methods

(3) Overview of research concepts, assumptions, and methods employed in, outdoor, recreation research. General procedures and techniques for conducting research on recreation problems and understanding research findings, such as problem formulation, study plans, and data col-lection, analysis, and interpretation of results. Prerequisite: graduate standing.

FOR M 561 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.

COLLEGE OF FOREST RESOURCES

FOR M 562 Advanced Forest Resources Management (3)

Notification (c) Bare, Rustagi Overview of concepts and procedures involved in manag-ing forested lands for the production of commodity and amenity values. Use of systems analysis techniques for evaluating alternative land-use programs and manipula-tions of the forest ecosystem. Prerequisites: graduate standing and permission of instructor. (Offered evennumbered years.)

FOR M 564 Advanced Forest Biometry (3 or 5) Turnbull

Classical problems in analysis of forest populations and growth theory, and principles of parametric analysis and estimation processes in forest biometry. Entry card required.

FOR M 567 Advanced Natural Resources Sociology (3) Lee

Comparative study of institutional and organizational aspects of natural resources management, with special at-tention to forest resources. Development, persistence, and change of selected institutions in the context of preindustrial, industrial, and advanced-industrial societies. Implications for policy formulation, decision making, and technology transfer.

FOR M 575 Forest Products Economics (3) Dowdle, Waggener

Economic analysis of the forest products industries; mar-ket structure, regional impact of forest products indus-tries, current problems in forest products economics. Entry card required.

FOR M 576 Goal Programming (3)

Rustagi Concepts and philosophy of goal programming as a tool in the evaluation of resource allocation among multiple, conflicting, often incommensurate objectives (goals). L.P. and G.P. computer programs are used to study im-

E.F. and C.F. computer programs are used to study in-pact of changes in relative importance of difficult goals. Goal programming applications in natural resource areas are discussed. Offered jointly with Q SCI 576. Prerequi-sites: familiarity with linear programming and permission of instructor.

FOR M 590 Graduate Studies (1-5) Study in fields for which there is not sufficient demand to warrant the organization of regular courses. Entry card required.

FOR M 600 Independent Study or Research (*)

FOR M 700 Master's Thesis (*)

FOR M 800 Doctoral Dissertation (*)

TUTORIAL STUDY

Tutorial study designed to meet individual requirements is available to graduate students in the graduate studies courses listed below. Such study may include literature review and field and laboratory work. The courses are offered in all quarters, and credits can vary from 1 to 5, and, with the permission of the instructor, each course may be repeated for credit. Credits are individually ar-remed for each course. Preservitings include products ranged for each course. Prerequisites include graduate standing and permission.

FOR M 530 Graduate Studies in Forest Fire Control (1-5) Pickford

FOR M 533 Graduate Studies in Applied Forest Protection (1-5) Agee, Driver, Edmonds, Gara, Pickford

FOR M 550 Graduate Studies in Forest Recreation (1-5)

Clark, Field, Sharpe

FOR M 559 Graduate Studies in Forest Resource Planning (1-5) Bradley

FOR M 560 Graduate Studies in Forest History and Policy (1-5) Dowdle, Waggener

FOR M 563 Graduate Studies in Forest Mensuration (1-5) Rustagi, Turnbull

FOR M 565 Graduate Studies in Forest Management (1-5) Bare, Schreuder, Waggener

FOR M 566 Graduate Studies in Forest Photogrammetry (1-5) Schreuder

FOR M 568 Graduate Studies in Forest Economics (1-5)

Dowdle, Schreuder, Waggener

FOR M 569 Graduate Studies in Forest Sociology (1-5) AWSpS Field

PHYSICAL SCIENCES

Students taking undergraduate and graduate courses, structured or unstructured, that require field trips, spe-cial laboratory supplies, or special material duplications erre required to pay appropriate amounts to cover such expenses. If a student fails to pay, the transcript may be withheld and the degree may not be conferred.

Courses for Undergraduates

FOR P 101 Introduction to Wood and Paper (1) Hruthord

Orientation course for freshmen entering curricula in pulp and paper technology and wood and fiber science. The nature of the forest products industries and the role of the two curricula in training for industry and research. Of-fered on credit/no credit basis only.

FOR P 102 Introduction to Pulp and Paper Technology (3)

Hrutfiord.

Technology of production of pulp and manufacture of paper. Laboratory study of papermaking,

FOR P 205 Pollution Problems in the Forest Industries (2) Hruthord

Considers the causes and the control of pollution prob-lems associated with the forest industries. Air, water, and solid-waste problems are identified during the forest's growth, harvesting, and conversion into the many forest products. The state of the art in controlling these prob-lems is reviewed, and future trends are indicated.

FOR P 243 Mechanics in Forestry (3)

Carson Principles of statics with application in forestry. Basic concepts, parallelogram law, Newton's laws, equilibrium diagrams and analysis. Treatment of structural systems and systems with friction. Prerequisite: MATH 125 or Q SCI 292, which may be taken concurrently.

FOR P 303 Wood in Art and Decoration (2) Types of uses of wood in the field of art and decoration and the purposes wood serves. Structure and identifying characteristics of wood, kinds of wood used, and wood properties relevant to uses in musical instruments, carvfor and sculpture, furniture, architecture, and interior decoration. Effects of finishes on appearance and per-formance of wood. Credit in both 303 and 304 may not he received

FOR P 304 Wood: Properties and Best Use (3)

Leney Service course for the nonspecialist. Description of wood as a fibrous material, its properties and variability as in-fluenced by species differences and growth conditions. Causes and preventions of wood deterioration in service; physical and strength properties important in common uses. Types of solid wood and fiber products. Role of wood in man's physical and economic environment.

FOR P 305 Wood: Properties and Best Use Laboratory (1) Lenev

Demonstrations and laboratory experiments on topics presented in 304 that should precede or be taken concurrentiv.

FOR P 309 Creativity and Innovation (2) Allan

Allan Meaning and understanding of the basic nature of crea-tivity and creative thinking. Challenge and dynamics of thinking. Blocks in creative thinking; emotional, social, cultural, economic, environmental, and habitual. Re-quirements for creative innovation; knowledge, judg-ment, planning, 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. Not open for credit to students who have taken GIS 309. Prerequisite: junior standing or permis-sion of instructor. sion of instructor.

FOR P 340 Forest Surveying and Drafting (4) Schiess

Plane surveying techniques; forest boundary line surveys; GLO comers; traversing; use of transit; compass and tape; contour maps. Drafting techniques; use of drafting machines and lettering guides; map drawing; plotting of surveys; road plan and profiles; blueprints. Taught at Pack Forest only.

FOR P 341 Timber Harvesting (4) Greulich

Timber harvesting methods and planning procedures. Logging cost and production control. Environmental con-siderations as related to logging and road construction. Prerequisites: 340, FOR B 320, FOR M 360.

FOR P 342 Forest Road Engineering (4) Burke

Reconnaissance, preliminary, and location surveys for forest roads. Horizontal and vertical alignment computa-tions. Earthwork computations. Design of forest roads. Prerequisite: ENGR 161.

FOR P 343 Introductory Soil Mechanics (3) Schiess

Provides necessary soil mechanics background required Frovices necessary soli mechanics background required in logging road design and harvest unit layout courses in forest engineering; various soil classification systems and their applications and limitations; basic laboratory and field testing procedures to predict soil mechanical condi-tions. Prerequisites: FOR B 310, GEOL 205.

FOR P 344 Hydraulics for Forest Roads (3) Elements of incompressible fluids. Open-channel gravity flow. Analysis and design of drainage ditches, ditch re-lief structures, and stream-crossing structures. Prerequi-sites: 10 credits in physics, 8 credits in mathematics.

FOR P 374 Wood Utilization (3)

Brvani Nature of the forest products industries from a global and Nature of the forest products industries from a global and national perspective; major processing steps in manufac-turing lumber, plywood, composition boards, pulp and paper; present trends and future possibilities of convert-ing all forest growth into useful products; secondary for-est products industries. Prerequisite: junior standing in forest resources.

FOR P 375 Wood Utilization Laboratory (2) Smith

Familiarization with the processing and economic envi-ronment of the forest products industries through field studies in local plants. Emphasis on small-log utilization in general and on the lumber industry in particular. Prerequisite: 374.

FOR P 377 Materials Science in Forestry (4)

Carson

Larson Introduction to the concepts of stress, deformation, and strain in solid materials, including the unique properties of wood. Development of those equations that relate these variables in structures. Laboratory session empha-sizes theory. Prerequisite: 243 or ENGR 210.

FOR P 400 Wood and Fiber Structure (5) Lene

Woody plants. Growth of the tree stem. Development of the woody cell and the structure of coniferous woods, including fiber characteristics. Structure of hardwoods, in-cluding, fibery relationship of wood structure to its total physical properties. Natural defects in wood and fiber. Entry card required. Prerequisites: forest resources major standing and permission of instructor.

FOR P 401 The Physics of Wood and Fiber

Composites (4) Equilibrium physical properties of composite systems. Structure and models, mass density, equilibrium moisture properties and equilibrium thermal properties. Stress, strain, Hooke's law for orthotropic materials. Electrical polarization, axial and bending stress, dielec-tric heating. Entry card required. Prerequisite: MATH 126, PHYS 116.

FOR P 402 The Physics of Wood and Fiber Composites (4)

Equilibrium properties, mass and energy transport, timedependent electrical behavior, inelastic behavior and vi-bration. Prerequisite: 401. (Offered alternate years; offered 1980.)

FOR P 403 Fibrous Structure and Rheology I (3) Allan

Review of the synthetic and natural fibers and their chemical, physical, microscopic, and submicroscopic properties. The bonding behavior of fibers in networks. Analysis of the structure of fiber networks with reference to nonwovens and paper.

FOR P 404 .Fibrous Structure and Rheology II (3) Allan

Behavior of fibers in fluid suspensions and properties of webs formed therefrom. Physics and chemistry of fiber-polymer interactions and adhesion. Fiber modification by physical and chemical processes and theory and design of fiber composite materials. Prerequisite: 403. (Offered al-ternate years; offered 1981.)

FOR P 405 Microtechnique (3)

Leney The technique of preparing, sectioning, staining, and mounting woody tissues and fibers for microscopic study. Entry card required.

FOR P 406 Wood Chemistry I (3) Sarkanen

Chemical and physical properties of cellulose, lignin, hemicellulose, and extractives. Wood as a raw material for the chemical industry.

FOR P 407 Wood Chemistry I Laboratory (2) Sarkanen

Laboratory to supplement 406.

FOR P 408 Wood Chemistry II (3)

Sarkanen Review of the chemistry of conversion of wood to pulp, paper, and by-products.

FOR P 409 Wood Extractives Chemistry (2) Hruthord

Nature, origin, and occurrence of the extraneous compo-nents of wood, their influence on pulp and paper preparation, and their utilization.

FOR P 410 Energy From Wood (3) ¹ Explores principal characteristics of wood fuels and focuses upon major systems for recovering energy from them. Considers wood fuels from resource, technical, and economic points of view. Prerequisites: CHEM 101, 102.

FOR P 440 Construction (4) Burke

Design and construction of forest roads; earth-moving methods and costs, explosives, surfacing, drainage facili-ties. Laboratory: design of timber bridges. Prerequisite: 377

FOR P 441 · Forest Engineering (5)

Burke

Planning the logging operation: logging methods, route projection, selection of landings and settings, logging cost control. Prerequisite: CETC 310 or equivalent.

FOR P 442 Financial Analysis of Logging Equipment and Operations (4)

Business investment management in logging industry with particular emphasis on equipment replacement. En-gineering performance of various types of logging equip-ment. Individual student project includes some field work. Prerequisite: 441.

FOR P 443 Safety Practices in Forest Industries (1) Burke

Accident costs and frequency rates; accident investiga-tions; safety inspection; safety organization and program. Prerequisite: forest engineering major.

FOR P 445 Advanced Forest Engineering (3) Greulich

Description and analysis of the logging and roading pro-

cess within a system's framework; application of management science methods in data collection, data analysis, and decision making to forest engineering problems within the systems context. Offered on credit/no credit basis only. Prerequisite: 441.

FOR P 446, 447, 448, 449 Senior Forest Engineering Field Studies (2,5,5,3) Burke, Greulich, Jorgensen

446: route projection and logging planning. 447: reconnaissance and preliminary surveys. 448: road location and construction surveys. 449: cost estimates and reports. Development of a complete logging plan for a timber tract. Courses given consecutively in Spring Quarter. Prerequisite: 441.

FOR P 470 Forest Products Protection (3) Driver, Smith

Wood- and fiber-destroying agencies, biological and physical, classification and manner of attack. Theory of toxicity and the important preservatives; pressure and nonpressure treatments. Fire retardant chemicals and treatments, coatings and impregnation.

FOR P 472 Gluing Process Technology (3) Bryant

Theory of wood adhesion, chemical nature of wood ad-hesives, requirements of adhesives and binders relative to important wood and process variables. Prerequisites: 374. 377.

FOR P 473 Plywood and Board Processes (4) Bryan

Familiarization with the technology of the modern lum-Paintanzation with the technology of the model fails ber laminating, plywood, and composition board indus-tries; product properties as related to process and species variables; uses and markets for these products. Prerequisite: 472.

FOR P 475 Wood Drying Technology (3) Leney

Analysis of the wood-drying process; technology of re-ducing the moisture content of wood in the form of lum-ber, veneer, particles, and fiber. Relationship of moisture to wood and fiber as it affects the manufacturing process and end use. Prerequisite: senior or graduate standing in Wood and Paper Division.

FOR P 476 Pulping and Bleaching Technology (3) Sarkanen

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 CH E 471.

FOR P 477 Papermaking Technology (3)

McKean Fiber sources and properties. Secondary fibers. Stock preparation, sheet forming, water removal, finishing. Coating, lamination, and printing. Paper products. Of-fered jointly with CH E 472.

FOR P 478 Pulp and Paper Laboratory (2) McKean

Laboratory experiments in the pulping of wood, fiber technology, and physical and chemical characteristics of paper and pulp. Offered jointly with CH E 473. Prerequi-site: 476.

FOR P 479 Analysis of Wood Processing Facilities (3)

Bethel

Application of wood science and technology to analysis of the effectiveness of wood processing facilities. Pro-duction control and quality control related to materials and processes. Procurement control problems. Decision making with respect to product mix, equipment modifica-tion, analysis of inventory control, and material movement.

FOR P 480 Wood Process Development and Design (3) Bethel

Study of the factors influencing feasibility judgments with respect to industrial development and factory de-sign. Feasibility of new forest products manufacturing installations with reference to raw material supply, mar-kets, transportation, and labor supply. Analysis of case histories of forest products manufacturing and facility de-velopment. Use of operations research methods in feasibility studies.

FOR P 481 Pulp and Paper Unit Operations (3) McKean

Unit operations of particular interest in the pulp and paper industry in addition to those covered in CH E 330 and 340. Prerequisite: CH E 340.

FOR P 485 Undergraduate Research (1-3, max. 3) Undergraduate research or independent study project under the supervision of the faculty; usually one credit per quarter. Prerequisite: senior standing in Wood and Paper Division.

FOR P 487 Introduction to Wood Biochemistry (3) Hrutfiord

Basic biochemical concepts; emphasis on the chemistry of photosynthesis, plant metabolism, and protein biosyn-thesis. (Offered alternate years; offered 1980.)

FOR P 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.

FOR P 489 Wood Biosynthesis (3) Hrutfiord

Hrunora Biosynthesis of carbohydrates, phenolic and terperoid compounds in forest trees, and biochemistry of wood degradation. Prerequisite: 487 or BIOC 405. (Offered al-ternate years; offered 1982.)

FOR P 490 Undergraduate Studies (1-5)

FOR P 491 Undergraduate Studies (1-5)

FOR P 492 Undergraduate Studies (1-5)

Individual tutorial study of topics for which there is not sufficient demand to warrant the organization of regular classes. The courses are offered in all quarters, and credits can vary from 1 to 5, and, with the permission of the instructor, each course may be repeated for credit. Credits are individually arranged for each course. Entry card required.

Courses for Graduates Only

FOR P 501 Elasticity of Wood and Fiber

Composites (4) The concept of stress, strain, and Hooke's law for the or-thotropic continuum. Tensor transforms of stress, strain, and the elastic coefficients. The compliance and stiffness tensors. Strain energy. Distribution functions of descrip-tions of internal geometry of composites. Orthotropic elasticity of the fiber wall. Elasticity and two- and threedimensional fiber networks. Elasticity of particle com-posite and laminates. Prerequisites: 401 and 402.

FOR P 502 Transport Processes in Composite Systems (2)

Time-dependent and time-independent diffusion of moisture and thermal diffusion. Mechanisms of moisture and thermal transport. Diffusion in particle composites. Solu-tion of the diffusion equation by separation of variables and finite difference methods. Prerequisites: 401 and 402.

FOR P 541 Advanced Forest Engineering (5) Logging organization and management; logging cost analysis and budgeting. Entry card required.

FOR P 542 Advanced Logging Engineering (3) Detailed consideration of problems of logging planning and truck road engineering, including the preparation and field layout of logging plans; location, design, and con-struction of logging truck roads. Entry card required.

FOR P 571 Advanced Wood Preservation (3) Permeability of wood, theory and factors affecting penetration, liquid movement in wood, chemical effects on wood. Entry card required.

FOR P 572 Wood Chemistry and Analysis (3-5) Hrutfiord

Application of instrumental methods of analysis to wood, Application of insuring an include of analysis to wood, wood products, and forest products processing effluents. Emphasis on separation systems, including gas and liquid chromatography, and on spectral analysis. Entry card re-quired. (Offered alternate years; offered 1980.)

INTERSCHOOL OR INTERCOLLEGE PROGRAMS

FOR P 573 Wood-Moisture Relations (3) Smith

Theories and practice on relationships between wood and moisture over a range of moisture contents; effects of other polar and nonpolar compounds; capillarity, adsorp-tion, and diffusion in wood. Entry card required.

FOR P 574 Wood-Resin Relations (3) Bryant

Technology of synthetic resins as wood adhesives, wood impregnants, binders, overlays, and surface coatings. Entry card required.

FOR P 576 Photomicrography of Woody Tissues (3) Leney

Theory and method in microscopy and photomicrography of woody tissues. Entry card required.

FOR P 577 Wood and Paper Science Seminar (1) Discussion of current topics in the science of wood and its various composites in the form of composition board, laminates, and paper. Offered on credit/no credit basis only.

FOR P 578 Environmental Protection in the Pulp and Paper Industry (2) Sarkanen

Nature and sources of air and water pollution in the pulp and paper industry. Methods to remove pollutants from and paper industry. Methods to remove pollutants from aqueous and gaseous effluent. Reduction of effluent vol-ume by recycling of water and chemicals and by the man-ufacture of by-products. Novel pulping and bleaching techniques to reduce the formation of pollutants. Offered jointly with CH E 578. Available to seniors. Prerequi-sites: 406, 476. (Offered alternate years; offered 1980.)

FOR P 579 Forestry and Wood Utilization in the Economic and Social Environment (2) Bryant

For graduate students in the College of Forest Resources with baccalaureate or master's degrees outside the for-estry field (e.g., biology, chemistry, engineering). World view of the interrelationships of forestry and wood utilization in the economic and social environment as well as an opportunity to relate research interests to this framework. Prerequisite: permission for graduate students outside the College of Forest Resources.

FOR P 590 Graduate Studies (1-5) Study in fields for which there is not sufficient demand to warrant the organization of regular courses. Entry card required.

FOR P 600 Independent Study or Research (*)

FOR P 700 Master's Thesis (*)

FOR P 800 Doctoral Dissertation (*)

TUTORIAL STUDY

Tutorial study designed to meet individual requirements is available to graduate students in the graduate studies couses listed below. Such study may include literature review and field and laboratory work. The courses are of-fered in all quarters, and credits can vary from 1 to 5, and, with the permission of the instructor, each course may be repeated for credit. Credits are individually arranged for each course. Prerequisites include graduate standing and permission.

FOR P 540 Graduate Studies in Logging Engineering (1-5) Burke, Greulich, Jorgensen

FOR P 570 Graduate Studies in Forest Products

(1-5) Allan, Bryant, Gardner, Hruthord, Leney,

QUANTITATIVE SCIENCE

See Interschool or Intercollege Programs.

INTERDISCIPLINARY GRADUATE DEGREE PROGRAMS

These programs are administered by interdisciplinary groups of the Graduate School. Certain courses carrying groups of the Graduate School. Certain courses carrying the particular program prefix appear below; other courses with the same prefix appear elsewhere as indi-cated. Other courses included in these programs are se-lected from many disciplines throughout the University and carry the prefix of the respective discipline.

APPLIED MATHEMATICS

AMATH 401 Analytical Methods in Engineering I (3)

Acquisition of technique and experience in application of areas of mathematics encountered in science and engi-neering; illustrated by case studies from many fields. Ap-propriate for seniors and graduate students in engineering and science who require a survey of techniques, but who and science with require a survey of techniques, but who are not prepared for, or do not seek, advanced material at the 500 level. Applications of first-order and linear ordi-nary differential equations, systems of differential equa-tions, phase plane, stability and power series solutions of differential equations and Laplace transformation. Of-fered jointly with ENGR 401. Prerequisite: MATH 238.

AMATH 402 Analytical Methods in Engineering II

(3) See 401. Applications of linear algebra—vectors and ma-See 401. Applications of infear algebra—vectors and ma-trices, vector differential calculus—vector fields, line and surface integrals, complex functions, power series, Taylor and Laurent series and integrations by method of residues. Offered jointly with ENGR 403. Prerequisite: MATH 238.

AMATH 403 Analytical Methods in Engineering III

(3) See 401. Application of Fourier series and integrals, par-tial differential equations, probability and statistics. Of-fered jointly with ENGR 403. Prerequisite: MATH 238.

AMATH 501 Seminar in Applied Mathematics

(1, max. 6) AWSp Special topics and selected problems of current interest in applied mathematics. Offered on credit/no credit basis only.

AMATH 562, 563, 564 Methods of Partial Differential Equations I, II, III (3,3,3) A,W,Sp First-order partial differential equations: characteristics, conservation laws, shocks, applications to geometrical optics and Hamiton-Jacobi theory. Elliptic equations: fundamental solution, Green's function, conformal map-nice, heuridany walks, problems, Berghelia equations Fing, boundary-value problems. Parabolic equations. Hyperbolic equations: characteristics, shocks, examples from fluid dynamics, approximate methods. Post-mas-ter's sequence!. Offered jointly with A A 562, 563, 564. Prerequisite: 569. (Offered odd-numbered years.)

AMATH 567 Analysis in Engineering I (3) A Algebra and calculus of vector and tensor fields. Linear mappings, matrices, finite dimensional eigenvalue prob-lems. Curvilinear coordinates. Complex variables, con-tour integration, conformal mappings. Offered jointly with A A 567.

AMATH 568 Analysis in Engineering II (3) W Survey of properties and practical techniques for ordinary differential equations. Series expansions; eigenvalue problems; Laplace transforms and applications; varia-tional methods; asymptotic expansions; perturbations, regular and singular; difference equations; numerical pro-cedures. Offered jointly with A A 568. Recommended:

AMATH 569 Partial Differential Equations (3) Sp Properties of diffusion, wave, and Laplace-type equa-tions; initial and boundary-value problems; series expan-sions; transform methods; singularities, Green's func-tions; classification of second-order equations, theory and applications of method of characteristics; numerical techniques. Offered jointly with A A 569 and MATH 569. Prerequisite: 568 or MATH 428.

AMATH 576, 577, 578 Perturbation Theory I, II, III (3,3,3) A,W,Sp Basic concepts of asymptotic expansions with applica-tions to linear partial differential equations. Singular perturbations: matched asymptotic expansions, boundary layers, shock layers, uniformly valid solutions, the method of multiple scales, weakly nonlinear wave propagation problems and resonance phenomena, nonlinear wave propagation in fluid, solid, and particle mechanics. Post-master's sequence. Offered jointly with A A 576, 577, 578. (Offered even-numbered years.)

AMATH 584, 585, 586 Approximate and Numerical Analysis I, II, III (3,3,3) A,W,Sp Approximation theory, curve fitting; numerical differen-tiation and integration; linear and nonlinear algebraic equation systems; ordinary differential equation methods; asymptotic expansions; perturbation methods, matrix iterative techniques; numerical methods for elliptic, para-bolic, hyperbolic partial differential equations; varia-tional methods; eigenvalue problems; nonlinearities; ap-plications to practical problems in fluid flow, stress analysis, acoustics, electromagnetism. Offered jointly with A A 584, 585, 586. Prerequisites: 567, 568, 569. (Offered odd-numbered years.)

AMATH 587, 588, 589 Techniques of Applied Analysis I, II, III (3,3,3) A, W, Sp Review of complex variables. Series expansions, contour

Review of complex variables. Series expansions, contour integration, generating functions, conformal mapping. Differential equations in the complex plane. Special functions. Asymptotic methods (saddle point, stationary phase, WKB, and others). Fourier and related transphase, WKB, and others). Fourier and related trans-forms. Radiation condition, signal propagation, singu-lar inversions, Green's functions. Applications to prob-lems in engineering and physics. Integral equations. Wiener-Hopf and other special techniques. Post-master's sequence. Offered jointly with A A 587, 588, 589. Pre-requisites: 567, 568, 569 or equivalent. (Offered even-vumberd users) numbered years.)

AMATH 600 Independent Research or Study (*) AWSoS

AMATH 700 Master's Thesis (*) AWSpS

AMATH 800 Doctoral Dissertation (*) AWSpS *

BIOLOGY TEACHING

No courses have this program prefix; all courses in-cluded in this interdisciplinary program appear under the appropriate headings in the various biological science and science education departments.

BIOMATHEMATICS

For related course work, see listings for the departments of Statistics and Biostatistics.

BMATH 554 Stochastic Processes in the Life Sciences (3) Sp

Rell

Bell Modeling of various biomedical phenomena in terms of the basic stochastic processes—bionomial, Poisson, and Gaussions. Extensions to include basic applications of random walk, compound, and nonhomogeneous Poisson processes, as well as Wiener processes and certain funda-mental time series. Estimation, testing, and interval esti-mation for parameters in parametric models. Introduction to nonparametric stochastic processes and associated inference. Special emphasis in air-pollution models, wa-ter-nollution models. epileptic-seizure models, and ter-pollution models, epileptic-seizure models, and cancer-related nutrition models. Prerequisites: basic course in each of statistical inference, probability, and biology.

BMATH 597 Seminar in Quantitative Ecology

(1, max. 9) AWSp Lectures and discussions of current problems in quantitative ecology. Prerequisite: permission of instructor.

BMATH 598 Special Topics in Quantitative Ecology (1-3, max. 12) AWSp Special topics in quantitative ecology, including popula-tion and community ecology, systems ecology, and phys-ical processes in ecosystems. Prerequisite: permission of instructor instructor.
BMATH 599 Research in Quantitative Ecology (1-5, max. 5) AWSp

Special advanced topics in quantitative ecology. Topics can be of a theoretical nature or combined theory and experiment. Prerequisite: permission of instructor.

BMATH 600 Independent Study or Research (*)

BMATH 700 Master's Thesis (*)

BMATH 800 Doctoral Dissertation (*)

COMPARATIVE LITERATURE

See also Comparative Literature graduate course listings. in the College of Arts and Sciences section.

C LIT 600 Independent Study or Research (*)

C LIT 700 Master's Thesis (*)

C LIT 800 Doctoral Dissertation (*)

HEALTH SERVICES ADMINISTRATION AND PLANNING

No courses have this program prefix all courses included in this interdisciplinary program appear under other pertinent Graduate School and departmental listings.

INDIVIDUAL PH.D. PROGRAM

IPHD 600 Independent Study or Research (*) AWSpS

IPHD 800 Doctoral Dissertation (*)

Restricted to graduate students approved for a special in-dividual Ph.D. program in the Graduate School. Requires permission of the student's Supervisory Committee chair-person. Name of dissertation supervisor should appear on the student's program of studies.

MARINE AFFAIRS

Graduate courses leading to the Master of Marine Affairs degree are shown in the Interschool or Intercollege Pro-grams section under Institute for Marine Studies.

PHYSIOLOGY-PSYCHOLOGY

P PSY 800 Doctoral Dissertation (*)

RADIOLOGICAL SCIENCES

RAD S 477 Introduction to Radioactive Tracer Techniques (3) A Robkin

Basic concepts of the use of radioactive tracers to mea sure the transfer between the compartments of a biologi-cal system. The theoretical analysis is restricted to cal system. The meorencal analysis is restricted to systems with no more than three compartments. Experi-ments are designed to permit the student to utilize the theory discussed and to make actual determinations of transfer coefficients. Offered jointly with NUC E 477.

RAD S 487P Radioactive Tracer Techniques (2) A Robkin

The use and behavior of radioactive tracers are studied; attention is given to the dynamics of the distribution of trace elements after their introduction into the system. Analysis of current models and application to examples from both living and nonliving systems. Offered jointly with NUC E 487. Prerequisite: permission of instructor.

RAD S 501, 502 Biological Effects of Ionizing Rediation (2,2) A,W Jackson

Effects of ionizing radiation at the molecular, cellular, organ, and organism levels with emphasis on mammalian systems. Prerequisite: permission of instructor.

RAD S 503, 504 Laboratory in Radiation Biology (1,1) A,W *Christensen*

Laboratory study of the biological effects of ionizing radiation. Prerequisite: permission of instructor.

RAD S 507 Radiation Hazards Analysis and Control (1) Sp Emphasizes methods and procedures rather than facility or equipment design.

RAD S 510 Special Topics in Radiation Biology (2) Sp Christensen

Detailed study of current research of special significance to the development of radiation biology. Prerequisite: permission of instructor.

RAD S 515 Chemical Mechanisms in Radiation Biology (2) ASp Christensen

Discussion of radiation-induced chemical reactions and their contribution to biological radiation damage, including alterations in enzymes, viruses, bacteria, and mam-malian cells. Prerequisite: permission of instructor.

RAD S 520 Radiological Sciences Seminar (1, max, 6) W

RAD S 540, 541 Nuclear Energy, Man, and His Environment I, II (3,3) Rohkin

For majors and nonmajors interested in evaluating the impact of nuclear power technology on man and his enviimpact of nuclear power technology on man and his envi-ronment. Studies of modern nuclear power cycles, nu-clear reactor safeguards, thermal effects, control of ra-dioactivity releases, biological response to radiation, environmental monitoring, evaluation of new energy re-sources and energy conversion systems. Offered jointly with NUC E 540, 541.

RAD S 550 Field Practice in Radiological Health (*, max. 6) S Christensen

Student rotates through laboratories engaged in radiologi-cal health and radiation safety work to gain experience in the problems encountered in practice. Prerequisite: permission of instructor.

RAD S 600 Independent Study or Research (*) AWSpS

RAD S 700 Master's Thesis (*) AWSpS

SOCIAL WELFARE

SOCWL 552 History of Poverty and Inequality: The Anglo-American Experience (1400-1900) (3) W Examines the roots of modern social welfare policy and program in two historic periods: the reign of the Tudors (1485-1603) and the evolution of welfare policy compati-ble with the aims of the nation-state; and the significant societal and intellectual developments preceding the En-glish Poor Law Reform of 1834. The English welfare heritage as it subsequently shaped public and private wel-fare measures in the United States also receives attention, or door the relevance of these actual bedraining to acdua's as does the relevance of these early beginnings to today's conceptualization of welfare policy.

SOCWL 553 Seminar in Contemporary Social

SOCWL 553 Seminar in Contemporary Social Welfare Policy (3) Sp Major American social welfare programs and some of the policies that guide their development and implementa-tion; contemporary income maintenance policies and their effectiveness in reducing income inequality. This course is closely linked to, and built upon, 552. Selected issues and dilemmas followed in that course, which serve as the focus for policy debate, are examined in the con-text of current welfare programs.

SOCWL 580 Introduction to Advanced Research Methods and Design (3) A Introduction to the broad scientific issues and the specific

Introduction to the order scientific issues and the specific methodological strategies used in formulating and an-swering research questions within the field of social wel-fare. Required of all first-year students in the social wel-fare Ph.D. program; open to others by permission.

SOCWL 581-582-583 Research Practicum (1-3, max. 3)-(1-3, max. 3)-(1-3, max. 3) A, W, Sp Development of specific methodological skills in social welfare research through participation in an ongoing re-search project. Offered on credit/no credit basis only.

SOCWL 598-599 Research Problems and Priorities in Social Work and Social Welfare (3-3) A,W Seminar assesses the current state of knowledge in selected major areas of social work and social welfare, exaction major areas of social work and social welfare, ex-amines analytic and methodological problems in con-ducting research in these areas, and identifies research priorities. Emphasis on peer learning centered on the identification of central research problems in the areas of social policy, program evaluation, and intervention with individuals, groups, families, and organizations. Prereq-uisite: admission to social welfare Ph.D. program or permission.

SOCWL 600 Independent Study or Research (*) AWSpS

SOCWL 800 Doctoral Dissertation (*) AWSpS

INTERSCHOOL OR INTERCOLLEGE PROGRAMS

BIOENGINEERING

Administered by the School of Medicine and the College of Engineering.

BIOEN 299 Introduction to Bioengineering

(1) ASp Lectures, discussions, and reading assignments on the various aspects of bioengineering; orientation in bioengi-neering studies and practice. Offened on credit/no credit basis only.

BIOEN 401 Fundamentals of Bloengineering I (3) Introduction to major physical, chemical, and biologic properties of major components of living systems. Appli-cation of engineering to measurement and characteriza-tion of these properties. Introduction to synthetic bio-materials and a case study of musculoskeletal system. Recommended: basic course in physiology (e.g., ZOOL 2009 D BIO 2600) 208, P BIO 360).

BIOEN 402 Fundamentals of Bioengineering II (3) Engineering principles and technology applied to investi-gation, diagnosis, and therapy in vasculature, heart, and respiratory systems, as well as selected topics dealing with skin, eyes, and ears. Prerequisite: 401.

BIOEN 403 Fundamentals of Bioengineering III (3) Engineering principles and technology applied to investi-gation, diagnosis, and therapy in renal, digestive, and re-productive systems. Selected topics in engineering con-tributions to health-care delivery. Prerequisite: 402.

BIOEN 410 Creative Prescriptions for Health-Care Delivery (3) S

Holloway, Rushmer

Current deficiencies in health care with cause or cure related to applications of modern technology. The nature and scope of medicine is considered in relation to manpower requirements, health-care facilities, distribution of care, data processing, data sources, and projections of fu-ture technological needs for various clinical specialties. Primarily for students in medicine, social management of technology, public health and community medicine, or bioengineering. Offered jointly with SMT 409. (Offered odd-numbered years.)

BIOEN 420 Orthopaedic Biomechanics (3) A Carter

Musculoskeletal system studied from an engineering perspective; engineering concepts used in the analysis of composite and porous materials are applied in the study of bone tissue; interrelationships between the mechanical and biological characteristics of bones and joints. Offered jointly with ORTHP 420. Prerequisite: M E 352 or equivalent. (Offered odd-numbered years.)

BIOEN 436 Medical Instrumentation (4) Sp Spelman

Introduction to the application of instrumentation to med-icine. Topics include transducers, signal-conditioning amplifiers, electrodes and electrochemistry, ultrasound

INTERSCHOOL OR INTERCOLLEGE PROGRAMS

systems, electric safety, and the design of clinical elec-tronics. Laboratory included. Offered jointly with E E 436. For juniors, seniors, and first-year graduate students who are preparing for careers in bioengineering, both re-search and industrial. Prerequisite: some knowledge of human physiology and electronics or instrumentation or permission of instructor. Recommended: 402. Entry card remired.

BIOEN 460 Waves in Bioengineering (3) Sp 1.00

Lee Ultrasonic, electromagnetic, and optical wave effects in biological materials. Applications to biomedical uses in diagnosis, therapy, and surgery. Offered jointly with E E 460. Prerequisite: E E 381 or other course in wave propa-gation as approved by instructor.

BIOEN 472 Diagnostic Ultrasound (3-6) AWSp Basic principles of ultrasound. A-mode applications, in-cluding delineation of midbrain structures, differentiating solid from cystic lesions, and measurement of biparietal diameters. TM-mode applications, including delineation of intracardiac structures, such as mirtal valve and peri-cardial effusions. B-mode scans of liver, spleen, kidneys, retroperitoneal structures, and uterus. Pulse and continuous Doppler applications. Teaching is by informal tutorials with laboratory and ward experience in the vari-ous ultrasound techniques. Prerequisite: permission of in-structor. structor.

BIOEN 490 Engineering Materials for Biomedical Applications (3) W Hoffman

Combined application of the principles of physical chem-istry, biochemistry, materials engineering, mass transfer, and fluid mechanics to biomedical problems. Case studies include considerations of the selection of materials; tes include considerations of the selection of materials, design, and the operation of instruments, components of, or entire, artificial organs (heart, kidney, lung) and artifi-cial structural elements (bone, teeth, skin), all for use in contact with body fluids. Offered jointly with the CH E 490. Prerequisite: organic chemistry or permission of in-structor. (Offered even-numbered years.)

BIOEN 491 Controlled Release Systems—Principles and Applications (3) W

Hoffman

Mechanisms for controlled release of active agents and Mechanisms for controlled release of active agents and the development of useful systems for this purpose. Re-lease mechanisms include diffusive, convective, or ero-sive driving forces. Applications to the biomedical, agri-cultural, forestry, and oceanography fields. Some special case studies covered in detail. Offered jointly with CH E 491. Prereguisite: permission of instructor. (Offered odd-numbered users) numbered years.)

BIOEN 499 Special Projects (2-6, max. 6) AWSpS Individual undergraduate bioengineering projects under the supervision of an instructor. In addition, classes on selected topics of current interests as announced. Prerequisite: permission of instructor. Entry card required.

BIOEN 510 Bioengineering Seminar (1) AWSpS Topics of current bioengineering interests presented by faculty, visitors, and students. Students must attend regularving, visions, and subjects. Students must alterna regu-larly, participate in discussions, and make presentations, Enrollment limited to graduate students actively engaged in bioengineering research. Offered on credit/no credit basis only. Entry card required. (Last time offered: Spring Quarter 1981.)

BIOEN 531, 532, 533 Electron Microscopy (1-5, 1-5, 1-5) A,W,Sp Johnson, Luft

Theoretical and applied aspects of microscopy in biology with emphasis on newer methods. Offered jointly with B STR 531, 532, 533. Offered on credit/no credit basis only. Prerequisite: permission of instructor.

BIOEN 547 Engineering Aspects of the Fluid Mechanics of the Human Body (3) W Oates

Engineering background to the many flow regimes exist-ing in the human body. Specific examples of flow prob-lems such as cardiovascular, bronchial, microcapillary, urethral, etc. Offered jointly with A A 547. Offered on credit/no credit basis only. Prerequisite: permission of in-structor. (Offered odd-numbered years.)

BIOEN 550 Circulatory Mass Transport and Exchange (3) W Bassingthwaighte

A bringing together of stochastic theory, network anal-

ysis, and chemical reactor kinetics to the kinetics of mass transport through the vascular system, dispersion in transorgan passage, and exchange across capillary and cell membranes. Prerequisites: graduate-level knowledge of cardiovascular physiology, elementary statistics, and differential equations. (Last time offered: Winter Quarter 1981.)

BIOEN 599 Special Topics in Bloengineering (2-6, max. 15) AWSpS Offered at a graduate level periodically by faculty mem-bers within the Center for Bioengineering; concerns areas or research activities with current and topical interest to bioengineers. Prerequisites: undergraduate or graduate courses (or equivalent) determined individually for each special topic. Entry card required.

COMPUTER SCIENCE

Courses for Undergraduates

C SCI 201 Introduction to Computer Science (5) AWSpS

Rigorous introduction to the theoretical and practical components of computer science: algorithms, programs, data structures, machines, computability, applications, social aspects. Prerequisite: MATH 124.

C SCI 241 Programming (3) AWSpS Basic algorithms, programming techniques, and basic concepts of the structured high-level language Pascal. Prerequisite: 201 or permission of instructor or depart-mental adviser.

C SCI 321 Discrete Structures (3) A

Fundamentals of set theory, graph theory, Boolean alge-bra, and algebraic structures with applications in comput-ing. Prerequisites: MATH 126 and major standing.

C SCI 322 Introduction to Formal Models in Computer Science (3) W

Computer Science (3) W 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 rigor-ous use of basic techniques of analysis. Induction proofs, simulation, diagonalization, and reduction arguments. Prerequisites: 241, 321, and major standing.

C SCI 326 Data Structures (5) Sp

Sequential and linked allocation of linear structures; tables, arrays, stacks, queues; in-core searching and sort-ing; circular and doubly linked lists; trees and threaded lists; dynamic memory allocation and garbage collection. Prerequisites: 321, 378, and major standing.

C SCI 341 Programming Languages (5) W Designed to make the student reasonably fluent in several radically different languages, such as LISP, SNOBOL, APL, ALGOL 60, Pascal, SIMULA 67, and others. Pre-requisites: 241 and major standing.

C SCI 373 Data Structures and Algorithms (3) ASp Fundamental algorithms, and data structures for their im-plementation. Techniques for solving problems by pro-gramming. Sorting, searching, linked lists, binary search trees, balanced trees, hashing. Offered jointly with E E 373. Prerequisite: 241 or 445 or equivalent knowledge of Pascal. For non-computer science majors: no credit if 236 has hear takan 326 has been taken.

C SCI 378 Machine Organization and Assembly Language (5) A

Differences and similarities in machine organization; central processors; fundamentals of machine language and addressing; assembly language programming, in-cluding macros; operating system interfaces. Prerequi-sites: 241 and major standing.

C SCI 401: Introduction to Assemblers and Compilers (3) W

Fundamentals of assemblers, compilers, and interpreters. Symbol tables. Macroprocessing. Lexical analysis, syn-tax analysis, semantic analysis, and code generation for general-purpose programming languages. Offered jointly with E E 401. Prerequisite: 373, 378 or E E 371.

C SCI 421 Introduction to the Analysis of Algorithms (3) A

Analysis of behavior of algorithms. Techniques for de-

sign of efficient algorithms. Methods for showing lower sign of enterin agonanis. Methods for showing lower bounds on computational complexity. Discussion of par-ticular algorithms for sorting, searching, set-manipula-tion, arithmetic, graph problems, pattern matching, and their implementations. Prerequisites: 322 and 326.

C SCI 431 Introduction to Theory of Computation (3) Sp

Models of computation, computable and noncomputable functions, space and time complexity, tractable and in-tractable functions. Prerequisite: 322.

C SCI 445 Computer Programming Laboratory (1) AWSD

AWSp For experienced computer programmers who want to learn Pascal quickly. Topics include the syntax and semantics of Pascal along with programming examples. Taught in a concentrated fashion during the first two weeks of the quarter with a number of programming as-signments. Not a substitute for 241; no credit given if 241 has been taken. Offered on credit/no credit basis only. Prerequisite: significant programming experience in a high-level language, such as ALGOL, BASIC, COBOL, FORTRAN, or PL/1.

C SCI 451 Introduction to Operating Systems

(3) W Principles of multiprogramming systems. Process management, resource management, and file systems. Pre-requisite: 326 or 373 or permission of instructor.

C SCI 470 Computer Design (4) AW Fundamental gating circuits are developed into large logic gating structures. The use of these structures in the design of central processing units, memories, and pe-ripheral equipment is illustrated. For computer science majors. Prerequisite: 378 or permission of instructor.

C SCI 473 Introduction to Artificial Intelligence (3)

Principal ideas and developments in artificial intelli-gence; LISP and SNOBOL as the basis of precise de-scriptions of AI processes; theorem-proving and probactin-solving methods; representation of knowledge in procedures and in frames; natural language analysis and synthesis, involving inference and generation from con-ceptual representations. Prerequisites: 326 and 341, or 373.

C SCI 478 Computer System Concepts (4) ASp For experienced computer users from other departments seeking a better understanding of the underlying mecha-nisms. Topics include microprogramming, machine-level architecture, computer system organization, assemblers and macroprocessors, compilers and high-level lan-guages, and operating systems. Not a substitute for 378; no credit given if 378 has been taken. Prerequisite: sig-nifecant more amming experience in a high-level lannificant programming experience in a high-level lan-guage; 241 or 445 must be taken concurrently.

C SCI 498- Senior Project (1-9-, max. 9) AWSp Consists of a report (and perhaps demonstration) describing a development, survey, or small research proj-ect completed by the student in an area of specialization. Objectives are: (1) applying and integrating the class-room material from several courses, (2) introducing the professional literature, (3) gaining experience in writing a technical document, and (4) enhancing employability through the evidence of independent work. The project may cover an area in computer science or an application to another field. The work normally extends over more than one quarter, for a maximum of 6 credits for 498- and a maximum of 9 credits for 498H-. Prerequisite: senior a maximum of 9 credits for 498H-. Prerequisite: senior standing in computer science major.

C SCI 499 Reading and Research (1-24, max. 24)

Available for special cases for advanced computer sci-ence majors to do reading and research in the field. Of-fered on credit/no credit basis only. Usable as a free elective, but not in place of a core course or computer science elective. Prerequisites: senior standing and permission of instructor.

Courses for Graduates Only

C SCI 500 Computers and Society (2) W

Study of the impact of computer technology on present and future societies; computer technology and economics; political, economic, cultural, social, and moral issues. Seminar with frequent guest lecturers and discussion leaders. Each student is required to complete a term project. Offered on credit/no credit basis only. Prerequisite: graduate standing in computer science or per-mission. (Offered alternate years.)

C'SCI 501 Compiler Construction (3) Sp

Design of compilers for block-structured general-purpose programming languages. Automatic generation of lexical analyzers and parsers. Error detection and correction. Code optimization. Prerequisites: 401 or E E 401, and 531.

C SCI 502 Advanced Topics in Compiler Construction (3) A

Translator-writing systems, incremental compilation. De-sign of production compilers. Offered on credit/no credit basis only. Prerequisite: 501. (Offered alternate years.)

C SCI 505 Concepts of Programming Languages (3)

Sp Basic concepts in programming languages, data struc-tures (arrays, records) types, patterns, environments, control, evaluation, application, matching; relation to high-level machines. Prerequisites: 401 or E E 401 and the base level data of Based and LISB working knowledge of Pascal and LISP.

C SCI 506 Formal Semantics (3) W

Basic formalisms in semantics including flow-chart schema, recursive schema, fixed-point semantics and the associated induction rules, lambda calculus and other interpretive models. Formal semantics are viewed as pro-viding foundations for formal definitions of programming languages, program interpretation, compiler verification, theory of program optimization, and other meaning-preserving program transformations.

C SCI 508 Representation and Handling of Data Structures (3) A

Linear lists (stacks, queues, deques): sequential and linked allocation; circular and doubly linked lists; trees, binary trees, and threaded trees; traversal algorithms; analysis of flow charts; path length of trees; garbage col-lection; dynamic storage allocation; data management on external media.

C SCI 510 List Processing and String Manipulation

(3) Sp Structure of information sets and processes that reflect syntactic and semantic relationships. The generation and processing of structures such as lists and trees. Symbolic pattern recognition and manipulation. Concepts and ap-plications of recent versions of languages such as LISP, SNOBOL, and FORMULA-ALGOL. Recent developments in languages for artificial intelligence.

C SCI 518 Digital Signal Processing (4) Sp Digital representation of analog signals. Frequency do-main and Z-transforms of digital signals and systems. Design of digital systems; IIR and FIR filter design tech-niques, Fast Fourier Transform algorithms. Sources of error in digital systems. Analysis of noise in digital sys-tems. Offered jointly with E E 518. Prerequisite: knowledge of Fourier analysis techniques or permission of in-structor.

C SCI 520 Computer Science Seminar (1, max. 9)

AWSp Weekly discussion by students and faculty or visitors on Offered on credit/no credit current topics of interest. Offered on credit/no credit basis only.

C SCI 521 Design and Analysis of Algorithms I (3)

Models of computation for measuring the efficiency of algorithms. Principles of design of efficient algorithms: recursion, divide and conquer, balancing, dynamic programming, data structure selection. Analysis of al-gorithms. Examples drawn from problems in sorting, searching, set-manipulation, pattern-matching, graphs, matrices, polynomials, and integers. Prerequisite: 508.

C SCI 522 Design and Analysis of Algorithms II (3) Sp

Sp Analysis of algorithms more sophisticated than those treated in 521. Design of efficient algorithms for special computing environments such as logical networks and formulas, Turing machines, list-processing machines, and on-line computation. Techniques for proving lower bounds on complexity. Prerequisite: 521.

C SCI 531 Formal Languages and Automata (3) A Formal models in computer science, including context-free grammars, finite automata, regular expressions, Tur-ing machines, and pushdown automata. Fundamental concepts of nondeterminism, undecidability, and syntax and semantics.

C SCI 532 Complexity Theory (3) W

Space and time complexity on various models of compu-Space and time complexity of various notes of comple-tation including Turing machines, random access ma-chines, and list-processing machines. Hierarchies based on complexity, time and space bounded reducibility, NP-completeness and other complexity classes, and provably different machines. difficult problems.

C SCI 533 Computability and Logic (3) Sp C SCI 553 Computability and Logic (3) Sp Formal systems that characterize the notion of compu-tation and model the notion of logical reasoning. Com-putability of recursively enumerable sets; the recursion theorem, and diagonalization methods. Logic includes first-order predicate logic, nonstandard models, proof systems, the completeness theorem, and undecidable the-ories. ories.

C SCI 540 Discrete System Simulation (3) A Principles of simulation of discrete, event-oriented sys-tems. Model construction, simulation and validation, and relationship to other techniques for system analysis and design. Use of special-purpose simulation languages such as SIMULA and study of functional components and data structures. Prerequisite: programming experience with ALGOL.

C SCI 542 Central Processor Architecture (3) Sp Several central processing units are examined at the gate level. Included are the logic structures of: I/O bus, mem-ory bus, ALU, address modification, control logic, com-binatorial and multiphase instructions, access priority, cycle stealing, etc. Prerequisite: 470.

C SCI 543 Analytic Models of Computer Systems (3) W Emphasizes the use of queuing network models as tools

for analyzing computer systems. Topics include useful to many set of the set hierarchical modeling. A realistic case study is undertaken.

C SCI 548 Computer Systems Architecture (3) W Notations for describing computer systems. Powerful CPUs. Memory organization. Channels and I/O proces-sors. Micro programming. Stack computers. Array and pipe line processors. Prerequisite: 470 to be taken concur-rently or permission of instructor.

C SCI 551 Operating Systems (3) Sp Operating systems design and construction techniques. Systems programming languages, concurrent program-ming, design methodologies, protection, deadlock prob-lems, virtual memory allocation, and other topics. Study of the structure of different kinds of operating systems. Prerequisite: 451 or permission of instructor.

C SCI 557 Computer Graphics (3) A Generation and interpretation of pictures by computer with or without human interaction. Graphics hardware. Display programming. Picture transformations. Repre-sentations of pictures and their attributes. Hidden line and surface problems. Graphics programming languages and systems. Linguistic methods in picture analysis and generation. Each student is required to complete a project on the interactive graphics facility in the computer sci-ence laboratory. Prerequisite: 508.

C SCI 561 Computer Communications and Networks (3) A Fundamentals of data transmission: coding, message for-

mats, and protocols; job and data management problems; mass, and protocols, for and take management protocols, organization of computer networks. A number of net-works are studied, and students are expected to prepare a class presentation of a network. Offered on credit/no credit basis only. (Offered alternate years.)

C SCI 573 Artificial Intelligence I (3) A Introduction to the use of the computer in nonnumerical problem solving. Survey of theorem proving, symbol manipulating, pattern recognition, and inductive prob-lem-solving techniques. Computer models of human thought. Prerequisite: 508 or 510 or permission of instructor.

C SCI 574 Artificial Intelligence II (3) W Continuation of studies of artificial intelligence systems. emphasizing theorem proving, symbolic problem solving, pattern recognition, and natural language data pro-cessing. Students are required to do projects. Pre-requisite: 573 or permission of instructor.

C SCI 590 Special Topics in Computer Science (*) AWSp

Lectures and discussions of topics of current interest in computer science. May not be offered every quarter; con-tent may vary from one offering to another. Prerequisite: permission of instructor

C SCI 600 Independent Study or Research (*) AWSpS

Offered on credit/no credit basis only.

C SCI 700 Master's Thesis (*) AWSpS Offered on credit/no credit basis only.

C SCI 800 Doctoral Dissertation (*) AWSpS Offered on credit/no credit basis only.

MARINE STUDIES

IMS 499 Undergraduate Research (1-3, max. 6)

AWSpS Research on assigned topics under the supervision of fac-ulty members. Prerequisite: permission of instructor.

IMS 500 Marine Affairs (5) A

Gibbs Intensive. Emphasis on the development of basic analyti-cal skills and comprehensive factual information about ocean activities, trends, and organizational settings. Se-lected concepts of marine policy analysis reviewed and applied to marine uses, such as the exploitation of living, hydrocarbon, and other mineral resources, transporta-tion, scientific research, waste disposal, naval activity, and coastal space utilization. Prerequisite: graduate standing or permission of instructor.

IMS 504 Marine Sciences and the Uses of the Ocean (2) W

R. H. Fleming

Analyses and applications of ocean data and information to selected examples of ocean use and resource exploita-tion. The nature and availability of such information is tool. The nature and availability of such mornauon is reviewed in terms of its applications in policy planning, decision making, regulation, and enforcement. The con-straints imposed by ocean conditions are identified and the consequences of human activities examined. Prereq-uisite: 500 or permission of instructor.

IMS 505 Marine Uses and Resources: Living Resources (3) W Alverson

Survey of living marine resources; factors affecting dis-tributions and abundance; direct and indirect impact of human activities; bases for management; the origin and character of conflict in fisheries management. Prerequisite: 500 or permission of instructor.

IMS 506 International Law of the Sea (3) A Burke

Examination of the way nation-states regulate activities on and under the ocean. Covers the inter-national regulations and institutions concerned with fishery exploitation, pollution, transit rights, scientific research, energy and mineral development, military uses, emplacement of in-stallations, and the boundary issues involved in these various ocean uses. Offered jointly with LAW B 561.

IMS 507 International Organizations and Ocean Management (3) W Miles

Survey of the manner in which international organizasurvey of the manner in which international organiza-tions attempt to manage and regulate the uses of the ocean. Primary emphasis is on the analysis of processes that support or constrain these organizations and on the search for alternative policies and organizations. Offered jointly with PB PL 507. Prerequisite: 500 or permission of instructor.

IMS 508 Economic Aspects of Marine Policy (3) W Crutchfield, Stokes

Development of pertinent economic concepts and their application to selected topics in marine policy decision making. Offered jointly with ECON 537. Prerequisite: 500 or permission of instructor.

INTERSCHOOL OR INTERCOLLEGE PROGRAMS

IMS 509 Principles of Coastal Zone Management (3) W

Hershman

Multiple uses of coastal waters and the adjacent land; conflicts arising from competition for space and re-sources; organizational problems associated with over-lapping jurisdiction and spheres of interest; the develop-ment of alternatives for the resolution of conflicts. Prerequisite: 500 or permission of instructor.

IMS 510 Law of the Coastal Zone (3) W Johnson

Covers federal, state, and local laws, regulations and programs for the management of the coastal zone, includ-ing the definition and ownership of the coastal zone; federal, state, local, and international law jurisdictional is-sues: legislative and administrative controls; federal and state common law. Offered jointly with LAW B 560.

IMS 511 Coastal Environment Management (3) Sp Duxbury, Hershman Coastal zone planners and managers evaluate proposed

and ongoing use activities that affect wetland, estuarine, and nearshore environments. Concepts and techniques for retrieving, analyzing, and using technical environ-mental information in planning and decision making. Washingon State case examples and practical exercises. Prerequisite: OCEAN 580 or permission of instructor.

IMS 512 Ocean Environment and Living Resources (3) Sp Wooster

Analysis of characteristics and processes in the ocean en-vironment affecting abundance of marine organisms; implications for management of oceanic fisheries. Prerequi-site: permission of instructor.

IMS 517 Marine Uses: Transportation and Commerce (3) W

D. K. Fleming Role of the oceans in the transportation of men and mate-rials; character and trends in vessel design and terminal facilities; pattern and nature of industry organization; reglacinics; pattern and name of industry organization; reg-ulations; economics of the shipping industry; manage-ment of fleets and vessels; manpower at sea and ashore; national policies affecting the merchant marine and port facilities. Prerequisite: 500 or permission of instructor.

IMS 530 The Regional Implementation of an Extended Economic Zone (3) Sp Miles

Team-research seminar to evaluate the implications of a two-hundred-mile economic zone in the Central and North Pacific and Atlantic oceans, the Arctic and Indian oceans, and the Mediterranean Sea. Focus is on one re-gion at a time. Prerequisite: 507 or permission of instruc-tor.

IMS 538 Economic Aspects of Marine Policy II (3) Sp Stokes

Development of pertinent economic concepts and their application to selected topics in marine policy. Offered jointly with ECON 538. Prerequisite: 508 or permission of instructor.

IMS 550 Special Topics in Marine Studies (1-3, max. 18) AWSpS

Examination of various aspects of marine studies. Con-tent 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.

IMS 551, 552 Ocean Engineering Systems Design I, П (3,3) ₩,Sp Vesper

Interdisciplinary ocean systems design, choice of system Internisciplinary ocean systems design, choice of system motivated by problems of current interest; participation by students and faculty from engineering, law, oceanog-raphy, business, etc., in order to study complete system; preliminary design and analysis of engineering hardware; direct interaction with government and industry con-cerned with chosen problem. Offered jointly with O ENG 551, 552. Prerequisites: graduate standing; 551 for 553. for 552.

IMS 562-563 Ocean Policy and Resources Seminar (3-3) W,Sp Burke, Miles

Study and research into selected problems relating law, international organizations, and marine affairs. Special

attention devoted to global and regional problems involv-ing decision processes and structures that are under par-ticular stress due to social, including technological, change. Problems examined change from year to year. Offered jointly with LAW B 563-B 564. Open to third-year and graduate law students; open to second-year law students with permission of instructor. Prerequisites: 506, 507, or permission.

IMS 571-572-573 Advanced Seminar in Coastal Zone Management (1-3 - 1-3 - 1-3, max. 6) A,W,Sp Hershman

Students develop analytical and conceptual papers ad-dressing an important theme in coastal zone manage-ment. Readings and discussions in selected topical subjects. Papers can complement theses or other degree requirements. Designed for students with career orientation related to coastal zone management. Prerequisite: 509 or permission of instructor.

IMS 587-588 Research Seminar in Marine Resource Management (3-3) A,W Crutchfield, Wooster

For students who select marine resource management as an area of concentration within the marine affairs program. Topics are from living resources, ocean mining, energy production from the ocean, and other areas. Integration of multidisciplinary analysis and supervised stu-dent research, leading to completion of the thesis, are pri-mary objectives. Offered jointly with PB PL 587-588.

IMS 600 Independent Study or Research (*) AWSpS

IMS 700 Master's Thesis (*) AWSpS

OUANTITATIVE SCIENCE

Administered by the College of Fisheries and the College of Forest Resources.

Q SCI 290 Introduction to Mathematics for Biologists (4) AWS Precalculus mathematics presented within the context of applications and/or models in forestry and fisheries: lin-ear and nonlinear functions, periodic relationships, and matrix algebra. Offered on credit/no credit basis only. Prerequisite: college algebra or permission of instructor.

Q SCI 291, 292 Analysis for Biologists (4,4)

AW,WSp Differentiation; integration, including multiple integrals and partial derivatives. Numerical and computing tech-niques in analysis. Emphasis on biological problems, particularly in ecology. Laboratories required. Prerequi-sites: MATH 105 for 291; 291 or MATH 124 for 292.

Q SCI 340 Applications of Digital Computers to Biological Problems (5) AW

Methods and procedures for processing biological and natural resource data by means of digital computers; problem analysis, elementary programming, use of pack-age programs for statistical analysis. No credit given if FISH 340 or 540 has been taken. Prerequisite: 381.

Q SCI 370 Quantitative Methods in Forest Resources Management (3) W Bare, Rustagi

Basic concepts of management science applied to forest resource management problems, including linear pro-gramming, multiobjective programming techniques, computer simulation, decision theory, and statistical forecasting. Offered jointly with FOR M 366. Prerequi-sites: 381 and FOR M 250 or equivalent.

Q SCI 376 Operations Research in Resource Utilization I (3) A Bare

Introduction to some of the tools of operations research Introduction to some of these in examining, defining, ana-and the application of these in examining, defining, ana-lyzing, and solving complex problems of resource man-agement and of resource product manufacturing. Empha-sis is placed on networks and graphs, principally PERT analysis, and on linear programming and its extensions, such as the transportation assignment and transhipments models. Sensitivity analysis and duality also are pre-sented. Prerequisite: 391, which may be taken con-currently. currently.

Q SCI 381 Introduction to Probability and Statistics (5) AWSpS

Elementary concepts of probability; sample spaceset

theory, random variables, expectations, variances, co-variance; multinomial, normal, hypergeometric Poisson, negative-binomial, geometric, uniform normal, chi square, "t" and "F" distributions; point and interval esti-mation, basic concepts of hypothesis testing; applications to biological problems. Not open for credit to students who have taken 281. Prerequisite: MATH 105 or equiva-lent

Q SCI 382, 383 Statistical Inference in Applied Research (5,5) AW, WSp Analysis of variance and covariance; chi square tests;

Analysis of variance and covariance; chi square tests; multiple and curvilinear regression; sampling theory; dis-crete distributions; experimental design and power of tests. Application to biological problems. Use of com-puter programs in standard statistical problems. Offered jointly with STAT 382, 383. Prerequisites: 381, MATH 124 or Q SCI 291 or permission of instructor for 382; 382 for 383.

Q SCI 391 Introduction to Matrices and Their Applications (3) Sp Elementary concepts of matrices and matrix operations;

use of computer in inverting matrices, solving systems of equations and other matrix operations; applications in op-erations research and biology. Prerequisites: 381, MATH 125, or FISH 340 or equivalent course in computer use, or permission of instructor.

Q SCI 392 ' Techniques of Applied Mathematics in Biology I (3) A

Ordinary differential equations—linear and nonlinear; systems of differential equations; approximation tech-niques, numerical solution techniques; applications to bi-ological processes. Prerequisite: 292 or MATH 126, or permission of instructor.

Q SCI 393 Techniques of Applied Mathematics in Biology II (3) W

Applications of advanced ordinary differential equations, special functions, and partial differential equations to de-scriptions of biological phenomena. Particular emphasis on transport in biological systems, including diffusion and fluid flow. Prerequisite: 392 or permission of instructor.

Q SCI 450 Linear Ecological Models (4) A

Bledsoe, Swartzman Complete introduction to the mathematical techniques and applications of linear systems analysis to ecological models. Techniques include matrix, eigenanalysis; linear differential and difference equations and Markov chains; simple model stochasticization and sensitivity analysis. Applications to species succession models, carbon en-Applications to species succession models, carbon en-ergy and nutrient cycling, food chain models, animal population life-cycle models, and Leslie matrices. Stu-dents review selected papers in the ecological modeling literature and develop, run, and analyze linear models on the computer. Prerequisites: 292 and 340, or permission of instructor. (Offered odd-numbered years.)

Q SCI 451, 452 Ecosystem Dynamics (3,3) W,Sp Bledsoe, Swartzm

Bledsoe, Swartzman Unified overview of the physical and biological processes that make up natural and man-managed ecosystems. Fac-ets of the physical environment—production, consump-tion, decomposition, nutrient cycling, and exploitation by man—are discussed as interrelated aspects of a whole ecosystem. Mathematical techniques for representing the interrelationships are emphasized; examples are drawn from aquatic and terrestrial systems of the biotic prov-inces of North America (biomes). Prerequisites: 292, 340, 450, or permission of instructor for 451; 451 for 452. (Offered even-numbered years.)

Q SCI 456 Mathematical Models in Population Biology (4) A Definition and role of mathematical models in population

biology; types of models; population processes and popu-lation growth; use of computer in model building; sam-pling and other methods of estimation of population pa-rameters. Prerequisites: 381, 292, FISH 425 or BIOL 210 or permission of instructor.

Q SCI 457 Management of Exploited Animal Populations I (4) W

Mathews

Equilibrium yield model; spawner-recruit models, man-agement methods; use of catch-effort statistics in estimation and management, computer simulation in management decisions. Offered jointly with FISH 457. Prerequisites: 381, 292; BIOL 210 or FISH 425, or permission.

Q SCI 458 Management of Exploited Animal Populations II (4) Sp *Gallucci*

Continuation of 457. Estimating catch and effort and ana-lyzing catch-per-effort statistics. Standardizing effort, gear selectivity, recruitment, models of exploited fishery populations with management applications. Introduction to simulation of fish and wildlife populations with emphasis on applications using current data from fishery and game organizations. Offered jointly with FISH 458.

Q SCI 480 Sampling Theory for Biologists (3) Sp Gallucci

Theory and applications of sampling finite populations including: simple random sampling, stratified random sampling, ratio estimates, regression estimates, systematic sampling, cluster sampling, sample size determina-tions, applications in fisheries and forestry. Other topics uons, applications in fisheries and forestry. Other topics include sampling plant and animal populations, sampling distributions, estimation of parameters and statistical treatment of data. Offered jointly with STAT 480. Pre-requisites: 382, 383, or permission of instructor. (Offered even-numbered years.)

Q SCI 486 Experimental Design (3) Sp Conquest

Conquest Topics in analysis of variance and experimental designs: choice of designs, comparison of efficiency, power, sam-ple size, use of computer for standard analyses. Offered jointly with STAT 486. Prerequisite: 383 or STAT 485. (Offered odd-numbered years.)

Q SCI 499 Undergraduate Research (1-5, max. 5) AWSpS

Special studies in quantitative ecology and resource management for which there is not sufficient demand to warrant the organization of regular courses. Offered on credit/no credit basis only. Prerequisite: permission of instructor.

Q SCI 502 Statistical Consulting for the Life Sciences (1-4) AWSp

Consulting experience in data analysis, applied statistics, experimental design, parameter estimation, and sam-pling. For graduate students in the Center for Quantitita-tive Science and Biomathematics. Student provides con-sultation services to students and faculty. Students spend one electrome how year user whether students conone classroom hour per week under faculty supervision discussing problems encountered. Prerequisites: 382, 383, STAT 472, 473, Q SCI 486 or BIOST 571, 572, 573, or equivalents, and permission of instructor.

Q SCI 576 Goal Programming (3) W

Concepts and philosophy of goal programming as a tool in the evaluation of resource allocation among multiple, conflicting, often incommensurate objectives (goals). L.P. and G.P. computer programs are used to study im-L.r. and C.P. computer programs are used to study im-pact of changes in relative importance of difficult goals. Goal programming applications in natural resource areas are discussed. Offered jointly with FOR M 576. Prereq-uisites: familiarity with linear programming and permission of instructor.

OUATERNARY STUDIES

No degree program is offered.

QUAT 417 The Late Cenozoic Glacial Ages (3) Sp

Leopold, Porter Physical and biological evidence, both terrestrial and marine, for cyclic climatic change during the late Co-nozoic, emphasizing regional stratigraphic patterns, dat-ing, and correlation. Growth and dissipation of Quatering, and correlation. Growth and dissipation of Quater-nary ice sheets and alpine glacters and change in distribution of fauna and flora, as indicated by the geo-logic record. Use of this data to evaluate theories on causes of glacial ages and potential for predicting future climatic variations. Offered jointly with GEOL 417. Pre-requisite intpoductory course in earth science and biolog-ical science.

QUAT 501 Seminar in Quaternary Environments 1, max. 6) WSp

(1, max. 6) wSp Interdisciplinary seminar in the changing natural environ-ments of the Quaternary Period, with emphasis on climatic changes and their effects. Speakers from the University and elsewhere present lectures on their spe-cialties, followed by discussion. Offered on credit/no credit basis only.

QUAT 502 Interdisciplinary Quaternary Investigations (2, max. 6) WSp Research course for interdisciplinary investigation of Quaternary problems. Student attends sessions of 501 and pursues a problem-oriented case study concurrently under faculty direction. Required paper on case study. Offered on credit/no credit basis only. Prerequisite: graduate standing.

1

SOCIAL MANAGEMENT **OF TECHNOLOGY**

SMT 301 Creating the Future (5) ASp Douthwaite

Douthwaite Examines the concept of alternative individual and socie-tal futures and the opportunities for creating them. Sev-eral aspects of thinking about alternative futures are con-sidered, including the determinants and nature of change, notions of time, the perception of present reality and development of visions of the future, and the implica-tions of alternative values and assumptions. A number of consense for the future are availand and everal methods scenarios for the future are explored and several methods of forecasting investigated. Offered jointly with HSS 301

SMT 310 Social Constraints on Engineering Design (3) WS Zerbe

Examines cases of engineering designs and identifies ways in which social goals affect engineering design de-cisions. As part of this examination, social values and public policy issues that generate design criteria are explored. Appropriate course for students from any disci-pline. Offered on credit/no credit basis only. Offered jointly with ENGR 310. Prerequisite: junior standing or permission of instructor.

SMT 401 Introduction to Technology as a Social and Political Phenomenon (3) A Bereano

Bereano Introductory survey presenting some of the issues per-taining to the development, implementation, and assess-ment of technology (e.g., technology and social change, technology and values, etc.). Emphasis on the social, po-litical, and economic aspects of current problems that have important technological components. Extensive reading required. No prior technical background re-quired. Prerequisite: junior standing or permission of in-structor. structor.

SMT 409 Creative Prescriptions for Health-Care Delivery (3) Sp Holloway, Rushmer Current deficiencies in health care with cause or cure re-

lated to applications of modern technology; the nature and scope of medicine in relation to manpower require-ments, health-care facilities, distribution of care, data processing, data sources, and projections of future tech-nological needs for various clinical specialties. Frimarily for students in medicine, social management of technol-ogy, public health and community medicine, or bioengi-neering. Offered jointly with BIOEN 410. (Offered alternate years.)

SMT 410 Technology Assessment-Concept and Methods (3) A

Technology assessment defined as the systematic study of the various impacts on society that may occur when a technology is introduced, extended, or modified. Ex-plores the conceptual origins, evolution, and current conprotes the cohology assessment (TA), examining many of the methods that have been and are being used in TA, their strengths and weaknesses, and critically analyzes several case studies. Students from all disciplines are en-couraged to earoil. Prerequisite: junior standing or per-mission of instructor.

SMT 454 Alternative Technology (3) A

Bereano

Exploration of the evolution of technological forms that Exploration of the evolution of technological forms that are small-scaled, decentralized, etc., emphasizing the public policy aspects of these developments. Topics in-clude the relationship between alternative technologies and: worker-controlled enterprises, community planning, the politics of technological change, the third world, and decentralized development. Open to juniors, seniors, and graduate students who have done some previous work in the social implications of technology; background in en-gineering design or the technical aspects of hardware op-eration is not required.

SMT 461 Energy Technology and Public Policy (5) WSp Hyman

Analysis of the bases of national and state energy policy developments, with main focus on institutional, environmental, and economic implications of energy devel-opment. Graduate students invited to enroll. Prerequisite: ENGR 307, which may be taken concurrently, or permis-sion of instructor. Recommended: introductory-level familiarity with the technical background.

SMT 498 Special Topics: Technology, Society, and Public Policy (3-5) AWSp Special topics dealing with technology, society, and pub-lic policy offered as lectures and seminars. Topics in-clude technology assessment, energy policy, role of tech-nology in social policy formation, and institutional means of regulating technology. Prerequisite: permission of instructor.

SMT 499 Special Research Projects: Technology, Society, and Public Policy (2-5, max. 10) AWSp Independent individual or team undergraduate research independent information technology, society, and public pol-icy. Prerequisites: 3.00 grade-point average and permis-sion of instructor.

SMT 520 Seminar (2, max. 6) AWSp Current topics in technology and society. Prerequisite: permission of instructor.

SMT 530 Technology Assessment Methods and Analysis I (3 or 5) W

Bereano

In-depth analysis of the practice and methods of technol-ogy assessment, a variety of policy analysis that concen-trates on the social consequences of technological development. Investigates the concept and uses of technology assessment: how to systematically attempt to investigate the social, political, economic, and environmental impacts of new technologies; the choice options for chanimpacts of new technologies; the choice options for chan-neling these developments; and the relevant decision-making institutions and processes. Open to students from all disciplines who have some academic or practical background in the area of technology and public policy. Usually, 3 credits are given; 5 credits available upon con-tracting for additional work. (Last time offered: Winter Quarter 1981.)

SMT 531 Technology Assessment Methods and Analysis II (3) Sp

Bereano

A technology assessment is performed as a group re-search effort, using different disciplinary techniques for aspects of the social impact and policy analyses. Students from all fields are encouraged to enroll. Prerequisites: 530, 410, or permission of instructor. (Last time offered: Spring Quarter 1981.)

SMT 532 Economics of the Regulation of Technology (3) AWSp Zerbe

A general political-economy framework for analyzing regulation and regulatory reform is applied to questions of regulating technology. Aspects of regulating transpor-tation, product safety, energy, and medicine are consid-ered as specific examples of general propositions previ-ously derived. Offered jointly with ECON 532. Prerequisite: ECON 300 or 400 or 500. (Last time offered: Spring Quarter 1981.)

SMT 540, 541, 542 Social Management of Technology I, II, III (3,3,3) A,W,Sp Wenk

Analyses of the interaction of technology and society through general principles and case studies of contemporary issues and public policy: the nature of the technolog-ical enterprise, its scientific base, ingredients of capital, specialized manpower, organizational structure and manspecialized manpower, organizational structure and man-agement; employment of public and private institutions; policy planning to generate, utilize, and manage technology so as to maximize opportunities and minimize unwanted consequences; institutional conflicts; development of goals, strategies, program priorities, and poli-cies; legal and economic considerations; process of pub-lic decision making. Offered jointly with CIVE 540, 541, 542, and PB PL 540, 541, 542. Prerequisities: permission of instructor for 540; 540 for 541; 541 for 542.

SMT 554 Cost-Benefit Analysis and Economic Methodology (3) WSp

Zerbe

For students in social management of technology, eco-nomics, engineering, public affairs, environmental stud-

SCHOOL OF LAW

ies, and other disciplines who wish to learn the technique of cost-benefit analysis and the strengths and limitations of economics in project evaluation. Theoretical foundation for cost-benefit analysis is examined, and suitable applied techniques are derived. These techniques are applied to alternative types of decision-making problems pertinent to both the private and public sectors. Offered jointly with ECON 554. Prerequisite: ECON 300 or 400. (Last time offered: Spring Quarter 1981.)

SMT 565 Seminar in Atmospheric Science Policy Problems (1-3) W Fleagle

Decision making and policy determination in major na-Decision making and poincy determination in major na-tional atmospheric programs. Case studies of policy de-velopment for the Global Atmospheric Research Pro-gram, climate change, weather modification, and air quality. Individual student study of selected topics, with emphasis on developing and evaluating alternate policies. Oral presentation and term paper. Offered jointly with ATM S 565. Prerequisite: 540 or permission of instructor.

SMT 568 Women and Technology (3) Sp Bereano

Bereano Interdisciplinary graduate-level seminar for those inter-ested in an investigation of the interaction between tech-nology and women. Topics include comparison of tech-nological rationality with feminist modes of thought (focusing on values that are/could be applied in assessing technologies in order to evaluate their effects); the impact of industrialization and the division of labor on the home and the home former observation between the interaction. and the labor force; technologies that particularly impact women (such as obstetrical and gynecological care); and investigation of how the needs of women can be met through technological means. Offered jointly with SOC 568.

SMT 582 Energy Conservation (3) Sp Hýmai

Examination of past, present, and projected patterns of energy use in this country: opportunities for reducing wasteful practices and for developing more efficient tech-niques of energy utilization; use of price and other forms of regulation to induce energy conservation; case studies from the residential, commercial, industrial, and trans-portation sectors; energy conservation legislation and public policy issues at federal and local levels. Emphasis on the technological, political, social, and environmental aspects. Prerequisite: 461. (Last time offered: Spring Quarter 1981.)

SMT 583 Promise of Solar Energy (3) A

Bodoia, Hyman Interdisciplinary approach to the technical, economic, political, and social considerations involving widespread use of solar energy. Direct applications of solar energy for water heating, space heating and cooling, centralized and decentralized generation of electricity; indirect forms such as wind, biomass, and ocean thermal gradients; examination of governmental research programs, institu-tional constraints, and financial incentives as they apply to solar energy.

SMT 598 Special Topics: Technology, Society, and Public Policy (3-5, max. 15) AWSpS Seminars designed primarily for graduate students. Read-ings, lectures, discussions of topics of current interest in-the field of technology and public policy. Subject matter varies from quarter to quarter. Prerequisite: permission of instructive instructor.

SMT 599 Current Topics in the Social Management of Technology (1-5, max. 9) AWSp Advanced independent study in the interdisciplinary SMT program. Prerequisite: permission of instructor.

UNIVERSITY CONJOINT **COURSES**

UCONJ 411 Psychology of Aging (3) W

Kiyak Focuses on developing the skills necessary for critically evaluating current psychological theories of aging, re-search findings in this area, and the implications of find-ings 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 un-dergraduates and beginning graduate students interested in the field of gerontology.

UCONJ 415 Drug Abuse (2) Sp Hammarlund

In-depth and multidisciplinary course covering selected topics of drug abuse primarily designed for upper-divi-sion students in the social and life sciences (i.e., law, medicine, nursing, pharmacy, social work, sociology, etc.). The student is expected to have already some previetc.). The student is expected to have aiready some previ-ous knowledge of drugs of abuse and basic pharmacology or biology and biochemistry. Teachers in the areas of law, nursing, pharmacy, pharmacology, psychiatry, so-cial psychology, and social work instruct in their areas of expertise, possibly including some off-campus visita-tions. Offered on credit/no credit basis only. Prerequisite: permission of instructor.

UCONJ 420 Biological Safety Practices (1) A

Kenny General introduction to appropriate laboratory procedures used for handling potentially hazardous biological agents. Particular focus on laboratory safety and appropriate pro-tocols that should be employed by those engaged in recombinant DNA research. Offered on credit/no credit basis only.

UCONJ 422 Venereal Diseases: An Overview (2) A Elmer, Holmes

Clinically oriented course designed to train upper-class health science students to the point they are stimulated and qualified to participate effectively in community out-reach programs for the prevention of venereal diseases. Lecture-discussion session each week with emphasis on Lecture-discussion session each week with emphasis on the nature of the prevalent sexually transmitted diseases. Field experience includes visits to VD clinics and possi-ble speaking engagements. Offered cooperatively by the departments of Pharmaceutical Sciences, Medicine, and Epidemiology and International Health. Department of Pharmaceutical Sciences responsible for administration of course. Offered on credition credit basis only. Prerequisite: permission of instructor.

UCONJ 440 Biological Aspects of Aging (3) A 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. In-cludes 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. Prerequisite: introductory course in biology or per-mission of instructor.

UCONJ 442 Social and Cultural Aspects of Aging (3) Sp Amoss

Involves faculty 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 inter-ested in gerentology.

UCONJ 460 Introduction to Oral Biology and Related Therapeutics (2) W

Related Therapeutics (2) w *J. Plein, Siegel* Oral biology and therapeutics designed for health profes-sion students not in dental or dental hygiene programs. Includes structure and function of the teeth and oral soft tissues; pathobiology, signs, prevention, and treatment of oral disease; patient counseling on use of drugs and oral hygiene measures for the prevention and treatment of dis-sures of the month Ornen to underoraduate students in eases of the mouth. Open to undergraduate students in last professional year and to graduate students. Prerequi-site: permission of instructor.

UCONJ 490 Social Sensitivity in Health Care (3)

AWSp Multidisciplinary course for students in the health professions to sensitize them to the life situation of the poverty sions to sensitize them to the life situation of the poverty and minority groups as it relates to the community's health-care system. Focuses particularly on the social, cultural, and physical barriers that these groups encounter when they seek solutions to their health problems. Stimu-lates student to define more clearly his professional role in the health-care problems of these groups. Since the primary input of information for this course is experien-tial, students are involved in field experiences with per-sons in minority groups and poverty situations to furnish students with the first-hand personal involvement with the life styles and experiences of these persons. The fac-ulty is selected from the involved schools, as well as from members of the cultural groups being surveyed. En-rollment is limited to twenty students. An attempt is made to achieve a balance of students from the various departments. Offered cooperatively by School of Nurs-ing, School of Dentistry, School of Social Work, School of Medicine, School of Pharmacy, School of Public Health and Community Medicine, and the School of Nu-tritional Sciences and Textiles in the College of Arts and Sciences. Prerequisite: permission of instructor.

UCONJ 492 The Developmentally Disabled Child: Selected Interdisciplinary Topics (1-10, max. 10) AWSp

Elective interdisciplinary series of minicourses designed to offer specific information and foster the development of specific skills in areas critical for effective profes-sional functioning with the developmentally disabled child. Each minicourse provides an intensive examination of one major topic represented within the basic com-ponents of an interdisciplinary training program. These basic components include: normal growth and development, exceptional growth and development, interdisciplinary theory, assessment devices and strategies, interven-tion strategies, information exchange skills, and community functioning. Faculty members from dentistry, education, medicine, nursing, nutrition, occupational therapy, physical therapy, psychology, social work, and communication disorders are involved. The minicourses have been especially developed for trainees in the Child Development and Mental Retardation Center. Offered on credit/no credit basis only. Prerequisite: permission of the course coordinator.

UCONJ 493 Interdisciplinary Health Team in

Primary Care I (*, max. 5) W Anderson, Carnevali, Eaton, Pittman, Smith, Truelove

Dentistry, medicine, nursing, pharmacy, and social work students are assigned to interdisciplinary teams represent-ing each discipline. Classes are conducted in didactic and ing each discipline. Classes are conducted in didactic and seminar mode. Family history and professional socializa-tion experiences form the point of departure for move-ment into study of team development and maintenance skills for health-care delivery teams. Self-instruction on baseline assessment skills in other discipline areas pre-tormations for the self-instruction of the self-instructin of the self-instruction of the self-instruction of the self-ins pares students for team-delivered care in 494. Students observe role behavior in selected clinical teams and begin to function as a team in a selected primary-care site. Pre-requisite: permission of instructor. Limit: six students from each discipline.

UCONJ 494 Interdisciplinary Health Team in Primary Care II (*, max. 4) Sp Anderson, Carnevali, Eaton, Pittman, Smith,

Truelove

Multidisciplinary student teams (dentistry, medicine, nursing, pharmacy, social work) are provided a clinical experience with model faculty teams in selected primaryexperience with model raculty teams in selected primary-care sites. Students continue to examine and conceptual-ize the multidisciplinary process in primary care in semi-nars and conferences. Variable credit is based on clinical hours taken for credit. Prerequisites: 493 and permission of instructor.

UCONJ 497 Health Care in a Rural Community (3) Sp Hall, Schodde

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 healthcare system. Pharmacy students, nurses, and other health professionals study application of theory in an appropri-ate clinical setting within the conceptual framework of each student's professional field.

UCONJ 510 Seminar in Neurobiology (0) AWSpS Weekly seminars organized each quarter by one of the four participating departments: biological structure, physiology and biophysics, psychology, or zoology. Required of graduate students supported by the Systems and Integrative Biology Training Program.

UCONJ 584 Plant Tumors (1, max. 9)

M. Gordon Discussion of the literature of plant tumors and current research work being carried on in this area at the Univer-sity. Offered cooperatively by the departments of Biochemistry, Botany, and Microbiology and Immunol-ogy. Offered on credit/no credit basis only. Prerequisite: offered only to persons actively pursuing work in this area.

UCONJ 585 Seminar in Molecular and Cellular Biology (1, max. 15) AWSp Gordon, Staff

For students enrolled in the Molecular and Cellular Biology Training Program. Participants present the back-ground and current progress in their thesis research. Of-fered on credit/no credit basis only. Prerequisites: enrollment in doctoral degree program in biological science and in graduate research.

WILDLIFE SCIENCE

Administered by the College of Fisheries and the College of Forest Resources

WLF S 350 Survey of Wildlife Biology and **Conservation** (4)

Manuwal Taber

Wildlife ecology and population biology, and interrela-tionships between wild animals and man, including encouragement of wildlife population growth and produc-tivity, control of pest populations, and preservation of endangered species. Open to nonmajors. Prerequisite: junior standing.

WLF S 401 The Biology and Conservation of Birds (3)

Manuwal

Lecture. Major principles of avian population biology, reproductive biology, and conservation strategies for both game and nongame birds. Laboratory and field trips are required and students may be asked to share travel costs. Prerequisites: 350, two quarters of college biology, and permission of instructor.

WLF S 402 Human Culture and Wildlife **Conservation (5)**

Taber

Human customs, attitudes, and institutions as they affect wild bird and mammal populations, including relations of range, forest, and farm management to wildlife conserva-tion. Emphasis on Europe and North America. Prerequisite: 350.

WLF S 404 Biology and Conservation of Mammals (3) Taber

Taber Lecture. Major principles of mammalian population biol-ogy, reproductive biology, ecology, and conservation strategies for mammals of all categories. Laboratory and field trips are required, and students may be asked to share travel costs. Prerequisites: 350, two quarters of col-lege biology, and permission of instructor.

WLF S 411 Biology and Conservation of Birds . Laboratory (2) See 401 for course description and prerequisites.

WLF S 414 Biology and Conservation of Mammals Laboratory (2) See 404 for course description and prerequisites.

WLF S 451 Birds in the Forest Environment (3) Relationship between forests and bird populations. Focus on integrating avian ecology with forest ecology and sil-viculture. Lectures and discussions. Prerequisite: 401 or ZOOL 464. (Offered alternate years; offered 1980-81.)

WLF S 452 Ecology of Marine Birds (4) Manuwal

Rocus on the driving forces for the adaptive radiation of marine birds, particularly the Aclidee of the northern hemisphere and the Procellariiformes of the southern hemispheric oceans. Emphasis on the major patterns of hattinghistic occasis. Emphasis of the high patients of natural history, resource division, and reproductive strategies and conservation of major marine bird groups. Prerequisite: 401 or ZOOL 464 or permission of instruc-tor. (Offered alternate years; offered 1981-82.)

WLF S 475 Marine Mammalogy and Conservation (3) Erickson

Lecture and laboratory in marine mammalogy: the evolu-tion, taxonomy, physiology, life history, and be-bavior of marine mammals; the techniques of studying and the management and conservation of them. Offered jointly with FISH 475. Prerequisite: junior or senior standing.

WLF S 476 Laboratory of Marine Mammalogy (2) Laboratory in marine mammalogy; the evolution, taxon-omy, physiology, life history, and behavior of marine mammals; the techniques of studying them and the man-agement and conservation of them. Offered jointly with FISH 476. Prerequisite: 15 credits in biology; Recommended: vertebrate anatomy and physiology.

SCHOOL OF LAW

Courses for Undergraduates

LAW 442 Land Law and the Urban Environment

(3) 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. Offered on credit/no credit basis only. For nonlaw students only; must be graduate or upper-division un-dergraduate. (Not offered every year.)

LAW 443 The Legal Process (5)

lesigned for, and limited to, students who are not regu-larly enrolled in the School of Law, both graduate stu-dents and undergraduate students who have completed at least three-fourths of the work toward the undergraduate degree. Furpose of the course is to assist the students to understand the system of law and its functions in our society rather than to learn the substantive law pertaining to any particular subject or to any particular academic discipline. Offered on credit/no credit basis only. (Not offered every year.)

LAW 444 Constitutional Freedom and American

Education (3-6, max. 6) Examines the relationships between the Constitution of the United States and the American system of public eduthe onlited States and the American system of public edu-cation, excluding higher education; constitutional free-dom and the obligation to go to school; constitutional freedom and the legal controls over curriculum, teachers, and students; constitutional freedom and racial desegregation; constitutional freedom and equal educational opportunity, including equal financing of the public schools. Offered jointly with EDEPS 444. (Not offered every year.)

LAW 449 The System of Military Justice (3)

Exploration of the system of criminal law established within the United States armed forces under the Uniform Code of Military Justice. The general scheme of the mili-tary justice system is studied and compared with other tary justice system is studied and compared with other Anglo-American systems of justice. Specific subjects in-clude sources of military law, jurisdiction, apprehension, kinds of court martial, nonjudicial punishment, pretrial procedures, roles of participants in the judicial process, crimes, trial procedures, rules of evidence, and the re-view and appellate process. Emphasis on procedures and the operation of the system, rather than upon substantive crimes. Discussion and lecture involve the study of cases and are a modified style of law school instruction and are a modified style of law school instruction. Credits may not be counted toward Juris Doctor degree. Prerequisite: junior standing or permission.

First-Year Courses

LAW A 500 Administrative Law (4)

Administrative process and its role in the legal system. Because the administrative process involves action that is susceptible of characterization as executive, legisla-tive, and judicial, a considerable portion of the course involves a study of the relationship of administrative agencies with these more traditional departments of gov-enument. Both formal and informal administrative procedures are examined.

LAW A 501- Contracts ((2-8)-, max. 8) Principles that regulate the creation, operation, and extin-guishment of the legal relation known as contract. Major subdivisions covered are mutual assent, consideration, conditions covered are mutual assent, consideration, conditions (express and constructive), performance, breach, damages, discharge, assignment, and beneficiar-ies. More limited coverage is accorded interpretation, the parol-evidence rule, the statute of frauds and illegality.

LAW A 502- Civil Procedure I ((2-6)-, max. 6)

Purdamentals of procedure in civil litigation. Major sub-divisions include jurisdiction of courts, venue, com-mencement of actions, pleadings, parties, discovery, and other pretrial devices, and trials.

LAW A 503- Property I ((2-8)-, max. 8)

Legal relationships among persons as to the ownership, transfer, and use of property from both historical and contemporary perspectives. Topics include estates and interests in land, landlord-tenant, conveyances, real estate contracts, the recording system, title insurance, and fixtures; other subjects that may be covered in vary-ing degree include public control of land use, nuisance, gifts, bailments, personal property, and water rights.

LAW A 504- Torts ((2-8)-, max. 8) Attempts to develop an understanding of the principles, concepts, and purposes of private law governing injuries and of the common law method of adjudication. Topics include intentional harms to persons, negligence, strict liability. May cover conversion, trespass to property, nui-sance, products liability, misrepresentation, defamation, privacy, misuse of legal procedures, and interference with advantageous relationships.

LAW A 505- Criminal Law ((2-5)-, max. 5) Examination of the basic principles, concepts, and purposes of substantive criminal law. Topics include legality, actus reus, mens rea, strict liability, causation, in sanity, intoxication, mistake, justification, excuse, parties, attempt, conspiracy, and homicide. May also cover larceny and statutory interpretation.

LAW A 506- Basic Legal Skills ((1-6)-, max. 6) Integrated introduction to the legal problem-solving pro-cess and skills, including research, analysis, and synthesis of statutes, appellate court opinions, and other legal materials. Students integrate use of their developing problem-solving skills and their writing skills through preparation of memoranda, briefs, or other documents for moot legal problems. Oral argument skills are developed through moot oral arguments.

Second-Year and Third-Year Courses

LAW A 510 Commercial Transactions (3) Covers Articles II, III, and IV of the Uniform Commer-cial Code (Sales and Negotiable Instruments) substan-tially as they are covered in the "a" term of Summer Quarter offering (*i.e.*, not quite the same depth as occurs in the 6-credit commercial transaction course). It does not include the heat equation and activity is the innot include the basic coverage of Article IX, which is covered in A 511. Article IX is explored in depth in Per-sonal Property Security. (Not offered every year.)

LAW A 511- Commercial Transactions

((2-6)-, max. 6)

(12-6)-, max. o) Payment, financing, and other problems in the distribu-tion of merchandise. Sale, transportation, and storage of goods, as well as commercial paper, including notes, drafts, and checks. Emphasis is given the Uniform Code, including basic coverage of personal property security under Article IX.

LAW A 512 Personal Propezty Security (3) All aspects of security in personal property (personal property includes everything except land). Covered are problems and legal principles relevant to the creation of the security interest, to its perfection, to priorities bethe security interest, to its perfection, to priorines be-tween competing security interests and between a secu-rity interest and other kinds of property interest, to pay-ment and redemption, and to realization procedures. Emphasis on Article IX of the Uniform Commercial Code. Course is considered a sequel to A 511 and in-volves a more advanced treatment of personal property security. security.

LAW A 513 Creditor-Debtor Law (3 or 4) Principal rights and remedies of unsecured creditors, in-dividually and collectively. Judgments and judgment liens, executions, attachments, garnishments, fraudulent conveyances, compositions, assignments for the benefit of creditors, and debtors' exemptions. Bankruptcy em-phasized. Strongly recommended that student has taken or is concurrently taking A 511 or A 512.

LAW A 514 Corporations (3 or 4) Basic corporation law and practice. Covers state law pro-Basic corporation law and practice. Covers state law pro-visions and common contractual arrangements governing formation of corporations; allocation of control, profit, and risk among the constitutents of the corporation; financing of corporations through the issuance of debt and equity securities; duties of officers, directors, and controlling shareholders; rights of shareholders; corpo-rate and shareholders' litigation; mergers, sales of assets, and duter fundamental changes in the corporate structure and other fundamental changes in the corporate structure.

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Emphasis on the "Federal Corporation Law" evolving out of the SEC proxy rules and Rule 10(b)-5.

LAW A 515 Associations (3)

LAW A 515 Associations (5) Introduction to law relating to association in business and its nonprofit analogies through agency, partnership, other unincorporated forms, and corporations. Emphasis throughout on the legal, financial, and tax factors bearing upon the type of structure to be selected for a group ac-tivity. Basic principles concerning operation of agency and partnership relationships are considered along with and particising relationships are considered along with an introduction to related corporate law doctrines, all in the context of both profit and nonprofit activities. Com-plete in itself, this course can also serve as a foundation for further study in such areas as business or nonprofit group behavior.

LAW A 516 Legal Accounting (4) Introduction to accounting concepts used in taxation, business finance, business law, and the economic regulabusiness intance, business law, and the economic regula-tion of business. Critical examination and evaluation of alternative concepts of profit and valuation under both stable and changing price levels. Special emphasis on is-sues in accounting for proprietary equities, business com-binations, goodwill and other tangibles, and interperiod allocation of corporate income taxes. Prerequisites: law students only; permission of instructor is required for stu-dents, who have completed intermediate accounting dents who have completed intermediate accounting courses.

LAW A 517 Securities Regulations (3) A Legal controls over the issuance and distribution of corporate securities with primary emphasis on federal regu-lation; registration and distribution under the Securities Act of 1933; regulation under state Blue Sky Laws. Pre-requisite: A 514.

LAW A 520- Property II ((2-8)-, max. 8) Problems of voluntary disposition of assets, primarily through wills and trusts. Attention is paid to disposition by will, creation of and disposition by a trust, and the ef-fectiveness of the disposition in the creation of present and future interests in property. Some consideration is given to alternative methods of wealth transmission and to the hasic tax formework improtentian black. to the basic tax framework important in formulating plans of disposition.

LAW A 521 Community Property (3) Dealing with all aspects of community property, includ-ing what constitutes community property as distinguished from separate property, how it may be acquired and dis-posed of, and the problems of conflict of laws encoun-tered in transactions with common law invisidities in the second tered in transactions with common-law jurisdictions. Washington cases constitute nearly all of the course material.

LAW A 522 Land-Use Controls (3) Substantive and procedural issues involved in land-use substantive and procedural issues involved in land-use controls. Taught entirely by the problem method, and materials include state enabling acts, a typical zoning or-dinance, rules and regulations of planning commissions and boards of adjustments, the State Environmental Policy Act and Guidelines thereunder.

LAW A 523 Real Property Security (3) Methods by which an obligation may be secured by real property of the obligor or of a third person. Covers the common-law principles and statutes that regulate the cre-ation, operation, and extinguishment of the legal re-bitate between the secure of the legal relations known as the real property mortgage and deed of trust, considered in the context of financing the purchase or development of land. Some attention may be given to principles governing operation of the lending industry.

LAW A 524 Private Land Development (3)

LAW A 524 Private Land Development (3) Emphasis on the problems encountered by a lawyer representing developers of land for commercial use, such as a retail shopping center. Some attention is given to the development of land, such as subdivisions, for housing purposes. Problems considered include, among others, financing, choice of developing entity, commercial leases, platting, and those of "overpromoting." It is de-sirable that students have previously taken A 523. (Not offered every year.) offered every year.)

LAW A 525 Water Law (3)

Legal problems of water use, riparian and appropriation systems; evolution of administrative controls; changing relationships of local, state, and federal governments; interstate compacts,

LAW A 526 Copyrights, Patents, and Trademarks (4)

Introduction to federal laws of copyrights, patents, and

trademarks and their relation to unfair competition doctrines under state law.

LAW A 527- Environmental Law: Pollution Control (3)

Survey of environmental issues developed in the context of pollution control. Emphasis on procedural and admin-istrative issues common to pollution-control regulation. Coverage includes air, water, and pesticides law and pol-

LAW A 528 Natural Resources: Energy (3) Survey of energy issues developed against the back-ground of natural resource law principles. Emphasis on common law and administrative law issues confronted in the context of the energy fuel cycles. Coverage includes common-law doctrines (including public trust), selected issues of administrative law, and rules governing conservation and allocation of natural resources.

LAW A 530 Basic Income Tax (5)

Study of federal income-tax law as it applies to individuals apart from their capacities as partners, share-holders, or beneficiaries of trusts or estates. Examination of the concept of gross income and net income, including investigation of what constitutes income, when it should investigation of what constitutes income, when it should be taxed, and its character as unearned, earned, or capital-gain income. Deductions and their nature as genuine or as artificial deductions con-sidered in detail. Fundamental principles of tax law as expressed in case law studied as foundation for an inten-sive examination of evolving tax legislation and tax legis-lative process itself lative process itself.

LAW A 531 Death and Gift Taxation (2-5) Federal and state transfer tax systems fiduciary income tax. Major subdivisions covered include basic application of death, gift, and generation-skipping taxes, the application of transfer taxes to joint interests, community prop-erty, and life insurance. Income taxation of trusts, estates, and their beneficiaries. Prerequisite: A 520..

LAW A 532 Federal Income Taxation of Business

LAW A 532 Federal Income Taxation of Business Enterprise (5) Examination of the tax law consequences of conducting business enterprises in partnership and corporate form. After a preliminary review of taxation of partnership in-come, the tax law problems and opportunities of form-ing, operating, dissolving, selling, and reorganizing corporations are examined. Specific areas include: incorporating existing enterprises, current cash, property and stock distributions, stock redemptions and partial liq-uidations, complete liquidations and sales of corporate enterprises, either as stock sales or as assets sales pursuenterprises, either as stock sales or as assets sales pursuant to liquidations, corporate divisions and amalgamations whether by means of corporate reorganizations or otherwise, accumulative earnings and personal holding company taxes, and special taxation of electing small business companies.

LAW A 533 Federal Income Taxation III (3) Survey of the basic structure of federal income taxation undertaken in the context of planning personal and com-mercial transactions of individual taxpayers. Matters con-sidered: items of income, transactions concerning capital assets, deductions, tax accounting, indirect and deferred compensation for services, family transactions, elemen-tary business transactions and transactions of tary business transactions, and special tax problems of creative persons and investors. (Not offered every year.)

LAW A 534 Federal Tax Procedure (3)

Consideration of procedural problems involved in the setterment of tax disputes. Topics covered include (1) return and filing requirements; (2) deficiencies and the mechan-ics of their assessment; (3) waivers and consents; (4) ex-tended periods of limitation on assessments and claims for refund; (5) jeopardy assessments and injunctions; (6) payment, credits, and refunds; (7) additions to tax, revopayment, creatts, and retunds; (7) additions to tax, revo-cable and irrevocable elections, and legal effect of regu-lations; (8) rulings, compromises, and closing arguments; (9) appellate division settlements, estoppel and setoff; and (10) recoupment and the obligation of consistency. Prerequisite: A 530.

LAW A 535 Problems of Federal Taxation (4)

Provides an alternative for students who, at registration time, prefer to devote a somewhat smaller fraction of their total law school studies to problems arising from federal income and donative transfer tax bases than othervise presented. After a brief introduction to the structure of the taxing statutes, particular problems representative of the sweep of economic, political, and social forces, current and proposed solutions, and professional applications of all types of legal authorities addressed to "who gets or should get what"—the federal fisc, taxpayers, which taxpayers, and which beneficiaries of the system are addressed. Based on a smaller number of problems of import, the course is a vehicle for learning how the problems are resolved, where they can be expected to arise, and the termporary nature of statutory solutions for the most difficult ones. Not a "minicourse" condensation of all problems selected for presentation in other federal in-come, estate, state inheritance, and gift tax courses offered.

LAW A 536 Deferred Compensation (3) Examination of major elements of private pension plan-ning: Social Security benefits and Federal Insurance Contributions Act compliance issues; the Treasury's re-quirements for the qualification of pension and profit-sharing plans for tax purposes; rules governing employee inclusion of benefits; and the Employees Retirement In-come Security Act of 1974 (the principal legislation in the subject area).

LAW A 537- Business Planning ((2-6)-, max. 6) Advanced work in corporations and federal taxation in the context of business planning and counseling. Exami-nation will be made of a series of problems involving nation will be made of a series of problems involving common business transactions and presenting corporate and tax issues for analysis and resolution. The problems covered include such topics as the formation of corpora-tions, both closely held and publicly owned, stock re-demption, the sale and purchase of businesses, mergers and other forms of acquisition; and recapitalization, divi-sion, and dissolution of corporations. Prerequisites: A 514, A 530, and A 532. Recommended: A 516.

LAW A 538 Estate Planning Workshop (3) Use of various lifetime and deathtime methods of disposing of property to meet the owner's objectives at the least to be projectly to most income is objective and his suc-cessors and in terms of income, gift, and estate taxes. In-cludes a consideration of selected provisions of the federal income, estate, and gift tax laws and the analysis of problems. Prerequisites: A 520 and 531. Limit: thirty students.

LAW A 550- Constitutional Law ((2-8)-, max. 8) Principles of constitutional law under the United States Constitution as they relate to the scope of, and limitations on, the powers of state and national governments in deal-ing with matters of life, liberty, and property. Fed-eral/state relationships and the constitutional role of the courts also analyzed courts also analyzed.

LAW A 551 Constitutional Freedom and American Education (4)

Examines the relationships between the Constitution of the United States and the American system of public edu-cation, excluding higher education. Main areas of con-cern are constitutional freedom, and the obligation to go to school; constitutional freedom and the legal controls over curriculum, teachers, and students; constitutional freedom and racial desegregation; constitutional freedom and equal educational opportunity, including equal financing of the public schools. Prerequisite: second- or third-year law student standing or graduate student status in another division of the University. (Not offered every year.)

LAW A 552 Antitrust (5) Examination of the antitrust laws (mainly the Sherman Act, Clayton Act, Robinson-Patman Act, and the Federal Trade Commission Act) through which the community seeks to keep economic markets pure and behavior fair by limiting the restrictive practices of business firms and by inhibiting the growth and maintenance of noncompeti-tive market structures: Particular attention is given to monopolies, restraints of trade mergers, and price dis-crimination.

LAW A 553 Labor Law (3) The law governing problems that arise prior to the estab-lishment of a collective bargaining relationship; organiza-tional rights of employees and unions, including study of the relationship of individual employees with the union; the economic weapons available to parties to labor disputes concerning both organization of employees into unions and collective bargaining.

LAW A 554 Labor Relations (3)

Processes of collective bargaining. Included is coverage of the statutory duty to bargain and problems that arise under specific contract clauses. Administration of the contract is also the subject of intensive investigation. Be-

LAW B 541 Law in East Asia: China (3)

Introduction to the basic institutions and processes of the Chinese legal system. Emphasizes the development and role of law in both the traditional and contemporary periods. A paper in lieu of a final examination may be required, depending upon enrollment and instructor preference.

LAW B 542 Law in East Asia: Korea and Southeast Asia (3)

Introduction to the basic institutions and processes of the Korean and Southeast Asian legal systems. Emphasizes 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 insti-tutions. A paper in lieu of a final examination may be re-quired, depending upon enrollment and instructor prefer-

LAW B 543 Islamic Law (3)

Origins of the shari-cah, its development throughout the Islamic period, and the modern reform of this law. Of-fered jointly with NE 432. (Not offered every year.)

LAW B 544 Justiciability Under the Civil Law and the Common Law (4)

Problems of justiciability in the transnational setting, with particular emphasis on the differences between the civil law of Japan and United States law. Considered are the potentials and limitations in litigation, arbitration, and conciliation in transnational transactions and prob-lems about the legal status of aliens. Topics compared are: jurisdictional rules of Japan and the United States; governing law clauses and their enforceability, proroga-tion clauses including arbitration clauses; choice-of-law; proof of foreign law; trial differences; enforcement of foreign judgments. The purpose is to understand the im-portant differences between the United States and Japaeach stage of a lawsuit in the order in which they are en-countered by counsel.

LAW B 545- United States-Japanese Contract and

Sales Problems ((2-4)-, max. 4) Basic contract and sales principles in Japanese and United States law are discussed, and term papers based on transnational transactions involving these countries are prepared.

LAW B 546 United States-Japanese Corporate Relations (4)

Corporate law problems with emphasis on trans-Pacific business planning and United States-Japanese, parent-subsidiary problems. Major topics of corporation law are discussed, comparing United States and Japanese law. The purpose is to enable lawyers to understand the important legal difference between a corporation in the United States and a Japanese kabushiki kaisha.

LAW B 547 United States-Japanèse Tax Problems (3 or 4)

Operation of the income-tax laws of Japan on income earned in Japan by American nationals and on income earned in the United States by Japanese nationals; opera-tion of the income-tax laws of the United States on income earned in the United States by Japanese nationals, and on income earned in Japan by American nationals. A series of problems based on transnational business transactions are solved by individual students, whose solutions are scrutinized by the class. (Not offered every vear.)

LAW B 548 Japanese Administrative Law (3)

Introduction to the Japanese public law system with par-ticular emphasis on the organization and role of bureaucracy in formulating and carrying out national pol-icy, the legal principles that govern procedural and decision-making aspects of the administrative process, the role of judiciary and judicial review, administrative guidance, and the dichotomy between private and public law. The course introduces students with Japanese language competence to the basic Japanese sources for legal research. It is also open, however, to students without Japanese language ability and, with the instructor's per-mission, nonlaw students with background and interest in Japanese public administration and politics. (Not offered every year.)

LAW B 549 Government Regulation of Business in Japan (3)

The Japanese approach to regulation of economic activity, focusing on antitrust regulation and consumer pro-tection, the promotion of small and medium enterprise, and regulation of international trade and investment. Emphasis on government-business relationships, ad-ministrative guidance, and limits of legal controls in Japan. Designed for LL.M. candidates specializing in Jap-nese law; also open to second- or third-year students. Open to nonlaw students with instructor's permission. Nonlaw students should register satisfactory/not satisfactory. (Not offered every year.)

LAW B 550- Legal Analysis and Research for Students Not Trained in the Common-Law System ((2-4)-, max. 4)

Integrated introduction to legal analysis, research, and writing for students trained in a non-common-law system. Papers on two or three major research projects are required. For graduate students who have already at tained a professional standing in law, but who require ex-perience in using American law sources.

LAW B 551- Comparative Law Seminar ((2-6)-, max. 6)

Introduction to the comparative method and the study of law and legal institutions in disparate cultural contexts. During Autumn Quarter, the seminar provides a general introduction to the structure and processes of selected countries, followed in the Winter and Spring quarters by discussion and research on a particular problem or area of law. The topic for research changes each year, depending on the interests of the students and instructors.

LAW B 552 Tutorial in Japanese Law

((1-4)-, max. 4) Individual research project handled on a tutorial basis in-volving an area of law of mutual interest to student and teacher. In the case of a student whose basic training was in a civil law jurisdiction, the subject matter of the tuto-rial is a topic selected from the law and the practice of the United States; in the case of a student whose basic training was in a common-law country, the subject matter of the tutorial is a topic selected from the law and the practice of Japan or of another country in East Asia, depending on the student's linguistic competence. In any instance, the tutorial discussions may be comparative, drawing on the law of more than one country.

Law and Marine Affairs

LAW B 560 Law of the Coastal Zone (3)

Federal, state and local laws, regulations and programs for the management of the coastal zone, including the definition and ownership of the coastal zone; federal, state, local, and international law jurisdictional issues; legislative and administrative controls; federal and state common law. Offered jointly with IMS 510.

LAW B 561 International Law of the Sea (3) Examination of the way nation states regulate activities on and under the ocean. Covers the international regulations and institutions concerned with fishery exploitation, pollution, transit rights, scientific research, energy and mineral development, military uses, emplacement of in-stallations, and the boundary issues involved in the various ocean uses. Offered jointly with IMS 506.

LAW B 562 United States Law for Living Marine Resources (3)

Evolution of fisheries regulations from mainly state and international sources to federal law is traced. Major focus on the Endangered Species Act of 1973, the Marine Mammal Protection Act of 1972, and the Fishery Conservation and Management Act of 1972, and the ristery Constru-vation and Management Act of 1976 (all as amended through 1978) and on international agreements directly concerning the United States. Indian fishing law is considered, but is not examined in depth.

LAW B 563-564 Ocean Policy and Resources

Seminar (3-3) Study and research into selected problems relating law, international organizations, and marine affairs. Special attention devoted to global and regional problems involving decision processes and structures that are under paring decision processes and structures that are under par-ticular stress due to social (including technological) de-velopment. Problems examined change from year to year. Offered jointly with IMS 562-563. Open to third-year and graduate law students; open to second-year law students with permission.

Seminars

LAW B 571- Criminal Procedure Seminar

((2-6)-, max. 6) Critical study of the criminal law and related processes at

various stages from detention to appeal, including a study of state and federal rules of criminal procedures, and the constitutionally derived procedural rights of persons ac-cused of crime or other deviant behavior. Possibilities for research include field studies of enforcement practices and studies of the procedure in quasi-criminal proceed-ings involving juveniles, parolees, and probationers, al-leged mental incompetents, and other persons subject to a loss based on a violation of official norms. Prerequisites: A 550. B 502. Limit: eight students. A 550, B 502. Limit: eight students.

LAW B 572- Federal Court Seminar

((2-6)-, max. 6) Selected topics in the structure, function, and power of federal courts. Problems not covered in depth, or at all, in the course Federal Courts and the Federal System are considered. Primary emphasis on individual research in the production of a written paper. Prerequisite: B 507, which may be taken concurrently. Limit: eight third-year students; others with permission of instructor.

LAW B 573- Federal Tax Policy Seminar ((2-6)-, max. 6)

Intensive examination of the substance of limited areas of federal tax law and the policy underlying that law. Dif-ferent aspects of federal law, such as the tax treatment of exempt organizations, taxation of capital gains, problems of income splitting, etc., are considered each year. Fo-cuses on individual research and writing and on the mutual examination and discussion of the research efforts of the group. Prerequisite: A 530. Limit: eight third-year students.

LAW B 574- Consumer Protection Seminar ((2-6)-, max. 6) Examines selected problems in consumer protection, in-

Evaluations becease protections in consumer protection, in-cluding those arising from use of consumer credit, dis-semination of credit information, fraudulent and decep-tive practices, etc. Consideration given to methods of providing, protection, such as existing legislation, pro-posed Uniform Consumer Credit Code, and consumer ed-conting. Each scheder accessed to exercise kick arelia. ucation. Each student expected to produce high-quality paper.

LAW B 575- The Supreme Court and the

Constitution ((2-6)-, max, 6) Concentrates on the basic problems inherent in the relationship of the individual to authority and in the protection of political and civil rights, including rights of mi-nority groups. Current problems, as illustrated by recent or pending Supreme Court cases, emphasized. Students of pending Supreme court cases, empirisized. Students required to do substantial amounts of in-depth research, including, but not limited to, isolation of the history of the doctrines involved, their relations to intellectual endeavor in related areas, and an exploration of alternative competing solutions to modern problems. Meets throughout year, with occasional recesses to facilitate student preparation of high-quality paper, which, in turn, is thoroughly discussed by the group, plus rewriting(s). Limit: six second- or third-year students, with permission of intervents. of instructor.

LAW B 576- Selected Problems on Environmental Protection Seminar ((2-6)-, max. 6) Examines legal problems resulting from impairment of the environment by technological advances and urban the environment by technological advances and urban growth. Various issues, including air and water pollu-tion, use of pesticides, protection of wildlife, and trans-portation, are considered. Special emphasis on examin-ing the utility of litigation as an instrument for ensuring protection of the environment. Pending cases are examined. The current political and legal efforts of groups, such as the Sierra Club and the Washington Environmental Council, are also considered. Experts in various fields are invited to participate.

LAW B 577- Human Ecology Seminar

((2-6)-, mar. 6) Selected problems drawn from such areas as poverty, welfare, health, or correction programs. Emphasis on the relation of a nonlegal system with respect to a specific problem (e.g., medicine and law related to alcoholism; social casework and law related to child abuse; parole board operation and law related to deviancy; community organization and law related to "model city" structure, etc.) in order to evaluate interaction. It is anticipated that students will work with materials from one discipline other than law. Students are expected to develop the requisite personal contacts with professionals or students in such other disciplines. Joint research with a graduate or professional student in another discipline is welcomed.

LAW B 578 International Legal Order Seminar (3) Focuses on the international legal context of develop-

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ment, especially bilateral or multilateral foreign-aid mochanisms that promote or inhibit democratic develop-ment and economic growth: income redistribution (including land reform), population limitation, food produc-tion, environmental damage, and "limits to growth" are among major problems considered. Open to second~and third-year law students; also open to non-law students with permission of instructor. Prerequisite: A 570.

LAW B 579- Federal Tax Seminar ((2-6)-, max. 6) Intensive examination of selected areas of federal taxation. The student is expected to prepare a high-quality pa-per. Limit: eight third-year students. Prerequisite: A 532.

LAW B 580- Deferred Compensation Seminar ((2-6)-, max. 6)

Advanced problems in the tax aspects of deferred compensation, with particular emphasis on pension and profit-sharing plans for corporate employees and the self-employed and stock-purchase options for executives and other employees. (Not offered every year.)

LAW B 581- Seminar on Problems of Judicial

Administration ((2-6)-, max. 6) Limited enrollment for students with special interest in judicial administration. Each student selects a particular problem for investigation, fieldwork, and research. Resources include judges and other judicial officers at all levels of government, as well as persons and agencies in other related disciplines and fields. A scholarly written document must be submitted and acccepted by the proaccument must be submitted and accepted by the pro-fessor for credit. Periodic mandatory group sessions are scheiduled during each quarter. For students who have completed B 524, special permission may be obtained to pursue further investigation of problems begun in the workshop course.

LAW B 582 Appellate Advocacy Seminar (2, max, 4)

Advanced instruction in techniques of advocacy, primarily brief writing, consisting of practice arguments and ex-ercises, meetings with prominent appellate practitioners and judges, and submission of *amicus curiae* briefs (under faculty supervision) to the Washington Court of Ap-peals, the Washington Supreme Court, and the U.S. Court of Appeals for the Ninth Circuit. In addition, stu-Court of Appeals for the winth Circuit. In addition, sub-dents discuss trends in, and theories of, judicial decision making and the principles of *stare decisis* and legislative interpretation. Prerequisite: B 521. Enrollment is limited to twelve students, selected by the instructor exclusively from the students enrolled in B 521 during Autumn Ouarter.

LAW 600 Independent Study or Research (*)

LAW 800 Doctoral Dissertation (*)

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LIBR 450 Survey of Children's Literature (3) Benne, Shaw

besigned for educators, librarians, and others interested in the selection and utilization of children's books for family, school, and library enrichment. Not open to librarianship majors.

LIBR 451 Literature for Young Adults (3) Reading and appraisal of literature appropriate to the needs, interests, and abilities of young adults. For the general student as well as the teacher. Not open to librari-anship majors.

LIBR 470 History of the Book (3) Skelley

Survey of the development of the book from hieroglyph-ics and clay tablets to the present, with emphasis on the printed book in the Western world since Gutenberg. The book as a physical object and the processes and materials of its production, viewed in the context of changing tech-nologies and various cultural, esthetic, economic, and trade influences. Includes aspects of book collecting.

LIBR 471 Storytelling: Art and Techniques (3) Shaw

Storytelling, past and present, noting its development as an art form. Reading and analyzing storytelling materials

(folk literature and literary forms) used by storytellers throughout historical periods. Learning essential tech-niques necessary to maintain this artistic skill in a professional field. Planning storytelling programs for various age and interest groups and situations, utilizing folk, classic, and contemporary literature. Not open to librarianship majors.

LIBR 490 Introduction to Information Resources

Designed to assist students in all subject fields in developing research skills. Emphasis on principles of research strategy applicable to all subject areas. Students become acquainted with a variety of information sources, includ-ing libraries, computer data bases, and government agen-cies, as well as with problems of access to both print and nonprint materials. Lecture/discussion approach supplemented with practical experience related to the stu-dent's field of interest. Not open to librarianship majors. Offered on credit/no credit basis only. Prerequisite: junior or higher standing.

LIBR 499 Study Projects in Library Development (1-5)

Han, Staff Individual or group study projects, workshops, or semi-nars on the improvement of library services.

LIBR 500 Society, Users, and Libraries (6)

Introduction to librarianship. Society's information pro-cesses, ways in which individuals use information in their environments, and the role of libraries and librarians. Students develop skills basic to other courses, establish personal agenda for study in the remainder of the program, learn the literature of the field, and become acquainted with the intellectual context of librarianship as a service profession. Prerequisite: major standing.

LIBR 501 Bibliographic Control (6)

Survey of the major types of instruments for the biblio-graphic control of the various kinds of library materials and of the conventions used in describing them. Basic concepts, historical background, and theoretical and practical aspects of bibliographic control; evaluation and methodology. Prerequisite: major standing.

LIBR 510 Management for Librarianship (3)

Zweizig Management concepts critical to provision of library ser-vices. The planning process applied to library problems and opportunities. Communications awareness and skills in the professional environment. Organizational con-cerns, including personnel, budgeting, control tech-niques, theories of management, and evaluation of effectiveness. Prerequisites: 500, 501, or permission of instructor.

LIBR 511 Library Administration Skills (3)

Zweizig Provides practice in the administrative skills related to personnel selection, supervision, and management, and to planning and budgeting processes in the library set ting. Topics include work specification, performance evaluation, personnel policy formulation, budget types, and budget preparation and control. Prerequisites: 500, 501, and 510 or permission of instructor.

LIBR 512 Community Analysis and Library Change (3)

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Review of the concepts, strategies, and tools for study of the community, response to community change, and pro-motion of desired library change. Includes experiential exercises, analysis of case studies, and investigation of the literature of relevant fields. Prerequisites: 500, 501, or permission of instructor.

LIBR 520 Organization of Library Materials: Introduction (3)

Page, Soper Introduction to principles and techniques of standard methods of organizing library materials for use. Includes fundamentals of descriptive cataloging, primary systems of subject analysis, and developments in technical services. Prerequisites: 500, 501, or permission of instructor.

LIBR 522 Descriptive Cataloging (3) Page, Soper

Continuation of 520, with emphasis on rules of descriptive cataloging for monographic print materials of all kinds and nonbook materials. Includes applications of au-tomation to bibliographic control of library materials. Prerequisites: 500, 501, and 520 or permission of instructor.

LIBR 523 Subject Analysis of Library Materials (3) Page, Soper

Continuation of 520. Includes work with Library of Con-gress and Dewey decimal classifications, Sears and Li-brary of Congress subject headings, and other systems used in libraries today. Prerequisites: 500, 501, and 520 or permission of instructor.

LIBR 525 Organization and Use of Serials (3)

Management of serials, including acquisition and re-placement, control, subject access, preservation, and use of all types in all kinds of libraries. Includes application of new technology and international developments as they affect serials. Prerequisites: 500, 501, and 522 or permission of instructor.

LIBR 526 Indexing and Abstracting (3) Bates, Mignon, Soper

Techniques of vocabulary control and thesaurus construcsign, selection, and evaluation of indexing systems. Computerized methods for free text, full text, and con-trolled vocabulary procedures. Application of methods to information retrieval systems. Offered on credit/no credit basis only. Prerequisites: 500, 501, or permission of instructor.

LIBR 528 Literature Searching (3) Mignon

Survey of concepts and techniques of professional literasurvey of contractions and evaluation of computerized biblio-graphic files. Analysis and evaluation of data bases. Management and planning of library searching services. Specialized procedures in user interviewing and request analysis. Experience in design and on-line execution of literature searches, using a variety of standard searching languages, including the Dialog and Orbit systems. Pre-requisites: 500, 501, or permission of instructor.

LIBR 540 Materials for General Information Needs (3) Nelson

Consideration of the individual in the generalized infor-mation environment. Interdisciplinary sources for the se-lection of library materials. Forms of materials for nonspecialized information retrieval and referral. Development of skills in question negotiation and search strat-egy. Prerequisites: 500, 501, or permission of instructor.

LIBR 541 Information Access in the Humanities (3) Nelson, Skelley Description and analysis of information problems and in-

formation sources in the humanities. Fields considered are philosophy, religion, visual arts, performing arts, lan-guage, and literature. Prerequisites: 500, 501, or permis-sion of instructor.

LIBR 542 Information Access in the Social Sciences (3) Skelley

Description and analysis of information problems and in-formation sources in the social sciences. Fields con-sidered are anthropology, business economics, educa-tion, geography, history, political science, psychology, and sociology. Prerequisites: 500, 501, or permission of instructor instructor.

LIBR 543 Information Access in Science and Technology (3)

Bates

Covers the following topics as they apply in the literature of the natural sciences and engineering: nature of infor-mation transfer; characteristics and organization of biblifrom manual and computer on-line sources; information retrieval from manual and computer on-line sources; search strat-egy; practice with specific data bases and manual sources. Prerequisites: 500, 501, and 528 or permission of instructor.

LIBR 545 Government Publications (3) Nelson

Government publications of the United States and foreign countries, their acquisition, organization, and use. Pre-requisites: 500, 501, or permission of instructor.

LIBR 546 Library Audiovisual Services (3) Program services, administration, organization, and bib-liographic control of library audiovisual materials in all types of libraries. Prerequisites: 500, 501, or permission of instructor.

LIBR 547 Evaluation and Selection of Audiovisual Materials (3)

Develops competency in applying criteria to the evalua-tion, selection, and use of audiovisual materials and their accompanying technologies. Focuses on previewing the full range of audiovisual formats found in all types of li-braries. Prerequisites: 500, 501, or permission of instructor

LIBR 549 Children's Materials: Evaluation and Use (3)

Benne, Shaw

Study of library materials for children with emphasis on literature in its various forms. Attention also given to criteria used in evaluation, issues in selection, and use of materials with children. Prerequisites: 500, 501, or permission of instructor.

LIBR 550 Children's Materials: Bibliography and Resources (3) Benne, Shaw

Study and evaluation of bibliography and selection aids necessary to develop collections for public, school, and academic libraries. Attention is given to the standard academic horanes. Attention is given to the standard works of literary criticism; contemporary and historical studies, and texts dealing with the use of literature with children; and publications of organizations, both United States and foreign, role of the publisher, the needs of the selector and the scholar. Prerequisites: 500, 501, or permission of instructor.

LIBR 551 Literature for Young Adults (3) Reading, evaluation, and sharing of literature currently

appropriate to the needs, interests, and abilities of young adults, ages twelve through twenty. Application of crite-ria to the assessment of young adult reading materials and consideration of the uses of these materials with young people. Prerequisites: 500, 501, or permission of instruc-

LIBR 553 Information Access in Health Sciences (3)

Mignon Characteristics of users of biomedical literature. Survey of information resources in health sciences and healthcare planning. Use of information retrieval systems, emphasizing services of the National Library of Medicine. Organization of medical and hospital libraries. Problems of information policy, professional standards, and certifi-cation. Prerequisites: 500, 501, and 543, or permission of instructor.

LIBR 554 Library and Information Retrieval Skills for Clinical Applications (3) Mignon

Mignon Practical introduction to effective use of research librar-ies, bibliographic services, and information retrieval sys-tems, emphasizing materials and skills strategic to needs of clinical professions. Efficient techniques for systematic searching of technical literature, organization of document collections, and information client consulta-tion. Not open to librarianship majors. Prerequisite: graduate standing in School of Pharmacy or permission of instructor.

LIBR 557 Advanced Legal Bibliography (2) Gallagher

Bibliographical data and use of federal and state law reports and statutes; quasi-legal and commissioners' reports of the states; bar association records, legal periodicals, indexes and digests, and cooperative bibliographies of law collections. Prerequisite: law librarianship major or permission of instructor.

LIBR 558 Selection and Processing of Law Library Materials (4) Gallagher

Aids to selection, processing, microphotography of legal material, etc. Prerequisite: law librarianship major or per-mission of instructor.

LIBR 560 Information Needs, Uses, and Users (3) Rates

Study of the factors and influences, both individual and social, associated with human beings needing, using, and acting on information. Information theory, human information processing, information flow among social and occupational groups, and research on information needs and uses. Prerequisites: 500, 501, or permission of instructor.

LIBR 561 . Serving Individual Information Needs (3) Zweizig

Training in awareness and skills for perceiving and re-

sponding to the information requests of users. Effective strategies for meeting information needs are learned through use of simulations, role playing, experiential ex-ercises, discussion, and practice. Offered on credit/no credit basis only. Prerequisites: 500, 501, or permission of instructor.

LIBR 562 The Design and Selection of Library Services (3) Hiatt

Principles underlying library and information services, and the selection and design of services to meet user needs in all types of libraries and information centers. Emphasis on adult clientele in academic, public, and special libraries, but attention given to school library media centers and all age levels. Prerequisites: 500, 501, or permission of instructor.

LIBR 563 Library Services for Special Populations (3) Hiatt

Acquaints students with the library and information needs of the aging, handicapped, and institutionalized; what li-braries are doing to meet these needs; and what skills, insights, and attitudes are needed by librarians working with these target groups. Some emphasis on the institu-tionalized and the institution environment. Prerequisites: 500, 501, or permission of instructor.

LIBR 567 Public Library Services for Children (3) Benne, Shaw

Administration of children's departments in public libraries; planning and promoting programs and services; evalroles of the children's librarian. Prerequisites: 500, 501, and 549 or permission of instructor.

LIBR 568 Administration of the School Library Media Program (3)

Develops competency in administering materials, equip-ment, and services of the library media program as an in-tegral part of the educational process of the school. Focuses on developing skills in acquiring, organizing, and managing the full range of learning resources for access and use and communicating the program to users. Required for school library media specialists. Prerequi-sites: 500, 501, or permission of instructor.

LIBR 569 Supervision of Public School Library Media Systems (3)

Media Systems (3) Develops competency in administration and supervision of school library media programs in school districts, re-gional educational service agencies, and state Depart-ment of Public Instruction. Emphasis on planning, orga-nizing, developing, and communicating programs and the relationship of the supervisory function to building level school library media programs. Prerequisites: 500, 501 and 662 conventions of the supervisory function to building 501, and 568 or permission of instructor.

LIBR 570 Seminar in School Library Media Programs (3)

Problems and trends that affect the school library media study. Prerequisites: 500, 501, or permission of instructor.

LIBR 571 Storyfelling: Art and Techniques (3) Shaw

Study of storytelling, past and present, noting its develstudy of storytening, part and present, noting its devel-ting materials (folk literature and literary forms) used by storytellers throughout historical periods. Learning essential techniques necessary to maintain this artistic skill in a professional field. Planning storytelling programs for various age and interest groups and situations, utilizing folk, classic, and contemporary literature. Prerequisites: 500, 501, or permission of instructor.

LIBR 572 Archival and Manuscript Services (3) Berner

Selection, organization; and uses of archival and manuscript collections. Emphasis on the principles and tech-niques; some attention to the administration of state archival and historical institutions' collections. Lecture. demonstration, and laboratory. Prerequisites: 500, 501, or permission of instructor.

LIBR 577 Law Library Administration (5) Gallagher

Gallagher Staff, patrons and public relations, circulation, architec-ture, book arrangements, equipment, rules, publicity, publications, budgets, reports, professional societies, re-gional service. Prerequisite: law librarianship major or permission of instructor.

LIBR 581 Intellectual Freedom in Libraries (3) Nelson

Analysis of issues related to intellectual freedom, with particular attention to implications for libraries and librar-ians. Topics include consideration of the current legal climate, conformity versus freedom in the modern word, the librarian as censor, social responsibility and individ-ual freedom, the intellectual freedom of children, prospects for the future. Prerequisites: 500, 501, or permission of instructor.

LIBR 583 Cooperative Information Systems (3) Analysis of cooperative information systems found among all types of libraries and information centers. Em-phasis on developments in the United States and also treatment of foreign and multinational systems, with as-sessment of their contributions. Prerequisites: 500, 501, or permission of instructor.

LIBR 588 International Librarianship (3)

For students who wish to deepen their knowledge of, and participation in, libraries of countries other than the United States. Studies include a consideration of the politics, economics, education, literacy, and other factors of a county that influence the character and efficacy of li-brary development. Offered on credit/no credit basis only. Prerequisites: 500, 501, or permission of instructor.

LIBR 590 Directed Field Work (2-4)

Shaw Six weeks of professionally supervised fieldwork in various types of libraries.

LIBR 591 The Book as Artifact (3) Skelley

Seminar approach to some of the major forces and figures Seminar approach to some of the major forces and neares that have been influential in the development of the book both as an esthetic object and as a functional, potentially marketable product, building upon the survey presented in 470. Cultural, social, technological, and economic forces; major printers, booksellers, publishers, type de-signers, typographers, illustrators, bookbinders. Empha-sis on the printed book in the Western world, but scope does not exclude oriental bookmaking or books prior to the mid-fifteenth century. Offered on credit/no credit basis only. Prerequisites: 470, 500, and 501, or permis-sion of instructor.

LIBR 592 Aspects of Publishing (3)

Skelley Examination of selected topics and figures relating to book and periodical publishing, primarily from the Renaissance to the present. Focus on publishing prac-tices, processes, and strategies considered in given ecotices, processes, and strategies considered in given eco-nomic, cultural, and social contexts. Does not cover the arts, crafts, materials, and technical means involved in producing the published product, but the combination of activities, entrepreneurial or otherwise, that constitute publishing. Offered on credit/no credit basis only. Pre-requisites: 500, 501, or permission of instructor.

LIBR 593 Career Development for Librarians (3) Hamilton

Review of the several components of the continuing education process: adult education, in-service training, staff development. Options for individual study are offered, such as planning and evaluating workshops and designing in-service programs for specific work situations. Prereq-uisites: 500, 501, or permission of instructor.

LIBR 597 Directed Fieldwork Seminar (2) Show

Research or in-depth study that leads to a consideration of problems, concerns, or issues of mutual interest that originated during field experiences. Prerequisites: 500, 50Ĩ.

LIBR 598 Special Topics in Librarianship (3) Seminar dealing with various topics in librarianship. Of-fered by visitors or resident faculty. Topics are changed from quarter to quarter. May not be offered every quar-ter. May be repeated for credit. Prerequisites: 500, 501, or permission of instructor.

LIBR 599 Methods of Research in Librarianship (3) Bates

Introduction to research methods commonly used in li-brary and information science. Emphasis on problem selection, study design, data interpretation, and dissemi-nation of results. Prerequisites: 500, 501, or permission of instructor.

LIBR 600 Independent Study or Research (*)

LIBR 700 Master's Thesis (*)

SCHOOL OF MEDICINE

ANESTHESIOLOGY

Courses numbered with a P suffix are not graduate courses and are restricted to medical student enrollment only.

ANEST 498 Undergraduate Thesis (*) AWSpS Hornbein By special arrangement. Time and credit to be arranged.

ANEST 499 Undergraduate Research (*) AWSpS Hornbein

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.)

ANEST 680P ' Basic Anesthesia Clerkship (4) AWSpS Hornbein

Introduction to the principles of airway management and ventilatory support, use of local anesthetics, techniques of resuscitation, techniques of patient monitoring, fluid therapy, preoperative and postoperative patient evalua-tion, and pathology of anesthesia. Skills taught include airway management, venipuncture, lumbar puncture and endotracheal intubation. Prerequisite; third- or fourth-year student. (Two weeks, full time. Limit: one to five students.) All affiliated hospitals.

ANEST 681P Advanced Clerkship in Anesthesiology (8) AWSpS

Hornbein

Hornbein Clerkship for students interested in some facet of anes-thesiology or desiring greater exposure to anesthe-sia as a specialty. Individual programs can be arranged in the fol-lowing areas: respiratory care, surgical anesthesia, ob-stetrical anesthesia, and pain clinic. Percequisitie: 680P or first two weeks on surgical anesthesia. (Four weeks, full time. Limit: one student in each area.) All affiliated hearing hospitals.

ANEST 697P Anesthesiology Special Electives (*, max. 24) AWSpS Hornbein

By specific arrangement for qualified students, special clerkships, externship, or research opportunities can at times be made available at institutions other than the University of Washington. Faculty can advise students of possible opportunities. Students wishing to elect this course should obtain a "Special Assignment" form from the Dean's office at least one month before advance reg-istration. Prerequisite: permission of instructor. (Six to turbus used, full time twelve weeks, full time.)

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BIOCHEMISTRY

Courses numbered with a P suffix are not graduate courses and are restricted to medical student enrollment only.

BIOC 405, 406 Introduction to Biochemistry (3,3) W.So

introductory course in general biochemistry covering ba-sic principles. Emphasis is placed on a broad understandste principies. Emphasis is placed on a broad understand-ing of the chemical events in living systems in terms of the metabolism and the structure-function relationships of biologically important molecules. This course does not fulfill the prerequisites for advanced courses in biochem-istry (see 440, 441, 442). Prerequisite: general biology and organic chemistry or permission of instructor for 405; 405 or permission of instructor for 406.

BIOC 426 Basic Techniques in Biochemistry (3)

MSp Agabian, Haschke, Herrion, Wade Introduction to basic biochemistry experiments. Ac-quaints students with basic biochemical laboratory techniques and serves as a preparation for advanced biochem-istry laboratory courses. Prerequisites: 405, 406 or 440, 441, 442, which may be taken concurrently.

BIOC 440, 441, 442 Molecular Biology (3,4,3) A,W,Sp Davie, Morris, Parson, Walsh, Young

Interdisciplinary course in general biochemistry with a strong component in molecular biology. Designed for un-dergraduate students enrolled in the curriculum in molecdergraduate students enrolted in the currectium in molec-ular and cellular biology and graduate students in other mission of instructor for 440; 440 for 441 (each student in 441 required to enroll in one-hour quiz per week); 441 for 442. Recommended: introductory physical chemistry.

BIOC 498 Undergraduate Thesis (*) AWSpS For senior medical students. Prerequisite: permission of instructor.

BIOC 499 Undergraduate Research (*) AWSpS Investigative work on enzymes, proteins, lipids, nucleic acids, protein biosynthesis, intermediary metabolism, physical biochemistry, and related fields. Offered on credit/no credit basis only. Prerequisite: permission of instructor.

BIOC 512P Medical Students' Laboratory (3) W Content similar to 444. When possible, the relationship of the biochemical techniques or experiments being per-formed to clinical or diagnostic medicine is demonstrated or discussed. For medical students and others by permis-sion. Prerequisites: HUBIO 514P, 524P or equivalent, and permission of instructor and permission of instructor.

BIOC 515P Biochemistry Review I (1) A Elective quiz section to clarify and amplify material pre-sented in HUBIO 514P. Offered on credit/no credit basis only.

BIOC 520 Seminar (1) AWSp Seminar dealing with special topics in the field of biochemistry. May be repeated for credit. Prerequisite: permission of instructor.

BIOC 525P Biochemistry Review II (1) Quiz section to clarify and amplify material presented in HUBIO 524. Not required. Offered on credit/no credit basis only. Entry card required.

BIOC 530 Advanced Biochemistry (3) A

Graduate-level discussion of the structure, function, and chemistry of proteins, control of enzymatic reactions. Prerequisites: a comprehensive course in biochemistry and permission.

BIOC 531 Advanced Biochemistry (3) W Graduate-level discussion of the action of hormones, membrane structure and function, electron transport, oxidative phosphorylation, photosynthesis. Prerequisites: a comprehensive course in biochemistry and permission of instructor.

BIOC 532 Advanced Biochemistry (3) Sp Graduate-level discussion of nucleic acid structure, viruses including oncogenic viruses, RNA biosynthesis, protein biosynthesis, and eukaryotic cell cycle. Prerequi-sites: a comprehensive course in biochemistry and permission of instructor.

BIOC 540, 541, 542 Literature Review (2,2,2) A,W,Sp

Emphasizes critical evaluation of original articles in the literature. Coordinated with 530, 531, 532, and to be taken concurrently. For first-year graduate students in biochemistry and students of other science departments, with permission. For 540; numerical grade; for 541 and 542: offered on credit/no credit basis only. Entry cards required.

BIOC 560 Physical Biochemistry (3) W

Specialized aspects of physical chemistry as applied to systems of biological interest. Particular emphasis on hy-drodynamic and optical properties of macromolecules. Prerequisite: physical chemistry.

BIOC 570 Current Topics in RNA Tumor Virology (2) Sp Eisenman, Lineal

Weekly lecture-discussion dealing with current research on the biology and biochemistry of RNA tumor viruses, with concentration on a critical evaluation of the literature. Offered on credit/no credit basis only. Prerequisites: 530 and 531, or equivalent, or permission of instructor. (Offered odd-numbered years.)

BIOC 574 The Biochemical Basis of Disease (2) Sp Bornstein, Shapiro

Discussion of pathologic physiology and molecular basis of clinical disorders. An attempt is made to demonstrate the relevance of biochemical research to the understanding and the rational therapy of human disease. Scope lim-ited to diseases in which new developments permit description in biochemical terms. Prerequisites: 442 or HUBIO 514P, 524P or permission of instructor.

BIOC 581 Introduction to Biochemical Research (3, max. 6) WSp

Student works with one of the research groups within the department for one quarter and then rotates to another laboratory for a second quarter. Offered on credit/no credit basis only. Prerequisite: graduate standing in biochemistry or permission of instructor. Entry card required.

BIOC 583 Advanced Techniques in Biochemistry (3, max. 9) A

(3, max. 9) A Intensive course involving conferences, reading assign-ments, and laboratory procedures, including ultracentrif-ugation, electrophoresis, chromatography, spectropho-tometry, and radioactive isotope techniques. For first-year graduate students in biochemistry and students of other science departments, with permission. Prerequisite: biochemistry graduate student standing or permission of instructor. Entry card required.

BIOC 585 Nucleic Acids in Biochemistry (1)

AWSp Agabian, Young Weekly research conferences on the role of nucleic acid in biochemistry. Offered on credit/no credit basis only. Prerequisite: permission of instructor.

BIOC 586 Enzyme Regulation (1) AWSpS Davie, Fischer

Review of the current literature on the control of cellular processes at the molecular level. Topics include hormonal control of mammalian systems, role of cyclic-AMP in pro- and eukaryotic organisms, allosteric and co-valent modification of regulatory enzymes, etc. Direct participation of students in the presentation of topics is required. May be repeated for credit. Prerequisite: permission of instructor.

BIOC 588 Current Topics in Molecular and Cellular Biology (1) AWSpS Agabian, Byers, Morris, Palmiter, Shapiro, Young Critical evaluation of the biochemical literature in areas related to molecular and cellular biology. May be re-peated for credit. Prerequisite: permission of instructor.

BIOC 589 Connective Tissue Macromolecules (1) AWSpS Bornstein

Seminars designed to discuss current knowledge of the biochemistry and pathophysiology of fibrous proteins and other structural macromolecules. Prerequisite: 442 or HUBIO 514P, 524P or permission of instructor.

BIOC 590 Proteins and Enzymes Seminar (1, max. 8) AWSpS Neurath, Walsh.

Weekly conferences on current research in proteins and enzymes. For graduate students in biochemistry. May be repeated for credit. Prerequisite: permission of instructor.

BIOC 591 Seminar on Protein Structures (1, max. 20) AWSpS Herriott, Jensen

Topics on the determination of protein structure by x-ray crystallography, and on relationships between structure and chemical properties in solution and in the crystalline state. May be repeated for credit. Offered on credit/no credit basis only. Prerequisite: permission of instructor.

BIOC 592 Topics in the Biochemistry of Regulation (1) AWSpS Morris

Control of enzyme activity and gene expression related to biology of growth and function. May be repeated for credit. Prerequisite: permission of instructor.

BIOC 593 Activation of Development (1) AWSpS

Shapiro Weekly research conference. Concentrates on biochemical events at the time of fertilization and early develop-ment and on the role of membranes in metabolic control. May be repeated for credit. Offered on credit/no credit basis only. Prerequisites: 530, 531, 532, or equivalent, or permission of instructor.

BIOC 594 Glycogen Metabolism Seminar (1) AWSpS Fischer

Weekly conferences on research in glycogen metabolism. May be repeated for credit. Prerequisite: permission of instructor

BIOC 595 Membranes, Bioenergetics (1) AWSpS Shapiro

Weekly research conferences on biochemical processes that occur in membranes. May be repeated for credit. Of-fered on credit/no credit basis only. Prerequisite: permission of instructor.

BIOC 596 Gene Expression (1) AWSpS Palmiter

Weekly research conferences. May be repeated for credit. Offered on credit/no credit basis only. Prerequisite: permission of instructor.

BIOC 598 Seminar in Developmental Biology (1) AWSpS

Hauschka

Discussion covers recent advances in the field of developmental biology, especially those areas that are or can be analyzed by a biochemical approach. May be repeated for credit. Prerequisite: permission of instructor.

BIOC 599 · Seminar in Physical Chemistry of Polymers (1) AWSpS Teller

Weekly conferences on current research in the physical chemistry of macromolecules. For graduate students in biochemistry. May be repeated for credit. Prerequisite: permission of instructor.

BIOC 600 Independent Study or Research (*) AWSpS

BIOC 700 Master's Thesis (*) AWSpS

BIOC 800 Doctoral Dissertation (*) AWSpS

BIOENGINEERING

See Interschool or Intercollege Programs.

BIOLOGICAL STRUCTURE

Courses numbered with a P suffix are not graduate courses and are restricted to medical student enrollment only.

B STR 301 General Anatomy (4) SpS Survey of systemic human anatomy, with correlated lec-tures and laboratory demonstrations. Limited to students who have declared majors in health education, physical education, physical therapy, or orthotics and prosthetics; others by permission of instruc-tor tor.

CONJ 317-318 Introductory Anatomy and Physiology (6-6) See Conjoint Courses.

B STR 331 Introduction to Neuroanatomy (3) W Sundsten

General survey of the structure of the central nervous sys-tem, including an analysis of sensory and motor systems and higher integrative functions. Prerequisite: 301 or permission of instructor.

B STR 440 Systemic Anatomy for Dental Students (5) A

Broderson

Lecture and laboratory work in neuroanatomy and gross anatomy. Emphasis on head and neck anatomy. For den-tal students; others by permission of instructor.

B STR 441 Microscopic Anatomy for Dental Students (3) A

Prothero Lecture and laboratory work in microscopic anatomy for dental students; others by permission of instructor.

B STR 450 Anatomy for Dental Students (4) W Kashiwa

bissection of oral cavity and related areas, emphasizing the location, relationships, and functions of anatomical structures pertinent to the practice of dentistry. Prerequisite: 440.

B STR 498 Undergraduate Thesis (*) AWSpS Prerequisite: permission of instructor.

B STR 499 Undergraduate Research (*) AWSpS Prerequisite: permission of instructor.

B STR 501 Gross Anatomy (4) A

Graney, Rosse Lecture and dissection course in regional human anatare students and medical students; others by permission of instructor

B STR 502 Gross Anatomy (3) W

Graney, Rosse

Lecture and dissection course in regional anatomy: upper and lower extremities. For graduate students and medical students; others by permission of instructor.

B STR 503 Gross Anatomy (4) Sp

Graney, Rosse Lecture course in regional human anatomy; head and neck. For graduate students and medical students; others by permission of instructor.

B STR 505 Comparative General Histology (3) W Roosen-Runge

Study of biology, histology, and ultrastructure of general tissues in vertebrates and invertebrates. Prerequisite: permission of instructor.

CONJ 508 Ultrastructural Methods and Interpretation (6) See Conjoint Courses.

B STR 511 Cellular Structure and Function (3, max. 6) W Koehler

Introduction to the principles of cytological experimentation, including a survey of microscopic and other instru-mental techniques. Emphasis is toward a detailed analysis of cellular architecture, particularly as it can be related to functional considerations and the dynamic behavior of cells. Cellular membranes, organelles, nuclear constituents, and organization are discussed. Prerequi-site: permission of instructor.

B STR 512 Human Microanatomy (4) Sp

Roosen-Runge Lectures and laboratory treating the specialized tissues and organs of the body from the microscopic and ultrami-croscopic points of view. Prerequisite: permission of instructor.

B STR 515 Biological X-ray Structure Analysis (3) W

Jensen

Theory of x-ray diffraction, with emphasis on applica-tions to biological systems. Prerequisite: permission of instructor.

B STR 525 Brain Dissection (2) AWSpS Sundsten

Detailed consideration of the macroscopic anatomy of the human brain (individual study). Prerequisite: permission of instructor.

B STR 531, 532, 533 Electron Microscopy (1-5, 1-5, 1-5) A,W,Sp

Johnson, Luft

Theoretical and applied aspects of microscopy in biol-ogy, with emphasis on newer methods. Offered jointly with BIOEN 531, 532, 533. Offered on credit/no credit basis only. Prerequisite: permission of instructor.

B STR 540P Special Problems in Biological

Structure (1-6, max. 6) AWSpS Broderson, Graney, Kashiwa, Rosse Guided dissection. Primarily for advanced medical students. Prerequisite: permission of instructor.

B STR 557 Seminar (1, max. 9) AWSp Required of graduate students. Offered on credit/no credit basis only. Prerequisite: permission of graduate program adviser.

CONJ 585 Surgical Anatomy (1-3, max. 12) See Conjoint Courses.

B STR 600 Independent Study or Research (*) AWSpS

B STR 697P Biological Structure Special Elective (*, max. 24) AWSpS By specific arrangement, for qualified students, special clerkship, externship, or research opportunities can at times be made available at institutions other than the University of Washington. The faculty can advise students of possible opportunities. 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 to twelve weeks.)

B STR 700 Master's Thesis (*) AWSpS

B STR 800 Doctoral Dissertation (*) AWSpS

BIOMEDICAL HISTORY

BI HS 401 Historical Development of Medical Thought (3) A Bodemer

Survey of the history of medicine from antiquity to the twentieth century, emphasizing concepts and ideas that influenced and were influenced by medicine.

BI HS 403 Issues of Life and Death in Historical Perspective (3) Sp Rodemer

Examination, in terms of their historical development and relation to human values, of some critical contemporary issues arising from advances in biology and medical tech nology. Topics include: the creation, prolongation, and termination of life, the control of human reproduction, termination of life, the control of numan reproduction, transplanted and artificial organs, behavior modification, and human experimentation, which are considered in the context of past and present concepts of life, death, and the individual, and the value judgments that impact upon the ethical dilemmas of modern medicine and society.

BI HS 410 Legal Issues in Biology and Medicine (4) s Dworkin

Brief introduction to law and the legal system. Pressing legal issues posed by advances in biology and medicine. Topics include informed consent, death definition, euthanasia, organ transplantation, allocation of scarce medical resources, genetic counseling, genetic screening, abor-tion and contraception, sterilization, artificial insemination, government funding of research, experimentation with human subjects, and the creation of biohazards. Emphasis on the variety of available legal responses to biomedical developments and the characteristics, strengths, and weaknesses of each. Previous exposure to law or legal studies not required. Not open to law stu-

BI HS 411 The Development of Modern Pharmacy (3) W Whorton

For pharmacy students. Evolution of the pharmaceutical profession from antiquity to the present. History of drug therapy, changing professional roles of pharmacists, growth of professional education, literature, associations, and legislation, and the relations of pharmacists with other health professionals; particular emphasis on phar-macy in the United States. Prerequisite: pharmacy student standing or permission of instructor.

BI HS 412 Health Without Doctors (3) Sp. Whorton

Detailed study of the evolution in American culture of the belief that health is best preserved and advanced not by reliance on the medical profession, but through reformed personal bygiene. The history of American attitudes toward diet, exercise, dress, cleanliness, and sexual activity are analyzed as elements in the quest for physical health, and as agents expected to effect general social im-provement. Prerequisites: introductory chemistry and biology or permission of instructor.

BI HS 413 American Medical Heresies (3) W Whorton

whorrow Detailed historical study of unorthodox approaches to healing in America. Discussion of the history of public dissatisfaction with "regular" medicine prefaces a careful examination of the historical development of the major alternative systems of care, including, Thomsonianism, homeopathy, hydropathy, osteopathy, chiropractic, na-turopathy, mesmerism, and faith healing.

BI HS 414 Public Health in Nineteenth-Century America (3) Sp Whorton

Analysis of the patterns of epidemic illness (particularly infectious disease) in the United States for the period of the Revolution to the early twentieth century, and of the evolution of concepts and programs of disease prevention.

BI HS 416 The Use and Abuse of Drugs in Western History (3) A Whorton

Whorton Analysis of the historical development of attitudes toward the medical and lay employment of drugs is made through the detailed study of five controversies: natural versus chemical remedies in the seventeenth century; heversus chemical remoutes in the seventeenin century, he-roic therapy opposed by therapeutic skepticism in the inteteenth century; chemotherapy and overmedication in the twentieth century; drug regulation since 1800; and the use of alcohol and opium during the past century.

BI HS 417 History of Disease and Public Health (3) A Whorton

Investigation of the role played by infectious disease in the development of Western civilization, of the theories devised to account for the origin and spread of epidem-ics, and of the practices adopted and institutions created to combat epidemic disease.

BI HS 418 History of American Medicine (3) ASp Whorton

Study of the development of the American medical profession from the early colonial period to the twentieth century. Attention is given to the education and regulation of American physicians, the theories of disease to which they have subscribed, the treatments that they have prescribed, the significant contributions to medical progress that they have made, and to the attitudes of the American public toward its physicians.

BI HS 419 Historical Foundations of Modern Biology (3) A Gottdenker

Examines origins and evolution of biological sciences from antiquity to twentieth century. Major emphasis on the natural philosophers of Greece, Hellenistic and Ara-bic medicine, the beginning of modern science in the Re-naissance, and the diversification of the biological sciences culminating in the nineteenth century.

BI HS 421 Biology in the Nineteenth Century (3) W Gottdenker

Survey of the scientific developments from the mid-1700s leading to the great biological syntheses of the nineteenth century. The impact of intellectual move-ments, and the diversification of biological sciences are treated in some detail. Prerequisite: 5 credits in biology or permission of instructor.

BI HS 422 . Evolutionary Thought and Society (3) Sp Gottdenker

The theory of evolution in the form of Darwinism has had a profound effect upon every aspect of human life and so-ciety. Lectures and discussions on the antecedents of this theory and the reasons for its subsequent impact.

BI HS 425 The Origin of Life From Myth to Mars (3) Sp Gottdenker

Consideration of the supernatural and naturalistic ideas from antiquity to the twentieth century that influenced the scientific approach to the problem of the origin of life. Acquaints student with main avenues, as well as byways, taken toward possible solution of one of the funda-mental problems of biology.

BI HS 426 The Biological Harvest of Travels and Scientific Explorations (3) A Gottdenker

from the conquering marches of Alexander the Great to the space explorations of NASA. These explorits opened new geographical horizons and discovered many forms of life that proved to be of great economical, medical, and biological importance. They also led to radical changes in the way man looked at himself and his place in nature.

BI HS 427 Medicinal Botany Through the Ages (3)

Gottdenker Lectures, discussions, and readings. Development of medical botany from the earliest times to the beginnings

of scientific botany, with an attempt to show how much of the widely proliferated herbal literature of the Renais-sance still influences the present-day revival of interest in the medicinal use of plant materials. Recommended: some background in biology or botany.

BI HS 430 Medicine and Society in the Age of Reason (3) A

Bodemer Detailed consideration of medicine and its institutions during the seventeenth and eighteenth centuries. Emphasis on the interacting forces and ideas leading to the de-velopment of scientific and humanitarian medicine.

BI HS 431 Medicine During the Nineteenth Century (3) W Bodemer

Detailed consideration of the development of the basic and clinical medical sciences during the nineteenth cen-tury, emphasizing medical theory and practice.

BI HS 432 Madness and Civilization (3) W Rodemer

Boarner Survey of attitudes toward madness, concepts of psycho-pathology, and the treatment of the mentally ill at differ-ent periods in the development of Western civilization. Special emphasis placed on the various social, psycho-logical, and cultural factors determining the position of the mentally ill in society.

BI HS 433 The Origins of Modern Psychiatry and Its Institutions (3) Sp Bodemer

Detailed consideration of the nineteenth- and early twenteth-century origins of modern medical psychology, the mental health movement, and mental institutions. Special attention is devoted to the philosophical and physiologi-cal foundations of psychopathological concepts and the treatment of the mentally ill since the end of the eighteenth century. The history of the asylum movement and the mental health movement are considered in their social and cultural context, with special attention to the United States.

BI HS 434 Seminar in the History of Psychiatry (2) Sp

Bodemer

To be taken concurrently with 433 or by permission of in-structor. Readings and discussion of primary works appropriate to topics considered in 433.

BI HS 470 Law and Medicine (4) S

Dworkin

Surveys the relationship of the legal system to medical practice. Considers the law's efforts to regulate medicine and to profit from medical knowledge, and the roles of sprincipants in the health-care system and of the state. Specific topics include: licensure; doctor-patient relation-ship; medical records and confidentiality; role of the hospital; professional liability; and introduction of new drugs and techniques. General background in health sciences desirable. The course does not assume or require any background in law.

BI HS 497 Biomedical History Special Electives (*) AWSpS

Prerequisite: permission of instructor.

BI HS 498 Undergraduate Thesis (*) AWSp Prerequisite: permission of instructor.

BI HS 499 Undergraduate Research (*, max. 5) AWSpS

Investigative work in history of the biomedical sciences Prerequisite: permission of instructor.

BI HS 500 Biomedical Historiography (*, max. 6) AWSp

Emphasis is placed on bibliography and utilization of bibliographic sources. Practice in techniques of organizing and writing history of medicine. Prerequisite: permission of instructor.

BI HS 505 The Growth of Biological Thought (3) A Bodemer

Survey course tracing the development of Western bio-logical thought from the period of classical antiquity to the twentieth century. Particular attention is devoted to the factors influencing the character of biological theories and to the techniques and the effects of biology upon so-ciety. Prerequisite: permission of instructor.

BI HS 506 Historical and Ethical Aspects of Modern Biology (3) W

Detailed consideration, through lectures, discussion, and Student presentations, of selected topics in the history of biological thought, emphasizing the nineteenth and early twentieth centuries. Intended for, but not limited to, those individuals in biology education. 505 is highly rec-ommended, but not required. Prerequisite: permission of instructor.

BI HS 510 Topics in Biomedical History (*, max. 6) AWSp Detailed study of topics in biomedical history through

lectures, seminars, and discussion. Open to majors and graduate students in medicine, the arts and sciences, and others with appropriate background and interest. Prerequisite: permission of instructor.

BI HS 511P Selected Topics in Biomedical Ethics (1) AWSp McCormick

Designed for first- and second-year medical students. Each section is limited to twelve students, and a seminar format is followed. Topics described in the course outline are investigated, with the instructor giving brief presentaare investigated, with the instructor gring offer presenta-tions, utilizing guest resource persons and a variety of au-diovisual aids followed by group discussion. Seminar participants are provided with a recommended reading list and a variety of reprints related to topics. Prerequisite: permission of instructor.

BI HS 520 Seminar in the History of Medicine (3) W Bodemer

Seminar in the history of medicine and allied sciences, stressing original literature and emphasizing independent research by the student. Prerequisite: permission of instructor.

BI HS 521 The Ethical Challenges of Modern Medicine (3) W

McCormick

Readings and discussion of critical contemporary ethical issues arising from progress in the biomedical sciences and medical technology. Emphasis on the impact of mod-em biology and medicine upon human values, the rela-tion of medical practices to the moral consensus, and the role and responsibilities of the physician. Prerequisite: permission of instructor.

BI HS 522 Ethical Problems Surrounding Death (3) Sp McCormick

Ethical issues related to the termination of life (e.g., euthanasia, natural-death theory, truth telling, guilt and grief) and conflicts of values arising in treating the dying patient. The course aims to identify ethical issues surrounding death, to test related student judgments, to develop increased awareness of feelings and values con-cerning life and death, and to explore ways of caring for the dying. Prerequisite: permission of instructor.

BI HS 523 Biomedical Ethics and the Life Sciences (3) A McCormick

Brief history of the development of bioethics and an examination of the normative issues in medicine today. Emphasis on methods of ethical reasoning about moral dilemmas. Selected case studies are used to illustrate the interface of ethics, biology, and medicine and to provide an opportunity for students to test their value assumptions and skills in analyzing a moral dilemma in medicine. Pre-requisite: permission of instructor.

BI HS 525 Seminar in the History and Philosophy of Biology (3) A Gottdenker

Seminar tailored to individual interests in certain areas of the history and philosophy of biology. Open to majors and graduate students in medicine, the arts and sciences, and others with appropriate background and interest. Pre-requisite: permission of instructor.

BI HS 530 Seminar in the History of Public Health (3) W Whorton

Seminar to analyze the evolution of man's understanding of the causes of epidemic disease and the development of practices and institutions to prevent the outbreak or spread of epidemic illness. Open to majors and graduate students in medicine, the arts and sciences, and others with appropriate background and interest. Prerequisite: permission of instructor.

Rodemer

BI HS 600 Independent Study or Research (*) AWSpS

Prerequisite: permission of instructor.

BI HS 700 Master's Thesis (*) AWSpS Prerequisite: permission of department.

CONJOINT COURSES

Courses numbered with a P suffix are not graduate courses and are restricted to medical student enrollment only.

CONJ 317-318 Introductory Anatomy and Physiology (6-6) SA,WSp Gaddum-Rosse, Landau

Human physiology with anatomical demonstrations. Inruman physiology with anatomical demonstrations. In-troductory course integrating gross and microscopic anat-omy, physiology, and biochemistry of the human body. Offered conjointly by the departments of Biological Structure and of Physiology and Biophysics. Prerequi-sites: CHEM 101 and 102, or equivalent; primarily for nursing students; others by permission of instructor. Coordinator. Department of Physiology and Biophysics.

CONJ 407 Animal Techniques (*, max. 3) W Ladiges, Van Hoosier

For graduate students and advanced undergraduates; focus is on the ethics, laws, and guidelines pertaining to the use of animals in research. Includes an introduction for experimental technique and animal models of human disease. Graduate students may elect to take the course for two or three credits and receive additional training in surgical techniques; both general and an individual proj-ect in the student's area of interest. Lectures, demonstra-tions, and experimental procedures. Offered on credit/no credit basis only. Prerequisite: permission of instructor.

CONJ 448 Fundamental Immunology Laboratory (2) A

Gilliland

Culturate Introduction to immunologic techniques. Experiments and demonstrations designed to illustrate the principles of antigen-antibody interactions and cell-mediated reac-tions. Special emphasis on medical applications of immu-nologic methods. Prerequisite: MICRO 441 or 447 or HUBIO 521P, which may be taken concurrently, or per-mission of instructor. Coordinator: Department of Microbiology and Immunology.

CONJ 475 Alcoholism: A Course for Medical > Students and Students in the Allied Health Sciences (2) Sp

Walker

For students at any level. Covers an introduction to the epidemiology, diagnostic strategies, natural history, physiologic effects, and treatment of alcohol-related disorders.

CONJ 503 Somatic Cell Genetics (2, max. 6) A Gartler, Martin, Pious

Introduction to the methodology and the biology of cul-tured somatic cells; analysis of heritable phenomena in somatic cells. A series of seminars emphasizes selected somatic cells. A series of seminars emphasizes selected original literature concerned with such topics as mutation cell fusion, and the mitotic cell cycle in mammalian cells. Required of all pathology graduate students. May be repeated for credit. Prerequisites: basic courses in biochemistry and genetics. Offered conjointly by the de-partments of Genetics. Pathology, and Pediatrics. Coor-dinator: Department of Pathology. (Offered even-num-bered years.)

CONJ 508 Ultrastructural Methods and Interpretation (6) S

Holbrook, Wight

Introduction to techniques used in transmission and scanning electron microscopy with emphasis on their practical application to biological tissues. Detailed analysis of cell architecture as it can be related to the functional behavior of cells. Cellular membranes, organelles, and processes in relation to their ultrastructure. Prerequisite: permission of instructor. Coordinator: Department of Pathology.

CONJ 509 Neurochemistry (3) W Stahl, Staff

Introductory neurochemistry course covering chemistry and metabolism, chemical pathology of disorders of lipid, amino acid, and carbohydrate metabolism, transport phenomena, neurotransmitters, memory, the visual system, and unique proteins of the central and peripheral nervous systems. This course is recommended for graduate students in the biological sciences and tor medical students. A general knowledge of biochemistry is strongly advised. Offered conjointly by the departments of Physiology and Biophysics, Medicine (Neurology), and Ophthalmology. Prerequisite: permission of instruc-tor. Coordinator: Department of Physiology and Bio-physics. (Offered alternate years; offered 1981-82.)

CONJ 511 Functional Neuroanatomy (4) W Smith

Lecture and laboratory course in neuroanatomy, the sequence being coordinated with P BIO 511. Laboratory includes some experience in histological techniques as well as conventional study of gross brain and slide mate-rial. Cat and monkey material, as well as human material, is provided. Offered conjointly by the departments of Biological Structure and of Physiology and Biophys-ics. Prerequisite: permission of instructor. Coordinator: Department of Physiology and Biophysics.

CONJ 525P Preventive Medicine in Primary Care (2) Sp

Leversee, Logerfo

Practice of health maintenance is discussed in a seminar format. Goal of course is to help students develop akills in evaluating the usefulness of current and future preventive measures. Coordinator: Department of Family Medicine.

CONJ 544P Medical Aspects of Sexual Problems (3)

Deisher, Hampson, James, McGuire

Lecture-discussion format, covering a body of informa-tion on dysfunctional sexual behavior. Topics include pathologic sexual behavior, common sexual dysfunc-tions, sexuality in the physically/mentally handicapped and aging. Treatment approach emphasized. Elective open to medical students. Term paper on some topic in the area of sexuality required for honors. Coordinator: Department of Psychiatry and Behavioral Sciences.

CONJ 550P Clinical Infectious Diseases (3) A Foy, Holmes

Important infectious diseases in the United States are re-viewed by systematic didactic presentation and by case study. Emphasis is placed on etiology, epidemiology, pathogenesis, clinical manifestations, laboratory diagnosis, treatment, and prevention. Permission required for graduate students in microbiology and pharmacology. Graduate students who have not had HUBIO 521P would have considerable difficulty with this course. Coordinator: Department of Medicine.

CONJ 560, 561 Tumor Biology (3,2) A,W I. Hellström, Nieman

Primarily designed for graduate students, but may also be taken by interested medical students. The general areas covered are the basis of carcinogenesis, tumor progres-sion and metastasis, virus-induced tumors, tumor genet-ics, and tumor immunology. Offered conjointly by the departments of Microbiology and Immunology and of Pa-thology. Required of all pathology graduate students. Prerequisite: permission of Department of Microbiology and Immunology. Coordinator: Department of Microbi-ology and Immunology. (Offered alternate years; offered 1981-82.)

CONJ 572 Advanced Immunology III---Immunopathology (2) W I. Hellström, K. E. Hellström

Lecture course for graduate students and upper-division undergraduates. Provides an in-depth treatment of basic immunology together with MICRO 570, 571. Covers the minimulogy ogener with immunological tissue inju-ries. Prerequisites: MICRO 447 (or equivalent), biochem-istry, genetics, and one quarter of general pathology. Of-fered on credit/bo credit basis only. Coordinator: Department of Microbiology and Immunology. (Offered every three years; offered 1981.)

CONJ 585 Surgical Anatomy (1-3, max. 12) AWSp

Guided dissection of selected regions, supplemented by onferences. Offered conjointly by the departments of Biological Structure and Surgery. Prerequisite: permis-sion of department. Coordinator: Department of Biologi-cal Structure.

CONJ 660P Clinical Research Center Clerkship (*, max. 24) AWSpS Ensinck

Students are introduced to a variety of clinical investigations that are being undertaken in the clinical research centers of Harborview Medical. Center and University Hospital. Through association with investigators from the clinical faculty, the students become familiar with experimental design and laboratory techniques used in clinical research. Each student is expected to prepare a scholarly treatise on a research problem. In addition, students at-tend meetings of the CRC Scientific Advisory Committee and Biomedical Sciences Review Committee, where crit-ical evaluation of research protocols and the ethical considerations of clinical investigation are considered. Prerequisites: basic curriculum and permission of instruc-culum and permission of instructor. Coordinator: Department of Medicine. (Six or twelve weeks.)

CONJ 677P Clinical Allergy (*, max. 12) AWSpS Van Arsdel (University Hospital)

Van Arsael (University Hospital) Clinic and office experience in diagnosing and managing allergic disease, clinical conferences, hospital rounds on hypersensitivity and immunology and allergy research seminars. Students taking four-week elective may have schinials. Students taking tod-week elective link have two half-days free for other electives. Student may elect a flexible program, depending on his interest, emphasizing adult or pediatric allergy with a balanced introduction to the entire field of clinical allergy. Offered conjointly by the departments of Pediatrics and Medicine. Prerequisite: PEDS 665P or MED 665P or FAMED 665P. Coordinator: Department of Medicine. (Four or six weeks, full time.)

CONJ 680P An Introduction to Detoxification and Rehabilitation Programs for Alcoholism (*, max. 16) W

Walker

Introduction to alcoholic detoxification and rehabilitation as they apply to the general physician, with supervised clinical experience in a variety of alcoholism treatment programs, accompanied by a core series of lectures and discussions. (Two, four, or six weeks.)

CONJ 690P Clinical Oncology Outpatient Elective (*) AWSp Figge, Gerdes, Jones, Moe, Smith

Figge, Geracs, Jones, Moe, Jonan One to five half-day oncology clinics, including surgical neoplasia, radiation oncology, head and neck tumor, GYN tumor, and medical oncology (Clinic 4). Student works with new patients and follows them through their evaluation and treatment and post-treatment follow-up. Evaluation and treatment and post-treatment follow-up. Emphasis is on multidisciplinary evaluation and care to provide as broad an exposure to clinical oncology as pos-sible. The student works closely with clinical faculty and arranges the number and combination of clinics desired. Prerequisite: permission of instructor. Coordinator: De-partment of Radiology.

FAMILY MEDICINE

Courses numbered with a P suffix are not graduate courses and are restricted to medical student enrollment only.

FAMED 499P Undergraduate Research (*) AWSpS English, C. K. Smith, Staff

Research activities are arranged with faculty members doing research in various areas related to family medidoing research in various areas related to family medi-cine. Areas include: clinical strategies, health-care deliv-ery, curriculum development at the undergraduate and residency levels, interdiscipinary activities, continuity of care, audit and retrieval strategies, and behavioral aspects of family practice. Research is generally clinically ori-ented and centered around patient care. Prerequisite: per-mission of instructor mission of instructor.

FAMED 501P Introduction to Family Medicine: Preceptorship (2½) AWSpS W. Phillips

Students are introduced to family medicine and its prac-Students are introduced to family medicine and its prec-tice through preceptorship assignments with practicing family physician clinical faculty, selected readings, di-rected observations, and monthly seminars. Each student spends one morning each week participating in the pre-ceptor's clinical practice and attends one seminar each month discussing readings and practice experiences. First-year (occasionally second-year) medical students.

FAMED 520P-521P-522P Ambulatory Care in Family Practice (2½-2½-2½) A,W,Sp Hadac, Smith

In the University or an affiliated teaching family practice the student works up and follows a small group of fami-lies. The student and preceptor are responsible for contin-uous and comprehensive care over a nine-month period. The student's experience will be the subject of a con-

ducted seminar series, and he or she should register for 523P-524P (Autumn and Winter quarters) when electing the continuity clerkship. Prerequisites: HUBIO 513P, control control of the second contr 522P. 535P.

FAMED 523P-524P Seminar—Topics in Family Medicine (1-1) A,W

Hadac. Smith Major topics in primary care and preventive medicine that arise in the course of treating patients in the elective Ambulatory Care in Family Practice are discussed. These include issues in patient care, office management, and community medicine. Limited to those students taking 520P-521P-522P. Prerequisites: HUBIO 513P, 522P, 535P.

FAMED 664P Basic Clerkship in Family Medicine (8) AWSp

Coggon

Emphasizes the clinical approach to the common and im-Emphasizes the clinical approach to the common and im-portant problems the family physician encounters. In-cludes regular seminars, readings, and daily patient workups under the supervision of family practice faculty and residents in the University's Affiliated Family Prac-tice Residency Network. Conditions commonly seen in practice are used to teach the family medicine approach to action the meansament including neuering and/min. to patient management, including preventive, epidemioto patient management, including preventive, epidemio-logical, and psychosocial aspects, as well as the use of the medical record. Students work closely with residents in an intensive experience stressing the family orientation to disease and the impact of illness on the patient's life. Prerequisite: third- and fourth-year medical student standing.(Four weeks, full time.)

FAMED 665P Community Clinical Clerkship in Family Medicine (12) AWSpS W. Phillips, Rosenblatt

Stresses the common and important clinical problems in family practice. Student functions as clinical clerk in a community clinical unit of the Department of Family Medicine, where he or she participates in care of as-signed patients, using office, hospital, home, and com-munity resources. Prerequisites: HUBIO 563P and MED 665P or permission. (Six weeks, full time.)

FAMED 675P Advanced Preceptorship in Family Medicine (*, max. 24) AWSpS Smilkstein

An opportunity for the student to apply and extend his or her clinical skills by working with a selected family phy-sician in an active practice. This course has three parts: sician in an active practice. Inis course has three parts: (1) in medically unserved areas; (2) in the United States; and (3) abroad. The experience is chosen with permission of the course faculty to fit the student's particular need in the late third year or during the fourth year. Student must have completed several general clinical clerkships previ-ously (e.g., MED 665P, PEDS 665P, SURG 665P, etc.).

HUMAN BIOLOGY

Courses numbered with a P suffix are not graduate courses and are restricted to medical student enrollment only. This sequence is required for all medical students. Other students may enroll by permission of the Assistant Dean for Curriculum, School of Medicine.

HUBIO 500P Medical Practice Preceptorship at WAMI Sites (1, max. 3) AWSp

Provides opportunity for first-year medical students to gain personal experience with, and insight into, medical gain personal experience with, and insight mice, includent practice situations. During this introductory period, the student is stationed with carefully selected clinical faculty members in their offices in accordance with the student's preference of discipline at the WAMI sites. Registration limited to first-year medical students at WAMI sites.

HUBIO 501P Human Biology Special Projects (*) AWSpS Loeser

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. Pri-marily intended for students in remedial or extended programs. Prerequisite: permission of assistant dean of curriculum.

HUBIO 510P Anatomy (Microscopic) (*, max. 3) A Eddy

Lectures and laboratory exercises designed to survey the microscopic structure of the tissues of the body. Correlates structural and functional concepts and relates

material with the content of 511, which is generally taken concurrently.

HUBIO 511P Anatomy (Gross) (*, max. 5) A Rosse

Development of the embryo from fertilization and implantation to full organ and organismal differentiation, with illustration of basic body plan. Important examples and etiology of faulty prenatal morphogenesis. Cell dif-ferentiation leading to a study of basic histology. Developmental and morphological aspects of hemopoietic system.

HUBIO 512P Mechanisms of Cellular Physiology (*, max. 6) A Detwiler

Physiological mechanisms. Membrane transport, epithe-lial transport, excitability, sensory receptors, junctional transmission, contractility, energy metabolism, hormonal mechanism, mechanisms of homeostasis control, integration of mechanisms, neural and hormonal-spinal reflex. autonomic nervous system, endocrines, gastrointestinal secretions and motility, temperature regulation.

HUBIO 513P Introduction to Clinical Medicine (2)

C. K. Smith

Instruction in communication skills and interview techniques to form the basis for the eventual doctor-patient relationship and for the skill of communicating with pa-tients. The patient profile is obtained, and the concept of problem identification is introduced.

HUBIO 514P Molecular and Cellular Biology I (*, max. 4) A

B. Shapiro Coordinated course covering classical molecular and cellular biochemistry, cellular physiology, and molecular genetics. Metabolic interrelationships as they occur in the individual are stressed and related to disturbances in dis-

HUBIO 515P The Ages of Man (*, max. 4) A Shepard

Physical and psychological development of the whole in-dividual from birth through old age, including neonatal adaptation, nutrition, and developmental milestones in childhood and adolescence, degenerative problems of senescence.

HUBIO 520P Cell and Tissue Response to Injury -(*, max. 7) W Schwartz

Patterns of cell and tissue response to injury. Immunity and immune responses. Hypersensitivity, homograft re-action and autoimmune response. Immunohematology. Morphological, functional, and kinetic aspects of leucocytes and immunocytes. Principles of neoplasia.

HUBIO 521P Natural History of Infectious Diseases and Chemotherapy (*, max. 7) W Falkow

Pathogenesis and immunity of infectious diseases, naturainogenesis and infiniting of infectious diseases, had rail barriers. Microbiology, epidemiology, clinical mani-festations and control of representative bacterial, fungal, parasitic, and viral infectious diseases. Chemo-therapeutics and principles of chemotherapy. Steriliza-tion, principles of asepsis, nosocomial and iatrogenic in-fection presentation fections and their prevention.

HUBIO 522P Introduction to Clinical Medicine (2)

w C.K.Smith

Continuation of communication skills especially as related to; and dealing with, affective material. The medical history is introduced and instruction in data collection begins. There is some experience with patients in con-ducting a medical interview for the purpose of obtaining the medical history and patient profile.

HUBIO 523P System of Human Behavior I (*, max. 3) W Carr

Carr Overview of conceptual systems and models of behavior, normality and abnormality, environment and social learning, conditioning, learning in the autonomic nervous system, catecholamines and behavior, illness behavior, feelings, emotion and cognition, physician-patient inter-action and disease and techniques of behavior change.

HUBIO 524P Molecular and Cellular Biology II (*, max. 2) W M. Gordon

Continuation of 514P.

HUBIO 530P Epidemiology (*, max. 2) Sp Peterson

Introduction to statistical inference and basic concepts of variance and statistical significances as applied to prob-lems in human biology and medicine; statistical and epidemiological health information systems and measurements of morbidity and mortality; computer usefulness, potentialities and limitations; epidemiological approaches to infectious and noninfectious diseases. Interaction of agent, host, and environment in causation and transmission

HUBIO 531P, Head, Neck, Ear, Nose, and Throat (*, max. 5½) Sp D. Graney

Gross anatomy (including skull, pharynx, and larynx). Audition and balance. Physiology and clinical evalua-tion. Maxillofacial disorders, diseases of nasal passages, nasopharynx and oropharynx, accessory sinuses. Physical examination.

HUBIO 532P Nervous System (*, max. 8) Sp J. Sundsten

Integrated approach to: normal structure and function of the nervous system, including the eye. Basic neuropa-thology and diseases of the eye. Neuropharmacology with emphasis on modes of action and classes of drugs. Clinical evaluation of the nervous system and eye with il-Instrative examples of the manifestations of specific and important neurological lesions, and common and rare, but important and reversible, conditions.

HUBIO 534P Endocrine System (*, max. 4) Sp F. Wood

Gross and microscopic anatomy of the endocrine system. Principles of endocrine physiology as illustrated by model systems (extending the concepts of homeostasis, control and feedback systems previously learned), hormonal biosynthesis and important pathophysiologic states. The endocrine integration of metabolism.

HUBIO 535P Introduction to Clinical Medicine (3) Sp Clark

Screening physical examination is taught. Further experi-ence and instruction in the medical history are offered. The problem-oriented write-up is an additional objective of this course.

HUBIO 540P Cardiovascular Respiratory System (*, max. 10) A E. Feigl

Anatomy of heart, vessels, and lungs; physiology of heart, circulation, respiration (including gas transport); major pathological disorders of the heart, great vessels, and lungs; physical examination of the chest and cardiovascular system.

HUBIO 541P Gastro-Intestinal System (*. max. 6)

Silverstein

Anatomy of the gastrointestinal system; physiology and pathology of digestion and hepatic function; and physical and laboratory examination.

HUBIO 542P Introduction to Clinical Medicine (2) A

Goodell

Advanced instruction in interview technique, history taking, and physical examination, with emphasis on detection of abnormalities.

HUBIO 543P Principles of Pharmacology I (31/2) A Vincenzi

General principles of pharmacology and autonomic and cardiovascular pharmacology.

HUBIO 550P Introduction to Clinical Medicine (6) w

Goodell

Continuation of 542 with emphasis on identification of problems and correlation of findings with pathophysiological mechanisms.

HUBIO 551P Skin System (*, max. 2) W Odland

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 hyper-sensitivity), and neoplastic diseases.

HUBIO 552P Reproductive Biology (*, max. 5) W Rlandau

The microscopic anatomy, physiology (including endo-crine physiology), pathology, and physical diagnosis of the reproductive system; gametogenesis, gamete transport, fertilization, implantation, placental develop-ment, ovulation and its control, menarche and menstruation, the physiology of pregnancy and labor, the gynecologic examination, and gynecologic pathology.

HUBIO 553P Musculoskeletal System (*, max, 5) W Greenlee

Gross, surface, applied, and x-ray anatomy of system, including entire spine but excluding head and neck. His-tology of bone, cartilage, tendon-myotendinal junction and joints. Musculoskeletal trauma and healing. Pathology and clinical manifestations of other degenerative, in-flammatory, metabolic, nutritional, and congenital disor-ders. Physical examination.

HUBIO 554P Genetics (*, max. 2) W

Stamatoyannopoulos Review of basic genetic principles in the context of their applications in clinical medicine. Topics discussed include 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 (pharmacogenetics); and prevention and treatment of genetic diseases, including prenatal diagnosis and population screening.

HUBIO 555P Medicine, Health, and Society (*, max. 4) W F. Connell

Community medicine and environmental health. Organizational aspects of medical care and public health. Socioeconomic factors in health-care delivery and environmental health.

HUBIO 560P Introduction to Clinical Medicine (6)

Sp Goodell

Continuation of 550P. Introduction to clinical and laboratory diagnosis.

HUBIO 561P Hematology (*, max. 4) Sp McArthur

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. Physiology, rather than minute details of individual disease, is stressed.

HUBIO 562P Urinary System (*, max. 6) Sp Cutler

Physiology, pathology, and examination, including radi-ology, of the lower urinary tract; kidney microscopic anatomy; physiology of the kidney, including fluid and diuretic therapy; pathology, microbiology, and immunol-ogy of renal disease with clinical examples; physical and laboratory examination.

HUBIO 563P System of Human Behavior II (3½) Sp M. Scher

Provides the student with a basic knowledge of clinical psychopathology, its etiology, objective clinical descrip-tion, and methods of treatment. Students obtain a working knowledge of the cognitive, affective, biologic, and social factors that determine an econtribute to behavioral disorders and diseased states; the processes of diagnosis and problem definition and selection of appropriate modes of intervention and behavioral change.

HUBIO 564P Principles of Pharmacology II (3½) Sp Horita

Lectures and conferences on drugs that act on the central Declines and connectices on adapt and on the connecting nervous system. Emphasis on physiological and biochemical mechanisms, with consideration of thera-peutic and adverse effects. Prerequisite: permission of instructor.

HUBIO 565P Saturday Morning Clinical Conferences (3-9) AWSp

Featherstone

Didactic seminar sessions covering the basic content of the basic science and clinical curriculum. The lecturethe basic science and clinical curriculum. The lecture-seminars, held every Saturday morning from 8:30 to noon, are problem-oriented and include a question-and-answer period. All third- and fourth-year medical stu-dents are excused from their clerkships during these hours, because they are expected to attend the seminars. Prerequisite: completion of human biology series.

LABORATORY MEDICINE

Courses numbered with a P suffix are not graduate courses and are restricted to medical student enrollment only

LAB M 321 Medical Technology: Introductory Clinical Hematology (5) W Behrens, Hamernyik, LeCrone

Lecture-laboratory coverage of the theoretical and practi-cal concepts associated with cellular morphology, instru-mentation, quality control, and selected hematological diagnostic studies. Prerequisite: permission of instructor.

LAB M 322 Medical Technology: Introductory **Clinical Chemistry (4) A**

LeCrone, Szabo

Lecture and laboratory covering the theoretical and prac-tical concepts associated with testing procedures per-formed in clinical chemistry. Prerequisite: permission of instructor.

LAB M 418 Topics in Clinical Chemistry (4) Sp Clayson, Gavin, Hamernyik, Szabo

Lecture and laboratory exercises covering fundamentals of instrumentation, methodology, and quality control in the clinical chemistry laboratory. Prerequisite: 322.

LAB M 419 Clinical Coagulation (3) S

Behrens, Gavin of coagulation with inclusion of selected diagnostic procedures. Prerequisite: permission.

LAB M 420 Clinical Microscopy (3) S

Hamernyik

Lecture and laboratory covering urinalysis testing pro-cedures and associated disease entities. Prerequisite: permission of instructor.

LAB M 421 Medical Microbiology (1 or 5) S

Gavin, McGonagle One-quarter lecture and laboratory designed to prepare medical technology students for further training in a clin-ical microbiology laboratory. Prerequisite: permission of instructor

LAB M 422 Topics in Hematology (2) S Behrens

Advanced didactic coverage of topics relating to theoreti-cal concepts and pathology in hematology. Prerequisite: permission of instructor.

LAB M 423 Clinical Chemistry (10) AW Szabo, Staff

Stabo, Staff Clinical testing related to protein and amino acid determi-nations, pancreatic functions and intestinal absorption, renal and liver function, enzymes, electrolytes, and acid-base balance, lipids, toxicology, and endocrinology. Pre-requisite: permission of instructor.

LAB M 424 Clinical Microbiology (8) AW

LAB M 424 Clinical Microsology (8) AW McGonagle, Staff Clinical review of general techniques, study of clinically significant bacteria, including specific methods of specimen examination, fluorescence microscopy, and testing for antibiotic susceptibility. Prerequisite: permission of instructor.

LAB M 425 Clinical Hematology (8) AW Behrens, Staff

Clinical coverage of automated and manual cell counting, cellular morphology, and testing procedures related to red and white cell disorders. Prerequisite: permission of instructor.

LAB M 426 Clinical Immunohematology (6) AW

Hamernyik, Staff Clinical study of immunohematology of the red cells and hemagglutination techniques. Prerequisite: permission of instructor.

LAB M 427 Selected Studies in Laboratory Medicine (15) Sp

Behrens, Clayson, Gavin, Hamernyik, LeCrone, McGonagle, Szabo

Selected study in either one of the major disciplines of laboratory medicine, in all major disciplines of this field; or pursuance of a clinical research problem. Prerequisite: permission.

LAB M 499 Undergraduate Research (*) AWSpS Specific project in clinical laboratory investigation. Of-

fered on credit/no credit basis only. Prerequisite: permission of department.

LAB M 501 Clinical Laboratory Diagnosis (3) W Beniamin

Orientation to role of clinical laboratory in diagnostic medicine. Emphasis on appropriate test selection, inter-pretation, principles, problems, and limitations. Lecturediscussion with illustrative case presentations and dem-onstrations. For third- and fourth-year medical students and graduate students. Prerequisite: permission of in-structor. Recommended: HUBIO 560P or 563P.

LAB M 502 Laboratory Medicine Seminar (1, max. 6) AWSp

Detter, Staff

Current topics in the field of laboratory medicine. Open to graduate students in laboratory medicine and other medical sciences. Offered on credit/no credit basis only.

LAB M 510 Clinical Chemistry Research Conference (1, max. 6) AWSp

Prerequisite: permission of instructor.

Kenny, Staff

Current projects under research and development in clinical chemistry and immunology. Open to graduate stu-dents in laboratory medicine and other medical sciences. Offered on credit/no credit basis only. Prerequisite: permission of instructor.

LAB M 520 Seminar in Organization and Management in Laboratory Medicine (3) Sp

Strandjord, Staff

Core course for the degree Master of Laboratory Medi-cine. Includes a detailed consideration of federal and state regulations concerning clinical laboratories and a discussion of managerial problems commonly encountered in laboratory medicine, such as quality control tech-niques, personnel selection and management, data prorecessing, equipment purchasing and maintenance, etc. Prerequisite: graduate student standing in laboratory medicine or permission of instructor. (Offered odd-numbered years.)

LAB M 521 Advanced Laboratory Hematology (1, max. 2) AW

Detter, Kadin

Lecture demonstrations of laboratory diagnosis in clinical hematology. Detailed description of laboratory instru-mentation, special cytochemical and immunologic anal-yses for analysis of complex diagnostic problems in yses for analysis of complex diagnostic problems in leukemia, lymphoma, gammopathies, and red cell disor-ders. Emphasis on clinicopathological correlation. For physicians and laboratory medicine graduate students with special interest in diagnostic clinical hematology. Students required to read literature in preparation for the lectures. Prerequisites: graduate or postgraduate standing and permission of instructor.

LAB M 522 Hematopathology Seminar (1, max. 3) AWSp Kadin

Biweekly seminar on diagnosis of disorders affecting bone marrow, lymph nodes, thymus, and spleen. Empha-sis on current clinical material. Morphologic, cytochemi-cal, and immunologic criteria are applied to each case. Clinicopathologic correlation with prognosis and therapy are determined. Current controversial topics in hematoare determined. Current controversial topics in hemato-pathology are discussed by local and guest lecturers. Reading in preparation for seminar is recommended. Of-fered jointly with PATH 522. Designed for graduate and postgraduate students. Prerequisite: permission of instructor.

LAB M 590P Research Projects in Laboratory Medicine (*) AWSpS Schmer

Schner Six or ten weeks to investigate one problem in a labora-tory medicine subspecialty area. Topics are assigned by staff. Designed to demonstrate methods, tools, princi-ples, and particularly problem-solving nature of labora-tory investigations. Entry card required.

LAB M 596 Clinical Chemistry Seminar (1) AWSp Kaplan

Conferences on research and development in clinical chemistry. For postdoctorals in clinical chemistry and graduate students. May be repeated for credit. Prerequisite: permission of instructor.

LAB M 677P **Clinical Electroencephalography** (*, max. 12) AWSpS Chatrian, Wilkus

For third- and fourth-year students who desire to acquire

SCHOOL OF MEDICINE

familiarity with the techniques, interpretive criteria, and clinical applications of electroencephalography. Prereq-uisite: MED 680P. Entry card required.

LAB M 680P Clinical Laboratory Testing: Methods and Interpretation (*) AWSpS Detter

Methods, tools, and principles used in the modern clini-cal laboratory. Choice of one to three specialty areas, including chemistry, coagulation, computers, hematol-ogy, immunology, microbiology, and virology. Investi-gates the methodologies in the specialty areas, identifies their limitations, and explores their usefulness in clinical medicine. Entry card required.

LAB M 700 Master's Thesis (*) AWSpS Entry card required.

MEDICAL PRACTICE

MED P 401 Medical Practice Preceptorship (1) AWSpS Loes

Losser Provides opportunity for first- and second-year medical students to gain personal experience with, and insight into, the medical practice situations in the departments of Medicine and Pediatrics. During this introductory period, the student is stationed with carefully selected clinical faculty members in their offices. Contact the Student Scheduling Coordinator (registrar) in the Dean's office.

MEDICINE

Courses numbered with a P suffix are not graduate courses and are restricted to medical student enrollment only.

MED 498 Undergraduate Thesis (*) AWSpS For medical students. Prerequisite: permission of department.

MED 499 Undergraduate Research (*) AWSpS Case studies, with laboratory research. For medical stu-dents. Prerequisite: permission of department.

MED 531P Human Genetics (*) AWSp

Hall, Moulsky Weekly seminar dealing with a variety of topics in medi-cal genetics given by staff of the Division of Medical Genetics and related departments and divisions. Open to medical students with a good foundation in genetics.

MED 533P Clinical Endocrinology (2) Sp Wood

Emphasis on the most major and dependable symptoms, signs, laboratory tests, and therapy for clinical endo-crinopathies. Patient illustrated.

MED 534P Clinical Respiratory Physiology (2) AWSp

Culver, Hlastala, Hudson, Lakshminarayan Curver, Htastala, Hudson, Lakshmurarayan Intermediate-level course in respiratory physiology. Ba-sic physiology, pulmonary function testing, applied physiology to clinical problems, and review of related literature. Covers clinical respiratory physiology in three sequential quarters, but students may register for any sin-gle quarter if desired. Prerequisite: permission of instruc-tor. (Twelve weeks.)

MED 548P Genetics, Medicine, and Society (1) WSp Motulsky, Omenn

Students and faculty discuss in lectures and seminars the aspects of genetics relevant to medicine and society. Pre-requisite: HUBIO 562P.

MED 604P Clinical Preceptorship in Internal Medicine-Bremerton (8) AWSpS Hamon

Hanon Working closely with primary-care physicians, the stu-dent is exposed to the private practice of internal medi-cine in a small community. Operating on a one-to-one basis with an internist (tutor), the student evaluates and manages inpatients and outpatients on a primary care, consultative, and emergency basis. In addition to varied subspecialty exposure through his tutors, the student has supplemental teaching sessions. The student assumes re-sponsibility for all aspects of patient care in parallel with his interest and ability. Prerequisite: 665P. (Four weeks, full time.) full time.)

MED 640P Dermatology Clinic (*, max. 5) AWSpS

Odland

Students attend dermatology clinic on Monday mornings and Thursday afternoons for twelve weeks. Two half-days per week. Prerequisite: 665P.

MED 641P Clinical Gastroenterology (8) AWSp Gelfand (Virgina Mason Hospital and Mason Clinic) Combined inpatient-outpatient elective in clinical gastro-enterology, which includes practical experience in GI en-doscopy and liver biopsy. Directed tutorial work. Special arrangements can be made for students with special inter-outpatient of the Gastrowards (Stuffers). ests. Prerequisite: 665P. (Four weeks, full time.)

MED 642P Clinical Oncology (*, max. 24) AWSpS Buckner, Thomas (Fred Hutchinson Cancer Research Center)

Students are responsible for the work-ups and daily care of patients no receiving marrow transplants, high-dose chemotherapy or immunotherapy on an intensive-care research ward. Emphasis is on the management and research ward. Emphasis is on the management and supportive care of patients with pancytopenia and im-munosuppression, transplantation biology, cancer chemotherapy, and infectious disease problems. Experi-ence in clinical oncology and hematology is a part of the rotation with clinic experience included. Students func-tion as the primary physicians for assigned patients under supervision of the fellows or residents on the wards. Prerequisite: 665P. (Four, six, or twelve weeks, full time.)

MED 643P Clerkship in Clinical Pharmacology (*, max. 12) AWSpS Aagaard

Auguard experience is provided in the diagnosis and treatment of patients with adverse drug reactions, drug interactions, or other significant therapeutic problems, utilizing outpatient clinics and inpatient care at University Hospital. Emphasis on special problems in clinical burgers and the adverse drug reaction of the adverse drug reaction. pharmacology and therapeutics presented by patients in the clinic or in the hospital. Reading, seminars, and pre-ceptorial sessions are the method of instruction. Monday ceptorial sessions are the method of instruction. Monday afternoons and/or Friday mornings are devoted to outpa-tient clinic sessions, with the other half day(s) devoted to the library. Students may register for one or two days per week. Remainder of time is filled with other part-time electives. Prerequisite: good standing as a third- or fourth-year medical student in a United States medical otheral (Site medice full time). school. (Six weeks, full time.)

MED 645P Clinical Dermatology, Spokane (8) Sp Odland

Participation in clinical dermatology in private offices of four Spokane dermatologists who are on the University of Washington clinical faculty. Supervised patient care and observation for one week in each office for a total of and over the set of th hour each week with staff. Attendance at conjoint noon teaching conferences, Sacred Heart and Deaconess Hos-pitals. Prerequisite: 665P. (Limit: two students, four weeks.)

MED 649P Application of Genetic Principles to Medicine (*) AWSpS Hall, Motulsky, Stamatoyannopoulos Ward rounds, clinic, and seminar discussions of patients

and topics in clinical genetics. Students must be available all day Mondays or Tuesdays to attend a medical genetics clinic and be available for ward rounds Wednesday afternoons. Course includes taking pedigrees from patients, examining patients and families with genetic diseases, and discussing cases with faculty. Prerequisite: 665P.

MED 665P Clinical Clerkships (*, max. 24)

AWSpS Brown, Dale, Emlen, Gilliland, Goodell, Larson,

Leonard. Turck

Hospital patients are assigned to each student for a com-plete work-up. Daily ward rounds; weekly lectures, clin-ics, and conferences. Students must register for HUBIO 565P (Saturday morning clinical conference) concur-rently. Prerequisites: HUBIO 563P; third- and fourth-unce the detect A written encodencies for this courte is year students. A written examination for this course is given annually. Students are required to pass this exami-nation to receive a passing grade. (Eight weeks, full time. Limit: forty-nine students per term.)

MED 666P Clinical Clerkship in Internal Medicino—WAMI (12) AWSpS Wallace

Advanced clinical preceptorship in internal medicine in three small urban communities in Washington and Mon-

tana, under the WAMI experiment in medical education. The student has a supervised and structured experience in the student has a supervised and structured expenditor in dealing with situations commonly encountered by the practicing internist. Continuity of care and the relation-ship between care given in the ambulatory setting and in the hospital, as well as by other community health services, is emphasized. Prerequisite: 665P. (Six weeks, full time. Limit: six students.)

MED 667P Advanced Medicine Clerkship (8) Dale. Turck

Students participate in care of acutely ill hospitalized pa-tients under supervision of internal medicine residents. Instruction by various medical specialists provides indepth understanding of the pathophysiology and manage-ment of major diseases affecting adult patients. Prerequi-site: 665P. Third- and fourth-year medical students only. (Four weeks, full time. Limit; twelve students.)

MED 678P Clinical Dermatology (8) AWSpS **Odland** (University Hospital)

Participants in dermatology clinics and inpatient consul-tations at University Hospital, Harborview Medical Center, United States Public Health Service Hospital, Veterans Administration Hospital, and Children's Ortho-pedic Hospital and Medical Center. Journal club and clinical conferences each week with entire staff. A con-tinuing series of teaching seminars and weekly der-matopathology conferences. Prerequisite: 665P. (Four weeks.)

MED 679P Clinical Gastroenterology (*, max. 12) AWSpS

Volwiler (University Hospital) Participation in consulting ward rounds, procedures, conferences, and selected clinics with full-time divisional staff at University, Veterans Administration, and United States Public Health Service hospitals and at Harborview Medical Center, plus directed tutorial work. Prerequisite: 665P. (Four or six weeks, full time.)

MED 680P Rheumatology (8) AWSp

Mannik

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 Hospital and the Harborview Medical Center. Emphasis on concepts in whether the state of the state o pathophysiology, diagnosis, and treatment of these dis-eases. In addition to patient contact, reading, seminars, and preceptorial sessions are the methods of instruction. Prerequisite: 665P.

MED 681P Advanced Clinical Endocrinology

(*, max. 24) AWSpS Paulsen (United States Public Health Service Hospital) Full-time inpatient-outpatient clerkship in clinical endo-crinology at United States Public Health Service Hospital. Library review on selected topics in the field and participation in medical clinical research problems op-tional during this clerkship. Prerequisite: 665P. (Four, six, or twelve weeks.)

MED 682P Clinical Cardiology and Electrocardiography (8) AWSpS Bruce (University Hospital), Cobb (Harborview Medical Center), Eiriksson (Boise Veterans Administration Hospital), McNamara (Madigan Hospital), Preston (United States Public Health Service Hospital) Clerkship in clinical cardiology-combined inpatient-out-patient assignments, ECG interpretation. At Harborview Medical Center and Veterans Administration Hospital special emphasis is placed on operation of an acute cardiac-care unit. Prerequisite: 665P. (Four weeks.)

MED 683P Clinical Respiratory Disease and Pulmonary Physiology (8 or 12) AWSpS Culver (University Hospital), Hudson (Harborview Medical Center), Huseby (United States Public Health Service Hospital), Lakshminarayan (Veterans Administration Hospital) Dualace discrete discrete and pulmon

Auministration riospital) Training in respiratory disease diagnosis and pulmonary therapy, with special emphasis on cardiopulmonary func-tion testing and interpretation. Inpatient and outpatient teaching rounds, conferences, and basic science integra-tion. Prerequisite: 665P. (Four weeks.)

MED 684P Clinical Hematology/Oncology (*, max. 24) AWSpS Finch (University Hospital), Harker (Harborview Medical Center), Adamson Veterans Administration Hospital), Thompson (United States Public Health Service Hospital)

Outpatient and inpatient experience with hematologic/oncologic disorders. The elective includes teaching Prerequisite: 665P. (Four weeks.)

MED 685P Clinical Genetics (*, max. 12) AWSpS

MED 6851° Clinical Genetics (*, itaa, i.e. ray ray of Hall, Motulsky, Stamatoyannopoulos Intensive study of genetic principles required in clinical work. May work in depth on one or more clinical prob-lems or get broader experience in working up a variety of clinical cases. Prerequisite: 665P. (Six weeks.)

MED 686P Clinical Neurology (*, max. 8) AWSpS Swanson (University Hospital)

Inpatient and outpatient experience in clinical neurology at University Hospital, Veterans Administration Hospi-tal, United States Public Health Service Hospital, Har-borview Medical Center, Virginia Mason Hospital, or Children's Orthopedic Hospital and Medical Center. Stu-dents used algorithm with and Churdren's Orthopedic Hospital and Medical Center. Stu-dents work closely with staff, work-up and present pa-tients on attending rounds, attend clinical conferences, and become familiar with diagnostic neurological pro-cedures. Students from all participating hospitals assem-ble twice weekly for seminars with the neurology staff on topics in clinical neurology. In addition, students attend one or more clinics per week. For students taking a linear muster an achieve autorities attendances in the quarter, an exclusively outpatient experience can be arranged. (Four weeks; limit: twelve students, eight students during summer.)

MED 687P Ambulatory Medicine Elective (*, max. 12) AWSpS Clark (Harborview Medical Center), Featherstone

(University Hospital)

Students acquire knowledge and skill in dealing with am-bulatory patients with problems commonly encountered in the office practice of internal medicine. By assuming first-line responsibility for patient care under the supervi-sion of an attending physician, students become ac-quainted with the demands that long-term personal medi-cal care places on the internist. Students must register for a minimum of two half-days per week to a maximum of five half-days per week (except with the permission of the instructor) in the general internal medicine clinics ei-ther at University Hospital (mornings and Monday after-noons) or at Harborview Medical Center (afternoons). M.D.-Ph.D. students may register for one half-day per week providing the M.D.-Ph.D. students take two or FAMED 665P. (Twelve weeks. Enrollment limits: five at University Hospital, eight at Harborview Medical Cen-Students acquire knowledge and skill in dealing with am-University Hospital, eight at Harborview Medical Center.)

MED 688P Ward Medicine Subinternship

MED ossP ward Medicine Subinternship (*, max. 24) AWSpS Goodell (Swedish Hospital), Leonard (United States Public Health Service Hospital), McNamara (Madigan Hospital), Turck (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: 665P. (Six weeks.)

MED 689P Clinical Infectious Diseases (*, max. 12) AWSpS

AWSpS Kirby (University Hospital) Students participate in the consulting service throughout the hospital, attend daily plate rounds, conferences, and seminars. Prerequisite: 665P. (Two, four, or six weeks.) *Turck* (Harborview Medical Center), *Holmes* (United States Public Health Service Hospital), *Plorde* (Veterans Administration Userial) Administration Hospital)

Students participate in the consulting service throughout the hospital. They are given the opportunity to learn the microbiological aspects of infectious diseases through the clinical laboratories. Prerequisite: 665P. (Four weeks.)

MED 690P Cardiology Subinternship (8) AWSpS

Students act in the capacity of interns on the white service under the supervision of house officer. Prerequisite: 665P. (Four weeks.)

MED 692P Clinical Endocrinology and Metabolism (*, max. 12) AWSpS Goodner (Harborview Medical Center), McCowen

(Madigan Hospital), Wood (University Hospital) Participation in inpatient rounds, conferences, and outparancipation in inpatient robusts, contractices, and outpet tient clinics at University Hospital and Harborview Medi-cal Center. Directed tutorial work in selected aspects of endocrinology and metabolism. Full-time or part-time (outpatient clinic only) scheduling may be arranged with instructor. The endocrine clinic sees 600-800 patients per month in both outpatient clinic and inpatient consult tion. One student at a time may participate. Flexible schedule. (Two to six weeks, full time.) Prerequisite: 665P

MED 693P Nephrology and Fluid Balance (8) AWSpS

Outler (Harborview Medical Center), Scribner (University Hospital), Sherrard (Veterans Administration Hospital)

Hospital) Nephrology/fluid balance clerkship at University Hospi-tal, Harborview Medical Center, Veterans Administra-tion Hospital. Students see clinical nephrologic problems under close supervision, participate in nephrology and transplant rounds, see consults with renal fellow and at-tending, and work-up patients in renal clinics. Students also attend a series of seminars throughout the clerkship in which clerks at all four hospitals participate. Prerequi-eirse 6559 (Four weeks.) site: 665P. (Four weeks.)

MED 694P Metabolism and Diabetes (4 or 8) AWSp

AWSp Nielsen (Virginia Mason Clinic) In addition to the clinical evaluation of patients with en-docrine disorders, this elective period provides op-portunity for the student to become actively involved in the treatment of metabolic disorders, with particular emphasis on the education of the diabetic and on the control of his disorder. Open only to fourth-year medical stu-dents. Prerequisite: 665P. (Two or four weeks, full time.)

MED 695P Clinical Aspects of Aging (7) AWSp Pribble

On-the-scene training and experience in the special medi-cal and social problems of old age are offered in a variety of actual community situations ranging from public hospitals to private nursing and retirement homes. Local physicians devoted to delivery of health care to this group with its special problems are used as preceptors. This is an opportunity for the student to incisively examine one's an opportunity for the student to incisively examine one's own approach to chronic illness and to the dying patient. Students work-up and follow individual diagnostic, ther-apeutic, and social problems. Prerequisite: 665P. (Twelve weeks, one morning per week.)

MED 697P Medicine Special Electives (*, max. 24) AWSpS Dale

By specific arrangement, for qualified students, special clerkship, externship, or research opportunities can at times be made available at institutions other than the Unitimes be made available at institutions other than the Uni-versity of Washington. The faculty can advise students of possible opportunities. The department is particularly in-terested in placing students in a preceptorship in Hawaii. Students wishing to elect this course should obtain from the Dean's office a "Special Assignment" form at least one month before preregistration. Prerequisite: permis-sion of department. (Six or twelve weeks.)

MICROBIOLOGY AND **IMMUNOLOGY**

MICRO 101 The Microbial World (5) W Lara

Lara For majors in the social sciences and humanities, but open to premajors and to science majors other than biolo-gists. Activities of bacteria, viruses, or other micro-orga-nisms and their interactions with humans and their envi-ronment are examined and a number of major biological concepts developed. Topic material and inclusion of a laboratory vary with individual instructors.

MICRO 301 General Microbiology (3) AWSpS Nester, Staff One-quarter lecture course designed to acquaint students

in the biological and physical sciences with micro-orga-nisms and their activities. The understanding of basic bi-ological concepts is elucidated through investigations of ological concepts is electedated infoogn investigations of micro-organisms. Topics include microbial cell structure and function, metabolism, microbial genetics, and the role of microorganisms in disease, immunity, and other selected applied areas. Prerequisite: two quarters of chemistry; a course in biological science is recom-mended. mended

MICRO 302 General Microbiology Laboratory (2) AWSpS Bicknell, Laxson, Nester

Laboratory course primarily for students taking 301. The laboratory exercises cover a variety of microbiological

techniques, with experiments designed to illustrate major concepts of microbiology, virology, and immunology. No auditors. Prerequisite: concurrent or previous registration in 301 or permission of instructor.

MICRO 319 Laboratory Techniques in Microbiology (1) AWSp Parkhurst

Parkhurst Self-instruction, self-scheduled laboratory in which the student performs the techniques fundamental to microbi-ology. Instructional material is presented in visual, au-diovisual, and written form. Not recommended for those who have already taken a laboratory in microbiology. Of-fered on credit/no credit basis only. Prerequisite: prior or concurrent enrollment in a microbiology course and/or permission of instructor.

MICRO 320 Media Preparation (2) AWSpS Parkhurs

Practical work in the preparation of culture media. Nutri-tional requirements of micro-organisms and sterilization methods are considered. For students expecting to enter vocations involving laboratory work with bacteria. Of-fered on credit/no credit basis only. Prerequisites: 301 and 302, or equivalent, and permission of instructor.

MICRO 322 Applied Clinical Microbiology (5) AWSpS

Schoenknecht

Directical experience in a clinical or public health labora-tory; fifteen hours per week. For students majoring in medical microbiology. Three quarters advance sign-up in G303 Health Sciences recommended. Applicants are se-lected by interview. Prerequisites: 443 and permission of instructor. (Limit: three students.)

MICRO 351 Introduction to Medical Microbiology (3) Sp Évans

One-quarter course designed for students who have a background in biology and whose goal is a career in one of the medical or associated sciences. Focus on the microbiology of medically important organisms, epidemiology, mechanisms of pathogenicity, and immune host re-sponse. Provides a background of understanding that will be supplemented during subsequent professional training. Students who need a laboratory to fulfill their degree requirements should register concurrently in 302 offer requirements should register concurrently in 302. Other students are encouraged to take 319 if 302 is full. Be-cause 351 is a modification of 301, students who take both 301 and 351 receive credit and grade in 351 only. Prerequisite: BIOL 210 or equivalent.

MICRO 400 Fundamentals of General

Microbiology (3) A Survey of the microbial world, metabolism, biosynthesis, regulation, growth, structure, and function. Required for students majoring in microbiology; recommended for students majoring in biology. Prerequisites: BIOL 210, 211, 212 and two quarters of organic chemistry.

MICRO 401 Fundamentals of General Microbiology (3) W

Structure, biochemical properties, and genetics of the major groups of procaryotes, and a survey of the general properties of viruses. Required for students majoring in microbiology, recommended for students majoring in bi-ology. Prerequisite: 400 or permission of instructor.

MICRO 402 Fundamentals of General

Microbiology Laboratory (3) AW

Laboratory course taken concurrently by students taking 400 or 401. Isolation by enrichment culture techniques of a wide selection of nonpathogenic bacteria. The isolates are identified, and exercises are performed to illustrate the kinetics of growth, quantitation of micro-organisms, genetic transfer in bacteria and yeast, and isolation of bacteriophage. No auditors. Prerequisites: BIOL 210, 211, 212, and two quarters of organic chemistry; previ-ous or concurrent 400, or permission of instructor.

UCONJ 420 Biological Safety Practices (1) A For course description, see Interschool or Intercollege Programs.

MICRO 431 Methods in Microbiology (2) Sp Bicknell, Groman

Laboratory exercises emphasizing methods used in mi-crobial metabolism, virology, and ecology. Limited to microbiology majors. No auditors. Prerequisites: 400, 401.402.

MICRO 432 Mechanisms of DNA Exchange in Procaryotes (2) Sp Crosa, Falkow, Groman, Nester Emphasizes mechanisms of DNA exchange in procary-

otic organisms, particularly those functioning in bacteria. Prerequisite; 400 or BIOL 210 or equivalent.

MICRO 435 Microbial Ecology (3) W Staley

Consideration of the various roles that micro-organisms, particularly bacteria and bluegreens, play in environmental processes. The interrelationships among micro-orga-nisms and the effects of the physical, chemical, and bio-logical properties of their environment are discussed and assessed. Prerequisites: 400 and 401 or equivalent, or permission of instructor.

MICRO 440 Introductory Bacteriology for Medical Technologists (1) A For medical technology students and others who need a limited introduction to basic microbiology, with focus on structure, metabolism, and genetics of medically impor-tant organisms. Prerequisite: medical technology student, or permission of instructor or permission of instructor.

MICRO 441, 442 Medical Bacteriology, Virology, and Immunology (3,3) A,W

Evans, Sherris

441: basic immunological concepts, host-parasite relationships, and the study of pathogenic bacteria. 442: con-tinuation of 441, followed by consideration of pathogenic viruses. Students are expected to synthesize all compo-nents of 441 and 442 continuously, and this expectation is reflected in the examinations. Laboratory course, 443, coordinates with this sequence. Prerequisites: 10 credits in basic biology, 6 credits in organic chemistry and previous or concurrent course work covering procaryotic cell structure and function (e.g., 400, 440-1 credit); 441 for 442.

MICRO 443 Medical Microbiology Laboratory (3) AW

Coyle, Memmer, Schoenknecht

Laboratory course for medical technology students, mi-crobiology majors, and on an elective basis for medical students. Procedures used in the medical microbiology Indents. Proceedings used in the instruction information of pathogenic micro-organisms and testing of their susceptibility to an-tibiotics. Selected reading assignments and demonstra-tions. No auditors. Prerequisites: enrollment in 441, 442 sequence or HUBIO 521P and permission of instructor.

MICRO 444 Medical Mycology and Parasitology (4) Sp

Coyle, Cramer, Plorde 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 technology stu-dents, microbiology majors, and medical students as an elective. No auditors. Prerequisites: 10 credits in basic biology and 6 credits in organic chemistry, and permis-sion of instructor.

MICRO 447 Fundamentals of Immunology (3) Sp

For undergraduate and graduate students in microbiol-ogy, medicine, and other areas requiring substantial knowledge in immunology. Occurrence and properties of antigens and haptens; synthesis, nature, fate, and activiantigens and haptens; synthesis, nature, fate, and activi-ties of antibodies; antigen-antibody interactions; mecha-nisms of antibody-mediated and cell-mediated immunity and hypersensitivity, including discussions on alloanti-gens, tissue transplantation, principles of blood transfusion, tumor immunology, allergic diseases, and autoimmune diseases; immunity to parasites. Prerequi-sites: 441 (for medical students, HUBIO 520P), or equiv-olant and upper division standing. alent, and upper-division standing.

CONJ 448 Fundamental Immunology Laboratory (2) A See Conjoint Courses.

MICRO 450 Molecular Biology of Viruses (3) Sp

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 viruse, the nature of infection, the variety of virus-host relation-ships and discussion of some models of viral pathogene-sis. Prerequisites: 400, 401, and/or GENET 451.

MICRO 495- Honors Undergraduate Research (*) AWSpS Specific problems in medical and general microbiology

or immunology. Prerequisite: permission of honors adviser.

MICRO 496 Undergraduate Library Research (2) AWSpS

Staley Introduction to library research and to the microbiological literature. Topics are assigned and supervised by staff, members. Offered on credit/no credit basis only. Prerequisite: permission of instructor; senior standing desirable.

MICRO 497 Microbiology Special Electives (*) AWSpS Falkow

Falkow By specific arrangement with the Department of Micro-biology and Immunology, special clerkship, extern-ship, or research opportunities can at times be made available at institutions other than the University of Washington. The faculty can advise students of possible opportunities. Students wishing to elect this course should obtain from the Dean's office a "Special Assign-ment" form and contact the Chairperson of the Depart-ment of Microbiology and Immunology at least one month before preregistration. Limited to medical stu-dents. Prerequisite: permission of instructor.

MICRO 498 Undergraduate Thesis (*) AWSpS Falkow

For medical students. Prerequisite: permission of instructor

MICRO 499- Undergraduate Laboratory Research (*) AWSpS Whiteley

Specific problems in medical and general microbiology or immunology. Prerequisite: permission of departmental adviser; senior standing desirable.

Courses for Graduates Only

MICRO 500 Introduction to Research (*, max. 20) AWSpS Nester

Introduction to research areas of the faculty and the techniques employed in their investigations. Offered on credit/no credit basis only. Prerequisites: graduate stand-ing in microbiology and/or permission of instructor.

MICRO 506 Techniques in Electron Microscopy of Micro-organisms (3) Sp

Lara

Lara Techniques used in the preparation of micro-organisms for electron microscopy, the operation of the electron mi-croscope, and the photographic reproduction of observa-tions. Offered on credit/no credit basis only. Prerequi-sites: major in a biological science and permission of instructor.

MICRO 510 Physiology of Bacteria (3) W Nester, Whiteley Fundamentals of physiological and metabolic processes of bacteria with emphasis on the synthesis of cellular constituents, mechanisms, and energy-yielding pro-cesses. Prerequisites: 400 and BIOC 440, 441, 442, or permission of instructor. (Offered alternate years; offered 1980-81.)

MICRO 512 Physiology of Gene Expression (1, max. 15) AWSpS

(1, max, 15) A WSpS Whiteley Weekly one-hour seminar in which students discuss cur-rent literature dealing with selected aspects of microbial physiology. Offered on credit/no credit basis only. Pre-requisites: 400, GENET 552, 553, BIOC 440, 441, 442, and permission of instructor.

MICRO 520 Seminar (1) AWSp

May be repeated for credit. Offered on credit/no credit basis only.

MICRO 525 Cell Surface Membrane in Cell Sociology and Immunology (2) Sp Hakomori

Structure and function of cell surface membranes in relation to various immunobiological and pathobiological phenomena (differentiation, organization, infection, and cancer, etc.). Offered jointly with PABIO 525. Prerequi-sites: 447, BIOC 440, 441, 442, and permission of instructor.

MICRO 530 Advanced General Microbiology (4) A O'Connor, Stale

Enrichment, isolation, and comparative morphology and physiology of selected bacteria. Open to qualified under-graduates. Prerequisites: 400, 401, and 402, or equivalent, and permission of instructor.

MICRO 532 Seminar in General Microbiology and Microbial Ecology (1, max. 15) AWSp

O'Connor, Lara, Staley Weekly one-hour seminar and discussion concerning selected topics of current research interest in the areas of general microbiology and microbial ecology. Offered on credit/no credit basis only. Prerequisites: 400, 401, and permission of instructor.

MICRO 540 Virology (3) W

Nowinski

Lecture-seminar course concerning host viral-interactions. Immunological and genetic approaches are empha-sized. Prerequisite: permission of instructor. (Offered al-ternate years; offered 1981-82.)

MICRO 550 Selected Topics in Immunology (2, max. 18) ASp

Hellström, Storb

Heliström, Storb Formal seminar-discussion course for advanced students focused on recent developments in the field of im-munology and consisting of literature research and in-tensive in-depth study of important and timely topics. Two-hour seminars semimonthly and a comprehensive final examination. Offered on credit/no credit basis only. Prerequisites: 447 or equivalent, and permission of instructor.

MICRO 553 Pathogenesis of Infectious Diseases of Man (4) W

Falkow, Groman

Discussion course focusing on the pathogenesis of infec-tious diseases, with emphasis on bacterial, viral, and mycotic infections of man in which selected models of important diseases are used to explore the biochemical, physiological, and immunological bases of the host-parasite interactions that govern host injury, development of lesions, and the course of disease. Prerequisites: 441, 442 or HUBIO 521P, PATH 444 or HUBIO 520P, BIOC 405 or HUBIO 521P and permission of instructor. (Of-fered alternate years; offered 1981-82.)

MICRO 554 Seminar in Molecular and Medical Microbiology (1, max. 15) AWSpS

Cross, Falkow, Groman Weekly one-hour seminar in which recent advances in molecular biology and medical microbiology or the cur-rent research of the participants is presented and dis-cussed critically. Offered on credit/no credit basis only. Prerequisite: permission of instructor.

MICRO 555 Advanced Clinical Microbiology (21/2) AWSpS

Schoenknecht, Sherris, Tompkins Attendance at daily plate rounds and the weekly journal club of the Division of Clinical Microbiology. Designed to increase understanding of clinical microbiological work and its application to the care of the patient. Of-fered on credit/no credit basis only. Prerequisites: 443 and permission of instructor.

MICRO 556 Clinical Microbiology Training and Research (*, max. 12) AWSpS

Tompkins

Training in clinical microbiology and research. Atten-dance at daily laboratory rounds in addition to bench-side training and research. For medical students and microbi-ology graduate students only. Offered on credit/no credit basis only. Prerequisites: 443 and permission of instructor

CONJ 560, 561 Tumor Biology (3,2) A,W See Conjoint Courses.

MICRO 570 Advanced Immunology I: Molecular Immunology (2) W Storb

Lecture course for graduate students and upper-division undergraduates. Together with 571 and CONJ 572, the course provides an in-depth treatment of basic immunol-ogy. Part I covers the structure and function of antigens, antibodies, and complements theories of antibody synthesis, and subcellular studies of the immune response. Of-fered on credit/no credit basis only. Prerequisites: 447 or equivalent, blochemistry, genetics. (Offered every three years: offered 1982.)

MICRO 571 Advanced Immunology II: Cellular Immunology (2) W Henney

Lecture course for graduate students and upper-division undergraduates. Together with 570 and CONJ 572, the course provides an in-depth treatment of basic immunology. Part II covers the cellular mechanisms of antibody synthesis, the activities of T- and B-cells, the mecha-nisms of cell-mediated immunity, and regulation of the immune response. Offered on credit/no credit basis only. Prerequisites: 447 or equivalent, biochemistry, genetics. (Offered the store where the store of the 1082). (Offered every three years: offered 1983.)

CONJ 572 Advanced Immunology III: Immunopathology (2) W See Conjoint Courses.

MICRO 573 General Immunology Seminar (1, max. 15) AWSp

Hellström

Weekly one-hour seminar in which original research re-sults are presented and discussed. Occasional seminars are concerned with review of important topics in immuare concerned with review of important optics in hinter nology, but the emphasis, in general, is on new and origi-nal contributions to the field. Offered on credit/no credit basis only. Prerequisites: firm background in immunol-ogy and permission of instructor.

MICRO 574 Antibody Response (1, max. 15) AWSpS

Storb

Weekly one-hour seminar in which subcellular aspects of antibody synthesis are discussed with current research findings presented. Offered on credit/no credit basis only. Prerequisite: permission of instructor.

MICRO 576 Basic Tumor Immunology (1, max. 15) AWSpS Hellström

Weekly one-hour seminar. Current research findings. Offered on credit/no credit basis only. Prerequisite: permission of instructor.

MICRO 577 Cellular Immunity (1, max. 10)

AWSpS Clagett Weekly one-hour seminar in which cellular aspects of B and T cell differentiation and their role in disease processes are discussed and current research findings pre-sented. Offered on credit/no credit basis only. Prerequisite: permission of instructor.

MICRO 585 Research in Cell and Molecular Biology (1, max. 15) AWSp

Champoux Weekly research seminar. Offered on credit/no credit basis only. Prerequisite: permission of instructor.

MICRO 599 Topics in Microbiology and Immunology (*, max. 6) AWSpS Evans, Minshew, Tompkins Current problems in microbiological research. Offered on credit/no credit basis only. Prerequisite: permission of instructor.

MICRO 600 Independent Study or Research (*) AWSoS

Offered on credit/no credit basis only.

MICRO 700 Master's Thesis (*) AWSpS Offered on credit/no credit basis only.

MICRO 800 Doctoral Dissertation (*) AWSpS Offered on credit/no credit basis only.

NEUROLOGICAL SURGERY

Courses numbered with a P suffix are not graduate courses and are restricted to medical student enrollment oniv.

NR 498 Undergraduate Thesis (*) AWSpS G. Ojemann

Prerequisite: permission.

NR 499 Undergraduate Research (*) AWSpS G. Ojemann

Investigation of special problems as an intimate member of the research team in the neurological surgery laborato-ries. Research to lead to a thesis, if desired. List of projects available on request. Prerequisite: permission.

NR 528P Neurological Surgery Seminar (1) AWSpS

Calvin

Weekly seminar centered around neurological research topics with discussion by staff and students. Prerequisite: HUBIO 532P or permission.

NR 541P Neurosurgery for the Generalist and Clinical Specialist (2) W

Kelly, Loeser

Keily, Loeser Series of lectures, seminars, and clinical demonstrations designed to identify and describe those diagnostic and therapeutic aspects of neurosurgical disease, the under-standing of which is essential in the general practice of medicine: This course does not include experience in pa-tient care, nor does it emphasize research data or tech-niques. The initial diagnosis and management of such medicinese head end principation for the section of such conditions as head and spinal injuries, intracranial hemconditions as near and spinal injuries, intrastration neuro-orrhage, CNS mass lesions, disk disease, hydrocephalus, and chronic pain are covered in depth. This course is not intended for those students planning to take 680P. Pre-requisite: HUBIO 532P; detailed information about any of the neurosciences is not required.

NR 542P Clinical and Basic Research Correlates of Epilepsy (2) A

G. Ojemann, Westrum G. Ojemann, westrum Clinical symptoms and treatment of epilepsy; related ba-sic research in neuroanatomy, neurophysiology, neuro-psychology, and neuropharmacology of epilepsy. Prereq-uisite: HUBIO 532P for medical students; permission for others

NR 680P Neurological Surgery Clerkship (*, max. 8) AWSpS G. Ojemann

Student serves clinical clerkship as an intimate member of the staff, participating in inpatient and outpatient care, both preoperative and postoperative, involving neuro-logical surgery patients. University Hospital or a University-affiliated hospital may be selected, subject to approval of the department. Prerequisite: HUBIO 563P. (Four weeks.)

NR 681P Seizure Clinic Clerkship (21/2) AWSpS A. Wilensky, Staff

Students participate in the initial evaluation and follow-up of patients with seizure disorders in the outpatient seizure clinic. Definition of the medical and social probservice chine: betinder of the mental and scalar pro-lems and drug therapy is stressed. Alternate forms of therapy are considered. Linear follow-up of patients seen throughout the clerkship is maintained. Limited contact with inpatients is possible. This clerkship provides not only a specialized contact with a common specific neurologic problem, but uniquely provides an experience in prolonged follow-up and management planning for a chronic disease. Prerequisites: MED 665P and permis-

NR 697P Neurological Surgery Special Electives (*, max. 24) AWSpS *Ward*

By specific arrangement, for qualified students, special clerkship, extenship, or research opportunities can at times be made available at institutions other than the University of Washington. The faculty can advise students of possible opportunities. 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.

OBSTETRICS AND GYNECOLOGY

Courses numbered with a "P" suffix are not graduate courses and are restricted to medical student enrollment only.

OB GY 498 Undergraduate Thesis (*) AWSpS Vontver By arrangement.

OB GY 499 Undergraduate Research (*) AWSpS Vontver

Prerequisite: permission.

OB GY 579P Obstetric and Gynecologic Investigation (*) AWSpS Vontver

The investigation may cover any one of the following fields: uterine muscle physiology, toxemias of preg-

nancy, hormone assays in obstetrics and endocrinology, obstetric and gynecologic oncology. By arrangement.

OB GY 665P Introduction to Obstetrics and Gynecology, UH-USPHS (*, max. 12) AWSpS Vontver

Introductory clerkship for medical students in the provision of comprehensive medical care and counseling ser-vices to adult and adotescent female patients. Inpatient and outpatient settings with management and delivery of obstetrical patients as well as diagnosis and management of gynecologic conditions and diseases. Students partici-pate in hospital rounds on both obstetric and gynecologic patients, in outpatient clinics, in seminars, tutorials, and community health-care agencies for women. Rotation be-tween University Hospital and U.S. Public Health Ser-vice Hospital. Prerequisite: HUBIO 552P. (Six weeks; limit: six students.)

OB GY 666P Introduction to Obstetrics and Gynecology, Boise (*, max. 12) AWSpS Vontver

Clerkship equivalent to 665P offered at Boise, Idaho (WAMI). Includes experience in several private physi-cian offices. Prerequisite: HUBIO 552P. (Six weeks; limit: three students.)

OB GY 667P Introduction to Obstetrics and Gynecology, Madigan (*, max. 12) AWSpS Vontver

Clerkship equivalent to 665P offered at Madigan General Hospital, Tacoma, Washington. During Summer Quar-ter, available for last six weeks only. Prerequisite: HUBIO 552P. (Six weeks; limit: three students.)

OB GY 668P Introduction to Obstetrics and Gynecology, Spokane (12) AWSpS Vontver

Clerkship, equivalent to 665P, offered at Spokane (WAMI). Includes experience in several private physi-cian offices. Prerequisite: HUBIO 552P. (Six weeks; limit: three students.)

OB GY 669P Introduction to Obstetrics and Gynecology, Swedish (12) AWSpS Vontver

Clerkship, equivalent to 665P, offered at Swedish Hospi-tal. Prerequisite: HUBIO 552P. (Six weeks; limit: three students.)

OB GY 670P Introduction to Obstetrics and Gynecology, Group Health (12) AWSpS Vontver

Clerkship, equivalent to 665P, offered at Group Health Cooperative of Puget Sound, a prepaid medical plan fa-cility. Prerequisite: HUBIO 552P. (Six weeks; limit: three students.)

OB GY 671P Introduction to Obstetrics and Gynecology, Anchorage (12) AWSpS Vontver

Clerkship, equivalent to 665P, offered at Anchorage, Alaska (WAMI). Includes experience in several private physicians' offices as well as Providence Hospital and Elmendorf Air Force Base. Prerequisite: HUBIO 552P. (Six weeks; limit: three students.)

OB GY 680P Clinical Clerkships (*, max. 12) AWSpS Vontver

For the student with background in general obstet-rics/gynecology who wishes a greater experience in, and knowledge of, the subspecialty areas. Student spends four weeks in the obstetrics/gynecology subspecialty clinics at University Hospital. These clinics include dysclinics at Oniversity Hospital. Inese clinics include dys-tocia, infertility, endocrinology, oncology, and genetics. By prior arrangement, options such as sexual courseling and routine gynecology are available. Prerequisites: 665P and permission of instructor. (Limit: one third- or fourthyear medical student each four weeks.)

OB GY 684P Endocrinology of Reproduction (*, max. 12) AWSpS Vontver

rangement with instructor.

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. By special ar-

OB GY 685P Obstetrics Gynecology Preceptorship (*, max. 8) AWSpS Vontver

Consists of a close working relationship with a physician

SCHOOL OF MEDICINE

engaged in the private practice of obstetrics and gynecol-ogy, including: hospital rounds, surgery, deliveries, and office and business aspects of private practice as individ-ually arranged with the practitioner. Forty hours per quarter is minimum time required; can be arranged as one half-day per week for twelve weeks (2 credits), up to four half-days per week for twelve weeks (8 credits), or as four weeks full time or other combinations, not to exceed 8 credits. Prerequisites: 665P or equivalent and permission of instructor. (Limit: two students per quarter.)

OB GY 697P Obstetrics and Gynecology Special Electives (*, max. 24) AWSpS Vontver

By specific arrangement, for qualified students, special clerkship, externship, or research opportunities can at times be made available at institutions other than the Uni-versity of Washington. The faculty can advise students of possible opportunities. Students wishing to elect this course should obtain from the Dean's office a "Special Assignment" form at least one month before preregistration. The department reserves the right to evaluate stu-dent performance. Prerequisite: permission of instructor.

OPHTHALMOLOGY

Courses numbered with a P suffix are not graduate courses and are restricted to medical student enrollment only.

OPHTH 498 Undergraduate Thesis (*) AWSpS Rodieck (University Hospital) Thesis-based research in vision and ophthalmology.

Elective. Prerequisite: permission of instructor. (Limit: two students.)

OPHTH 499 Undergraduate Research (*) AWSpS Rodieck (University Hospital)

Laboratory or clinical research in morphology, biochem-istry, immunology, experimental pathology, or clinical studies of the eye and visual system. Prerequisite: permission of instructor. (Limit: two students.)

OPHTH 524 Modern Views of the Visual System (3)

Hendrickson, Rodieck

Seminar covering modern developments in the anatomy, physiology, biochemistry, and pharmacology of the vi-sual system. (Last time offered: Spring Quarter, 1981.)

OPHTH 681P Ophthalmology Clerkship (8) AWSp Bensinger (University Hospital) Inpatient and outpatient diagnosis and treatment of eye

disease. Student attends regularly scheduled conferences in eye pathology and lectures in ophthalmic basic and clinical sciences. In-depth exposure to ophthalmology provided for the student planning a career in a neurological science or considering a career in ophthalmology. Prerequisites: completion of human biology series and concurrent registration in 684P. (Limit: one student, four weeks.)

OPHTH 682P Ophthalmology Externship (4) AWSpS

Kramar (United States Public Health Service Hospital) Student works with a faculty member in the diagnosis and treatment of ocular diseases in both outpatient and inpatient populations. Experience in common ocular disorders is gained, and neurological and other consultations seen. Prerequisite: completion of human biology series. (Limit: one student.)

OPHTH 683P Pediatric Ophthalmology (21/2)

AWSpS

Kalina (Children's Orthopedic Hospital and Medical Center)

Reamination and observation of treatment of children with ocular diseases and learning to differentiate trivial from potentially blinding disorders. A programmed text in general optithalmology is on loan. One-half day per week for one quarter. Clinic experience. Third- and fourth-year medical students. Prerequisite: completion of human biology series. (Limit: two students.)

OPHTH 684P Ophthalmic Pathology (1) AWSp Milam (University Hospital) Student participates with the eye pathologist in gross and microscopic examination of surgical and autopsy eyes. Emphasis on anatomic study and on correlation of obser-vations with clinically recognized ocular and systemic disease processes. Third- and fourth-year medical stu-

dents. Must be taken concurrently with 681P. Prerequisite: completion of human biology series.

OPHTH 685P Ophthalmology Externship (4) AWSpS Chin (Veterans Administration Hospital)

Student works with a faculty member in the diagnosis and treatment of ocular diseases in both outpatient and in-

patient populations. Experience in common ocular disor-ders is gained and neurological and other consultations seen. Student learns the basic techniques involved in tonometry, ophthalmoscopy, and biomicroscopy of the eye. Prerequisite: completion of human biology series.

OPHTH 686P Ophthalmology Externship (4) AWSpS

Boriner, Brandt, McEvoy (Group Health Hospital) Student works with a clinical faculty member in the diag-nosis and treatment of ocular diseases in outpatients. Each week the student is assigned to the Group Health ophthalmologist responsible for the care of walk-in and urgent patients, which is most likely to demonstrate find-ings pertinent to the future practice of primary-care phy-sicians. Opportunity to learn examination techniques, including tonometry, optithalmoscopy, and biomicroscopy. Prerequisite: completion of human biology series.

OPHTH 697P Ophthalmology Special Electives (*, max. 24) AWSpS Kalina

Kalina By specific arrangement, for qualified students, special clerkship, extenship, or research opportunities can at times be made available at institutions other than the Uni-versity of Washington. The faculty can advise students of possible opportunities. Students wishing to elect this course should obtain from the Dean's office a "Special Acciencest" from a level new protect before a "Special Assignment" form at least one month before preregistration. Prerequisite: permission of instructor.

ORTHOPAEDICS

Courses numbered with a P suffix are not graduate courses and are restricted to medical student enrollment only.

ORTHP 498 Undergraduate Thesis (*) AWSpS Greenlee, Spengler

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 recognition. Pre-requisites: HUBIO 523P and permission of department. (Twelve weeks.)

ORTHP 499 Undergraduate Research (*) AWSpS Greenlee, Lippert, Maisen, Spengler Investigation of problems pertinent to the study of mus-culoskeletal problems in the orthopaedic laboratories as part of the research group. Prerequisite: permission of department. (Twelve weeks.)

ORTHP 515P Orthopaedic Biomechanics (2) Sp

Lippert, Spengler Designed to provide a relevant engineering background for the understanding and solution of orthopaedic prob-lems. Encompasses statics, dynamics, strength of materials, and metallurgy. Prerequisite: member of the hospital staff or, by arrangement, a student enrolled in bioengineering courses.

ORTHP 545 Nutrition in Sports Medicine (3) W N. Smith, Staff Designed to provide the performing athlete, teacher, and

coach with a basic understanding of food and the nutri-tional process and its relation to exercise and competition. Particular consideration given to the nutritional needs and practices of adolescent girls and boys in physical education and sport programs. Consists of class lecture-discussion periods, case-problem analysis, and comple-tion of one related field project. Prerequisite: upper-division or graduate standing or permission of department.

ORTHP 675P Preceptorship in Orthopaedics (*, max. 4) AWSpS 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. Prerequisites: SURG 665P or HUBIO 563P and permission of department. (Two weeks, full time.)

ORTHP 676P Pediatric Orthopaedics (*, max. 8) AWSpS Staheli, Staff

Specifically designed to acquaint the student with all as-Specifically designed to acquaint the student with all as-pects of musculoskeletal problems in childbood. In addi-tion to the didactic conferences and seminars, the student has opportunities for active participation in both inpatient and outpatient care at the Children's Orthopedic Hospital and Medical Center, and the correlative anatomy and pa-thology as in 680P. Prerequisite: SURG 665P or HUBIO 563P. (Four weeks, full time.)

ORTHP 677P Musculoskeletal Trauma (*, max. 8) AWSp

Bramwell, Greenlee, Hansen, Lippert, Matsen, Spengler Instruction takes place largely at Harborview Medical Center, where there is a high concentration of muscu-loskeletal trauma. The student follows the patient from the emergency room onto the wards and into the operatthe emergency room onto the wards and into the operat-ing room as necessary and has opportunity to continue follow-up in the outpatient clinics. Instruction is given in both general and special clinics, including hand, hip, foot, and fracture, with emphasis placed on physical ex-amination of the patient. Students take correlative anat-omy and pathology as in 680P. Prerequisites: SURG 665P and HUBIO 563P. (Four weeks, full time.)

ORTHP 680P General Orthopaedic Clerkship

(*, max. 8) AWSp Bramwell, Greenlee, Hansen, Lippert, Matsen, Spengler, Winquist This clerkship offers the student the unique opportunity This certain ories the student die under opportunity to study the wide variety of problems presented to a gen-eral orthopaedic service. University Hospital offers gen-eral inpatient and outpatient clinics covering general trauma, bone and joint infections, degenerative joint distrauma, bone and joint infections, degenerative joint dis-ease, rheumatoid arthritis, and outpatient pediatrics. The Veterans Administration Hospital is principally an inpa-tient service involved with a wide variety of musculo-skeletal problems, including reconstruction of war injuries. Emphasis is placed on the diagnosis and the evaluation of functional deficits. Prerequisite: HUBIO 563P or SURG 665P. Students automatically are regis-tered for combining environment of the transfer tered for correlative anatomy and pathology, a review of gross anatomy and pathology in light of clinical problems affecting the musculoskeletal system. It is an anatomic, clinical, and radiographic correlation of disease processes. (Four weeks, full time.)

ORTHP 697P Orthopaedic External Elective (*, max. 12) AWSpS

Greenlee, Spengler

Special arrangements can be made for students desiring Special altangements can be made to students detaining to take orthopaedic electives at other institutions. Pro-grams generally approved include orthopaedic clerkships at other universities or at large orthopaedic institutes. Prerequisites: HUBIO 563P and permission of department

OTOLARYNGOLOGY

Courses numbered with a P suffix are not graduate courses and are restricted to medical student enrollment only.

OTOL 490 Neural Mechanisms of Hearing (3) Sp Clopton

Major areas within auditory neurophysiology, including peripheral mechanisms of analysis and encoding, central aspects of the development of auditory structures, binau-ral hearing, representations of complex sounds, and other topics of current interest. Introductory knowledge of neurophysiology and sensory physiology assumed. Lectures, discussions, assigned readings. Prerequisite: permission of instructor.

OTOL 498 Undergraduate Thesis (*) AWSpS Miller

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 rec-ognition. Prerequisite: permission of instructor.

OTOL 499 Undergraduate Research (*) AWSpS Miller ·

Research opportunities offered under direction in the area of otolaryngology. May be repeated for credit. (Twelve weeks.)

OTOL 681P Otolaryngology Clerkship (*, max. 8) AWSpS

Cummings (University Hospital)

Student participates in evaluation and care of outpatients and inpatients at the University Hospital. In addition he attends department conferences. Prerequisite: completion of human biology series. (Four weeks, full time.)

OTOL 682P Otolaryngology Externship (*, max. 8) AWSpS Yue (United States Public Health Service Hospital)

Student serves externship in otolaryngology in outpatient clinic, where visits average six hundred per month, sup-plemented by inpatient assignments. Individual training provided, giving student opportunity to utilize his own diagnostic abilities; student performs or assists instructor in all phases of patient work-ups and care; attends ward rounds and conferences. Prerequisite: completion of hu-man biology series. (Four weeks, full time.)

OTOL 683P Otolaryngology Externship (*, max. 8) AWSpS

Hays (Madigan Hospital)

Individual externship training at outpatient clinic, where visits average twelve hundred per month, supplemented by inpatient assignments. Student is responsible for patient work-ups; follows assigned patient to operating room; participates in ward rounds and hospital confer-ences. Students reside at the hospital during externship, using facilities of BOQ and hospital mess. (Subsistence and quarters charges, approximately \$2 per day.) Prerequisite: completion of human biology series. (Two or four weeks, full time.)

OTOL 684P . Otolaryngology Clerkship (*, max. 8) AWSpS

Buckert, Weymuller (Harborview Medical Center) Student participates in evaluation and care of outpatients and inpatients at Harborview Medical Center. He or she assists in surgery, and in addition, the student attends deand University Hospital in conjunction with department training. Prerequisite: completion of human biology series.

OTOL 685P Otolaryngology Externship (*, max. 8) AWSpS Cummings (Children's Orthopedic Hospital and

Medical Center)

Medical Center) To give medical students additional training in pediatric otolaryngology at Children's Orthopedic Hospital and Medical Center. Students assist in patient work-ups, sur-gery, and postoperative care, and study general otolaryn gology problems with special emphasis on childhood dis-ease entities. Prerequisite: SURG 665P. (Four weeks.)

OTOL 686P Otolaryngology: Medical and Surgical Aspects (*, max. 12) AWSpS Duckert, Weymuller (Harborview Medical Center) Clinical in-depth study of otolaryngology that may be taken in a six-week clerkship. For the student whose in-terest lies in pathology of the head and neck. Reasonable feribility to strange the content of the course which fexibility to arrange the content of the course, which provides exposure to all aspects of patient care in the out-patient clinic, operating room, and ward-care activities. The student pursues a topic of current interest in toloar-yngology by review of the literature and presents a paper.

OTOL 687P Otolaryngology Clerkship (*, max. 8) AWSpS Doble (Veterans Administration Hospital)

Student participates in the evaluation and care of outpa-tients and inpatients at the Veterans Administration Hospital, to provide him or her with an adequate introduction to ear, nose, and throat problems. In addition, the student must attend department conferences at Uni-versity Hospital. Prerequisite: completion of human biology series. (Four weeks; limit: one student.)

OTOL 697P Otolaryngology Special Electives (*) AWSpS

Cummings

By specific arrangement, for qualified students, special clerkship, externship, or research opportunities can at times be made available at institutions other than the University of Washington. The faculty can advise students of possible opportunities. 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.

PATHOLOGY

Courses numbered with a P suffix are not graduate courses and are restricted to medical student enrollment only.

PATH 410 Introduction to Pathology (3) A Wolf

Woy Study of causes, processes, and effects of important dis-eases. Required for students in medical technology, physical therapy, and pharmacy. Prerequisites for other students: CONI 317-318, and MICRO 301, or equivalent courses in human anatomy, human physiology, and mi-crobiology, and permission of instructor and/or adviser.

PATH 444 General Pathology (4) A

Page

Study of basic pathologic processes that underlie disease, including inflammation, neoplasia, infarction, and cellular alternations. An attempt is made to correlate the gross, functional, and biochemical alterations. Lectures, demonstrations, small-group discussions are used to con-vey these concepts. The course is designed for second-year dental students, graduate students, and others with a reasonable grounding in biologic and chemical sciences. Prerequisite for nondental students: permission of instructor.

PATH 445 Systemic Pathology (3) W Page, Wolf

Page, Wolf Survey of pathologic processes affecting organs and sys-tems pertinent to the practice of dentistry. Lectures and demonstrations present a coherent picture of systemic disease. For second-year dental students, graduate stu-dents, and others with a reasonable background in bio-logic and chemical sciences. Prerequisite: 444 and permission of instructor for nondental students.

PATH 498 Undergraduate Thesis (*) AWSpS Benditt, Staff

Elective. Prerequisite: permission of instructor.

PATH 499 Undergraduate Research (*) AWSpS

Bendit, Staff Elective. May be repeated for credit. Prerequisite: permission of instructor.

PATH 500 Principles of Pathology (5) A Schwartz

Basic disease processes such as inflammation, neoplasia, cell alteration, and genetic and developmental pathology. Lectures, laboratory exercises, and demonstrations of animal and human pathologic materials are used to teach the basic concepts of pathology that are important in biologic medical research. Intended for graduate students and advanced undergraduates in the biological sciences. Suitable knowledge of either biochemistry or biological structure is strongly recommended. Prerequisite: permission of instructor.

PATH 501 Cellular Response to Injury (2) Sp

Lecture-seminar. Considerations of current concepts of cellular and subcellular reactions to injury, including neoplasia, as studied by modern techniques of cell biol-ogy. Required of all pathology graduate students. Of-fered on credit/no credit basis only. Prerequisite: permis-sion of instructor. (Offered odd-numbered years.)

PATH 502 Inflammation and Repair (2) Sp

Lecture-seminar; a seminar course dealing with an in-depth examination of the processes involved in inflammation and repair. Required of all pathology graduate students. Offered on credit/no credit basis only. Prerequisite: permission of instructor. (Offered even-numbered years.)

CONJ 503 Somatic Cell Genetics (2, max. 6) Gartler, Martin, Pious See Conjoint Courses.

PATH 507 Cellular Pathology (2) S

Schwartz

Emphasis on application of recent developments and techniques in biology to problems of pathology. Series of lectures by eminent visiting scientists with expertise in the area being discussed. May be repeated for credit. Of-fered on credit/no credit basis only. Prerequisite: permission of instructor.

PATH 510 Anatomical Analysis of Disease

(*, max. 30) A Barker, Norris *, max. 30) AWSpS

The anatomical features of human disease as revealed at

surgery or postmortem by gross examination and light microscopy are correlated with chemical and physiologic changes. Prerequisites: graduate student standing and permission of instructor.

PATH 512 Introduction to the Anatomical Analysis of Animal Disease (5, max. 10) AWSp Giddens

Designed for students who will use animals in the experimental study of disease, and with an introduction to: (1) techniques of animal necropsy, (2) characterization and interpretation of gross and microscopic lesions, (3) correlation of lesions with altered physiological processes, (4) differentiation between naturally occurring and experimentally induced lesions. Under supervision, and experimentally induced lesions. Under supervision, students conduct necropsies, gross and microscopic ex-amination of tissues, correlate findings with clinical and laboratory data, work up a final report, and present cases at a conference. Laboratory primates with both naturally occurring and experimentally induced diseases are uti-lized for necropsy. (Limit: two students per quarter.)

PATH 514 Comparative Pathology Conference (1, max. 6) AWSp

Giddens, Landolt

Focus on the histopathology of naturally occurring and experimentally induced lesions of primates, laboratory and domestic animals, fish, wildlife, and birds. Partici-pants discuss the lesions and the basic pathogenetic mechanisms that underlie them. Prerequisites: 500 or equivalent, and permission of instructor.

PATH 520 Experimental Pathology Seminar (1) AWSpS

Wolf

Review of current research in various areas of experimental pathology by members of the department and vis-iting scientists. May be repeated for credit. Offered on credit/no credit basis only. Prerequisite: permission of instructor.

PATH 522 Hematopathology Seminar (1, max. 3) AWSp Kadin

Biweekly seminar on diagnosis of disorders affecting bone marrow, lymph nodes, thymus, and spleen. Emphabone marrow, lymph nodes, thymus, and spleen. Empha-sis on current clinical material. Morphologic, cytochemi-cal, and immunologic criteria are applied to each case. Clinicopathologic correlation with prognosis and therapy are determined. Current controversial topics in hemato-pathology are discussed by local and guest lecturers. Reading as preparation for seminar is recommended. Of-fered jointly with LAB M 522. Designed for graduate and extending the therapylicity accommended for the seministic of and and preference of the seministic of the s and postgraduate students. Prerequisite: permission of instructor

PATH 530 Human Cytogenetics (*, max. 4) A Hoehn

Sources and methods of preparation and identification of human chromosomes. Human cytogenetic pathology; karyotype-phenotype interactions. Prerequisite: permission of instructor.

PATH 535 Fundamentals of Human Disease (*, max. 20) AWSpS

Mottet

Graduate student participation in the observation and study of human disease processes as they are seen in au-topsy cases at the University and Veterans Administra-tion hospitals and Harborview Medical Center. Under the direct supervision of a graduate faculty member, each student is responsible for the work-up and analysis of the student is responsible for the work-up and analysis of the disease assigned. Consists of analysis of the problem from the research perspective emphasizing the cellular, subcellular, and biochemical aspects of the body's reac-tion to injury and of using experimental methods where applicable. Students present their observations and analy-sis of the disease processes at a weekly seminar. Prereq-uisites: 444 or 500 or 555, and permission of instructor.

PATH 536 Microscopy of Human Disease (3) W Mottet

Previously completed cases; examples of human disease are selected to cover the major patterns of disease processes. Summaries of the clinical and autopsy find-ings and microscope slides from unusually instructive cases are lent to each student for study. At the next class the case is reviewed with a graduate faculty member, and gross organ lesions are shown when appropriate. Empha-sis is on the disease at the level of microscopy, but ultrastructural, biochemical, and genetic parameters are discussed. Prior to class, the student writes an analysis of the disease process based on the case and a review of the

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literature. Emphasis is on the critical evaluation of the literature and areas where research needs to be done. Pre-requisites: 444 or 500 or 555 and permission of instruc-

PATH 551 Experimental and Molecular Pathology (2-5, max, 20) AWSpS Schwartz, Staff

Introduction to experimental pathology. A tutorial course designed to introduce a graduate student (medical, den-tal) or senior undergraduate to selected methods and problems through literature surveys and/or laboratory ex-perience. 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) AWSpS *Barker*

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. Offered on credit/no credit basis only. Prerequisite: permission of instructor.

PATH 555 Environmental Pathology (3) Sp

Mottet Survey of exogenous environmental agents (chemicals agricultural, industrial, household; physical-kinetic, elec-trical, thermal, radiation) and of how they are involved in the causation and expressions of human disease processes such as developmental anomalies, mutagenesis, carcinogenesis, and degenerative diseases including athero-sclerosis. Prerequisite: 444 or 500 or HUBIO 520P, or permission of instructor.

CONJ 560, 561 Tumor Biology (3,2) See Conjoint Courses.

PATH 560P Introduction to the Analysis of Human Disease I (3) AWSpS Mottet (University Hospital, Harborview Medical

Center)

Center) Autopsy participation and review serves as an introduc-tion to the analysis of disease. The aim is to integrate morphologic, biochemical, and physiologic parameters to gain an understanding of the pathogenesis of disease and of the effects of therapy. The course includes both autopsy and surgical material and covers gross and mi-croscopic aspects, regional and applied anatomy, and biochemical and physiologic abnormalities as they relate to disease processes. Students are assigned in groups of three or four in one of the hospitals indicated. Prerequi-sites: second-year medical student standing and permis-sion required in order to make appropriate group assign-ment. ment.

PATH 562P Cardiovascular Pathology Conference (*) AWSpS Reichenbach

Course consists of two parts: a laboratory review of gross and microscopic cardiovascular pathology of selected au-topsied cases followed by a combined clinical (medical and/or surgical) and pathology conference discussing these cases. Prerequisites: HUBIO 540P and permission of instructor.

PATH 563 Neuropathology (*) AWSpS Alvord, Shaw, Sumi

Course consists of ten parts, some or all of which may be Course consists of ten parts, some or all of which may be taken separately or concurrently. Conferences on gross neuropathology (brain cutting and clinicopathologic cor-relations) held at various hospitals—Children's Ortho-pedic Hospital and Medical Center, Harborview Medical Center, University Hospital, Veterans Administration Hospital. Virginia Mason Hospital, and Swedish Hospi-tal—constitute, respectively, the first six parts of the course. Students may additionally elect to attend weekly surgical neuropathology conferences (as part 7) and/or weekly neurology neuropathology conferences (as part 8), at which current cases coming to biopsy or autopsy are discussed. Participation in a scheduled neuropatholor at which current cases containing to buyly of autopsy are discussed. Participation in a scheduled neuropathol-ogy slide show is another option in this course, as is a neuropathology laboratory case study (parts 9 and 10, re-spectively). Designed for graduate students, residents, and interns, and open to interested medical students. Pre-requisite: permission of instructor.

PATH 564 Neuropathology Brain Modeling (4) S Alvord

Designed along clinically important, functional, neuroan-atomic lines, generally based first on the embryologic de-

velopment of the most primitive segmental elements (sensory, motor and association cells, and simple re-flexes), followed by the more elaborate suprasegmental elements (cerebellum, colliculi, and forebrain). Lectures emphasize comparative (phylogenetic) and developmental aspects of the segmental, intersegmental, and su-prasegmental components of the human nervous system. May be taken concurrently with 584.

PATH 571 Neuroanatomic Pathology (*) W Alvord, Shaw, Sumi

The particular diseases occurring in specific parts of the nervous system are considered in terms of the segmental (motor, sensory, and association plates); intersegmental (reticular formation), and suprasegmental (cerebellum, colliculi, and forebrain) components. Clinicopathologic correlations are emphasized in the discussions of the syl-labus and study sets of 35-mm. lantern slides. Prerequi-sites: HUBIO 532P and permission of instructor; 572 recommended; 563 recommended as concurrent course.

PATH 572 Neuropathologic Reactions (*) A Alvord, Shaw, Sumi

The reactions of the nervous system, only more or less similar to those of other organs of the body, are considered in terms of congenital malformations, inflam-mations, vascular, traumatic, metabolic-toxic, degenerative, and neoplastic diseases peculiar to the nervous sys-tem as a whole. Clinicopathologic correlations are emphasized in the discussions of the syllabus and study sets of 35-mm. lantern slides. Prerequisites: HUBIO 532P and permission of instructor; 563 recommended as concurrent course.

PATH 574P Systemic Pathology I (3) W Reichenbach

Reichenbach Analysis of disease processes organized on the basis of the organ systems with emphasis on dynamics of lesions and physiologic and biochemical correlations. Organ sys-tems reviewed include cardiovascular, respiratory, gas-trointestinal (including liver and pancreas), central ner-vous, and endocrine. For graduate, postdoctoral, and medical students. Prerequisites: for paramedical students, an introductory pathology course, 410; for graduate stu-dents, 500 or 555; for medical students, HUBIO 540 or Module 21: and permission of instructor for all students. Module 21; and permission of instructor for all students.

PATH 575 Systemic Pathology II (3) Sp Mottet

Mottet Analysis of disease processes organized on the basis of the organ systems with emphasis on dynamics of lesions and physiologic and biochemical correlations. Organ sys-tems reviewed include breast and female reproductive, orthopaedic, hematologic, dermatologic, urinary, and male genital systems. The special parameters of environ-mental, teratologic, and forensic pathology also are dis-cussed. For graduate, postdoctoral, and medical students. Prerequisites: for paramedical students, an introductory pathology course, 410; for graduate students, 500 or 555; for medical students, HUBIO 540 or Module 21; and per-mission of instructor for all students.

PATH 576 Systemic Pathology Laboratory I (2) W Reichenbach

Common and uniquely informative specimens of lesions from human autopsies are reviewed grossly and micro-scopically. Students are drilled in the recognition of hu-man disease lesions and the correlation of the morphologic features of diseases with the clinical findings on the patient. Lesions from the same organ systems presented in 574 are studied. Prerequisites: for paramedical students, an introductory pathology course, 410; for graduate students, 500 or 555; for medical students, HUBIO 540 or Module 21; and permission of instructor for all educate for all students.

PATH 577 Systemic Pathology Laboratory II (2) Sp Mottet

Common and uniquely informative specimens of lesions from human autopsites are reviewed grossly and micro-scopically. Students are drilled in the recognition of human disease lesions and the correlation of the morphologic features of diseases with the clinical findings on the patient. Lesions from the same organ systems presented in 575 are studied. Prerequisites: for paramedical stu-dents, an introductory pathology course, 410; for gradu-ate students, 500 or 555; for medical students, HUBIO 540 or Module 21; and permission of instructor for all students students.

PATH 584 Neuropathology Brain Modeling Laboratory (4) S Alvord

Designed along clinically important, functional, neuroan-atomic lines, generally based first on the embryologic de-velopment of the most primitive segmental elements velopment of the most primitive segmental elements (sensory, motor and association cells, and simple re-flexes), followed by the more elaborate suprasegmental elements (cerebellum, colliculi, and forebrain). Three-dimensional neuroanatomical relationships, critical for understanding neuropathology, can best be obtained in the construction of a model of the brain. May be taken concurrently with 564.

PATH 600 Independent Study or Research (*) AWSpS Offered on credit/no credit basis only.

PATH 665P Surgical Pathology (*) AWSpS Mottet

Study of fresh gross surgical specimens and review of microscopic sections of diagnostic problems in general surgery. Prerequisites: HUBIO 563P and permission of instructor.

PATH 666P Renal Pathology Conference (1) AWSpS Striker

Conference-seminar on the histopathologic aspects of re-nal disease. May be taken concurrently with MED 693P. For third- and fourth-year students. Prerequisite: permission of instructor.

PATH 667P Renal Pathology Laboratory (*, max. 6) AWSpS Striker

Laboratory elective for third- and fourth-year medical students. Students read the current literature, review various renal biopsies and urine sediments, and read the standard texts prior to a weekly conference, which is topic oriented. Topics include various mediators of renal disease, such as post-infections, genetic, metabolic, and ease, such as post-intections, genetic, metabolic, and those accompanying certain systemic syndromes. To earn more than 3 credits, student must submit a paper on a topic agreed upon with the instructor. All students earn 1 credit for one-hour seminar per week. Laboratory credits are earned on the basis of two hours laboratory work per week each quarter for 1 credit up to a maximum of 6 credits. May be taken concurrently with MED 693P. Prerequisite: permission of instructor.

PATH 668P Skin Pathology (*) AWSpS

Barker

Histopathological aspects of skin diseases are presented and discussed in a group-conference type of seminar. Current dermatologic cases also are discussed. Prerequi-sites: dermatology elective and permission of instructor.

PATH 669P Oral Pathology (*) W

Page Experience in, and recognition and interpretation of, the histopathologic and clinical manifestations of the oral cavity, and study of basic pathological mechanisms re-sponsible for these conditions. Prerequisites: HUBIO 520P and 531P, and permission of instructor.

PATH 670P Gastrointestinal Pathology (*) Sp Norris

Laboratory elective for medical students and certain Laboratory elective for medical students and certain graduate students covering the developmental, inflamma-tory, neoplastic, and degenerative diseases of the gas-trointestinal tract, liver, gall bladder, and pancreas. The gross, light, and electron microscopic features of these diseases are correlated with biochemical and physiologic changes and symptomatology. Prerequisites: permission of instructor and HUBIO 541P. (Limit: six students.)

PATH 673P Cardiovascular Pathology (*) W Reichenbach

Reichenbach The spectrum of cardiovascular pathology is covered in depth by case studies and by gross and microscopic mate-rial. Case analysis for presentation, including clinical and gross and microscopic material, is prepared outside of class time. Topics covered include cardiomyopathy, pathology of the pulmonary vasculature, vasculitis, neoplasms, inflammatory diseases, diseases of the peri-cardium, valvular heart disease, hypertension, arti-riosclerotic heart disease, and congenital heart disease. Clinicopathologic correlation is emphasized. Prerequi-site: HUBIO 540P and permission of instructor and sec-ond-year medical student standing. (Limit: fourteen stu-dents.) dents.)

PATH 680P Diagnostic Pathology Clerkship (*, max. 24) Six or twelve weeks, full time, AWSp; ten or twelve weeks, S Mottet

Medical student participation in the dissection and study of autopsy and surgical pathology cases. Each student is responsible for the work-up of cases assigned to him or her under the the direction of a senior staff member. This may include dissection, microscopic examination, and literature review. The student also attends pathology conferences and seminars. Clerkships are available at the University Hospital, Veterans Administration Hospital, Harborview Medical Center, and Children's Orthopedic Hospital and Medical Center, and selected community hospitals. Prerequisites: HUBIO 520P and permission of instructor for second-, third-, and fourth-year medical students for hospital assignments ...

PATH 700 Master's Thesis (*) AWSpS

PATH 800 Doctoral Dissertation (*) AWSpS

PEDIATRICS

Courses numbered with a P suffix are not graduate courses and are restricted to medical student enrollment only.

PEDS 498 Undergraduate Thesis (*) AWSpS

Morgan For medical students. Prerequisite: permission of instructor.

PEDS 499 Undergraduate Research (*) AWSpS Morgan

Morgan An opportunity to gain research experience through par-ticipation in various clinical or basic research programs in progress. The following specific opportunities are available, and others can be arranged: child development, developmental biology, human embryology and teratol-ogy, medical genetics, infectious diseases, neonatology, medical genetics, infectious diseases, neonatology, ogy, mencal genetics, intertous diseases, neutatology, neuroembryology, pediatric cardiology; metabolic as-pects, pediatric cardiology; physiological aspects, pediat-ric endocrinology and metabolism, pediatric immu-nology, respiratory disease, dysmorphology. Prerequi-site: permission of instructor.

PEDS 501P Survey of Human Growth and Development (1½) AWSp

Baker (Clinical Training Unit) Clinical observation and study of normal growth patterns in multiple areas of human development, within the set-ting of routine well-child care. Observation and increasing participation in patient interview, examination, and treatment plan. This course covers briefly the subjects covered in more detail in 502P-503P-504P. Credit is not allowed for both 501P and 502P-503P-504P sequence.

PEDS 502P-503P-504P Human Growth and Development (1½-1½-1½) A,W,Sp Bennet, Doan

The student learns more about physical growth and be-havioral development through the supervised intensive observation and discussion of an individual child over the observation and discussion of an individual child over the span of a major portion of the child's first year of life. In addition, he becomes aware of the individuality of this child's maturational patterns through the more casual ob-servation of several other children of the same age. The servation of several other children of the same age. The starting point is the newborn as seen in regular monthly visits for well-child care throughout the school year. Physical, emotional, intellectual, etc., growth are fol-lowed. Home and family background are studied. There is an opportunity to participate in the doctor-patient rela-tionship. The student follows the same family for nine months and must plan to take this elective for all three quarters

PEDS 511P Pioneer Square Clinic (*, max. 3) AWSpS Deisher

Students attend one night clinic per week at a free clinic for adolescents and young adults in the Pioneer Square area. The patients seen generally have low incomes, lack area. Inc patients seen generally nave low incomes, lack education, and have histories of inadequate health care. Seminars that focus on young people with nontraditional life-styles and values are conducted each week in con-junction with the clinic. The impact of the differing life-styles and values on the individual's health status are ex-lored through interquiers with their mainly and each plored through interviews with ethnic, racial, and sexual minority youth.

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PEDS 512P Laboratory in Human Embryology and Teratology (3) W Shepard

Teaches and stimulates interest in human terabology and helps the student understand congenital malformations. Informal seminars, laboratory demonstrations, patient presentations, and lectures. For medical or graduate students. Prerequisite: permission of instructor.

CONJ 550P Clinical Infectious Diseases (3) See Conjoint Courses.

PEDS 551P Pediatric Electrocardiography (2) W Guntheroth

Brief review of the physiology and physics pertinent to clinical electrocardiography is followed by a presentation of terminology and methods in clinical use. Normal elecor terminology and methods in clinical use. Normal elec-trocardiograms are studied, followed by abnormal trac-ings, with emphasis on pediatric material, but including adult material such as myocardial infarction. Pre-requisite: HUBIO 540P.

PEDS 553P Nutrition for Physicians and Allied Health Professionals (2) Sp N. Smith

N. Smith Nutrition for health professionals presented in a series of lecture discussions and patient presentation teminars. Nutrition principles as related to health maintenance and fitness emphasized, with little emphasis given to complex disease states. Prerequisites: zoology and organic chem-

PEDS 665P Pediatric General Clerkship (*, max. 24) AWSpS Robertson

General introductory impatient and outpatient pediatric Ceneral introductory impatient and outpatient pecuanic clerkship. Exposes students to environments where chil-dren are receiving medical and health services. Approxi-mately half of the six-week experience takes place in a hospital setting (at Children's Orthopedic Hospital, Medical Center, University Hospital, Medigan Hospital, etc.), with the other half in an outpatient department, a clinic, or a series of offices. Student's preferences for lo-cotions are convident Orthopedic Dispital, the threat true. clinic, or a series of offices. Student's preferences for lo-cations are considered. Opinionnaires with student-sug-gested changes have been introduced. Course is open to all students, not just those planning on pediatrics as a ca-reer. The twelve-week clerkship is broader and allows for more individual selection of rotations. Locations available: Children's Orthopedic Hospital and Medical Center, University Hospital, Harborview Medical Center (maximum enrollment, 14); Madigan General Hospital (maximum enrollment, 2); Mary Bridge Hospital (maxi-mum enrollment, 3); WAMI units (maximum enroll-ment, 5). Prerequisites: HUBIO 563P and third- and fourth-year medical students. (Six weeks, full time, or twelve weeks; limit: twenty-four students.) twelve weeks; limit: twenty-four students.)

PEDS 669P Neonatal Pediatrics-Clerkship (*, max. 24) AWSpS Hodson

Participation in the activities in the newborn and premafamiliarization with certain laboratory techniques, particularly those relating to acid-base balance. Prenquisite: 665P.

PEDS 670P Pediatric Infectious Diseases (*, max. 24) AWSpS A. Smith

Elective primarily based at Children's Orthopedic Hospi-tal and Medical Center and oriented toward medical stutal and Medical Center and oriented toward medical stu-dents at the third- or fourth-year level. Material includes the broad category of infectious diseases. Students are expected to see and work-up all clinical consultations and to present these in detail to the attending physician. Daily rounds include both problem-solving discussions and di-dactic presentations. Opportunity for experience in clini-cal research and laboratory techniques is provided. Pre-requisites: 66SP or permission of instructor; third- or fourth-year medical students. (Limit: two students.)

PEDS 672P Clinical Experience in Child Growth and Development (*, max. 8) AWSp Telzrow

Clinical experience with behavioral problems in children and a behavioral approach to child development. Selected review of the literature with practical experience in an ambulatory pediatric clinic, University Hospital. Prerequisite: permission of instructor. (Two or four weeks, full time.)

PEDS 673P Office Practice (*, max. 12) AWSpS Robertson

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 activi-ties in the community. Prerequisite: 665P.

PEDS 676P Pediatric Clerkship With the Mentally Handicapped (*, max. 12) AWSpS Ruvalcaba (Rainier School), Hayden (Fircrest School) Total care involvement with mentally handicapped pa-tients, incorporating general pediatric knowledge of mental retardation and neurology, plus other specialties related to mental deficiencies. Additional information may be obtained from Dr. W. O. Robertson, Children's Orthopedic Hospital and Medical Center. Prerequisite: 652P. Gour or six weeks. full time.) 665P. (Four or six weeks, full time.)

CONJ 677P Clinical Allergy (*, max. 12) See Conjoint Courses.

PEDS 679P Clinical Problems in Developmental Disabilities (*, max. 12) AWSpS Holm

Holm Experience in multidisciplinary evaluation of the handi-capped child and management of the problem. Children with a variety of developmental deviations living in the community are assessed, and a rehabilitation program is planned. Participation by performing pediatric evalua-tions, by obtaining neurological, genetic, and other con-sultations, and by observing additional professional assessments (e.g., psychological testing) as indicated in the total evaluation of the handicapped child. Opportu-nity to provide parent counseling. Prerequisite: 665P.

PEDS 680P Pediatric Clinics (*, max. 24) AWSpS Robertson, Staff

Robertson, Staff Elective part- or full-time experience in pediatric general and subspecialty clinics for twelve weeks. From one to ten half-day sessions may be elected each week in the fol-lowing areas: general pediatrics, endocrinology, neurol-ogy, immunology, arthritis, cardiology, congenital de-fects and retardation, well-child, teratology, addescent medicine, allergy, cystic fibrosis, hematology, prema-turity, neonatology, and poison control center. Prerequi-site: 652P. site: 665P.

PEDS 681P Pediatric Genetics (*, max. 24) AWSp

Scon Clinical experience with focus on the evaluation and management of children with genetic disorders. Students have exposure to problems in genetic counseling, the evaluation of children with hereditary structural defects, and the diagnosis and management of children with in-born errors of metabolism. Emphasis on understanding genetic mechanisms that cause human disease. Both Uni-merity Meetingl and Children's Orthopedic Meetingl and versity Hospital and Children's Orthopedic Hospital and Medical Center used as clinical settings. Prerequisite: 665P. (Four, six, or twelve weeks.)

PEDS 682P Congenital Defects—Clinical Experience (*, max. 24) AWSpS Shurileff

Advanced course in pediatrics providing experience in the clinical diagnosis and management of structural and metabolic congenital defects. Prerequisite: permission of instructor.

PEDS 685P Pediatric Hematology and Oncology (*, max. 24) AWSpS

Hartmann

Hartmann Introduction to the problems in children with malignant or hematologic disease. Didactic sessions are held four times weekly, in addition to "one-on-one" teaching with the fellow or attending physician. Self-learning programs are available, as well as specific training in the tech-niques and interpretation of bone marrow aspirations, in-travenous chemotherapy, transfusions, and the laboratory techniques of hematologic evaluation. Prerequisite: 665P. (Two, four, six, or twelve weeks, full time.)

PEDS 686P Pediatric Cardiology (*, max. 24) AWSpS

AWSpS Guntheroth, Morgan The clerkship deals with both inpatients and outpatients with cardiovascular problems in the pediatric age group. Emphasis on acquiring skills in physical diagnosis and electrocardiography and on clinical knowledge of diag-nostic techniques and surgical possibilities. Observation of catheterizations and cardiovascular operations may be arranged at the option of the student. There are weekly cardiac clinics, and rounds on inpatients with cardio-uses the roblems occur twice daily. On average, two or vascular problems occur twice daily. On average, two or

three catheterizations and one cardiac surgery are performed weekly. Prerequisite: 665P.

PEDS 687P Advanced Clinical Clerkship in Child Neurology (*, max. 8) AWSpS

Milstein

Advanced course in neurology dealing with neurological disease in children. Both inpatient and outpatient experi-ence are included. Prerequisite: 665P.

PEDS 688P Adolescent Clinic (*, max. 24) AWSp Deisher

Advanced pediatric clerkship dealing with special prob-lems of the adolescent. Medical students are offered an experience in a multidiscipline clinic. Prerequisite: 665P.

PEDS 691P Advanced Pediatric Clerkship (*, max, 24) AWSpS

Robertson, Staff

Ward and/or outpatient experience with direct involve-ment in patient care. Student works under supervision of residents and attending physicians, having responsibilities comparable to an intern for patient work-up, diagbilities comparable to an intern for patient work-up, diag-nosis, and care. This externship type of experience can be obtained at any one, or combination, of the hospitals in the affiliated program, including WAMI units in Idaho, Montana, or Washington. Students interested in this option should make arrangements well in advance of registration. Prerequisite: 665P.

PEDS 697P Pediatric Special Electives (*) AWSpS

Morgan By specific arrangement, for qualified students, special clerkship, externship, or research opportunities can at times be made available at institutions other than the University of Washington. The faculty can advise students of possible opportunities. Students who wish 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.

PHARMACOLOGY

PHCOL 234 General Pharmacology (4) Sp

Lectures and demonstrations 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 hygiene students.

PHCOL 401 General Pharmacology (5) A Catterall, Juchau

Introduction to general aspects of pharmacology. Consideration of principles governing drug absorption, distribution, excretion, metabolism, interaction with living systems, and dose-effect relationships. General pharmacology of drugs influencing the autonomic and phalmacology of dugs inherening me autonome and cardiovascular systems, with emphasis on sites and mechanisms of action. For pharmacy students; others by permission. Prerequisites: organic chemistry, introduc-tory anatomy, physiology, and biochemistry, or second-year medical standing, or permission of instructor.

PHCOL 402 General Pharmacology (5) W Beavo, Storm

For pharmacy students. Further consideration of general For pharmacy students, runner consideration of general aspects of pharmacology, including actions of drugs on endocrine and central nervous systems and principles of chemotherapy for infectious and neoplastic disease. Ba-sic pharmacologic phenomena are considered in their relationships to present-day pharmacy, medicine, and soci-ety. Prerequisite: 401 or equivalent, or second-year medical standing, or permission of instructor.

PHCOL 434 General Pharmacology (4) Sp Lectures and demonstrations 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.

PHCOL 498 Undergraduate Thesis (*) AWSpS For medical students. Prerequisite: permission of instructor.

PHCOL 499 Undergraduate Research (*) AWSpS Participation in departmental research projects. Open to medical students. Prerequisite: permission of instructor.

PHCOL 507 Pharmacology Seminar (1) AWSp Presentation of comprehensive reports on recent medical and scientific literature in fields of current importance. Research progress reports, and reports on results of com-pleted research. Prerequisite: permission of instructor.

PHCOL 511 General Pharmacology (5) A Catterall, Juchau

Consideration of principles governing drug-receptor in-teraction, dose-effect relationships, drug absorption, dis-tribution, excretion, and metabolism. Systemaic pharma-cology of drugs influencing the autonomic and cardiovascular systems, with emphasis on sites and mechanisms of action. Current research in these areas of phar-macology is discussed. Prerequisites: graduate standing and organic chemistry, introductory anatomy, physiology and biochemistry, or permission of instructor.

PHCOL 512 General Pharmacology (5) W Beavo, Storm

Study of antimicrobial and cancer chemotherapeutic agents and of drugs affecting the central nervous and en-docrine systems. Emphasis on physiological and bio-chemical mechanisms with consideration of their thera-peutic, diagnostic, and toxic effects. Prerequisites: \$11, graduate standing and organic chemistry, introductory anatomy, physiology and biochemistry, or permission of instructor

PHCOL 515 General Pharmacology Laboratory (3)

Juchau Selected laboratory experiments in pharmacology for demonstration of basic principles of drug actions. Autonomic nervous system, central nervous system, and cardiovascular drugs are employed in both intact and iso-lated mammalian systems. One lecture and one four-hour laboratory per week. Prerequisite: permission of instructor.

PHCOL 525 Cardiac Pharmacology (2) Sp Vincenzi

Advanced considerations of drug actions on the heart. Advanced considerations of drug actions on the heart. Emphasis on cellular and membrane actions of drugs in-fluencing cardiac automaticity, excitability, contractility, and interpretation of original research in these areas. Open to medical and graduate students. Prerequisites: 401, 402 or 512 or HUBIO 540P, or permission of in-structor. (Offered alternate years; offered 1980-81.)

PHCOL 526 Autonomic Pharmacology (2) A Horita

Advanced treatment of pharmacologic effects on storage, Prefease, and action of autonomic transmitter substances. Prerequisites: 512 or 401, 402 or 434, or permission of instructor. (Offered alternate years; offered 1980-81.)

PHCOL 527 Drug Metabolism (3) W Juchau

Considerations of the biochemical mechanisms for the biotransformation of drugs and foreign compounds. Included are reaction mechanisms, ultrastructural considerations, induction mechanisms, intrastructural consider-ations, induction mechanisms, methodology, kinetics of inhibition and activation, steroid and amine metabolism, and implications in modern therapy. Open to medical and graduate students. Offered jointly with PHSCI 527. Pre-requisite: one year graduate, medical, or dental bio-chemistry, or permission of instructor. (Offered alternate years; offered 1981-82.)

PHCOL 528 Neuropsychopharmacology (2) A /

Halpern The pharmacology of the central nervous system. Prerequisites: 401, 402 or 434, or permission of instructor. Offered alternate years; offered 1981-82.)

PHCOL 529 Membrane Pharmacology (2) Sp Catterall, Storm

Advanced consideration of the fundamental properties of biological membranes and of the mechanisms of drug and hormone action on enzymes, drug and hormone receptors, and ion transport systems in the plasma membrane of cells. Discussion of current research emphasized. Pre-requisites: 511, BIOC 440, 441, or 531 or permission of instructor. (Offered even-numbered years.)

PHCOL 530 Cyclic Nucleotide Metabolism (2) W Beavo, Storm

Advanced consideration of synthesis, degradation, and effects of cyclic nucleotides on physiological processes. Topics include adenylate cyclase and hormone receptors, cyclic nucleotide phosphodiesterases, and protein ki-nases. Current research emphasized. Open to medical and graduate students. Prerequisites: 511 or BIOC 440, 441, 531, or permission of instructor. (Offered evennumbered years.)

PHCOL 533 Methods of Toxicology (2) Sp Loomis

A combined laboratory demonstration and didactic con-

sideration of chemical, physical, and biological methods involved in studies of harmful effects of chemicals on biological tissue. Prerequisites: 401, 402 or 434, or permis-sion of instructor. (Offered alternate years; offered 1980-81.)

PHCOL 534. Advanced Dental Pharmacology (3)

Sp In-depth treatment of the pharmacology of those drugs commonly employed in the practice of dentistry. Prereq-uisite: 434 or equivalent.

PHCOL 541 Special Pharmacological Techniques (3)S

Laboratory treatment of biochemical, biophysical, and surgical approaches employed in pharmacological inves-tigation. Prerequisites: 401, 402 or 434, or permission of instructor.

PHCOL 600 Independent Study or Research (*) AWSoS

PHCOL 697P Pharmacology Special Electives (*) AWSpS

By specific arrangement, for qualified students, special clerkship, externship, or research opportunities can at times be made available at institutions other than the University of Washington. The faculty can advise student of possible opportunities. Students wishing to elect this course should obtain from the Dean's office a "Special Assignment" form at least one month before preregistration

PHCOL 700 Master's Thesis (*) AWSpS

PHCOL 800 Doctoral Dissertation (*) AWSpS

PHYSIOLOGY AND BIOPHYSICS

CONJ 317-318 Introductory Anatomy and Physiology (6-6) SA, WSp See Cenjoint Courses.

P BIO 360 General Human Physiology (5) A

Conrad Lecture, laboratory, and laboratory conference instruc-tion in the basic principles and basic laboratory tech-niques of physiology. For students of pharmacy and oth-ers. Prerequisites: general zoology, chemistry, physics, and microbiology, or permission of instructor.

P BIO 401 Basic Human Physiology: Neurophysiology (3) A

Kennedy, Patton

The sequence 401, 402, 403 covers basic human physiol-ogy at an intermediate level. It is desirable to take the three parts in sequence. Covers nerve, muscle, synapse, reflex, general and special sensory systems, and motor systems of the brain. Prerequisites: general chemistry, el-ementary physics, permission of instructor.

P BIO 402 Basic Human Physiology: Transport and Exchange Organ Systems (3) W Brengelmann

Covers cardiovascular system, respiration, acid-base balance, renal system, temperature regulation. Prerequisites: general chemistry, elementary physics, permission of instructor.

P BIO 403 Basic Human Physiology: Metabolism and Endocrinology (3) Sp

Koerker, Steiner

Covers energy metabolism, gastrointestinal system, en-docrinology, and reproduction. Prerequisites: general chemistry, elementary physics, permission of instructor.

P BIO 405-406 Human Physiology (3-3) A,W Intensive coverage of advanced physiology through lec-tures and demonstrations. Autumn—Neurophysiology from basic properties of membranes through sensory and motor systems. Introduction to autonomic nervous sys-tem. Winter—Applied systems: cardiovascular, respira-tory, renal, endocrine, and gastrointestinal. Required for first-year dental students; also offered for graduate stu-dents. Entry card required.

P BIO 424 Vision and Its Physiological Basis (5) A Teller

Phenomena of human vision, including: spectral sensitivity, color vision, spatial interactions, light and dark adaptation, distance perception, and binocular inter-actions. Techniques for the study of vision in human subjects; emphasis on correlation of human visual functioning with known optical, biochemical, anatomical, and physiological factors. Offered jointly with PSYCH 424. Prerequisite: permission of instructor, some background in a physical or biological science recommended.

P BIO 498 Undergraduate Thesis (*) AWSpS For medical students. May be repeated for credit. Prerequisite: permission of instructor.

P BIO 499 Undergraduate Research (*) AWSpS For medical students. May be repeated for credit. Prerequisite: permission of instructor.

PBIO 503 Biological Instrumentation (4) S Fetz

Introduction to linear systems and electronic instrumentation used in physiological research. Topics include: basic circuit theory; step and frequency response of first and second order linear systems (RC and RLC circuits); Bode plots of transfer functions and impedance; operational amplifiers—basic principles and practical applications; digital logic and TTL implementation; A/D and D/A con-version; basic computer operations; sources of noise; signal/noise enhancement; transducers, recording and display devices. Designed to provide physiology and medical students with technical training for laboratory research. Prerequisites: beginning calculus and permission of instructor.

PBIO 504 Biological Instrumentation Laboratory (2) S Fetz

Laboratory exercises designed to provide working experi-ence with topics presented in 503. Experiments include: responses of RC and RLC circuits to sine waves and step functions; physiological recording system; operational amplifier circuits; digital logic circuits; A/D conversion. Prerequisite: permission of instructor.

P BIO 506 Physiological Basis of Dental Science (3) Ŵ.

Van Hassel

Current concepts in areas of physiology related to dentistry, including pain, taste, speech, microcirculation, oc-clusion, and calcification. Review of basic physiologic mechanisms, survey of recent literature and design of ap-plied dental research in each area. Offered jointly with ENDO 525. Prerequisite: permission of instructor

P BIO 508 Physiology Laboratory (1-2) AWSp Kerrick, Patton, Rowell

Small-group experiments to complement the content of courses 509 through 514. Four or five different laborato-ries are scheduled for each quarter. May be repeated for credit. Prerequisite: permission of instructor.

P BIO 509 Physiology of Transport Organ Systems (3) A Stirling

Detailed biophysical discussion of diffusion and active sodium-potassium transport provides a foundation for a subsequent presentation of transport phenomena of the al-imentary canal and kidney. Emphasis on the transport mechanisms of these tissues. Prerequisite: permission of instructor.

CONJ 509 Neurochemistry (3) W See Conjoint Courses.

P BIO 510 Nerve-Muscle Physiology (3) A Almers, Kerrick

Detailed consideration of ion transport, nerve-impulse conduction, neuromuscular synaptic transmission, excitation-contraction coupling, and contraction coupling and contractile processes of vertebrates. Aim is to convey the concepts of excitable, synaptic, and contractile phenomena. Prerequisite: permission of instructor.

P BIO 511 Neurophysiology (3½) W

Patton An advanced course on functioning of the central nervous system (somatic and visceral); special senses (audition, vision, vestibular); descending systems (cortical and sub-cortical); cerebellum; hypothalamus; behavior and neurophysiology; comparative neurophysiology. Prerequisite: permission of instructor.

CONJ 511 Functional Neuroanatomy (4) See Conjoint Courses.

PBIO 512 Cardiovascular Physiology (3) Sp

Rowell Considers the function of the heart and blood vessels from a cellular and organ point of view, including the regulation of flow to various organs. Integrates much of this material into a consideration of the cardiovascular system. Prerequisite: permission of instructor.

P BIO 513 Respiratory Physiology and Acid-Base Balance (3) (Sp) Berger

Introduction covering, in moderate depth, metabolism, respiratory gas transport, lung mechanics, neural and chemical control, and acid-base regulation, primarily as related to humans. Prerequisites: elementary physics and biology, and permission of instructor.

P BIO 514 Physiology of Metabolic and Endocrine Regulation (2¹/₂) Sp Gale

Control functions of endocrine system: pituitary, hypo-thalamus, target organs, thyroid, adrenal cortex and medulla, pancreas, parathyroid, reproduction physiol-ogy. Prerequisite: permission of instructor.

P BIO 515, 516, 517 Physiological Proseminar (7,7,7) A,W,Sp

Guided survey of the experimental literature of major topics in physiology. Course conducted as seminar with oral analysis of assigned papers and topics. Prerequisite: permission of instructor.

P BIO 518 Research Topics in Cardiovascular Physiology (1) WSp

Feigl Graduate students and faculty members present and dis-cuss current literature and research. May be repeated for credit. Prerequisite: permission of instructor

P BIO 519 Membrane and Muscle Biophysics Seminar (1) AWSp Almers, Hille, Kerrick

membrane function and study of current topics in cell membrane function and muscle contraction. May be repeated for credit. Prerequisite: permission of instructor.

P BIO 520 Physiology Seminar (*) AWSpS

Selected topics in physiology. May be repeated for credit. Prerequisite: permission of instructor.

P BIO 521 Biophysics Seminar (*) AWSpS Selected topics in biophysics. May be repeated for credit. Prerequisite: permission of instructor.

P BIO 522 Pulmonary Mechanics and Gas Exchange (1-3) AWSpS

Hildebrandt

Viscous and elastic properties of chest-lung system; flow of gases and gas transport through tissue. May be re-peated for credit. Prerequisite: permission of instructor.

P BIO 523 Heat Transfer and Temperature Regulation (2-5) S

Brengelmann

Thermal exchange between the body surface and the en-vironment. Heat production and distribution within the body. Properties of cutaneous and deep temperature receptors. Neural integration and homeothermy. Prerequisite: permission of instructor.

P BIO 524 Advanced Membrane Potentials (*) Sp Almers, Hille

Quantitative analysis of functional properties of excitable membranes. Active transport. Ionic flux equations. Con-ductance changes. Calculations of the action potential. Nerve, muscle, and model systems. May be repeated for credit. Prerequisite: permission of instructor.

P BIO 525, 526, 527 Readings in Advanced Physiology and Biophysics (*,*,*) A,W,SpS 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. Each course may be repeated for credit. Prerequisite: permission of instructor.

P BIO 528 Advanced Physiological Control Systems (1-3) AWSpS Hildebrandt

Chemical and neural control of respiration stability. May be repeated for credit. Prerequisite: permission of instructor.

P BIO 530 Synapse and Reflex Seminar (4) A

Guided survey of the literature pertaining to reflex and

synaptic physiology. Course is conducted as seminar with students giving oral reports on assigned topics. Pre-requisites: 515 and permission of instructor.

P BIO 532 Mathematical Methods of Physiology and Biophysics (3)

Selected mathematical methods particularly useful in physiology and biophysics are developed. Emphasis is on deriving mathematical descriptions, usually in the forms of ordinary or partial differential equations. for physiological systems. Topics covered usually include solution of differential equations using the Laplace transform lin-ear approximation of nonlinear systems, transfer function, and Green's function description of physiological systems. Prerequisite: permission of instructor.

P BIO 533 Theory of Biological Control Systems (3)

Emphasizes development of the mathematical techniques used in biological control systems analysis: block and signal flow diagrams, description of response of feedback systems; roots and poles of linear systems; frequency re-sponse and Bode plots; s-plane description of feedback systems; synthesis of descriptive functions of experimen-tal results; effect of nonlinearities on control system response. Basically a course in mathematical analysis of feedback systems, using biological examples. Recom-mended background includes some acquaintance with differential equations and course work in vertebrate or mammalian physiology. Prerequisite: permission of in-structor. (Offered alternate years with 534.)

P BIO 534 Applications of Biological Control Systems (3) W

Fuchs

Examples of biological control systems are discussed in detail. Problems in research on respiratory, cardiovascular, hormonal, metabolic, oculomotor, and other regula-tory systems are presented. Prerequisite: permission of instructor. (Offered alternate years with 533.)

P BIO 535 Operative Techniques in Neurophysiology (2-5) S

Smith

Decerebration, laminectomy, cortical ablation, sterotaxic lesions, cardiovascular surgery, chronic electrode im-plants, anesthesiology. Aseptic procedures and animal care. Prerequisite: permission of instructor.

P BIO 537 Real-Time Computer Systems (3) W Kehl

Use of digital computer as an instrument in biological experimentation. Includes real-time analog-digital conversion, digital-analog conversion, interrupt processing from the "real" world, display and analysis of data. Prerequisite: permission of instructor.

P BIO 541 Motor Systems I: Peripheral Mechanisms (3) A

Luschei

Critical reading and discussion of research papers on the current physiology of the motor unit, afferent inputs and segmental interneurons that control motor units. Each student is responsible for leading the discussion of one topic. Prerequisites: 511 or equivalent, and permission of instructor. (Offered alternate years: offered 1980-81.)

P BIO 542 Motor Systems II: Brainstem Mechanisms (3) W.

Anderson, Fuchs

Critical discussion of research papers and resulting con-cepts regarding the role of various brainstem systems in controlling somatic and ocular movements. Each student is responsible for leading the discussion of one topic. Prerequisites: 511 or equivalent, and permission of in-structor. (Offered alternate years: offered 1980-81.)

P BIO 543 Motor Systems III: Cerebral Cortex and Cerebellum (3) Sp Fetz; Kennedy

Critical reading and discussion of classical and current papers on motor cortex, corticospinal, corticopontine, and corticobulbar systems; on cerebellar circuitry and function, and cerebrocerebellar relations. Each student is responsible for leading the discussion of one topic. Pre-requisites: 511 or equivalent, and permission of instruc-tor. (Offered alternate years: offered 1980-81:)

P BIO 545 Physiology of Vision (3) Sp Teller

Selected readings from recent literature on visual systems. Emphasis is placed on studies of single neuron discharge, but other topics, such as biochemistry of vi-

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sual pigments and optical properties of the eye, are usu-ally included. May be repeated for credit. Prerequisite: permission of instructor. (Not offered every year.)

P BIO 550 Cortical Potentials (4) Towe

Properties of continuous and evoked potentials and their interactions, including the biophysics of their cellular ori-gin. Prerequisites: 515 and permission of instructor.

P BIO 559 Integrative Neurophysiology (3) Sp Towe

Interpretation of neurophysiological phenomena from comparative, biophysical, and evolutionary standpoints. Prerequisite: permission of instructor.

P BIO 560 Contraction of Skeletal Muscle (*) W Gordon

Selected topics on muscle contraction. Consideration of different types of muscle. Reading of original papers. Presentations by students and faculty. Prerequisite: per-mission of instructor. (Not offered every year.)

P BIO 570 Selected Topics in Endocrinology and Metabolism (3) A Gale

Reading and discussion of current literature with emphasis on regulatory mechanisms in mammals. May be repeated for credit. Prerequisite: permission of instructor.

P BIO 594 Neurological Study Unit (2) AW Crill

Crill Faculty and student discussion of neurological topics il-lustrated with clinical cases or demonstrations include the following: physiology, neuroanatomy, neurology, neuropathology, neurosurgery, and psychiatry. May be repeated for credit. Offered on credit/no credit basis only. Prerequisite for medical students: HUBIO 532P taken prior.

P BIO 600 Independent Study of Research (*) AWSpS

P BIO 700 Master's Thesis (*) AWSpS

P BIO 800 Doctoral Dissertation (*) AWSpS

PSYCHIATRY AND BEHAVIORAL SCIENCES

Courses numbered with a P suffix are not graduate courses and are restricted to medical student enrollment only.

PBSCI 267 Mental Health and the Community (2) Broughton

Explores mental health and mental illness in a commulogical, social, and cultural factors. Emphasis on understanding of mental health issues from a consumer as well as a societal perspective. For nonmedical students.

PBSCI 451 Principles of Personality Development (2) Heilbrunn

Development of the personality from infancy through ad-vanced age traced to its physiologic, experiential, and cultural sources with emphasis on psychodynamic concepts and behavior.

PBSCI 452 Clinical Psychiatry (2 or 3) W

PBSUI 432 Clinical repeating (as c)... Reckich Traces the development of psychiatric concepts to the present day, including theories of causation, prevention, and treatment. Emphasis on the use of therapies appropri-ate to the diagnosis. Designed for students preparing for careers in the allied health and behavioral sciences. Di-dentin only for 2 condities didacting blue national demostradactic only for 2 credits; didactic plus patient demonstra-tions for 3 credits. Enrollment unlimited. Prerequisites: permission of instructor for didactic plus patient demonstration only.

PBSCI 497 Seminar on Recent Advances in Medical and Psychiatric Anthropology (3) Sp Chrisman, Kleinman

Review of selected recent advances in theory and research in medical and psychiatric anthropology. Includes comparative studies of medical systems; cultural construction of illness categories and behaviors; culture-bound health-seeking behavior; comparisons of indige-nous and biomedical practitioner-patient transactions; cross-cultural studies of the healing process; cultural analysis of affective and behavioral disorders; and ap-plied clinical relevance of anthropological concepts and findings. Offered jointly with ANTH 498. Prerequisites: 321 and/or permission of instructor. (Limit: thirty students.)

PBSCI 498 Undergraduate Thesis (*) AWSpS Scher, Staff

Opportunity to complete work on psychiatric research projects or to pursue a specific psychiatric topic in depth, for instance, through library research. May be repeated for credit. Perequisite: permission of responsible faculty member. (Two, four, or six weeks, full time, or equiva-lent part-time.) Entry card required.

PBSCI 499 Undergraduate Research (*, max. 15) AWSpS Scher. Staff

Opportunities are available for participation in a wide va-riety of ongoing research in the behavioral sciences and clinical psychiatry, or for the development of an individ-ual investigative project under the supervision of a faculty sponsor. May be repeated for credit. Prerequisite: permission of faculty sponsor. (Two, four, six, or twelve weeks.) Entry card required.

PBSCI 525P Forensic Issues in Mental Illness (3) Sp

Goldenberg Concentration on major areas in psychology and law (e.g., criminal, civil); several outside speakers from pro-fessional, legal, judicial, and psychiatric communities; lectures followed by discussion groups; and case presentations. Background in psychopathology and diagnosis recommended. For medical students, graduate students in the allied health sciences, and advanced law students.

PBSCI 530P Developmental Psychoanalytic Therapy (2) Thorpe

Focus on application of modern psychoanalytic theory (ego psychology, object relations) to developmental psy-chology, psychiatric diagnosis, and psychoanalytic psy-chotherapy. Borderline, narcissistic, and psychotic disor-ders discussed and illustrated with clinical cases. Prerequisites: some familiarity with psychoanalytic the-ory; in good standing as medical student, graduate stu-dent, or psychology intern.

PBSCI 535P Basic Concepts of Modern Psychoanalysis (2)

Psychoanalysis (2) Seminar centering on discussion of assigned readings, augmented by comments from several visiting psychoan-alysts. Emphasis on theory with a certain amount of prac-tice discussed for illustration. Recommended as a desir-able prelude to 530P and 556.

PBSCI 539 Interviewing and Case Formulation (2, max. 6) W

Becker, Carlin

Sessions alternate between intake interviewing of a patient one week and a case presentation on the following week. Emphasis on developing interviewing skills that facilitate psychiatric classification (by the Research Diag-nostic Criteria), case formulation, treatment planning, and case presentation. For graduate students in psycholand case presentation. For graduate students in psychol-ogy, educational psychology, nursing, social work, an-thropology, advanced medical students. Offered jointly wth PSYCH 539. Offered on credit/no credit basis only. Prerequisite: graduate or professional student standing. (Limit: fifteen students.)

PBSCI 540P Physiology of Emotions (*) AWSp Holmes

Seminar based on discussion of selected readings or original articles from psychophysiologic and psycho sociologic literature. Designed to orient and interest stu-dents for participation in current or future research projects and clinical medicine. For medical students; graduate students by permission of instructor. Entry card r.squired.

PBSCI 541P Clinical Geropsychiatry (3) Cohen, Raskind

Cohen, Raskind Clinical and didactic experience in the prevention, diag-nosis, and treatment of mental health problems in the aged, including observation and interaction with well and ill old people in the hospital, extended care facilities, and other community agencies. Explores topics including physical and behavioral changes associated with aging and their relationship to clinical manifestations; differenand their relationship to clinical manifestations; differential diagnosis of the brain syndromes, depression, and paranoia; psychopharmacological and behavioral treat-ment and management strategies; techniques for the as-

sessment of change; community and institutional care; influence of the environment on dependence; and models of care for the aging and aged. Prerequisites: completion of human biology series for third- and fourth-year medical students; others by permission of instructor.

PBSCI 544 Etiology and Epidemiology of Alcoholism and Drug Abuse (3) A Roffman

Intensive survey of the historical evolution of etiological concepts pertaining to alcoholism and drug abuse; review and critique of current research on testing etiological hyand critique of current research on testing eutogical hy-potheses; emphasis on the unique problems of applying epidemiological research methodologies to study of alco-hol and other drugs. Offered jointly with SOC W 544 and PSYCH 580. Prerequisites: graduate or postdoctoral standing in social, behavioral, or biological sciences and permission of instructor. Entry card required.

PBSCI 547P Families and Family Therapy (2) Chiles

Theoretical and practical seminar with review of the literature and discussion, plus a review of videotapes of families in therapy, including: family through history; what is a healthy family; the develomental stages; evaluation of families in distress; couples and couple therapy; family therapy, nonspecific intervention, and specific systems of intervention; indications and contraindications. Open to third- and fourth-year medical students and graduate students.

PBSCI 548P Aging and Adult Development (2)

ASp Preston

Aging in Western technologically advanced societies fre-quently involves losses in status, in stamina, and in economic and social supports. Consideration is given to vari-ous adaptations to losses among the aged. Students select individual projects in the area of aging and work at their own levels of expertise and sophistication. Open to students regardless of major. Seminar format with guided reading.

PBSCI 549P Assessment of the Older Patient (3) W Cohen

Seminar focuses on a special methodology for studying cognitive and affective dysfunction in the elderly and ba-sic methods for diagnosis, management, and assessment of change during treatment. Open to medical students and graduate students in the allied health sciences. Pre-requisites: HUBIO 563P and permission of instructor.

PBSCI 553 Psychodynamics of Psychopathology (2) Sp Heilbrunn

General psychopathologic phenomena and their defense reactions are traced to the developmental history of the individual with attention to constitution and organic causes. The general phenomena are applied to the most important psychiatric syndromes. Relevant case illustra-tions are offered as bases for therapeutic intervention.

PBSCI 556P Classical Readings in Psychiatry (2) Survey of some of the major thinkers and contributors to psychiatric theory, including Sigmund and Anna Freud, Fromm-Reichman, Winnicott, and Eric Erikson. Recom-mended background equivalent of undergraduate courses in basic neuchology. in basic psychology.

PBSCI 557P Behavioral Medicine (2)

Armstrong, Carr Theory and technique of behavioral medicine and behav-Incory and technique of behavioral medicule and behav-ior modification as applied to medical practice. Focus on the use of behavioral techniques in the management of various chronic and acute disorders. Open to second-, third-, and fourth-year medical students and graduate stu-dents in clinical psychology. Others by permission of instructor.

PBSCI 558P Psychosocial Growth and Development (2) A Landesman-Dwyer

Current theories and research related to children's development, with emphasis on the interaction of biological, psychosocial, and cognitive factors. Open to medical students and to advanced undergraduate students.

PBSCI 560P Community Psychiatry (3) A Broughton

Familiarizes students with the role of physician, administrator, and mental-health professional in community mental health centers. Introduces the student to community resource systems and analyzes some of the social problems contributing to community mental health con-cerns. Open to medical students and other graduate students by permission of instructor. (Limit: twelve stu-dents, minimum: four.)

PRSCI 562P Principles of Hypnosis (2) WSp Dworkin, Wall

History and theory of hypnosis. Induction techniques. Application to the treatment of emotional and physical problems. Medical and dental students. Others by permission. Entry card required.

PBSCI 566 Biological Correlates of Psychiatry (2) Heilbrunn

Anatomic, chemical, and electrical communication systems in the brain examined under normal and pathologic conditions. Central localization of emotions and behavior and their neurochemical connections correlated with psychodynamic tenets. Organic causes and therapies for the major psychiatric disorders reviewed in depth. For medical students and for students in the allied mental health professions.

PBSCI 570P Organic Aspects of Behavior (2) Sp Masuda

Biochemical, genetic, pharmacologic, and physiologic factors influencing behavior are studied in a seminar with guided reading. Open to third- and fourth-year medical students and graduate students with permission of in-structor. (Limit: ten students, minimum: five.)

PBSCI 578 Affective Disorders: Theory and Research (2) A

Becker

Causes, sustainers, correlates, and consequences of affective disorders, including biological and psychosocial factors. Emphasis on the latter. Graduate or professional student standing or permission of instructor. Offered jointly with PSYCH 578. Offered on credit/no credit basis only.

PBSCI 579 Depression: Diagnosis and Psychological Treatment (2) Sp Becker

Differential diagnosis of depression and depressive sub-types: with emphasis on psychodynamic, cognitive-behavioral, and combined forms of psychological treatment of less severely incapacitated patients. Some discussion of biological approaches (e.g., antidepressant drugs, electroconvulsive therapy, etc.) as alternative or adjunctive treatments in severe, psychotic, and endogenous-like depressions. Offered jointly with PSYCH 579. Prerequi-sites: graduate or professional student standing or permis-sion of instructor. Recommended: graduate course in psychopathology and personality.

PBSCI 591P Seminars and Conferences in Psychiatry (*) AWSp Scher, Staff

Special seminars and conferences on a variety of topics can be arranged to accommodate the particular interests of students. Prerequisite: permission of responsible fac-ulty member. Entry card required.

PBSCI 592P Behavioral Science Study Unit (*) AWSp Masuda

A variety of topics is presented under the sponsorship of the Department of Psychiatry and Behavioral Sciences, with participation of faculty members from departments throughout the University. May be repeated for credit. Open to medical and graduate students. Entry card required.

PBSCI 664P Basic Clerkship in Ambulatory Services, HCMHC, or Clinic II (12)

Services, HCMHC, or Clinic II (12) Hampson, Hunt, Womack Opportunity to experience a variety of ambulatory ser-vices in Harborview Community Mental Health Center or Psychiatric Outpatient Services for University Hospital located in Clinic II. Focus on improving interviewing skills and developing an interviewing style and content appropriate to patients wth psychiatric dysfunction, and identifying psychiatric dysfunction; gaining familiarity with psychopharmacology; and gaining exposure to, and facilitate management of, problems seen in both psychiatric emergency medicine as well as family prac-tice settings. Offered six weeks full time or twelve weeks half time. Students limited to two during the Summer and five during Autumn, Winter, and Spring quarters. Other basic clerkships that may be elected in lieu of 664P are 665P and 666P.

PBSCI 665P Basic Clinical Clerkship (*, max. 24) Backus, Loebel, Ward

Inpatient clerkship in psychiatry, lasting six weeks. Students have primary responsibility under the direction of attending psychiatrists and residents for diagnosis and care of patients at University Hospital, Harborview Med-ical Center, or Veterans Administration Hospital. Emergency room, crisis intervention, and consultation service experiences complement inpatient experience. Students refine interviewing and diagnostic skills. Principles in the reme merviewing and diagnostic skills. Frinciples in the use of ward milieu management, group psychotherapy, physical and pharmacological therapies, and psychologic testing stressed. Third- and fourth-year medical students only. Other basic clerkships that may be elected in lieu of 665P are 664P and 666P.

PBSCI 666P WAMI Psychiatry and Behavioral Sciences Clerkship (12) AWSpS Wreggit

This training experience is primarily clinical in nature. The rotation aims to increase student's skills in basic psychiatry, social psychiatry, transcultural psychiatry, and office management. Orientation is around the diagnosis, treatment, and clinical management of White, Aleut, In-dian, and Eskimo children and adults in outpatient and community settings, both urban and rural. For third- and fourth-year medical students (other basic clerkships in psychiatry that may be elected in lieu of 666P are 664P and 665P). Prerequisite: HUBIO 563P. (Limit: two students.)

PBSCI 670P Clerkship in Consultation-Liaison Psychiatry (*, max. 24) Kleinman

Evaluation and brief treatment of patients with major psychosocial problems associated with physical disease, including: problems stemming from way illness is per-ceived and experienced, such as maladaptive personal and family coping mechanisms, somatization and inappropriate use of sick role, staff-patient conflicts, and problems in clinical communication and management leading to recognition and treatment of masked depresical discretion, systematic and treatment of masked terres-sion, hysteria, psychophysiological problems, organic brain syndromes, obscure and intractable pain, and termi-nal sickness. Active liaison with colleagues in other clini-cal disciplines. May not be elected to fulfill requirement for basic clerkship (664P, 665P, 666P) in psychiatry.

PBSCI 680P Clerkship in Emergency Psychiatry (*, max. 24)

Daggett

Patients present emergency rooms with a spectrum of acute and emergent psychiatric problems, often com-pounded by associated severe nonpsychiatric illness; acute psychosis, suicidal behavior, violent behavior, acute psychosis, suicidal behavior, violent behavior, acute and chronic organic mental syndromes, and a vari-ety of substance intoxications. Emphasis on clinical eval-uation, acute management, and treatment planning for in-dividual patients. Experience in coordinating these activities with other emergency room personnel, and var-ious hospital and community resources. Teaching by close supervision and didactic conferences. Emphasis on ekile weight to physicines in acute merginly. skills useful to physicians in any specialty. For third- and fourth-year medical students only. Prerequisite: either 664P, 665P, or 666P.

PBSCI 690P Adult Development Program (*, max. 24) AWSpS

Dagadakis

In the Adult Development Program, the student functions as a team member. He or she is expected to participate in all the classes offered in the program. The student funcall the classes offered in the program. The studeni func-tions as a consultant to a client assigned to him or her. The student has an opportunity to acquire experience with a wide variety of behavior change techniques, in-cluding group experiences, role playing, couples work-shops, fixed-role workshop, etc. Third- and fourth-year medical students; second-year medical students with spe-cial permission from Dr. Dagadakis. Twelve-week course option recommended, because it provides best learning experience. This clerkship may not be elected to fulfill requirement for a basic clerkship (664P, 665P, 666P, or 696P) in psychiatry. Prerequisite: HUBIO 523. (Six or twelve weeks, full time: limit three students.) (Six or twelve weeks, full time; limit: three students.)

PBSCI 696P Advanced Clerkship in Child

riscu ovor Advanced Ciertship in Child Psychiatry (12 or 24) AWSpS Reichler, Trapin Child psychiatry rotation provides students an opportu-nity to participate in evaluations and treatment in both outpatient and inpatient settings. Experiences in special-ized clinics such as Drug Evaluation Clinic, Learning Disabilities Clinic, and the Child Development and Mental Retardation Center are also available. Prerequisites: 664P, 665P, or 666P. (Six or twelve weeks, full time; limit: two students [four per quarter]; additional students by permission of instructor only.)

PBSCI 697P Psychiatry Special Electives (*, max. 24)

Eisdorfer, Scher

By special arrangement, clerkships, externships, and re-search opportunities can at times be made available at the University and other institutions. Faculty advises of opportunities. Students should obtain permission from Dr. Scher before obtaining a Special Assignment form from the Dean's Office at least one month before advance regthe Dean's Office at least one month before advance reg-istration. Students should personally contact the affiliating institutions and develop in detail their plan for presentation to the instructor. No funds available for travel or housing. May not be elected to fulfill the re-quirement for a basic clerkship (664P, 665P, 666P) in psychiatry. Prerequisite: permission of Dr. Scher. Entry card comjured card required.

RADIOLOGY

Courses numbered with a P suffix are not graduate courses and are restricted to medical student enrollment only.

RADGY 498 Undergraduate Thesis (*) AWSp

Figley The student may write a thesis in either therapeutic or diagnostic radiology. Medical students only. Prerequisite: permission of instructor.

RADGY 499 Undergraduate Research (*) AWSp Figley

Orgoing projects or a new project designed for the stu-dent. Opportunities in clinical or laboratory investigation in diagnostic and therapeutic radiology and nuclear medi-cine can be provided. Prerequisite: discussion with Dr. Figley or Dr. Nelp.

RADGY 505, 506 Radiological Physics I, II (1-3, max. 3; 1-3, max. 3) A, W

Wootton

Application of physical concepts methodology and in-strumentation in the study, production, and mensuration of lonizing radiations and their interactions with biological materials. Prerequisite: permission of instructor.

RADGY 517 Radiation Dosimetry (3) Sp Bichsel

Bichsel Examines the interactions of ionizing radiations with matter and the physical principles involved in their mea-surement in greater depth than 505. Presented in group tutorial, as well as didactic lecture form. For students contemplating a career in research concerned with ioniz-ing radiation and assumes a sound background in phys-ics. Mailut suited to crudents in the December Scientist ics. Mainly suited to students in the Research Scientist Pathway with at least a physics major at the first degree level and a continuing interest in physics. Prerequisite: permission of instructor.

RADGY 560P Introduction to Clinical Radiology (1) Sp Figley, Gerdes

Elective course intended to introduce clinical diagnostic radiology and radiation oncology. In small tutorial groups, the students analyze x-ray examinations that depict some of the internal structure, function, and derangement studied in the first-year curriculum. In radiation onocology the same group sees patients who are afflicted with cancer, diagnosis and treatment are discussed, building on student knowledge of general and specific organ system pathology. Prerequisite: HUBIO 520P.

RADGY 580P Nuclear Medicine Technique, Physics, and Instrumentation (2½) S Lewellen

Provides familiarization with basic nuclear phenomena and with the instrumentation used in the practice of nu-clear medicine. There are discussions and laboratory ex-ercises. Practical experience in instrument operation and sample counting are provided. Prerequisite: permission of instructor.

RADGY 600 Independent Study or Research (*) AWSpS

Prerequisite: permission of instructor.

SCHOOL OF MEDICINE

RADGY 693P Diagnostic Radiology Clerkship (*, max. 12) AWSp Morishima

Basic clerkship provides a survey of radiology, the depth and breadth of which are individually structured. Instruction and experience in radiation therapy and nuclear medtion and experience in radiation therapy and nuclear med-icine is provided; however, the majority of the time is spent in the diagnostic department. Students observe and participate in ongoing film interpretation, fluoroscopy, and special procedures. A variety of x-ray and clinical conferences can be attended, supplementing daily film-reading sessions and seminars with the staff. Opportuni-ties for self-instruction are provided in the form of read-nom waterial and a large years. these for sent-instruction are provided in the form of read-ing material and a large x-ray teaching file. A short expe-rience in community radiology is designed to provide insight into radiologic care delivery in community prac-tice. Prerequisite: completion of human biology series.

RADGY 695P Clinical Cancer Management (*, max. 8) AWSpS Gerdes (University Hospital)

Supervised participation in clinical management of the patient with cancer. Includes clinical evaluation, plan-ning of treatment, and follow-up examination of patients. Daily teaching conferences. Prerequisite: MED 665P or HUBIO 563P, or permission of instructor. (Two weeks.)

RADGY 696P Nuclear Medicine Clerkship (*, max. 12) AWSpS Nelp

Student participates from 8:00 a.m. to 5:00 p.m. daily in the nuclear medicine clinical laboratory, where diagnos-tic studies of various types are performed. The student has responsibility for examining patients and assists in the diagnostic or therapeutic procedure. He or she assists in ward consultation, attends daily clinical conferences, and participates in the ward rounds of the division. Prerequisite: permission of instructor. (Two, four, or six weeks.)

RADGY 697P Radiology Special Electives (*, max. 24) AWSpS Morishima

By specific arrangement, for qualified students, special clerkship, externship, or research opportunities can at times be made available at institutions other than the University of Washington. The faculty can advise students of possible opportunities. 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.

REHABILITATION MEDICINE

Courses numbered with a P suffix are not graduate courses and are restricted to medical student enrollment only.

REHAB 290 Introduction to Occupational Therapy (2) ASp Becker

Develops understanding of the purpose and philosophy of occupational therapy and the function of the occupational therapist. Includes modalities used, settings in which occupational therapists work, and the therapist/patient relationship. Course may aid student in career selection. Of-fered on credit/no credit basis only. Prerequisite: permission of instructor.

REHAB 320, 321 Medical Science (5,5) W, Sp Staffs of departments of Medicine, Obstetrics and Gynecology, Orthopaedics, Pediatrics, Rehabilitation Medicine, Psychiatry and Behavioral Sciences,

Medicine, Psychiatry and Behavioral Sciences, Radiology, Surgery, and community agencies serving various disability groups Lectures in medical science fields related to: general sur-gery, obstetrics and gynecology, internal medicine, neu-rology, rehabilitation medicine, orthopaedics, psychiatry and behavioral sciences, theumatology, and pediatrics. Required for occupational therapy, prosthetics and orthotics, and physical therapy students, and rehabilita-tion counseling students. Offered on credit/no credit basis only. oniy.

REHAB 332 Pathologic Physiology for Physical Therapists and Occupational Therapists (5) A

Interaptises and occupational interapties (o) a Anderson Emphasis on normal and pathologic physiology of the circulatory, respiratory, central nervous, and musculo-skeletal systems as basis for treatment in occupational therapy, physical therapy, and prosthetics-orthotics. Re-quired for occupational therapy, physical therapy, and

prosthetics and orthotics students; others by permission. Prerequisites: B STR 301, ZOOL 208 or 118, and permission of instructor.

REHAB 340 Spinal Orthotics (3) Sp

Dralle, Simons

Instruction in, and experience with, the use of orthotic components and materials, including layout, measure-ment, and fitting of orthoses for management of spinal pathology. Each student plans, fabricates, and fits orthoses for lumbar, dorsolumbar, thoracic, and cervical regions. Required for prosthetics and orthotics majors; others by permission of instructor.

REHAB 341 Upper-Limb Prosthetics (4) W Daiv

Instruction in, and experience with, the use of prosthetic components and materials, including preprosthetic care, prosthetic components, principles of fabrication and har-nessing, and techniques of checkout and prosthetic train-ing for all amputation types. Required for prosthetics and orthotics majors; others by permission of instructor.

REHAB 342 Upper-Limb Prosthetics II (4) Sp Draile

Instruction in, and experience with, the use of prosthetic Instruction in, and experience with, the use of prosthetic components and materials, including preprosthetic care, prosthetic components, principles of fabrication and har-nessing, and techniques of checkout and prosthetic training for all amputation types. Instruction in, and a re-view of, anatomy, biomechanics, normal and abnormal locomotion, and motor disability as they pertain to upper-limb prosthetics, as well as medical management and experience considerations. prescription considerations. Instruction and practice in immediate postsurgical fitting techniques.

REHAB 343 Upper-Limb Orthotics (6) S Simons

Instruction in, and experience with, the use of orthotic components and materials. Students evaluate and fabricate therapeutic and functional orthoses, including externally powered devices. Required for prosthetics and orthotics majors; others by permission of instructor.

REHAB 380 Occupational Therapy in the Health-Care System (2) A

Hager

Exploration of the meaning of occupational performance and the importance of purposeful activities in maintaining health and an overview of the health-care delivery system as applied to rehabilitation and health maintenance. Prerequisite: occupational therapy major.

REHAB 404 Physical Therapy Management of Patients With Common Musculoskeletal Disorders (4)

Hertling, Kessler

retruing, Ressier Functional anatomy, biomechanics, clinical assessment and management as they relate to patients, with common musculoskeletal disorders, who have been referred to physical therapy services. Emphasis on development of appropriate therapeutic strategies. Prerequisite: major standing only.

REHAB 408 Tests and Measurements in Physical Therapy (3) A

Hertling, Kessler

Methods of performing, recording, and interpreting test procedures used in physical therapy; measurement of joint motion, evaluation of muscle strength through manual tests, and posture and pain evaluation. Labora-tory. Required for physical therapy students.

REHAB 413 Special Studies in Physical Therapy (1-5, max. 15) AWSpS

Series of courses on theory and practice in specialized series of courses on mergy and practice in specianced areas of physical therapy. Includes organization and administration of specialized programs, advanced eval-uation and treatment techniques, role of the consultant. Offered on credit/no credit basis only. Prerequisite: permission of instructor.

REHAB 414 Psychological Aspects of Disability (3) A₩ Fowler, Steger

Psychological processes underlying adjustment to disa-bility; application of behavioral/analysis systems in pa-tient therapy management; effects of intellectual and per-ceptual deficit on patient performance and treatment strategies. Required for physical therapy students; others by permission of instructor.

REHAB 415 Undergraduate Seminar for Physical Therapy Students (2-1-2) A,W,Sp McMillan

Basic principles of medical ethics; history, scope of physical therapy; relationships of physical therapy, occu-pational therapy, nursing, rehabilitation counseling, so-cial service, and other allied services. Required for physical therapy students. Offered on credit/no credit basis only.

REHAB 416 Principles of Physical Therapy Administration (4) Sp McMillan

The nature of administration, economic trends, opera-tional policy, aspects of supervision, ethical and legal in-fluences applicable to a physical therapy department. Required for physical therapy students.

REHAB 420 Lower-Limb Prosthetics I (8) A Dralle, Simons

Drate, Simon in fabrication, fitting, and alignment of the patellar-tendon-bearing prosthesis. Emphasis is placed on the biomechanics of below-knee fit and alignment, dy-namic alignment, and the use of the below-knee adjust-able leg and duplication devices, as well as methods of suspension. Required for prosthetics and orthotics ma-jors; others by permission of instructor.

REHAB 421 Lower-Limb Prosthetics II (11) W Simons

Instruction in stump casting, cast modification, socket fabrication, static and dynamic alignment, alignment du-plication, and suspension system. Required for prosthet-ics and orthotics majors; others by permission of instructor.

REHAB 423 Lower-Limb Orthotics (8) A Simons

Instruction in, and experience with, the use of orthotic components and material, including measurement and fit-ting of lower-limb orthoses and shoe modifications to patients. Each student evaluates patients and plans, fabri-cates, fits, and checks out several orthoses. Required for prosthetics and orthotics majors; others by permission of instructor.

REHAB 427, 428 Applied Prosthetics and Orthotics I, II (1-1-1; 5) Sp,S

Daly, Dralle, Simons

Burther clinical experience in patient evaluation, planning, fabricating, and fitting of prosthetic and orthotic devices, and attendance at prosthetics and orthot-ics clinics at University Hospital and University-affiliated Seattle hospitals. Experience in immediate postoperative prosthetics. Required for prosthetics and orthotics ma-jors; others by permission of instructor.

REHAB 429 Immediate Post-Operative and Early Fitting (3) Sp Daly, Simons, Zettl

Lecture and laboratory designed to introduce the student to the principles of immediate postsurgical prosthetic fit-ting, including patient management for both upper and lower extremities.

REHAB 430 Advanced Limb Prosthetics and Engineering Concepts (4) S Daly, Dralle, Simons

Instruction and experience in the use of prosthetic com-ponents and materials including casting techniques and alignment procedures used for hip disarticulation patients alignment procedures used for hip disarticulation patients and the Symes prostheses. Instruction in, and review of, anatomy, biomechanics, normal and abnormal locomo-tion, and motor disability as they pertain to hip disarticu-lation and Symes prosthetics. Instruction in the physical principles that underlie modern prosthetic/orthotic de-vices and practice. Hydraulic control, material behavior, force analysis and basic electronics with emphasis on condition to exception prostice provides. application to prosthetic/orthotic practice.

REHAB 435 Professional and Therapeutic Communication in Occupational Therapy (3) A Kanny

Review of concepts of social behavior typical of smallgroup interaction and dynamics. Focus on principles and purposes of effective interpersonal and organizational communication. Analysis of selected examples of dys-functional communication are analyzed. Laboratory experience includes practice with various interpersonal and small-group communication techniques. Prerequisite: oc-cupational therapy major.

REHAB 442 Advanced Clinical Kinesiology and **Biomechanics (6) Sp** deLateur, Lehmann

Study of joint motion and muscle function in relation to both the normal and abnormal state. Specific techniques employed in the field of rehabilitation medicine are analyzed. Required for occupational therapy and physical therapy students; others by permission.

REHAB 443 Kinesiology Laboratory (2) Sp Hertling, McGee

Laboratory practice and clinical problem-solving sessions related to joint motion, muscle function, and gait evalua-tions in the normal and abnormal state. Required for students in physical therapy and in prosthetics and orthotics.

REHAB 444-445 Function of the Locomotor System (4-4) A,W Dundore, Lehmann

Dundore, Lehmann Functions of musculoskeletal system as applied to normal and pathologic patterns of motion. Emphasis on upper extremity, shoulder girdle, lower extremity, and trunk. Anatomy of peripheral-vascular and peripheral-nervous system. Required for occupational therapy students and physical therapy students; others by permission of in-structor. Prerequisites: B STR 301, ZOOL 208 or 118.

REHAB 446, 447 Anatomy Laboratory for Occupational Therapists (1,1) A,W

Becker, Lossing Guided self-study of musculoskeletal, peripheral-vascu-lar, and peripheral-nervous systems from prosected material. Required for occupational therapy students.

REHAB 451, 452 Functional Anatomy Laboratory (1,1) A,W McGee

Study of musculoskeletal, peripheral-vascular, and pe-ripheral-nervous systems from prosected material. Re-quired for physical therapy students.

REHAB 460 Physical Therapy Procedures II (2) A McGee *

Introductory principles and concepts related to clinical physical therapy. Laboratory and clinical practice of ba-sic physical therapy procedures in hydrotherapy, ther-motherapy, and cryotherapy. Application of physiologi-cal principles to clinical procedures. Required for physical therapy students.

REHAB 461 Physical Therapy Procedures III (3)

Trotter

Exercises commonly used for treatment purposes in phys-ical therapy. Motor learning, physiological effects, safe and effective utilization of selected equipment, and de-velopment of appropriate exercise programs. Laboratory. Required for physical therapy students.

REHAB 462 Physical Therapy Procedures IV (2)

Sp Heriling Introduction to physical restoration techniques. Lecture Introduction to physical restoration activities; se-

and laboratory in basic transfer; ambulation activities; se-lection, care, and use of wheelchairs, crutches, canes, and other assistive devices. Practice in selected clinical problem-solving sessions. Required for physical therapy students.

REHAB 463 Physical Therapy Procedures V (1-2, max. 2) W

McGee

Theory, technique, demonstration, and practice in the use of the physical agents employed in physical therapy, which include ultraviolet radiation, short-wave dia-thermy, ultrasound, and microwaves. Required for physi-cal therapy students.

REHAB 464 Physical Therapy Procedures VI (4) W Hertling

Lectures and laboratories in massage, traction, and soft-tissue techniques. Required for physical therapy students.

REHAB 466-467 Advanced Biophysical and Physiological Effects of Modalities (2-2) A,W Lehmann

Biophysical principles of equipment employed in physi-cal therapy, physiological effects produced. Required for physical therapy students; others by permission of instructor.

REHAB 468 Therapeutic Modalities: Activities and Analysis (1-4) AWSp Hagedorn

Laboratory devoted to the development of skills in the analysis, adaptation, and teaching of arts and recreational activities with an emphasis on their therapeutic application to occupational therapy. Prerequisite: occupational therapy major standing.

REHAB 469 Therapeutic Modality: Facilitating Movements (1-3) W Becker

Lectures and laboratory practice of special skills in occupational therapy directed toward facilitation of move-ments as applied to the treatment of the physically dis-abled. Emphasis on evaluation skills and treatment techniques in mobility, activities of daily living, muscle, re-education, and upper-extremity prosthetics and orthot-ics. Prerequisite: occupational therapy major.

REHAB 471- Therapeutic Exercise for Neurologic Dysfunctions (5-) A Trotter

Methods of application, physiologic and therapeutic effects of exercises commonly used for treatment purposes in physical therapy. Special attention given to correlation of techniques to appropriate age level and handicap. Simulations of patient management. New developments from the field analyzed and evaluated. Required for physical therapy students.

REHAB -472 Management of Selected Therapeutic Problems (-3) Sp

Trotter

See 471- for course description.

REHAB 473 Administration of Occupational Therapy Services (3) Sp Becker

Develops understanding of organizational structure, ad-ministrative techniques, and communicative processes. Includes principles of cost accounting, personnel man-agement, marketing services, and funding and accounta-bility mechanisms. Provides practice in developing appli-cable skills. Prerequisite: occupational therapy major standing.

REHAB 475 Physical Restoration (2) A

Herling Instruction in theory and methods of physical restoration of the severely handicapped patient. Laboratory demon-stration and practice, in splinting procedures, orthopaedic tractions, and ambulation activities; special problems in the area of activities of daily living. Required for physi-ol theorem students cal therapy students.

REHAB 477 Group Techniques (3) A Kanny

Experience in knowledge and understanding of self, group, and organizational behavior through participation in a learning group and through observation of patient groups. Focal point is directed around the use of activi-ties. Prerequisite: occupational therapy major standing.

REHAB 479 Speech Pathology in a Medical Setting (3) A Beukelmann

The unique aspects of speech pathology in a medical and private practice setting. Introduction to a variety of medical and allied health specialties. Observations of hospital speech pathology practice, comprehensive rehabilitation, and team interaction required. Offered jointly with SPHSC 452.

REHAB 481, 482, 483, 484 The Dynamics of Occupational Therapy (4,4,4,4) Sp,A,W,Sp Hager

Hager Series of sequential interrelated courses examining the development and integration of skills, life tasks, and roles essential to productive living for the individual from birth through old age. The dynamics of occupational therapy in facilitating functional, physical, social, emo-tional, work, and leisure performance of persons whose behavior is dysfunctional in one or more of these areas is studied leabled are accessment methods relation and studied. Included are assessment methods, selection and use of modalities, and effects of cultural and environmental factors on treatment planning. Laboratory ses-sions are scheduled in various clinical settings to provide observation and limited participation in application of treatment principles. Prerequisite: occupational therapy major.

REHAB 489, 490, 491 Clinical Clerkships in Physical Therapy (2,3,4) A,W,Sp Trotter

Observation, instruction, and supervised practice in treat-ment of patients in diverse clinical settings. Emphasis is given to the application of previously learned material and skills to specific clinical problems. Required for physical therapy students. Offered on credit/no credit basis only.

REHAB 492 Pathways in Occupational Therapy (*, max. 3) WSp Becker, Kanny

Provides the opportunity for continued study in a specific area of interest under the preceptorship of selected fac-ulty members with guided readings and clinical experi-ences. Results of each study are shared through periodic class meetings. One quarter required, repeat optional. Offered on credit/no credit basis only. Prerequisite: occupational therapy major.

REHAB 494 Field Experience (2-9, 3 gtrs. max.) Lossing

A minimum of six months of directed and supervised oc-cupational therapy fieldwork experience at the Univer-sity-affiliated hospitals and other approved centers. Required for occupational therapy major. Offered on credit/no credit basis only.

REHAB 495 Clinical Affiliation in Physical Therapy (2-5, max. 5) S

Trotter

Twelve to fifteen weeks with six hundred minimum working hours. Clinical application of physical therapy techniques under supervision in affiliated hospitals. Re-quired for physical therapy students. Offered on credit/no credit basis only.

REHAB 496 Special Topics in Rehabilitation (1-9, max. 14) AWSpS Lucci

Guided opportunity for in-depth study in specific areas of rehabilitation. Topics vary. Prerequisite: permission of instructor.

REHAB 498 Undergraduate Thesis (*) Prerequisite: permission of instructor.

REHAB 499 Undergraduate Research (*) AWSpS Warren

Students are given the opportunity to participate in clinical and basic research under the direct supervision of an instructor. Topics presently under study are: physiology of the locomotor system, effects of physical agents, and psychosocial-vocational aspects of disability. Common methods of the quantitative approach to basic and clinical problems as used in rehabilitation medicine are taught. Opportunities are given for the use of these methods in solving a research project. Prerequisite: permission of instructor.

REHAB 500 Specialized Clinical Experience in Physical Therapy (1-5, max. 15) AWSpS Trotter

Student is assigned to an affiliated clinical facility. Activities could focus on a wide variety of processes. These might include acquisition of an advanced and/or special-ized treatment skill to be used in direct patient care: the development and presentation of an inservice training program; the analysis and assessment of existing supervi-sory problems, such as scheduling procedures. Offered on credit/no credit basis only. Prerequisite: permission of instructor.

REHAB 501 Physical Therapy Management of Selected Motor Problems (2-5, max. 7) ASp Trotter

Study of mechanisms involved in the control of posture and movement. Critical examination of selected literature and techniques dealing with the evaluation or modifica-tion of motor behavior. Prerequisite: physical therapy graduate student standing.

REHAB 504 Physical Therapy Approach to Common Orthopaedic Problems (4) Sp Kessler

Discussion of common disorders affecting the musculoskeletal system, with emphasis on evaluation and physical therapy management of patients with such disorders. Required for Master of Physical Therapy degree students. Prerequisite: 464.

SCHOOL OF NURSING

REHAB 510 Somatopsychology: Psychological Aspects of Disability (3) Sp Fordyce

Psychological adjustment to disability; techniques of milieu management; application of conditioning techniques to treatment structuring; effects of intellectual and per-ceptual deficit; rehabilitation team management. Required for residents: others by permission of instructor.

REHAB 513 Special Studies in Physical Therapy (1-5, max. 15) AWSpS

(1-5, mar. 1-) Avv5p5 Series of courses on 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. Offered on credit/no credit basis only. Prerequisite: permission of instructor.

REHAB 516 Medical Information and **Rehabilitation Counselors (4) Sp** Jamero

prognosis, and physical restoration of common disabling conditions. Case studies are used extensively, and major emphasis is placed on vocational implications of physical disability. Required for rehabilitation counseling students; others by permission of instructor.

REHAB 520 Seminar (1-5) AWSp

Lehmann, Moore Conferences, seminars, discussions of advanced physical medicine and rehabilitation topics for residents and post-doctoral fellows in rehabilitation medicine. Lectures, dis-cussion, and laboratory work in selected aspects of occupational therapy appropriate to elected area of study for applicants for Master of Occupational Therapy de-gree. May be repeated for credit.

REHAB 522 Neurophysiological Topics in Rehabilitation Medicine (2) S

Anderson

Anaerson Review of traditional concepts and an exposition of re-cent advances in neurophysiological research related to the practice of physical medicine. The mechanisms un-derlying facilitation techniques and other techniques used in neuronuscular re-education are examined. Prerequisites: resident M.D. standing or permission of instructor.

REHAB 524, 525, 526 Approach to Treatment Strategies in Occupational Therapy (4,4,4) A,W,Sp Process of collecting, analyzing, and interpreting assess-ment data, formulating treatment objectives, and select-ing and utilizing treatment media. Emphasis on the im-portance of ascertaining all ability requirements for human functional performance with the social, emo-tional, physical, and culturally handicapped. Prerequi-site: occupational therapy major.

REHAB 530 Medical Aspects of Vocational Counseling (3) A Jamero

Introduction to vocational implications of physical and emotional disabilities. Methods, counseling techniques, therapeutic modalities, community resources used in pro-ducing vocational assistance for the handicapped. Prerequisite: resident standing in rehabilitation medicine.

REHAB 532 Clinical Affiliation for Rehabilitation Counselors (5-6) A

Under the general preceptorship of the rehabilitation counseling professional staff, the student counsels and counseling professional start, the student counsels and evaluates patients who have severe physical, emotional, or social problems, arranges for and administers voca-tional testing, obtains placement on job stations, and works with community resources in planning for voca-tional/educational placement after follow-up, and devel-ops activity-oriented schedules. Prerequisite: permission of instructor of instructor.

REHAB 534 Normal Developmental Sequencing in Occupational Therapy (3) AWSp

Tyler Study of the motor, perceptual, cognitive, and social skills of the child from birth to ten years. Laboratory experiences include use of assessment tools and techniques, and detection of perceptiveness of parents' concerns. Pre-requisite: permission of instructor.

REHAB 535 Administration (3) W

Kann

Introduction to administration, management, and super-vision of services in health care. Management theory, specific administrative techniques, formal organizational

structure, and the practical application of this knowledge of occupational theory.

REHAB 539 Communication Disorders in Rehabilitation Medicine (2) S Reukelman

Overview of communication disorders secondary to cen-

tral and peripheral nervous system impairment. Emphasis on facilitating identification of speech/language disorders with discussion of implications for rehabilitation. Prereq-uisite: graduate student status (postdoctoral fellow).

REHAB 540 Application of Measurement Systems (3) Sp Brockway, Klein

Introduction to, and clinical application of, basic measurement concepts pertinent to rehabilitation therapy. Includes quantitative behavioral measurements, test administration and evaluation of the test's adequacy. Prerequisite: permission of instructor.

REHAB 542 Advanced Pediatric Occupational Therapy (3) W Crowe

Provides opportunity to integrate information pertinent to pediatric occupational therapy research, theory, and prac-tice as it relates to developmental disabilities, cerebral palsy, and learning disabilities; and to develop a personal theoretical framework of occupational therapy practice. Prerequisite: permission of instructor.

REHAB 543 Biomechanics Basic to Therapeutics in Physical Medicine (3) Sp

Physical Medicine (3) Sp Lehmann, Simons The physical and mechanical properties of the muscu-loskeletal system are discussed. Mechanical principles in the functional replacement, using ambulation aids, braces, and prosthesis, are reviewed. Emphasis is on ba-sic understanding of the biomechanical principles in-volved, as well as on detailed discussion of clinical application at the level of residents and academician trainces. Prerequisite: resident standing in rehabilitation medicine; others by permission of instructor.

REHAB 550 Electromyography for Occupational Therapists (3) AWSp Kraft

Introduction to clinical electromyography methods as a research tool through demonstrations in advance, and practice sessions. Prerequisite: permission of instructor.

REHAB 553P First-Year Clinical Elective in Physical Medicine and Rehabilitation (3) AWSp Halar

Halar Explores through lecture, demonstration, patient inter-view, and readings the disabling diseases, their func-tional impairment, the family problems produced, and the interplay between disease and the environment. Med-ical, psychological, and social aspects considered. For medical students during their first year. (Two two-hour services reacted for each off during the per week of sessions per week or one-half day per week.)

REHAB 555P Neuromuscular Electrodiagnosis (2½) AWS Kraft

Kraft Demonstration of fundamentals of electromyography and peripheral nerve stimulation followed by student partici-pation in clinical electrodiagnosis examinations. An ef-fort is made to develop in the student an awareness of the usefulness of these tests so that he will, in the future, know when such procedures are indicated for his patients and will be able to interpret the results rather than to de-velop proficiency in performing these examinations. Pre-requisites: HUBIO 564P and permission of instructor.

REHAB 566 Special Topics in Rehabilitation (3) Philosophy and concepts in the interdisciplinary rehabili-tation of persons with major disabilities, including advanced content in the rehabilitation theory and process of selected categories: post-CVA, post-spinal cord in-jury, and chronic back pain.

REHAB 568 Biophysics as Applied to Physical Medicine (2) A Lehmann

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 re-habilitation medicine; others by permission of instructor.

REHAB 596 Electromyography and Electrodiagnosis (3) S. Kraft

Kraft Comprehensive didactive course covering all aspects of clinical electromyography and electrodiagnosis. The course is given in two parts, the first covering basic neu-rophysiology and the second covering clinical electromy-ography, with emphasis on disease states. Prerequisite: residency in rehabilitation medicine; others by permis-sion of instructor.

REHAB 597-598-599 Electromyography and Electrodiagnosis Laboratory (1-1-1) A,W,Sp Kraft

Elective work in clinical electromyography and other electrodiagnostic methods. Prerequisite: residency in re-habilitation medicine; others by permission of instructor.

REHAB 600 Independent Study or Research (*) AWSpS Offered on credit/no credit basis only.

REHAB 654P Second-Year Clinical Elective in Physical Medicine and Rehabilitation (20 or 24) WS O'Shaughnessy, Stolov

Special emphasis on the technique of eliciting historical Special emphasis on the technique of eliciting historical and physical evidence of ability of the patient to function in his environment. Topics include transfer abilities, nor-mal and abnormal gait, reambulation, communication disorders, modalities in physical medicine, psychological aspects of disability, learning aspects in chronic disease, vocational evaluation, principles of physical and occupa-tional therapy, educational problems of the disabled, neu-romuscular electrodiagnosis, braces, and prosthetics. Pa-tients with stroke, amputation, spinal cord injury, traumatic brain injury, and multiple injuries are followed. Patient-care responsibilities are assumed by the student appropriate with his level. Students who have completed the first year of medical school work on ward, two per the first year of medical school work on ward, two per preceptor. Prerequisite: HUBIO 532P. (Ten or twelve weeks, full time.)

REHAB 685P Basic Rehabilitation Medicine (4) AWSpS Stolov

Combined outpatient, inpatient, and consultation structured experience on the wards, where the student studies and plans treatment strategies for a select number of disabled patients. The student learns the functional consequences to support maximal function, and the impact of the illness or the disability on the people around the patient, and in his environment. The concern is with the relationship of disability to work, social functioning, and leisure time. Therapeutic techniques that remove disability are emphasized. Prerequisite: HUBIO 564P. (Two weeks, full time.)

REHAB 686P Rehabilitation Medicine Clerkship-Pediatrics (8 or 12) AWSpS Stolov

Stolov Clerkship experience in the specific rehabilitation ap-proaches for the disabling pediatric diseases. Includes school planning, family counseling, and community sup-port services. The 6-credit (four-week) package is an in-patient experience. The 9-credit (six-week) package is an cludes, in addition, a two-week clinic and consultation experience. Prerequisite: HUBIO 564P; PEDS 665P rec-ommended. (Four or six weeks, full time.)

REHAB 687P Rehabilitation Medicine Clerkship-Medical (8 or 12) AWSpS Stolov

Experience in the specific rehabilitation approaches for the various nonsurgical diseases. Primarily for those in-terested in the medical nonsurgical specialties, and tailored to the individual student's requirements. For third-and fourth-year medical students. Prerequisite: HUBIO 564P. (Four or six weeks, full time; limit: ten students. In summer, offered with 685P or 688P for ten or twelve weeks.)

REHAB 688P Rehabilitation Medicine Clerkship-Surgical (8 or 12) AWSpS Stolov

Stolov Experience in the specific rehabilitation approaches for the various surgical problems. Primarily for those inter-ested in the surgical specialties and tailored to the indi-vidual students. Percequisite: HUBIO 563P. (Four or six weeks, full time; limit; ten students. In summer, of-fered with 686P or 687P for ten or twelve weeks.)

REHAB 696P Rehabilitation Medicine Outpatient Clinics (4) AWSp Stolor

Rehabilitation medicine outpatient clinic experience, two half-days per week. emphasizing continuing care of the patient with chronic disease and disability in order to maintain optimum health and function. Evaluation of new patient for inpatient or outpatient management, and use of physical treatment for ambulatory pain and motion problems. Designed for those interested in family prac-tice and internal medicine. Prerequisite: HUBIO 564P.

REHAB 697P Rehabilitation Medicine Special Electives (*, max. 24) AWSpS Stolog

By specific arrangement, for qualified students, special by specific antagement, for quantum students, specific clerkship, extenship, or research opportunities can at times be made available at institutions other than the Uni-versity of Washington. The faculty can advise students of possible opportunities. Students wishing to elect this course should obtain from the Dean's office a "Special decise are the faculty of the student of the second studen Assignment" form at least one month before preregistration. Prerequisite: permission of instructor.

REHAB 700 Master's Thesis (*) AWSpS Offered on credit/no credit basis only.

SURGERY

Courses numbered with a P suffix are not graduate courses and are restricted to medical student enrollment only.

SURG 498 Undergraduate Thesis (*) AWSpS Schilling Offered to those students who have engaged in under-

graduate research in general surgery. (Full or part time.)

SURG 499 Undergraduate Research (*) AWSpS Schilling

Provides the student with an opportunity to participate in origoing research projects in general surgery being car-ried out by members of the faculty of the Department of Surgery or to carry out an independent research project under supervision. Practical experience in experimental design and execution is provided under the direct superdesign and execution is provided under the direct super-vision of a selected faculty member. Analysis of results and formulation of a report are included. The experience gained in experimental techniques and equipment de-pends upon the project chosen. This course should be of value to any student, regardless of goals, but should be of particular importance to academically oriented individu-als. (Finil or part time) als. (Full or part time.)

CONJ 585 Surgical Anatomy (1-3, max. 12) See Conjoint Courses.

SURG 600 Independent Study or Research (*) AWSoS

SURG 665P Clinical Clerkship (*, max. 24) AWSpS Heimbach

Student is introduced to the diagnosis and the management of problems amenable to surgical therapy. A comprehensive program is offered that includes instruction in the physiological basis of surgical care, differen-tial diagnosis and decision making, and the basic princi-ples of surgical management. Active participation in the care of inpatients and outpatients, including participation in the operating rooms, provides practical experience in the application of these skills. Students are assigned to the surgical service of one of the major affiliated hospitals. Approximately twelve hours per week are devoted to seminars, conferences, and teaching rounds. The remainder of the time is spent working with assigned patients on the ward or in outpatient clinics, in the operating rooms, or in study. Students serve a significant role as a part of the total patient-care team. The course is designed to be of value to all students, regardless of their ultimate interests. The information presented serves as a basic fund of knowledge concerning an important therapeutic modality of nonsurgeons, and as a base for further study for prospective surgeons. Prerequisite: HUBIO 563P. (Six weeks, full time; limit: twenty-four students.)

SURG 681P Peripheral Vascular Disease (4 or 8) AWSp Strandness

An intensive, in-depth look at peripheral arterial and venous problems. This includes: (1) methods of clinical evaluation; (2) new diagnostic procedures; and (3) the

available methods of treatment. Emphasis on active student participation in patient work-up, performance of di-agnostic studies, and presentation of case material to the staff. Two seminars are held weekly with the staff to dis-cuss the pathophysiology of vascular disease. Texts are provided on a loan basis to the students. These cover the entire field and should serve as useful source material for the student. Clerkship consists of seeing patients and working in the clinical setting at both Veterans Administration and University hospitals. Prerequisites: 665P, HUBIO 563P. (Two or four weeks, full time; limit: one student.)

SURG 682P Externship in General Surgery or Clinical Burn Care (*, max. 12) AWSpS Heimbach

Offered on the general surgery wards of the University affiliated hospitals or the burn unit of Harborview Medi-cal Center. Develops knowledge of surgical disease and enhances ability to manage comprehensively the prob-lems encountered in surgical patients. Students function at the intern level under close supervision of the staff and house staff. Focus on diagnosis, preoperative care, and postoperative care; management of surgical emergencies and outpatient follow-up of discharged patients. The extern attends all operative procedures on assigned patients and participates in all rounds and teaching conferences. skills in dealing with medical as well as surgical problems. Prepares the medically or surgically oriented student for internship. For third- and fourth-year stu-dents. Prerequisite: 665P. (Four or six weeks, full time; limit: six students.).

SURG 683P Pediatric Surgery Externship (8 or 12) AWSpS

Stevenson Students participating in the elective clerkship of pedi-atric surgery are based primarily at Children's Orthopedic Hospital and Medical Center. Instruction stresses surgical conditions peculiar to the particular age group. There is obviously a preponderance of various congenital and neo-plastic conditions that are amenable to surgical treatment. It is desirable, therefore, that students who plan to take this elective prepare themselves by acquiring a reason-able background of knowledge in human embryology and genetics. Prerequisite: 665P. (Four or six weeks, full time; limit: two students.)

SURG 684P Trauma and Emergency Care (*, max. 16) AWSpS

Ciliberti, Copass, Eisenberg, Gloster, Heimbach, Miller The student may register for one or both segments of this The state in the register to one of ood segments of this course. Segment 1: emergency medicine and trauma at Harborview Medical Center with assignment to the Emergency Department. Emphasis on the systematic ap-proach of trauma and on the management of critical medproach of trauma and on the management of critical med-ical emergencies. Segment 2: acute and emergency medi-cine at University Hospital, where senior medical students work with an Emergency Medicine Service at-tending faculty member. An extensive syllabus and daily lectures provided at both sites. Prerequisites: 665P, MED 665P. (Four weeks, full time at each hospital; limit: ten fourth-year medical students, Harborview; three fourth-urear medical students, Harborview; three fourthyear medical students, University Hospital.)

SURG 685P Cardiothoracic Surgery Externship (*, max. 12) AWSpS D. Miller

Students actively engage in the care and treatment of inwork closely with the cardiovascular cases. They work closely with the cardiovascular team on preoper-ative diagnostic studies, in the operating room, and in postoperative patient care. Prerequisite: 665P. (Six weeks, full time; limit: two students.)

SURG 686P Plastic Surgery Clerkship and Preceptorship (*, max. 12) AWSp Buehler, Engrav

Buenter, Engrav Plastic surgery service at University-affiliated hospitals; includes patient work-ups and operating room experience with emphasis on learning the fundamentals of plastic surgery. General topics in plastic surgery include wounds, burns, facial trauma, head and neck cancer, cosmetic surgery, skin tumors, hand surgery, and recon-structive surgery. For third- and fourth-year medical stu-dents. Prerequisite: 665P. (Four or six weeks, full time; limit: one student.)

SURG 697P Surgery Special Electives (*, max. 24) AWSpS Schilling

By specific arrangement, for qualified students, special

clerkship, externship, or research opportunities can at times be made available at institutions other than the University of Washington. The faculty can advise students of possible opportunities. Students wishing to elect this course should obtain from the Dean's office a "Special Assignment" form at least one month before preregistration. Prerequisites: 665P and departmental permission. (Four, six, or twelve weeks, full time.)

UROLOGY

Courses numbered with a P suffix are not graduate courses and are restricted to medical student enrollment only.

UROL 498 Undergraduate Thesis (*) AWSpS

Berger Provides an opportunity for medical students to write theses in the area of urology. Prerequisite: permission of sponsor and department.

UROL 499 Undergraduate Research (*) AWSpS

Berger The student participates in current urologic research proj-ects under supervision of full-time staff. Certain specific problems may be elected by the student. Elective for medical students. Prerequisite: permission of sponsor and department.

UROL 675P Urology Preceptorship (*, max. 8) AWSpS

Berger

Student follows a preceptor in all of his or her work in order to better understand the pathophysiology and man-agement of the problems of the urogenital system and to become acquainted with the office management of uro-logical problems. Prerequisite: HUBIO 562P. (Two or four weeks.)

UROL 680P Urology Clerkship (*, max. 8)

AWSpS Ansell, Berger, Chapman, Correa, Mason, Mayo Student participates in the full activities of the clinical service, which includes both outpatients and inpatients, which includes both outpatients and inpatients, and a service of the clinical principally the latter. Basic principles of urology are em-phasized: infection, obstruction, trauma, tumors, stones, male fertility, renovascular hypertension, and pediatric urology. Prerequisite: HUBIO 562P. (Two or four weeks.)

UROL 685P Urology Subinternship (*, max. 12) AWSpS

Ansell, Berger, Chapman, Correa, Mason, Mayo

Subintern is responsible for patient work-ups and for pre-Submern is responsible for patient work-ups and for pre-operative and postoperative care and participates in the operating room at the appropriate level of competency and training. The student participates in ward rounds and urology conferences at selected hospitals. Participating individuals should be prepared to work hard and, in turn, expect comparable dividends beyond those of the stan-dard clerkship. Prerequisite: MED 66SP or PEDS 66SP or permission of instructor. or permission of instructor.

UROL 697P Urology Special Electives (*, max. 24) AWSpS

Berger

By special arrangement, for qualified students, special clerkship, externship, or research opportunities can at times be made available at institutions other than the University of Washington. The faculty can advise students of possible opportunities. 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.)

SCHOOL OF NURSING

Courses for Undergraduates (Majors only)

NURS 263 Communication in Helping Relationships (3) WS

Introduction to communication within the helping process. Factors affecting communication, such as anxiety, anger. Setting and purpose are discussed. Interviewing

SCHOOL OF NURSING

individuals and analyzing the interactions required. Open to nursing majors only. Prerequisites: sophomore stand-ing and PSYCH 101.

NURS 281 Nursing Process I (6) WS Beginning course in nursing process: systematic method of assessing human needs and maintaining optimal health. Theory, seminar, and clinical laboratory include application of the process to selected functional status abilities of patients in various clinical settings. Three hours theory, seminar; eight hours laboratory weekly. Prerequisites: sophomore standing, MICRO 301, 302, CONI 317-318, CHEM 101, 102, KINPE 205, PHARM 315, NUTR 301.

NURS 290 History of Nursing (2) AWSp History of nursing from antiquity to the present. Ex-amines forces that shaped nursing, including the social, cultural, economic, and scientific. Role of woman and its influence on nursing, with special emphasis on past and present leaders of nursing and their unique contribution to nursing. Reviews the present role of the nurse. Elec-tive course open to all interested students.

NURS 297 Human Development I: Adolescence

NUKS 297 Human Development I: Addressence Through Aging (3) WS Study and practice include parameters of growth and de-velopment from addressence, through early adulthood and middle age to old age; developmental tasks related to these age periods; environmental influences that affect maturation; contemporary life styles and developmental trends. Open to nonnursing majors with permission. Two hours lecture, one hour seminar weekly. Prerequisites: sophomore standing and CONJ 317-318 or equivalent, or permission of Undergraduate Advising Office.

NURS 300 Human Development II: Conception Through School Age (3) ASp Further development of knowledge and skills established

Further development of knowledge and skills established in 297. Development of assessment skills and knowledge basic to management of infants, preschoolers, school-age children. Study and practice include parameters of normal growth and development from conception through school age; child-rearing practices; selected be-havior patterns; environmental influences on growth and development and more rearrant logences. One to page development, and major parental concerns. Open to noning Office. Prerequisites: 297 and sophomore standing.

NURS 302 Nursing Process II (6) ASp Continuation of 281. Theory and seminar: nursing process related to selected human needs. Clinical labora-tory increases depth and breadth of nursing process and skills. Three hours theory, seminar; eight hours labora-tory weekly. Prerequisite: 281; 300 and 303 may be taken prior to opecurently. prior to or concurrently.

NURS 303 Psychosocial Care in Adaptive and Maladaptive Behaviors (2) ASp Behavioral responses to social, psychological, and physi-ological factors. Rationale and techniques for care and treatment: crisis intervention, chemotherapy, counseling. Contemporary issues in prevention and treatment. Open to nursing majors only. Prerequisites: 263, sophomore standing, and PSYCH 101, or permission of Undergradu-ate Advising Office.

NURS 321 Nursing Care of Ill Adults I (5) ASp Commonly occurring alterations, involving concept of dynamic equilibrium and compensatory mechanisms that produce broad pathological changes, are considered as a basis for comprehensive nursing interventions in the care of the ill adult. Prerequisites: 263, 300, 302, 303; 321 taken concurrently with, or prior to, 322, or permission of Undergraduate Advising Office.

NURS 322 Nursing Care of Ill Adults I Laboratory

(8) ASp Application of scientific principles to the nursing care of ill adults in the acute-care setting. Emphasis is on increasing skill in orderly patient assessment, developing competency with common nursing therapics, and identi-fying common elements and significant differences in the physiological alteration. Three weeks of operating room experience included or in 324. Two hours clinical seminar, fourteen hours laboratory weekly. Offered on credit/no credit basis only. Prerequisites: 263, 300, 302, 303; 321 taken concurrently or later with permission of Undergraduate Advising Office.

NURS 323 Nursing Care of III Adults II (5) WS Alteration of function in selected systems leads to broad-

ening and deepening knowledge relevant to the care of ill adults. Emphasis on the preventive, maintenance, and restorative elements of comprehensive nursing care; immediate, acute, and long term. Prerequisites: 321, 322; 323 taken concurrently with, or prior to, 324, or permis-sion of Undergraduate Advising Office.

NURS 324 Nursing Care of Ill Adults II Laboratory

NURS 324 Nursing Care of III Adults II Laboratory (8) WS Comprehensive nursing care of hospitalized adults with more complex physiological alterations. Previous knowl-edge and skills are increased, with emphasis on the syn-thesis and application of knowledge underlying critical thinking, sound clinical judgment, and evaluation in the nursing process. Three weeks of operating room experi-ence included or in 322. Taken concurrently with 323 or later with permission of Undergraduate Advising Office. Two hours clinical seminar, fourteen hours laboratory tweekly Offered on credit/no credit basis only. weekly. Offered on credit/no credit basis only.

NURS 327 Nursing of Children (4) AWSpS Builds on previous nursing courses and includes essential concepts of pediatric nursing. Student gains appreciation of the current philosophy of child care; impact of disease, disability, and health-care settings on the child and on the family; common congenital conditions and diseases af-cortise of bildren and carels. family; common congenital condutions and diseases af-fecting children; and goals, methods, and resources for health care of children. Prerequisites: 300, 323, 324; taken concurrently with, or prior to, 328, or permission of Undergraduate Advising Office.

NURS 328 Nursing of Children, Laboratory (8) AWSpS Emphasis on adaptation of skills and knowledge to nurs-

ing of children and the incorporation of new pediatric ing of children and the incorporation of new pediatric content. Student applies the nursing process in caring for pediatric patients in the hospital and ambulatory settings. Technical and professional skills build upon proficiency established in previous clinical courses. Experiences complement theory content in 327 whenever possible. Offered on credit/no credit basis only. Prerequisites: 300, 324, taken concurrently with 327, or later with permission of Undergraduate Advising Office.

NURS 350 Advanced Nursing Process (5) WS Advanced course for registered nurses on the decisionmaking process used in management of nursing problems and selected skills used in the assessment and implementation phases. Students analyze and test in clinical prac-tice: the manner in which value systems impact on the nursing process; the theoretic rationale as a basis for the nursing process; a conceptual system for organizing the knowledge base for effective use in the nursing process; knowledge case for effective use in the nursing process; and the systematic use of all steps of the nursing process. Prerequisites: admission to the upper-division registered nurse major and CONJ 317-318 (or taken concurrently). Four hours seminar, six hours laboratory weekly, workstudy option.

NURS 351 Changing Concepts of Professional Nursing (4) Exploration of current concepts of nursing and nursing

education including present and potential roles, responsi-bilities and required competencies of professional nurses in our society. Prerequisite: junior year standing in the registered nurse curriculum pattern.

NURS 353 Scientific Basis for Nursing Actions (3-9, max. 9) Homeostasis is used as an organizing concept to enable the student to assess selected alterations of physiological equilibrium, to derive appropriate nursing interventions, and to evaluate outcomes of nursing actions and related therapies.

NURS 354 Comprehensive Maternal-Child Nursing

(6) ASp Current theories, concepts, and principles applicable to maternal-child nursing. Emphasis on application of relevant principles from the humanities, natural and social sciences, and psychiatric nursing. Three hours of theory, six hours of clinical laboratory weekly, work-study op-

NURS 356 Comprehensive Medical-Surgical

NURS 356 Comprehensive Medical-Surgical Nursing (4) ASp Theories, concepts, and principles in assessing, plan-ning, and evaluating the nursing care of selected adult medical-surgical patients. Emphasis on prevention, reha-bilitation, continuity of care, and application of science principles. Six hours of clinical laboratory weekly. Pre-requisites: insize user standing in the registered nurse requisites: junior year standing in the registered nurse curriculum pattern, and 351 and 353.

NURS 361 Cultural Variation and Nursing Practice (3) WS

Ethnomedical beliefs, values, and practices pertaining to illness-wellness, care seeking, and healing. Comparative approach emphasizing cross-cultural similarities and differences. Focus is on value orientations influencing the effectiveness of professional nurses working with people of different backgrounds. Open to nonnursing majors with permission of Undergraduate Advising Office. Pre-requisite: upper-division standing. Recommended: ANTH 202.

NURS 397 Scientific Basis for Nursing Interventions (5) ASp

(5) ASp For registered nurses. Builds on basic knowledge of nor-mal and abnormal physiology and incorporates concepts from social and psychological sciences. Functional adap-tations to changes in the external and internal environ-ments are considered in terms of mechanisms maintaining homeostasis and the responses elicited by se-loated three of elters. Changes in present during a origin. lected types of stress. Changes in response during aging are emphasized. The nursing process framework is used to consider preventive, maintenance, and restorative aspects of nursing. Prerequisites: admission to the upper-division registered nurse major, 350. Taken concurrently with 398.

NURS 398 Care of III Adults III (4) ASp For registered nurses. Synthesis and application of the nursing process are demonstrated in the comprehensive nursing process are demonstrated in the comprehensive care of adults with complex alterations in normal physio-logical functioning. Emphasis on critical thinking, sound clinical judgment, and evaluation. Offered on credit/no credit basis only. Prerequisite: 350. Taken concurrently with 397, or later with permission of Undergraduate Advising Office. Eight hours laboratory weekly.

NURS 400 Family-Centered Maternal and Child

Nursing in the Community (6) AWSpS Focus is on the normal family through pregnancy, child-birth, child rearing, and climacteric. Clinical experiences are provided in community and institutional settings. Two hours lecture, eight hours laboratory weekly. Pre-requisites: 327, 328, 403, 407 and 400 prior to 425 in maternal and child nursing.

NURS 402 Maximizing Health in the Community (9) AWSpS

Synthesis and application of the process of community Synthesis and application of the process of community health nursing, community organization, and public health and epidemiological principles. Emphasis on pre-vention of disease, health maintenance and health promo-tion within households, families, groups, and communi-ties. Students collaborate with health-team members, using an interdisciplinary approach in a variety of set-tings. Prerequisites: 327, 328, 403, 407; 402 must be taken prior to 423.

NURS 403 Psychosocial Nursing Care in Adaptive and Maladaptive Behaviors II (3) AWSpS Concepts and principles of care of emotionally disturbed persons with emphasis on the social milieu. Includes study of dynamics and behavior patterns associated with maladaptive behavior, plus theories and rationale of nurs-ing intervention and rehabilitation. Open to nursing ma-ter with unice structing jors with junior standing.

NURS 405 Care Systems Analysis (3) ASp Comparative analysis of past, current, and emerging health-care systems and their effect on the delivery of nursing care services. Emphasis on the health-care needs and values of the public and socioeconomic, political, and technological factors that influence the delivery of nursing care services. Open to nonnursing majors with permission of Undergraduate Advising Office. Prerequi-site: upper-division standing.

NURS 406 Introduction to Research in Nursing (3)

AWSpS Introduction to concepts and processes of research uti-lized in investigation of nursing problems. Prerequisites: one elementary statistics course, SOC 223, EDPSY 490 or BIOST 472.

NURS 407 Psychosocial Nursing Practice (7) AWSpS

Application of principles and concepts in care of emotionally disturbed persons with emphasis on treatment modalities such as group therapy, client-centered ther-apy, environmental management, and social action. Includes experiences in acute care, day care, congregate care, and outpatient facilities. Two hours of clinical sem-inar and twelve hours of laboratory weekly. Open to

nursing majors with junior standing. Taken concurrently with 403 or later with permission of Undergraduate Advising Office. Offered on credit/no credit basis only.

NURS 412 Scientific Principles in Nursing Care (3) Undergraduate seminar devoted to critical analysis of selected nursing situations, with identification of the natural and behavioral science principles that guide nursing actions. Prerequisite: senior standing in the School of Nursing

NURS 420 Special Fields of Community Health Nursing (3-8) Å

Nursing (3-8) A Practicum devoted to nursing responsibilities in special fields such as school health nursing or occupational health nursing. Emphasis and credit of course varies with the interest and needs of the student. Nine to twenty-four hours clinical laboratory weekly, including two hours of conference. Prerequisites: 402 or equivalent and postbac-calaureate standing in the School of Nursing.

NURS 423 Senior Practicum in Community Health-Care Systems (12) AWSpS

Further development, critical examination, and synthesis of nursing care in community health-care systems with focus upon practice, leadership skills, application of se-lected theoretical concepts, research findings and assessneutron incontential concepts, research intollings and assess-ment of issues, problems, and forces impinging upon quality of care and health-delivery modes. Two to five hours of lecture, twenty-one to thirty hours of laboratory weekly. Prerequisites: 402 and senior standing.

NURS 424 Senior Practicum in Psychosocial Nursing (12) AWSpS

Nursing (12) AWSpS Further development, critical examination, and synthesis of nursing care in psychosocial nursing with focus upon practice, leadership skills, application of selected theoret-ical concepts, research finding and assessment of issues, problems and forces impinging upon quality of care and health-delivery modes. Two to five hours of lecture, twenty-one to thirty hours of laboratory weekly. Prereq-uisite: senior standing.

NURS 425 Senior Practicum in Maternal Child Nursing (12) AWSpS Further development, critical examination, and synthesis of nursing care in maternal child nursing with focus upon practice, leadership skills, application of selected theoret-ical concepts, research findings and assessment of issues, problems and forces impinging upon quality of care and health-delivery modes. Two to five hours of lecture, twenty-one to thirty hours of laboratory weekly. Prereq-uisites: 400 and senior standing.

NURS 426 Senior Practicum in Advanced Medical-

Surgical Nursing (12) AWSpS Purther development, critical examination, and synthesis of nursing care in medical-surgical nursing with focus upon practice, leadership skills, application of selected theoretical concepts, research findings and assessment of issues, problems and forces impinging upon quality of care and health-delivery modes. Two to five hours of lec-ture, twenty-one to thirty hours of laboratory weekly. Prerequisite: senior standing.

NURS 429 Nursing Functions in Gerontology (2)

Aging as a normal developmental process; the problems of the aged; the community resources available; and the derivation of implications for nursing care of aged per-sons from gerontological concepts. Prerequisite: permission of instructor.

NURS 499 Undergraduate Research (1-5, max. 5) AWSpS

Supervised individual research on a specific nursing problem. Prerequisites: junior year standing in the School of Nursing, cumulative grade-point average of 3.00 or better, and permission of Undergraduate Advising Office.

Courses for Graduates Only

NURS 436 Interpersonal Interaction in Staff-Parent-Child Relationships (3) AWSpS Emphasizes teaching and evaluative strategies to assist professionals or students working, or intending to work, with parents in centers serving children. Introduction to basic communication theory. Sessions with individuals and analysis of interactions is required. Audiovisual emigrave for the surges of chearing according, and equipment for the purpose of observing, recording, and identifying behavioral units and patterns for analysis is strongly recommended, but optional. At present, offered by the Maternal-Child Nursing Department only through Independent Study by Correspondence. Prerequisite: se-nior standing, RN licensure or equivalent in other "helping" discipline.

NURS 438 Practice Teaching in Maternal and Child Nursing (3) S

Guided experience in selected teaching-learning situa-tions in clinical nursing. Identification, analysis, and solution of teaching-learning problems in clinical nurs-ing. A minimum of seven hours of guided experience weekly. Prerequisites: 530, 531, 532.

NURS 450 Advanced Fieldwork Community Health Nursing (2) W

Guided experience in identifying nursing problems, iden-tifying rationales for implementing nursing therapy, and evaluating results in selected situations in community health nursing. An application of core concepts presented in 523. A minimum of four hours of guided experience weekly. Prerequisite: 523.

NURS 452 Health Assessment of Adults and Children (5) A

Systematic approach to the collection, analysis, and eval-uation of physical, psychosocial, and historical data nec-essary to administer primary health care to adults and children. Delineation of subjective and objective findings as they deviate from normal. Selected diagnostic pro-cedures. Requires eighty hours of self-directed multi-media study and selected supervised fieldwork in the primary health-care setting.

NURS 458 Practice Teaching Community Health Nursing (3) Sp

Guided experience in selected teaching-learning situa-tions in community health nursing. Identification, analy-sis, and solution of teaching-learning problems. A mini-mum of seven hours of guided experience weekly. Prerequisite: 450.

NURS 460 Seminar in Interpersonal Approaches in Nursing (2) S

Theoretical basis for interpersonal process in the treat-ment of maladaptive behaviors. Synthesis of nursing in-tervention, based on concepts in psychosocial nursing and in the social and behavioral sciences. Analysis of social, medical, and educative models for treating behav-ioral disorders and the rationale for use of medications in psychiatric treatment.

NURS 464 The Community and Mental Health: Theory and Research Foundations (3) ASp

Study of factors contributing to mental health and mental illness; the impact of values, ethnic and racial differ-ences, social status differences, and selected group di-mensions on individuals in different communities. Opportunity to compare indices of mental health and illness, concepts of community, and parameters of community structure employed in the study of community mental health.

NURS 466 Continuing Education in Nursing (3) ASp

Planning, developing, and evaluating continuing educa-tion 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. Prerequisite: graduate standing.

NURS 467 Evaluation of Performance in Nursing (3) S Philosophy and rationale of evaluation for nurses with

administrative, teaching, and supervisory responsibility in various health agencies. The purposes of evaluation as they relate to guidance of students or staff toward per-sonal satisfaction and growth, and toward improved patient care.

NURS 470 Practicum in Interpersonal Approaches in Nursing (2-6) AS

Supervised experience in working with individuals who Supervised spectrates in working with instructions who are experiencing emotional distress. Guided experiences in individual therapy approaches are oriented toward as-sisting the client to identify and alter maladaptive behav-iors. Prerequisite: 460, which may be taken concurrently, or equivalent.

NURS 488 Effects of Alcohol and Its Relation to

Health and Disease (3) ASpS Intensive inquiry into the effects of alcohol on the total person with emphasis on the physiological effects, utiliz-

ing case studies, research reports, and audiovisual mate-rials. Focus on studying methods used in the assessment of patients, in patient management, and in evaluation of therapeutic intervention. Open to students in other disciplines. Prerequisite: permission of Alcoholism Office.

NURS 489 Alcohol Problems in Family and Society (3) WS

(3) WS Analysis of family problems associated with alcoholism. Emphasis on psychological, cultural, and social implica-tions; examination of various counseling practices em-ployed and theories of prevention. Open to upper-divi-tion and theories of prevention. Open to upper-divi-tion and theories of prevention. sion and graduate students. Prerequisite: permission of Alcoholism Office.

NURS 490 Alcohol Practicum I (2-6, max. 6) AWSpS Guided practicum in nursing of alcohol- and drug-depen-

dent persons; prevention, management, and rehabilitation dent persons; prevention, management, and rehabilitation of the acutely ill. Major components include the critical assessment of patients, including physical examinations, nursing histories, evaluation of therapeutic interventions, and analysis of preventive methods employed with spe-cific groups. Weekly conferences provide guidance to learning. Credit variable, depending upon objectives agreed upon by student in counsel with faculty adviser. Offered on credit/no credit basis only.

UCONJ 490 Social Sensitivity in Health Care (3) AWSp

For course description, see Interschool or Intercollege Programs.

NURS 491 Alcohol Practicum II (2-6, max. 6) AWSpS

Guided practicum in nursing of alcohol- and drug-dependent persons; postacute stage of illness. Students function as primary or cotherapists in the application and evaluation of selected therapeutic interventions. Weekly conferences provide guidance for learning, based on an analysis of audiotapes, videotapes, and process recordings of students' experiences with clients. Offered on credit/no credit basis only.

NURS 495 Child Rearing, Culture, and Health (3)Sp

Cross-cultural study of the child-rearing practices, cul-tural norms, and health behavior of children and adolescents in different societies. Comparative approaches, diverse theoretical postures, and empirical research find-ings are used to study socialization practices and their re-lationship to cultural, social, and health systems of se-lected cultures. Offered jointly with ANTH 440. Prerequisite: permission of departmental adviser.

NURS 502 Applied Group Development Principles (3) AWSp

(3) AWSp Evaluation of selected theoretical concepts relating to dy-namics operating in groups; analysis of process and de-velopment of skills to increase group productivity through class and laboratory sessions.

NURS 503 Seminar in Psychosocial Family Theory (4) W

(4) W Examination of theories relevant to psychosocial family intervention into problems of children, adults, and the aged. Analysis of appropriateness of theories for nursing theory development, practice, and research.

NURS 504 Theories of Intervention and Process in Family and Child Treatment (3) Sp Critical review of the family assessment and intervention

ing adaptation to psychosocial nursing practice. Prerequi-site: 503.

NURS 505 Selected Topics in Psychosocial Nursing

NUKS S05 Selected Topics in Psychosocial Nursing (2-10, max. 10) AWSpS In-depth exploration of the major theoretical issues in psychosocial nursing. Seminar with analysis and discus-sion of selected topics and readings and implications for research and health care.

NURS 506 Seminar in Nursing Administration (3)

Sp Critical analyses of problems affecting the administration of nursing. Intensive directed study of the conditions that influence human behavior in nursing work environments. Prerequisites: graduate standing, ADMIN 510, and per-

NURS 508 Historical and Contemporar

Perspectives in Personality Theories (3) ASp Social history is examined as influenced by selected per-

sonality theories. A comparative analysis of psycho-analytic learning, and phenomenological personality the-ories with emphasis on orientations toward health, illness, and treatment.

NURS 509 Practice Teaching in Physiological Nursing (3) A

Guided experience in selected teaching-learning situations in nursing, in both classroom and clinical situa-tions. Identification, analysis, and solution of teaching-learning problems in clinical nursing. Minimum of seven hours of guided experience weekly. Prerequisite: 540.

NURS 510 Curriculum Development in Nursing Education (3 or 5) WS

Theoretical rationale for curriculum development, study of curricular problems in nursing in relation to the ele-ments of the curriculum as described in a curricular de-sign. The 5-credit plan includes the development of a curricular plan in a simulated faculty group.

NURS 511 Theoretical Bases for Management of Stress Response (3) W

Suress Response (3) w Seminar and clinical experiences centering on interrela-tionships of physical and emotional aspects of illness and development of principles of nursing care. Minimum of four hours of guided experience weekly. Prerequisite: 547 or permission of departmental adviser.

NURS 512 Community Mental Health: Strategies and Programs (3) AS

Community mental health as the study of problems and Community memarinean as the study of pilotents and the implementation of strategies to alleviate invidious so-ciopsychological factors that afflict high-risk mental ill-ness populations. Includes study of multidisciplinary re-lationships, community organization, and psychiatric hardings, communy organization, and polynamic readitions that inhibit or potentiate community mental health programs, and evaluation of community mental health programs and social action strategies.

NURS 513 Seminar in Group Treatment (2) Sp Seminar on the theoretical basis for working with various treatment on the development of therapeutic group experi-tions in the development of therapeutic group experiences.

NURS 514 Practicum for Community Mental Health (3-3) WSp Field study in community assessment and social action relative to mental health. Experiences include the devel-opment and evaluation of community mental health programs through participation with community members, community groups, and practicing professionals. Offered on credit/no credit basis only. Prerequisite: 512.

NURS 515 Stress Management Seminar Fleid Study (3, max. 6) AS Theory and supervised field experience in self-manage-

ment techniques for clients with dysfunctional stress responses, including training in relaxation responses, biofeedback, behavior modification, and counseling. Emphasis on use of data as feedback for client treatment and evaluation of outcomes. Prerequisites: 511, 547, P BIO 403 or PSYCH 421, or equivalent and permission of departmental adviser.

NURS 520 Methods of Research in Nursing (3) A Research process as it applies to nursing. Use of the literature in building theoretical rationale. Selection of appropriate methods. Presentation of findings. Minimum of two laboratory hours weekly. Prerequisite: a course in training. statistics.

NURS 521 Methods of Research in Nursing (2) W Continuation of 520, with emphasis on methods of re-search applied to the solution of problems in all fields of nursing.

NURS 523 Seminar in Therapeutic Nursing Process 1 (3) AS

Analysis and synthesis of concepts relevant to therapeutic Analysis and synthesis of concepts relevant to the appendic nursing based upon consideration of the dignity of man and selected aspects of theories related to the interaction process in nurse-patient relationships. Library research, field study, and minimum of two laboratory hours weekly.

NURS 524 Seminar in Nursing Leadership

RURS 324 Settimate to runsing second sup **Processes (3) ASp** Considers the dynamic processes involved in leadership roles assumed by nurses in a variety of settings. Included in the course is an explanation of the complex human re-

lationships integral to leader functions in the attainment of health goals. Minimum of two laboratory hours weekly.

NURS 525 Seminar in Therapeutic Nursing Process II (3) WS

Analysis and synthesis of concepts relevant to therapeutic nursing based upon a consideration of responses to crises and factors in health and illness. Library research, field study, and minimum of two laboratory hours weekly.

NURS 526 Evaluative Analysis of Health-Care Programs (3) AS Evaluative analysis of health-care programs in light of

decision-making processes. Attention centers on the evaluative analysis, developing measurable objectives, measurement of quantitative and qualitative objectives, experimental design, reliability and validity of measure-ments, and goal attainment scaling as a means for measuring treatment outcome. Prerequisite: one quarter of statistics.

NURS 527 Practicum in Family Treatment (2-6) SpS

SpS Supervised experience as a cotherapist within a family. Opportunities for primary and secondary intervention in family crises, as well as longer term therapy. Emphasis on treatment of all family members, including extended family as appropriate. Supervision provided by nursing faculty member. Offered on credit/no credit basis only. Prerequisites: 503, 504, which may be taken concur-rently, or equivalent, and permission of departmental ad-viser. viser.

NURS 528 Field Study in Evaluative Analysis for Health Care Programs (3, mar. 6) WSp Field study in evaluation. Experiences include pre-evalu-

ation studies; consultation with community members, community groups, and agency personnel to operational-ize health-care program objectives in terms of measurable goals; construction of evaluation protocols; and assessment of program functioning in relation to program ob-jectives. Offered on credit/no credit basis only. Pre-requisite: 526.

NURS 529 Practicum in Group Treatment (2-6) SpS NORS 529 Practicum in Group Presentent (2-0) SpS Supervised experience working as primary therapist or cotherapist in a group. Opportunity is provided to prac-tice selected therapeutic techniques in therapy groups. Supervision is provided by nursing faculty member. Of-fered on credit/no credit basis only. Prerequisites: 502, 513, or equivalent, which may be taken concurrently, and permission of departmental adviser.

NURS 530 Maternal and Child Nursing: Concepts, Issues, and Trends (3) A Lectures and seminars of this core course are designed to

assist the graduate student to explore and analyze selected topics of the theoretical framework, societal influ-ences, current trends and health needs upon which the practice of maternal and child nursing is based. Seminars focus the lecture content to the four specific pathways: nursing of children, maternal-infant nursing, predictive nursing care of the infant and young child, and handi-capped-child care.

NURS 531 Maternal and Child Nursing:

Assessment and Prediction (4) W Theories and issues related to health care of families with special emphasis on the events of pregnancy, growth and development, and illness in the child's life. Alternative seminars and pathway field experiences available in nurs-ing care of children, predictive health of the neonate and young child, and maternal-infant nursing. Prerequisite: 530.

NURS 532 Maternal and Child Nursing: Care Process (1-5, max. 8) SpS

Therapeutic approaches to care of mothers, infants, and children in a variety of health settings. Involves individ-ual and group strategies of health-care delivery. Student continues in selected pathway directions. 3 credits re-quired for all MCN majors. Course may be repeated for a maximum of 5 additional credits. Prerequisites: 530, 531.

NURS 534 Cultural Influences Upon Parenting (3)

Sp Data from several cultures to compare cross-cultural sim-ilarities and differences in: definitions of ideal parenting; socializations into a parent role; social support for, and controls upon, parenting. Analysis of additional effects of changes in ideology, technology, and demography upon cultural parenting roles. Prerequisite: permission of departmental adviser.

NURS 535 Nursing the Child With Handicaps: Evaluation (3) A

Systematic observation and assessment methods designed to evaluate growth and development of newborns, into evaluate growth and development of newdorns, in-fants, and the young child, and recognition of develop-mental delays associated with handicapping conditions. Minimum of four hours field study weekly. Enrollment limited. Prerequisite: permission of departmental adviser.

NURS 536 Operant Techniques in Modification of Deviant Behavior (3) Sp Systematic analyses of selected sequences of behavioral interactions among children, families, and health-care personnel, and implementation of programs designed to influence and evaluate behavioral outcomes. Minimum of four hours field study weekly. Enrollment limited. Prerequisite: permission of departmental adviser.

NURS 537 Nursing the Child With Handicaps: Care Process (4) W

Process (4) W Identification and description of the critical components of each stage in the continuum of the nursing relationship as these apply to the care of the handicapped child and his family. The purpose is to provide a frame of reference within which each can operate. Minimum of eight hours field study weekly. Prerequisites: 523, 535.

NURS 538 Nursing the Child With Handicaps: Family Reactions (4) W

Development of a framework for systematically evalbevelopment of a framework for systematically eval-uating parental behaviors in high-risk families and in families where there is a handicapped child, and for ap-plying this knowledge to nursing interventions. The im-plications for nursing are derived from students' clinical experiences, as well as from theoretical content and rele-vant research findings. A minimum of eight hours field study weekly. Prerequisites: 523, 535, 536, 537.

NURS 539 Nursing the Child With Handicaps: Community (2) S Evaluation of essential components of resources for the handicapped that are presently or potentially available in the community, and the comparison of nursing practices within those resources. The leadership roles of the nurse as clinician, consultant, educator, and researcher come under review. A minimum of four hours field study weekly. Prerequisites: 535, 537, 538.

NURS 540 Core Concepts in Physiological Nursing (3) ASp

(3) ASP Focus on selected physical health problems that occur in many disease states. Relates physiology to pathophysiol-ogy and compensatory mechanisms. Major emphasis on interrelationships between problems and multiple effects of therapies. Implications for nursing diagnosis and therapy. Assumes basic knowledge of anatomy and physiology.

NURS 541 Clinical Physiological Nursing Seminar I (3) Sp

(3) Sp Guided experience in nursing practice with selected individuals in a specialized field of nursing. Synthesis and application of relevant principles and theories from biological, behavioral, and pathological sciences; profi-ciency in comprehensive nursing assessments, interventions, and evaluations; effective collaborative functioning as a member of the health team. Prerequisite: 540.

NURS 542 Seminar in Cardiovascular Nursing (3)

Systematic inquiry into the influence of physical and emotional factors on pathophysiology underlying se-lected cardiovascular conditions; group study of current therapies with emphasis on prevention and rehabilitation. Individual study of topic of interest. Prerequisite: \$40 or permission of departmental adviser.

NURS 543 Seminar in Nursing in Gerontology (3) A Gerontological research findings applied to complex nursing problems in maintenance of health and maximum functioning in the aged.

NURS 544 Clinical Physiological Nursing Seminar II (3) S

Continuation of 541. Guided experience in selected situa-tions in area of clinical interest. Minimum of seven hours of guided experience weekly. Prerequisites: 540, 541, and permission of departmental adviser.
NURS 545 Special Topics in Physiological Nursing (3, max. 9) AWSpS Guided survey of the experimental literature of major topics in physiological nursing, including cardiopulmotopics in physiological nursing, including cardiopulmo-nary, biology of aging, neuromuscular, cancer, and en-docrine. Course conducted as a seminar with analysis and discussion of selected topics and readings. Implications for future research and health care are emphasized.

NURS 546 Rehabilitation Nursing Seminar I (3) S Analysis of selected theoretical components underlying rehabilitation and utilization of scientific rationale in clin-

ical nursing studies, with emphasis on prevention and maintenance. Library research and field study (minimum of seven hours weekly) are required. Prerequisite: permission of departmental adviser.

NURS 547 Neurological Basis for Human Responses in Health and Illness (3) W

Systematic inquiry into the neurological mechanisms underiving physiological and psychological responses to se-lected life situations, such as sleep alteration, pain, sensory alterations, and physical and emotional stress. Implications for nursing management in maintaining health and coping with illness. Prerequisite: P BIO 401 or 402, or equivalent neurophysiology, or permission of departmental adviser.

NURS 548 Management of Adults With Respiratory Dysfunction (3) S

In-depth examination of problems such as abnormal secretions and shortness of breath associated with respiratory uons and shortness of breath associated with respiratory dysfunction due to pulmonary diseases and other patho-physiological states. Lectures and laboratory sessions de-velop knowledge and skill necessary to problem solving and management techniques expected of the expert practi-tioner. Prerequisite: 540 or comparable preparation, or permission of departmental adviser.

NURS 550 Advanced Community Health Nursing

(3) W Derivation of community health nursing concepts and principles. Identification of current and complex commu-nity health problems. Role of the nurse in their solution. Prerequisite: 402 or equivalent.

NURS 551 Advanced Primary Health Care I: Children and Women of the Childbearing Age (4) S Children and Women of the Childbearing Age (4) S Critical analysis of physiological, developmental, psy-chosocial, and anthropological theories related to women and children in the context of the childbearing and child-rearing family for the purpose of developing a framework for advanced nursing intervention. Application of the the-oretical framework developed will facilitate the indepen-dent and interdisciplinary clinical decision-making skills of the nurse practitioner within the boundaries of primary health care. Articulates with Advanced Fieldwork Seminar in Primary Health Care I: Children and Women of the Childbearing Age.

NURS 552 Advanced Fieldwork Seminar in Primary Health Care I: Children and Women of the Childbearing Age (4) S Supervised fieldwork within selected primary health-care settings. Emphasis on children and women of child-bear-ings. Emphasis on children and women of child-bear-

ing ages. Seminars focus on relating nursing theory, recent research, and scientific rationale to fieldwork experi-ence and the evaluative analysis of selected nursing interventions. Offered on credit/no credit basis only.

NURS 553 Advanced Primary Health Care II: Adults (4) W Systematic inquiry into the influence of specific physio-logical and psychosocial factors on adult health. In-depth study of the unifying aspects and clinical manifestations of the inflammatory and immunologic responses in se-lected illness states with heavy emphasis on the frame-work of reasoning for independent and interdisciplinary actions of the advanced nurse practitioner within the defined limits of primary health care. Presupposes basic competence in biologic science and primary nursing care skills. Articulates with Advanced Fieldwork Seminar in Primary Health Care II: Adults. Primary Health Care II: Adults.

NURS 554 Advanced Fieldwork Seminar in Primary Health Care II: Adults (4) W

Supervised fieldwork within selected primary health-care settings. Emphasis on nursing intervention in selected health problems of adults within the context of the family. Seminars focus on relating nursing theory, recent re-search, and scientific rationale to fieldwork experience, and on the evaluative analysis of selected nursing inter-ventions. Offered on credit/no credit basis only.

NURS 555 Advanced Primary Health Care III: The

NURS 555 Advanced Primary Hearn Care III: 1 ne Elderly (4) Sp Critical analysis of the theories of aging. Systematic inquiry into the influence and detection of specific physi-cal, psychosocial, and environmental factors on the el-derly. Heavy emphasis on the framework of reasoning for independent and interdisciplinary actions of the advanced nurse practitioner within the defined limits of privarice in this partitioner within the defined minus of pri-mary health care. Presupposes basic competence in bio-logical science and primary nursing care skills. Articulates with Advanced Fieldwork Seminar in Primary Health Care III: The Elderly.

NURS 556 Advanced Fieldwork Seminar in Primary Health Care III: Middle and Older Adults

(4) Sp Weekly, seminars and supervised clinical fieldwork within selected primary health-care settings. Emphasis on nursing intervention in long-term health problems of the middle and older adult within the context of the family middle and older addit winnin the context of the family and community. Focus on application of the primary and secondary concepts presented in 555. Process of clinical decision making emphasized, using nursing theory, re-cent research findings, scientific rationale, and appropri-ate evaluation methods for measuring outcomes. Offered on credit/no credit basis only. Prerequisites: 452, 553, 554.555 to be taken concurrently. 554; 555 to be taken concurrently.

NURS 557 Advanced Fieldwork Seminar: Primary

Health Care in Urban and Rural Communities (4) A Intensive supervised fieldwork in either rural or urban communities. Focus on theoretical models for analyzing community organization and its effect on the delivery systems of primary health care.

NURS 559 Helping Relationships With Individuals, Groups, and Families (3) W

Basic foundation for synthesizing differing philosophies, theories, and beliefs about the nature of human action. Students relate appropriate theories to specific health-related goals from which to practice, facilitate, and evaluate therapeutic encounters with individuals, families, and other groups.

NURS 560 Selected Topics in Primary Health Care (3) Sp

Critical examination and analysis of selected topics and current issues (i.e., legal, economic, social, as they re-late to the developing role of the nurse practitioner in providing primary health care). Topics may vary with the instructor.

NURS 561 Systems Analysis in Nursing Administration (3) W

Administration (3) W Examines concepts and techniques of industrial engineer-ing, system analysis, and operations research applicable to decision making, control and monitoring functions in nursing administration. Student demonstrates application and critical appraisal of concepts and techniques. Prereq-uisites: ADMIN 510, or equivalent, and permission of demonstrate loghiers. departmental adviser.

NURS 562 Implications of Concepts From Anthropology for Nursing (3) A

Examination of selected core concepts from anthropology and assessment of the implications of these concepts for nursing research. Prerequisite: permission of departmental advisers.

NURS 564 Nursing Administration (3) W Elements of the administrative process as applied to orga-nized nursing service. Exploration of concepts related to organizational structure, administrative behavior, person-nel management, and the technology of administration. Prerequisites: ADMIN 510, graduate standing, and per-mission of denantmental advices mission of departmental advisers.

NURS 565 Implications From Microbiology for Nursing (2) W Examination of selected major fields in microbiology. Exploration of particular aspects of those fields and of current research progress in microbiology. Prerequisite: permission of departmental advisers.

NURS 566 Program Development in Clinical Areas

(3) A Application of administrative theory in the development of a program in a selected clinical area of practice. The program will be developed on consumer need, commu-nity and agency resources and constraints, program de-velopment will include projected evaluation plans, two-hour seminar, and three hours field study each week. Pre-requisites: graduate standing, 561, 564, ADMIN 510, or permission of departmental advisers.

NURS 567 Evaluation and Quality Assurance in Nursing (3) A Synthesis of research, operational, and policy issues of

education. Examines the framework for the evaluation and quality assurance of nursing practice in health-care and educational settings. The multiprofessional responsibility for review of health care is incorporated into the legal and professional mechanisms of peer review prac-tices. Prerequisites: graduate standing, 520, 521, research in nursing.

NURS 568 Field Study in Nursing Administration (8) S

(5) S Field study provides opportunities to study and analyze the relationships between espoused theories and theories in action under real-time conditions and to make a com-parative analysis of structure and behavior of manage-ment systems. Minimum of sixteen hours of field study and a two-hour seminar weekly. Prerequisites: equivalency of 506, 520, 521, 564, and ADMIN 510.

NURS 569 Psychosocial Nursing Consultation and

NURS 569 Psychosocial Nursing Consultation and Supervision (3) A Seminar and guided experiences that explore the inter-personal processes in consultation and supervision in psy-chosocial nursing. Students examine the effects of the organization and the setting on the therapeutic re-lationships. Mental health consultation theories are stud-ied in relation to the roles of the clinical specialist, super-visor, and instructor in psychosocial nursing. Each stu-dent is required to develop a consultative or supervisory relationship in a clinical setting. Minimum of six hours guided experience. Prerequisites: 464, 502, and 508, plus one psychosocial nursing pathway. one psychosocial nursing pathway.

NURS 570 Seminar in Clinical Research in Nursing (3) Sp

Philosophy, problems of design; use of criterion measures in terms of patient care. Prerequisite: permission of departmental advisers.

NURS 571 Seminar in Nursing and the Social Order (3, max. 9) AWS

Changing patterns of nursing service and education in contemporary society. Implications of personal value systems. Prerequisite: permission of departmental advisers.

NURS 573 Selected Topics in Maternal and Child Nursing (3-5, max. 12) AWSpS In-depth examination of the literature pertinent to major theoretical issues in maternal and child nursing. Seminar with analysis and discussion of selected topics and read-ings. Implications for research, prevention, and health care stressed.

NURS 574 Selected Topics in Comparative Nursing Care Systems (2 or 3, max. 10) SpS 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 se-lected topics and readings. Implications for research and health care stressed.

NURS 575 - Death Influence in Clinical Practice (4) WS

Analysis and study of social, cultural, and psychological conditions that influence human death in modern society. Continuous unintentic enternan transmission in inductive screep-ence provide direction for examination of philosophic, theoretic, and pragmatic issues underlying choices and decisions in clinical practice. Open to graduate students with permission of departmental advisers. (Limit: sixteen students.)

NURS 576 Operant Techniques in Modification of Behavior (3) Sp Critical review of research related to the development of motor skills, language, and imitative behavior in the young child in order to facilitate the development of these skills in the child with handicaps. A minimum of four hours field study weekly. Prerequisites: 536 and permis-sion of departmental advisers.

NURS 578 Seminar in Cross-Cultural Nursing (3)

Sp Analysis, synthesis, and evaluation of selected theories from nursing and anthropology in application to the de-livery of health care cross-culturally. Includes a consider-tion of community study methods as relating to the asation of community study methods as relating to the as-sessment of health needs, cultural beliefs about health, illness, and health-seeking behaviors. Provides the student with the opportunity to articulate theory and method in planning the subsequent field experience in cross-cultural nursing. Prerequisite for 579.

NURS 579 Field Course in Cross-Cultural Nursing

(6) S Guided field practicum in application of concepts from cross-cultural nursing to health-care delivery. Includes assessment of health needs and analysis of their relationships with cultural beliefs, collaboration with other health personnel in designing plans for care and evaluation of results. A minimum of eighteen hours field experience is required. Prerequisites: \$78, which may be taken concurrently, 583, and permission of departmental advisers.

NURS 580 Theory Building in Nursing I (3) A Exploration and analysis of nursing theory, types, tech-niques of construction, problems in evaluation and test-ing, and implications for nursing science. Prerequisite: permission of Graduate Office.

NURS 581 Theory Building in Nursing II (3) S Continuation of 580 with emphasis on evaluation of ex-isting nursing theories, student construction and presentation of a theory for nursing, and critiques of the students' theories. Prerequisite: 580.

NURS 582 Environments, Supporting and

NURS 582 Environments, Supporting and Nonsupporting (3) A Analysis and study of environments as complex multidi-mensional systems that, depending upon the balance of elements and forces in existence, support or do not sup-port human health. Emphasis on the influence of differ-ent conceptualizations of the nature of human health and human environmental interactions. Demonstrations on the human-environmental interactions. Prerequisites: gradu-ate standing, 520 and 521 or equivalent, and permission of Graduate Office.

NURS 583 Transcultural Nursing Practices (3) WS Study of nursing practices in different cultures. Seminar focus is on theoretical formulations and comparative analysis of values, patterns, techniques, and practices of nursing care in many societies. Rituals, myths, taboos, and beliefs are studied in relation to the subculture(s) of caring and nursing practices.

NURS 584 Clinical Therapeutics: Physical (3) S Analysis and study of current theories and knowledge re-garding physical therapeutic measures and interventions that promote, maintain, or restore health status for hu-mans throughout the life span. Various conceptualiza-tions for viewing nursing interventions with emphasis on study and expansion of knowledge of therapies. Prerequisites: admission to Graduate School and comple-tion of 520, 521 or equivalent, and permission of Gradu-ate Office ate Office.

NURS 585 Individual Adaptations to Wellness and Illness (3) W

Survey and analysis of current theory and research in health and illness awareness, in health seeking and mainnearm and unness awareness, in health seeking and main-taining behaviors, and in coping responses to illness and disability. Topics include psychological and physiologi-cal responses to pain, grief, acute illness, recovery, chronic illness, preillness factors that influence responses and individual patterns of adaptations to illness and well-ness. Prerequisites: graduate standing, 520 and 521 or equivalent, and permission of Graduate Office.

NURS 586 Family Adaptations to Wellness and Illness (3) W

Current theory and research in family functioning in health and illness. Family developmental tasks, separa-tion, divorce, major and minor disablements, social-cultural processes, and other events that strengthen or weaken the family. Focus also on appropriate and inap-propriate coping patterns and caring strategies. Prerequi-sites: graduate standing, 520 and 521 or equivalent, and permission of Graduate Office.

NURS 600 Independent Study or Research (*) Offered on credit/no credit basis only.

NURS 700 Master's Thesis (*) Offered on credit/no credit basis only.

NURS 800 Doctoral Dissertation (*) AWSpS

Research for the doctoral dissertation (") A Waps Paratory or related thereto. Offered on credit/no credit basis only. Prerequisite: permission of Supervisory Com-mittee chairperson or graduate program adviser.

SCHOOL OF PHARMACY

PHARMACEUTICAL SCIENCES

Courses for Undergraduates

PHSCI 320, 321 Pharmaceutical Sciences

Laboratory (3.2) A,W Laboratory (3.2) A,W Laboratory demonstrates by experimentation basic ana-lytical procedures and the properties of drugs in different physical and biological systems. Prerequisites: CHEM 236; 320 for 321.

PHSCI 332 General and Physical Principles (3) W Presentation of those physical-chemical properties of drug systems that have a significant effect on the thera-peutic efficacy of drugs. Prerequisite: PHARM 331.

PHSCI 350 Psychotropic Plants (3) Sp Brady

Lecture course reviewing the ethnobotany, history, chemistry, and physiological activity of various plants used throughout the world for stimulant and psychotropic purposes. Prerequisites: CHEM 236 and BIOL 212, or equivalents.

PHSCI 400 Biophysical Medicinal Chemistry (4)

Principles of physical organic chemistry relevant to pro-cesses of drug distribution, transport, binding, elimination, specificity, and mechanism of action in general, and their relationships to these processes. Prerequisite: CHEM 236 or 337 or equivalent.

PHSCI 405 Biopharmaceutics and

Pharmacokinetics (4) Sp

Levy, Slattery Lectures, conferences on drug release from dosage

forms, absorption from different routes of administration and the resulting concentration time curves in blood and urine. Prerequisites: PHARM 333, 369.

PHSCI 406 Clinical Pharmacokinetics (3) Sp Slattery Applications of pharmacokinetics to the clinical setting

including: determination of patient-specific dosage regi-mens, role of disease in drug requirements, mechanism and importance of drug interactions, influence of age and concomitant nondrug therapy on drug requirements and nonlinear pharmacokinetics. Prerequisite: 405.

PHSCI 412, 413, 414 Pharmacognosy (3,3,2) A,W,Sp Brady, Elmer

Medicinally and pharmaceutically useful products of plant, microbial, and animal origin. Biologic and chemi-cal properties are emphasized. Prerequisites: BIOC 406, BIOL 212, CHEM 236, MICRO 302 and 351.

PHSCI 430 Inorganic Medicinal Products (3) Sp Krupski

Introduction to electrolyte and water balance and a discussion of selected groups of inorganic medicinal agents. Prerequisite: P BIO 360.

PHSCI 432 Nuclear Pharmacy Laboratory (3) Sp Hwang

Lectures, experiments, and demonstrations of radionu-clide detection equipment and techniques and selected radiotracer techniques. Experiments illustrate applica-tions of nuclear chemistry to problems in the pharma-ceutical sciences. Prerequisite: permission of instructor.

PHSCI 435 Diagnostic Medicinal Chemistry (3) A Edwards, S. Nelson

Examination of clinical diagnostic tests with regard to the chemical or biochemical rationale of the testing method, chemical of biochemical rationale of the testing method, interpretation of test results, and major factors influenc-ing test values with special emphasis on the effects of medications. Clinical laboratory data from patients con-sidered in light of these factors. Prerequisite: BIOC 406.

PHSCI 440, 441, 442 · Medicinal Chemistry (3,3,3)

A,W,Sp McCarthy, S. Nelson, W. Nelson, Trager

Study of the various classes of medicinal compounds with particular emphasis on biological activity, mecha-

nism of action, biotransformation, and the structural and physical properties governing absorption, distribution, and excretion. Prerequisites: CHEM 236 and P BIO 360.

PHSCI 445 Radiopharmaceutics (3) W Hwang

Fundamentals of radioactivity; properties of radiation; in-strumentation used in nuclear medicine; problems associated with the formulation, production, and use of radiopharmaceuticals; and a discussion of radiopharmaceuticals currently used for diagnosis and therapy. Pre-requisite: permission of instructor.

PHSCI 490 Metabolism of Drugs (3) W

McCarthy Study of the processes of drug metabolism and their imblications in modern therapy. The influence of metabo-lism on effect, duration, potency, use, and design of drugs is considered. Prerequisite: PHCOL 402.

PHSCI 497 Toxicology (2) W Krupski

Study of the properties and toxic effects of various sub-stances used in medicine, as well as chemicals employed in industry and as insecticides, rodenticides, and fungicides. Includes symptoms, treatment, antidotes, and prognosis for various classes of poisons, and also a study of environmental pollutants and their effect on biological systems. Prerequisite: PHCOL 402.

PHSCI 499 Undergraduate Research (*, max. 6) AWSpS

Research problems in biopharmaceutics, medicinal chemistry, pharmaceutical chemistry, pharmacognosy, and radiopharmaceutics. Prerequisites: cumulative grade-point average of 2.50 and permission of instructor.

Courses for Graduates Only

PHSCI 510 Topics in Pharmaceutics (3, max. 6) S Reading, conference, and laboratory work in physical pharmacy and biopharmaceutics. Prerequisite: permission of instructor.

PHSCI 520 Seminar (1, max. 5) AWSp Graduate students attend seminars and make one formal presentation per year while in residence; 1 credit per year is allowed. Offered on credit/no credit basis only.

PHSCI 521, 522 Advanced Medicinal Chemistry

PHSCI 521, 522 Advanced Medicinal Chemistry (3,3) W,Sp McCariby, S. Nelson, W. Nelson, Trager Application of integrated data from the physical and bio-logical sciences to problems of chemotherapy, including transport of drugs to site of action, biotransformation of drugs, interaction of drugs with enzyme systems, and re-cent advances in drug design. Prerequisites: CHEM 457, 531, and BIOC 442, or permission of instructor.

PHSCI 527 Drug Metabolism (3) W

Juchau, Nelson Considerations of the biochemical mechanisms for the biotransformation of drugs and foreign compounds. Includes reaction mechanisms, ultrastructural considera-tions, induction mechanisms, methodology, kinetics of tions, induction incompany, including, and induction inhibition and activation, steroid and amine metabolism, and implications in modern therapy. Open to medical and graduate students. Offered jointly with PHCOL 527. Pre-requisite: one year of graduate or medical biochemistry, or permission of instructor. (Offered alternate years; of-ferent 1090 01) fered 1980-81.)

PHSCI 581 Topics in Pharmacognosy (1, max. 2) AWSp

Brady

Discussions and readings of topics of current interest in the field of pharmacognosy. Subject matter changes from year to year. Prerequisite: reading knowledge of German.

PHSCI 582 Topics in Pharmaceutical Sciences (1, max. 10) AWSp Discussion of pertinent articles from current literature. Offered on credit/no credit basis only.

PHSCI 600 Independent Study or Research (*) AWSpS

Offered on credit/no credit basis only.

PHSCI 700 Master's Thesis (*) AWSpS Offered on credit/no credit basis only.

PHSCI 800 Doctoral Dissertation (*) Offered on credit/no credit basis only.

PHARMACY PRACTICE

Courses for Undergraduates

PHARM 304 Profession of Pharmacy (3) A

Orr Orr Overview of the profession of pharmacy: description of professional practice opportunities, specializations, pharmaceutical education, professional associations and publications, laws governing pharmacy, ethics, and pro-fessionalism; medical terminology and pharmacy nomenclature self-study; introduction to pharmacothera-peutics of prescription and nonprescription drugs. Prereq-uisite: pharmacy majors; prepharmacy students by per-mission of instructor. mission of instructor.

PHARM 310 Drugs in Our Society (3) SpS Hammarlund

Designed to develop a general knowledge of drugs and an understanding of their proper use. Discussion of drug problems and methods for their control. For nonmajors only.

PHARM 311 Drugs in Our Society: Special Projects (2) SpS Hammarlund

For nonmajors only. The student undertakes a worth-while in-depth project on some aspect of drug abuse pre-vention or education and submits a satisfactory report in the form of a term paper on the findings of the study. Pre-requisites: 310, which may be taken concurrently, and permission of instructor.

PHARM 315 Introduction to Pharmacotherapeutics (3) ASp Plein

Introductory course in drug therapy. Includes drug infor-mation resources; principles of pharmacology; pharma-cologic and therapeutic classes of drugs with emphasis on characteristics of the classes and on clinically important prototype drugs. Required for nursing students; other health science students by permission. Prior or concur-rent courses in anatomy, physiology, and microbiology strongly recommended.

PHARM 330 Pharmaceutical Calculations (1) A Hammarlund

Self-study workshop reviewing practical calculations used in pharmacy. Offered on credit/no credit basis only. Prerequisite: first-year standing.

PHARM 331 General and Physical Principles (4) A Hammarlund

Introduction to the study of pharmacy as a laboratory sci-ence. The intent of the course is to study the theory and the problems involved in incorporating chemicals into forms suitable for administration as human medication and stable enough to be transported and stored. Prerequi-site: CHEM 236.

PHARM 333 Dispensing Practice (2) W

Hall, Hammarlund

Dispensing of drug products on prescription order. In-cludes laboratory exercises, patient drug profiles, and pa-tient counseling. Familiarization with commercial drug products. Prerequisite: 331.

PHARM 340 Pharmacy, Health, and Society (3) A Campbell, Christensen, Romano

Overview of the health-care system, with an emphasis on factors of financing, organization, and patterns of use of pharmacy services; contemporary health issues, such as cost control, quality insurance, and national health insurance; and implications to pharmacy. Prerequisite: pharmacy major.

PHARM 369 Pharmacy Experience Project I (PEP I) (1) AS Jones, Romano

Role of a pharmacist in practice. Overview of drug ac-tion. Students complete a practice-related project in a community or hospital pharmacy and complete a selfinstructional program on introductory pharmacodynamics and pharmacokinetics. Offered on credit/no credit basis only. Prerequisite: pharmacy major standing.

PHARM 407 Prescription Practice (4) A

Hall, Hammarlund

Study of the supply of drugs through prescription or other type of order. The interaction of the pharmacist with his clientele and other health professionals in the process of ordering, supplying, and encouraging the proper use of drugs. Prerequisites: 330, PHSCI.405, and PHCOL 402.

PHARM 408 Evaluation of Drug Products (3) W Hall, Hammarlund

The study of the process by which choices among various drugs and their products are made. Prerequisite: 407.

PHARM 410 Clinical Dispensing Pharmacy (1-3, max. 3) AWSpS

. . .

Compounding and dispensing of prescriptions originating in the Rubenstein Memorial Pharmacy in Hall Health Center and University Hospital pharmacy. Laboratory work is under direct supervision of the Student Health Services pharmacist and the University Hospital pharma-cists. Prerequisites: third-year standing and permission of instructor.

PHARM 412 Nonprescription Drugs and Self-Care (3) W Hall

Self-medication as a public health problem. An analytical study of the use and abuse of nonprescription remedies by the general public.

PHARM 435 Social and Behavioral Aspects of Pharmacy Practice (2) A

Christensen, Romano

Basis for understanding the backgrounds and motivations Basis for understanding the backgrounds and motivations influencing health practitioner and patient behavior. Focus on health and illness behaviors, pharmacist and other health professional interrelationships, patterns of drug prescribing and use, and the roles and responsibili-ties of pharmacists in rendering care. Open to second or third professional year pharmacy students; graduate stu-dents in pharmacy practice; others with permission of instructor.

PHARM 436 Social and Behavioral Aspects of Pharmacy Practice II (2) Christensen, Romano

Continuation of 435. Basic concepts of the sick role, as well as patient and health professional behaviors, belief systems, attitudes, roles, and motivations. Communica-tion theory and practice opportunities to enhance interac-tion skills with patients and health professionals in phar-mean grading exting a Description 125. macy practice settings. Prerequisite: 435.

PHARM 450 Pharmacy Laws (3) W

Taniguchi

Study of the laws regulating the practice of pharmacy. These include federal, state, and municipal laws, and professional ethics.

PHARM 452 Contemporary Problems (1) WSp Discussion of current trends affecting the role of phar-macy in health-care delivery. Offered on credit/no credit basis only. Prerequisite: third-year standing.

PHARM 460 Principles of Professional Practice Management (3) W

Campbell, Christensen, Romano

Topics include organization of time and objectives, management of financial resources, management of inven-tory, and marketing management. Emphasis on develop-ing specific skills, such as burden rate analysis, and financial ratio analysis. Primarily for students who are in-terested in managerial careers in community pharmacy practice. Offered on credit/no credit basis only. Prerequisite: third-year professional standing or permission of instructor.

PHARM 461 Seminar in Professional Practice Management (3) Sp Campbell, Christensen, Romano

Campbell, Christensen, Komano Selected application of management skills in pharmacy. Practitioners discuss third-party reimbursement pro-grams, inventory control, and professional communica-tions. Individual speakers are selected on the basis of demonstrated expertise in one or more areas of pharmacy management. Seminar format. Offered on credit/no credit basis only. Prerequisite: 460 or permission of in-structor structor.

PHARM 469 Pharmacy Experience Project II (PEP II) (1) AWSpS

II) (1) AWSpS Prescription practice. Under guidance of practicing phar-macists, students perform tasks involved in processing prescription orders, including filling prescriptions, main-taining drug profiles, counseling patients, and solving re-lated problems. Offered on credit/no credit basis only. Prerequisites: 333 and 369.

PHARM 470 Externship in Pharmacy (*, max. 15). AWSpS

Hall, Orr Closely supervised study-experience periods in community and hospital pharmacies. Ordinarily, students rotate through two periods of five weeks each, and they partici-pate in active pharmacy practice under the supervision of a preceptor. Conferences on selected topics supplement the work experience. Offered on credit/no credit basis only. Prerequisite: permission of instructor.

PHARM 481 Introduction to Clinical Pharmacy (3)

W Consideration of principles of patient monitoring and provision of drug information. Instruction in approaching a patient chart, interviewing patients, and medication counseling techniques. Consideration of variables affect-ing patient behavior. Prerequisites: PHCOL 401, 402.

PHARM 482 Introduction to Clinical Clerkship (3) AWS

Introduction to patient medication monitoring and education techniques. Students participate in daily medical rounds at various institutional sites. In-depth review of patient case histories provides practical application of pharmaceutical knowledge. Communication skills are strengthened through patient discharge counseling, provi-sion of drug information and participation in interdiscipli-nary conferences. Offered on credit/no credit basis only. Prerequisite: 481 or permission of instructor.

PHARM 483 Hospital Pharmacy (3-5) AWSpS Introduction to hospital pharmacy. Principles and tech-niques of hospital pharmacy operation. Laboratory work is conducted in pharmacies of University Hospital and affiliated hospitals. Prerequisite: permission of instructor.

PHARM 484 Clinical Pharmacy (3) Sp Clinical roles of the pharmacist and study of more com-mon diseases and their drug therapy. Methods of drug therapy monitoring, drug histories, laboratory tests, drug administration, and case method studies of drug therapy. The pharmacist's professional responsibilities for inpa-tient and outpatient care. Prerequisites: 481.

PHARM 485 Clinical Pharmacy (2) A Continuation of 484 with emphasis on disease states and their drug therapies. Lectures stress assessment of drug therapy and application of basic pharmaceutical sciences to selection of drugs in patient care. Prerequisite: 484.

PHARM 487 Clinical Clerkship: Inpatient Care

(4, max, 15) AWSpS Supervised experience in the clinical roles of pharmacy practice in selected inpatient care facilities. Under supervision of a faculty member, students participate in medi-cine and pharmacy rounds, take drug-use histories, monitor drug therapy of patients, instruct patients about discharge medications, provide consultation of drug ther-apy problems to other health-care professionals, provide in-service education programs and drug utilization reviews. Interdisciplinary approaches to providing patient care are emphasized. Daily conferences with the faculty supervisor are usually included. Offered on credit/no credit basis only. Prerequisite: permission of instructor.

PHARM 488 Clinical Clerkship: Outpatient Care (*, max. 15) AWSpS Supervised experience in performing clinical roles of pharmacy practice in selected ambulatory patient care fa-clilities. Under supervision by a faculty member, students clinics. Under supervision by a faculty member, students engage in such activities as maintaining and using indi-vidual medication records and profiles, taking drug-use histories, consulting with physicians about drug therapy problems, counseling patients, etc. Interdisciplinary ap-proaches to providing patient care are emphasized. Daily conferences with the faculty supervisor are usually in-cluded. Offered on credition credit basis only. Prerequi-cies computience of instructors credit basis only. Prerequisite: permission of instructor.

PHARM 489 Clinical Clerkship: Drug Information Services (*, max. 15) AWSpS

Supervised experience in performing the clinical roles of the pharmacist relating to the retrieval and analysis of drug information from various library resources. Students work under direct supervision of a faculty member in prework must direct super sign of a ranky inclusion of pro-paring answers to actual consultation requests presented to the Drug Information Service. Techniques of preparing suitable written and verbal drug information reports are also stressed. Offered on credit/no credit basis only. Pre-requisites: PHSCI 405 and permission of instructor.

PHARM 490 Fluid and Electrolytes and Parenteral Nutrition (2) W

Principles of fluid and electrolyte therapy, including sa-line, water, and acid-base balance. Carbohydrate,

GRADUATE SCHOOL OF PUBLIC AFFAIRS

protein, lipid, vitamin, and mineral requirements in par-enteral nutrition. Nutritional assessment, complications of parenteral nutrition, stability and compatibility of intravenous solutions, modifications of parenteral nutrition in pediatrics and specific disease states. Prerequisite: 481

PHARM 493 Nursing Home Pharmacy (5) WSp Plein

Plein Students under the direction of a registered pharmacist participate in supplying full pharmacy service (clinical plus administrative) to patients in the nursing home se-lected as a laboratory for the project. Students monitor patients' drug therapy, confer with nursing home staff and the patients' physician regarding individual patients' drug therapies, present in-service seminars, develop skills in communicating with other health professionals and with geriatric patients, and confer with and assist the pharmacif(s) who sumplies the nursing home with pharpharmacist(s) who supplies the nursing home with phar-macy service. Prerequisites: 407, 484, and permission of instructor; Recommended: 483.

PHARM 495 Special Studies in Pharmacy (*, max. 6) AWSpS Special studies of professional topics in pharmacy. An opportunity to expand the breadth and depth of under-standing in specific pharmaceutical areas. Students usu-ally undertake independent study under the individual di-rection of a faculty member. Prerequisite: permission of instructor instructor

PHARM 499 Undergraduate Research (*, max. 6) AWSpS

Pharmaceutical research problems. Prerequisites: cumulative grade-point average of 2.50 and permission of instructor.

Courses for Graduates Only

PHARM 505 Clinical Pharmacokinetics (3) W

Koup Clinically oriented introduction to advanced pharmaco-kinetic theories. First half devoted to didactic presentation of the above materials, remainder comprises discussion sessions dealing with the clinical pharmaco-kinetic concepts of particular drugs or classes of drugs. Reference materials provided prior to sessions. Prerequi-sites: 484, 530, PHSCI 405, and permission of instructor.

PHARM 506 Clinical Pharmacokinetics (3) Sp Koup

Action Communication of 505. Discussion sessions regarding the pharmacokinetics of a drug or class of drugs are required. An original research proposal developed by each student and presented in class. Prerequisites: 484, 530, 505, PHSCI 405, and permission of instructor.

PHARM 507 Topics in Clinical Pharmacokinetics (1, max.12) AWSp

Gibaldi New and important findings and trends in pharmacokinet-ics, biopharmaceutics, drug metabolism and drug tox-icity, with particular emphasis on clinical significance and applicability. Offered on credit/no credit basis only. Prerequisite: PHSCI 405 or equivalent.

PHARM 520 Seminar (1, max. 5) AWSp

Graduate students must attend seminars and make one formal presentation per year while in residence; 1 credit per year is allowed. Offered on credit/no credit basis only.

PHARM 530 Seminar: Research Methods in Pharmacy Practice (3) Sp

Christensen

Christensen Research methods and protocols designed to help develop skills in preparing research proposals and conducting re-search in pharmacy practice. Selected research methods, sources of data, analysis designs, and statistical method-ologies. Prerequisites: graduate standing in pharmacy; one statistics course or permission of instructor.

PHARM 582 Primary Care Pharmacy II (2) A Erickson, Fuller, Kradjan Introduction to the use of protocols for monitoring chronic disease states, with practice in development of specific protocols for anticoagulation, diabetes, hyper-tension, and others. Prerequisite: permission of instruc-tructure. tor.

PHARM 584 Seminar in Clinical Pharmacy (3, max. 9) AWSp

Edwards, Erickson, Fuller, Horn, Koup, Kradjan, Smith, Woo

Readings and in-depth discussions of rational manage-ment of diseases and drug-related problems. Emphasizes medical and therapeutic problem solving. Prerequisites: permission of instructor and a working knowledge of material covered at the undergraduate level in clinical pharmacy.

PHARM 587 Advanced Clinical Clerkship: Inpatient Care (*, max. 15) AWSpS Under faculty supervision, students participate in medical

Under faculty supervision, students participate in medical and pharmacy patient rounds in hospitals or long-term-care facilities, monitor drug therapy, instruct patients concerning proper use of medications, and provide drug consultation to other health-care providers. Students also participate in drug-use review and in-service education participate in dug-tac review and in-service education programs. Interdisciplinary approaches to providing care are emphasized through conferences with faculty. Of-fered on credit/no credit basis only. Prerequisites: 484, 485, or equivalent, and permission of instructor.

PHARM 588 Advanced Clinical Clerkship: Outpatient Care (*, max. 15) AWSpS Under faculty supervision, students refine skills in devel-oping and maintaining a drug-use data base for ambula-tory patients. Activities include taking drug histories, de-veloping patient medication profiles, and documenting drug-use experience. In addition, students deliver ser-ince to outpatient focilities through patient counseling uug-use experience. in addition, students deliver ser-vices to outpatient facilities through patient counseling, intraprofessional consultation, and patient monitoring ac-tivities. Interdisciplinary approaches to improving patient care are emphasized. Offered on credit/no credit basis only. Prerequisites: 484, 485, or equivalent, and permis-sion of instructor.

PHARM 589 Advanced Clinical Clerkship: Drug Information Services (*, max. 15) AWSpS Under faculty supervision, students refine skills in the re-trieval, analysis, and clinical use of drug information trieval, analysis, and clinical use of drug information from library resources. Students receive training in the School of Pharmacy Drug Information Service, where they receive and respond to information requests. Tech-niques of providing written and verbal drug information services. Interdisciplinary relationships in providing and using drug information are emphasized. Offered on credit/no credit basis only. Prerequisites: 484, 485, or equivalent, and permission of instructor.

PHARM 600 Independent Study or Research (*) AWSpS

Offered on credit/no credit basis only.

PHARM 700 Master's Thesis (*) AWSpS Offered on credit/no credit basis only.

GRADUATE SCHOOL OF **PUBLIC AFFAIRS**

PUBLIC ADMINISTRATION

Courses for Graduates Only

PB AD 500 General Seminar (1, max. 9) AWSp

PB AD 501 Public Policy and Administration (3) A Interaction between the bureaucracy and Administration (3) A interaction between the bureaucracy and those institu-tions, organizations, and groups involved in the policy process. Analysis of current policy problems is made from this perspective. Offered jointly with POL S 570.

PB AD 502 The Administrator and the Policy Process (3) W

Process (3) W Context of public administration from the perspective of the administrator. Through case and research materials, field inquiries and interviews, the manifold roles and functions of the administrator are examined, particularly in relation to the process of implementing, making, and changing public policy. Offered jointly with POL S 571.

PB AD 503 Administrative and Executive Leadership (3) Sp

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. Offered jointly with POL S 572.

PB AD 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. Primarily for students in the Graduate School of Public Affairs; others by permission of instructor.

PB AD 506 The Law of Citizen Participation (3)

PB AD 506 The Law of Citizen Participation (3) Sp Relationship of the administrative agency to the general citizenry, including citizen control through taxpayers' suits; constitutional guarantees of citizen control; and statutory guarantees of citizen control, with an emphasis on this third area (i.e., laws requiring citizen participa-tion, open meetings, public hearings, impact statements, and freedom of information). Proposed legislation and relevant social science research is also read and discussed as a guide to understanding the policy behind the legal re-quirements and to provide a framework for analysis of the efficiency of these laws.

PB AD 509 Social Theory and the Public Policy Process (3) A

Approaches to the study of organizational behavior in a changing society, including consideration of formal and informal organization, personality needs, role playing, client relations, and sociopolitical and technological environment.

PB AD 510 Governmental Organizations (3) AW

PB AD 510 Governmental Organizations (3) AV Survey of the theory, the current practice, and experience relating to governmental organizations and their program objectives. Comprises a synopsis of subject matter cov-ered in 511, 512. No credit allowed if 511 and 512 are taken for credit.

PB AD 511 Administrative Problems: Micro-Organization (3) A Analysis and solution of problems involving the interac-

Analysis and solution of problems involving the interac-tion of individuals and groups within organizations. Em-phasis is placed upon the differences between the tradi-tional approach and the behavioral approach to the understanding of the governmental organization, the motivation of the persons involved in the decision to pro-duce, the nature of the decision to participate, the nature of conflict and innovation, and the limits of rationality.

PB AD 512 Administrative Problems: Macro-

Organization (3) W Analysis and solution of problems inherent in the charac-teristics and behavior of large-scale organization and multiagency complexes. Systems approaches are interre-Interd with social systems theory: functional problems are internetated with types of organizations resulting from the public purpose served, and information flows are ana-lyzed. Emphasis is given to concepts of organizational effectiveness and change.

PB AD 513 Administrative Problems: Program Analysis (3) Sp

Applicability of systems approaches and systems modeling to various types of program problems. Emphasis is upon comprehensive program planning, approaches to factoring of alternatives, evaluation of cost-utility relationships, and assessment of alternative options or "trade-offs" in activity components of large-scale action programs.

PB AD 521 Public Management: Program Planning and Design (3) AW Topics include the policy context of planning and pro-gramming, the institutionalization of purpose, the planning process, activity design, work scheduling and measurement, and program evaluation.

PB AD 522 Public Management: Budgeting (3)

Budgeting as a management process. Study of formula-tion and administration of government budget, including the role of budgeting in the policy process, the ap-proaches to budget formulation and analysis, the devel-opment of the PPB approach, and the aspects of budget

1

administration, such as revenue estimating, allotment control, and cost accounting.

PB AD 523 Public Management: Personnel (3)

WSp Study of line-staff decision making in acquisition and use of human resources in public organizations, including evaluation of job responsibilities, establishment of com-pensation levels, collective bargaining, selection and placement, performance appraisal, incentive management, and training.

PB AD 524 Education and Training for the Public Service (3) A

Preparation of students for participation in the Pacific Northwest continuing education and training for public administration network, and to address substantive issues auministration network, and to address substantive issues in training and management education in the public sec-tor. The role of the local and state training director in de-veloping human resources is explored and contrasted with federal organizations such as the Federal Executive Institute and the United States Conference of Mayors. Training methods, laboratory models, the relation of the-ory to executive training, and methods of evaluation also are examined.

PB AD 525 Organization Development in Public Agencies (3) W Examination of the philosophies, theories, and models of behavioral science interventions in organizational diagnosis and development (OD). In addition to a review of the basic literature dealing with the OD approach, em-phasis is placed on examination of case studies and class experience in OD applications, including organizational diagnosis, problem confrontation, and team building. Prerequisite: permission of instructor.

PB AD 526 Social Intervention (3) Sp

Exploration of the public manager's role as an interventionist, as well as the decision to seek third-party inventionist, as well as the decision to seek third-party in-volvement in policy disputes between competing interest groups. Diagnosis of organizational problems, adminis-trative responses to political and social environmental pressures, the organization as a learning system, and the limits of public organization change. Theoretical consid-erations in intervention, as well as the internal contradic-tions faced by static organizations in changing society. Prerequisite: 524 or permission of instructor.

PB AD 527 Quantitative Analysis (3) AW

Provides a nontechnical approach to statistical analysis, the logic of statistical testing, and data presentation as ap-plied to the field of public policy and administration. Covers such commonly used techniques as tests concerning means, binomial distribution, cross tabulations, and simple regression. Student's understanding is deepened by a required interpretive or critical study.

PB AD 528 Advanced Quantitative Methods in Public Administration (3) WSp

Provides in-depth coverage of the techniques of analysis of variance, multiple regression, chi-squared and nonpar-ametric versions of statistical tests as applied to the field of public policy and administration. Practical, analytical, and interpretive skills covered include the use of SPSS and interpretive skins covered include the use of SPSS computer packages. In addition to a critical study, each student completes a statistical research project of his or her choosing, generally requiring more advanced use of an SPSS package. Prerequisite: 527 or equivalent.

PB AD 529 Quantitative Applications in Public. Affairs (3) SpS

Examines specific public policies by utilizing quantita-tive methods to evaluate the evidence and data upon which such policies are based. Evidence on real public issues and programs is analyzed by students, who are expected to explain and critique the statistical techniques employed and measurements taken, to make recommen-dations for improvements, and to identify and assess other relevant factors. Policy issues are drawn from such functional areas as education, manpower, law enforcement, natural resources, and experiments in negative in-come tax. Prerequisite: 528 or equivalent.

PB AD 530 Financial Management in the Public Sector (3) Sp

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 account-ing, internal controls, auditing, financial analysis, and financial reporting. Prerequisite: permission of instructor.

PB AD 542-543 Social Research and the Public Policy Process (3-3) W,Sp

Survey of research evidence in the study of complex organizations and their environments, stressing develop-ment of analytic skills in the interpretation and the application of research results.

PB AD 545 Systems Theory and the Public Policy Process (3) Sp

Survey of systems theory approaches to the study and the analysis of public organizations and their environments, including systems analysis, cybernetics, information theory, and general and social systems theory.

PB AD 551 Comparative Administrative Systems (3) W

Methodological problems of research in comparative ad-ministration. Theoretical and substantive aspects of administrative systems in urban-industrial and developing nations. Offered jointly with POL S 579.

PB AD 552 Administrative Problems of

Development (3) Sp Problems of administering developing nation-states and regions, including theoretical aspects of development administration, bureaucratic change, administrative-political interaction in policy making, organizational develop-ment, political impact of administering major programs. Prerequisite: permission of instructor.

PB AD 599 Special Topics (2-6, max. 6) AWSp Systematic study and analysis of special subject matter in public administration and policy. Topic for each quarter varies. Prerequisite: permission of instructor.

PB AD 600 Independent Study or Research (*)

PUBLIC POLICY

Courses for Graduates Only

PB PL 507 International Organizations and Ocean Management (3) W

Survey of the manner in which international organizations attempt to manage and regulate the uses of the ocean. Primary emphasis on the analysis of processes that support or constrain these organizations and on the search for alternative policies and organizations. Offered jointly with IMS 507. Prerequisite: IMS 500 or permission of instructor.

PB PL 515 Decision Theory (3) A Examines the use of formal models and quantitative methods as an aid to decision making in the public sector. Both deterministic and probabilistic models are explored. Formal decision-analysis techniques are used to examine how uncertainty can be formally dealt with in a quantita-tive approach to decision making. Cost-benefit analysis and discounting and present value estimations are stressed. Prerequisite: basic statistics and economics course.

PB PL 520 Federal Delivery Systems and Domestic Policy (3) Sp

Comparative study of the existing and proposed methods by which the federal government may deliver services or benefits. Students examine service programs administered by the federal government, grant programs, direct-payment systems, voucher systems, block grants, reve-nue sharing, and tax deduction and credit systems. Selected programs are examined to determine probable impact on beneficiaries, intergovernmental relations, and program accountability. Political and constitutional limi-tations are also discussed. Prerequisite: permission of instructor.

PB PL 534 American Foreign Policy Formation (3)

A American foreign policy viewed whole, including de-fense policy, the relationships of foreign policy to do-mestic policies and priorities, and the full range of historical, constitutional, institutional, political, and the-oretical questions related to the formation and the execu-tion of foreign policy in this broad sense. Offered jointly with POL S 534.

PB PL 535-536 Seminar in American Foreign Policy

(3-3) W.Sp Foreign policy and defense policy formation and execu-tion. Administration of national security programs, White House, Congress, state and defense departments, special problems, and case studies. Prerequisite: 534.

PB PL 540, 541, 542 Social Management of Technology I, II, III (3,3,3) A,W,Sp Analysis of the interaction of technology and society

Analysis of the interaction of technology and society through general principles and case studies of contempo-rary issues and public policy: the nature of the technolog-ical enterprise, its scientific base, ingredients of capital, specialized manpower, organizational structure and man-agement; employment of public and private institutions; policy planning to generate, utilize, and manage technology so as to maximize opportunities and to mini-tice unsuch concurrence opportunities and to minimize unwanted consequences; institutional conflicts; development of goals, strategies, program priorities, and policies; legal and economic considerations; process of public decision making. Offered jointly with CIVE 540, 541, 542 and SMT 540, 541, 542. Prerequisites: permis-sion of instructor for 540; 540 for 541; 541 for 542.

PB PL 548 Economics of Labor and Human Resources (3) Sp

Economic analysis of policy-related topics in human re-sources. Topics include labor demand and supply, educasources. Topics include labor demand and supply, educa-tion and occupation, wage structures and income inequality, discrimination, and poverty. Offered jointly with ECON 548. Prerequisite: equivalent of ECON 400, or permission of instructor; not open to economics ma-

PB PL 556 Public Policy, Administration, and Political Theory (3) A

Levi

Examines the meaning of democracy in the context of American public policies and administration. The per-spective of individual and group participation in the pol-icy process, the individual's role in organization, the functions of the public servant in the making of policy decisions, and the realities of policy formulation in rela-tion to political values. Enables the student professionally committed to public activity to reflect in a discussion setting upon his or her position as a participant in the society in which he or she works. Offered jointly with POL S

PB PL 557 The Politics of Collective Bargaining in the Public Sector (3) W

Seminar explores purposes served by establishment of collective bargaining, the benefits and beneficiaries of the bargaining process, and implications of bargaining for the political power of managers, union leaders, union rank and file, unorganized workers, and citizen consumers. Both private and public sectors are discussed with focus on collective bargaining in government agencies. Participants need some backgound in organizational theory and are expected to engage in fairly extensive reading and in a research project.

PB PL 561-562 Policy Development and Administration: Urban Affairs (3-3) A,W

Administration: Orban Anarrs (5-5) A, w A two-quarter graduate course in the structures, func-tions, and processes of government in cities, with special emphasis on the origin, content, and implementation of public policies. Major focus is on the political process at the municipal level: the distribution of influence, the po-litical actors, the decision-making machinery, and the policy outputs. Of special interest to graduate and profes-tional students preserving for scenars in when course sional students preparing for careers in urban government.

PB PL 565 Seminar in Urban Public Policy Analysis (3) Sp The use of methodology from public administration, po-

litical science, and economics to examine urban public policies. Emphasis on the relationships between research and public policy. Prerequisite: ECON 416.

PB PL 567 The Urban Police Function in American Society (3) A Locke

Contemporary problems, trends, and issues in American policing within the context of the history, role, and func-tion of law enforcement in urban America. Emphasizes tion of law enforcement in urban America. Emphasizes the external tensions between the stated ideals of a demo-cratic society and the realities of institutionalized crime-control methods and procedures, internal conflicts be-tween the quest for professionalization of the police function vs. the demand for organizational effectiveness and accountability, and current efforts toward institu-tional change and functional reorganization.

PB PL 568 Policy Issues in Urban Law Enforcement (3) W Locke

The current volatility in American law enforcement revolves around a number of policy issues that have emerged in the past decade and are considered crucial to

the future role, organization, and function of urban policing. Nine of these issues are explored, with emphasis on their historic settings, the "actors" who shape their ar-ticulation, and the parameters of the debate, legal con-straints on, and sociopolitical considerations in, the development of policy alternatives, and emerging pat-terns of resolution. Prerequisite: 567 or equivalent.

PB PL 571, 572, 573 Public and Educational Policy Issues in the Development of Human Talent (3,3,3) A,W,Sp

Higher education and the nation's human resources; trends, projections, policy issues, problems and goals in the relation between education and utilization of professional and specialized personnel. Offered jointly with EDEPS 571, 572, 573. Prerequisite: permission of instructor.

PB PL 583, 584, 585 Seminar in Science and Public Policy (3,3,3) A,W,Sp Issues and problems relating to the interaction of science and scientists with the public policy-making processs. Sci-ence versus the nature and values of political processes, and the continuing tensions between the two. The evolv-ing interaction between scientific and technical knowledge and political power; scientific versus ethical judgments. Role of science in the establishment of na-tional goals. Plans and proposals for increasing govern-mental competence to deal with public policy issues in-volving science and technology. volving science and technology.

PB PL 586 International Science and Technology Policy (3) A

Seminar is designed: first, to analyze the relationships between R&D policy, capabilities, and national techno-logical strategies for advanced industrial and less-developed countries; second, to deal with the international im-plications of particular technologies as countries try to make policy for them in regional and global organiza-tions. Examples of specific technologies are chosen from such fields as space telecommunication, weather and cli-mate modification, airline transportation, nuclear energy and seabed exploitation.

PB PL 587-588 Research Seminar in Marine Resource Management (3-3) A,W

Crutchfield, Wooster For students who select marine resource management as an area of concentration within the marine affairs proan area of concentration within the manne artians pro-gram. Topics from living resources, ocean mining, en-ergy production from the ocean, and other areas. Integra-tion of multidisciplinary analysis and supervised student research leading to completion of the thesis are primary objectives. Offered jointly with IMS 587-588.

PB PL 590, 591, 592 Midcareer Seminar (3,3,3)

PB FL 370, 371, 572 Interdisciplinary seminar in public policy for midcareer executives. Open to participants in the Education for the Public Management Program; others by permission of in-

PB PL 593-594-595 Policy Development and Administration: Natural Resources (3-3-3) A,W,Sp Interdisciplinary research seminar in natural resources policy development and administration. Major concern is with the processes of natural resources policy formulation and analysis, and the role of various sectors in influence ing policy development and administration. Open to graduate and professional students in varied disciplines who are emphasizing preparation in natural resources fields. Prerequisite: permission of instructor.

PB PL 596 Social Policy Analysis (3) Sp Examines the techniques and methods required in social policy analysis, including the technical issues in develop-ing, using, and interpreting research relevant for social policy and bureaucratic problems in using research and conclusion the policy memory. pointy and our-autrance process. Designed to aid future ad-analysis in the policy process. Designed to aid future ad-ministrators and analysts in performing policy analysis and in working with researchers to develop relevant stud-ies and with the agency bureaucracy to integrate research and analysis. Prerequisite: permission of instructor.

PB PL 599 Special Topics (2-6, max. 6) Systematic study and analysis of special subject matter in public policy. Topic for each quarter varies, depending upon the needs of the school and the interests of student and faculty. May be repeated for credit. Prerequisite: permission of instructor.

PB PL 600 Independent Study or Research (*) AWSoS

PB PL 604, 605, 606, 607 Degree Project (2-6, 2-6, 2-6, 2-6)

e economics courses below serve as an integral part of the Graduate School of Public Affairs curriculum.

ECON 392 American Indian Economic Development Problems (5) W

Economic problems faced by native Americans. Primary emphasis on the management of narve rangementation resources, particularly those resources important on reservations in the northwestern United States. Secondary emphasis is on the study of the integration of Indian workers into the general labor force of the United States. Prerequisite: 200 or equivalent or permission of instructor.

ECON 400 Fundamentals of Micro-Theory (3) A Hashimoto

Fundamentals of microtheory with emphasis on applica-tions to public policy. Designed primarily for graduate students majoring in fields other than economics. No credit given if 300 has been taken for credit.

ECON 401 Fundamentals of Macro-Theory (3) W Fundamentals of macrotheory with emphasis on applica-tions to public policy. Designed primarily for graduate students majoring in fields other than economics. No credit given if 301 has been taken for credit.

ECON 416 Urban Economics (5)

Examines what is happening in urban areas. Use of economic analysis to explain urban trends; urban government organization; and problems of housing and renewal, transportation, poverty and race, and the environment. Offered jointly with GEOG 416. Prerequisite: 300 or 400 or equivalent.

ECON 435 Natural Resource Utilization and Public Policy (5) AWSp

Special emphasis on elements of economic theory relating to resource-oriented industries. Case studies in the theory and practice of resources. Case studies in the theory and practice of resource management dealing with both stock and flow resources. Benefit-cost analysis and the evaluation of multipurpose projects.

ECON 445 Income Distribution and Public Policy (5)

Income distribution implications and economic effects of public policies toward unemployment, illness, industrial accidents, old age, poverty, and discrimination from age, sex, or race. Prerequisite: 200 or 201 or permission of instructor.

ECON 451 State and Local Public Finance (3)

Analysis of state and local government revenue sources and consequences of their use. Includes taxation, user charges, debt finance, and intergovernmental fiscal rela-tions. Emphasis on metropolitan finance problems. Pre-requisites: 201, 400, or equivalent.

ECON 452 Economic Approaches to Political Analysis (5)

Analysis (5) Application of economic theory and methodology to po-litical phenomena. Emphasis on theory construction with application in American context. Offered jointly with POL S 416. Prerequisites: 201, 400, or equivalent.

ECON 553 Economic Analysis and Government

Programs (3) Sp Application of economic analysis to public enterprises and programs. Prerequisites: 400, 401, or equivalent.

SCHOOL OF PUBLIC **HEALTH AND** COMMUNITY MEDICINE

For related course work, see Department of Statistics and Blomathematics Group.

BIOSTATISTICS

Courses for Undergraduates

BIOST 472 Introduction to Statistics in Health Sciences (4) AWSp DeRouen, Wahl

Description and examples of common concepts in biosta-

tistics. Probability, point and confidence interval estima-tion, hypothesis testing including two-sample and paired t and chi-square tests, introduction to simple linear re-gression. Examples in health sciences stressed.

Application of Statistics to Health BIOST 473

Sciences (4) Sp Brodsky, Feigl, Wahl Standard statistical techniques with examples drawn from health sciences literature. Critical interpretation of re-search results, and introduction to the computer for data processing and statistical analysis. The sequence 472, 473 is the equivalent of 511. Prerequisite: 472 or equivalent.

BIOST 497 Biostatistics Special Electives (*) AWSpS

Offered when demand is sufficient.

BIOST 499 Undergraduate Research (*) AWSpS

Courses for Graduates Only

BIOST 511 Medical Biometry I (4) A

Kronmal, Temkin Presentation of the principles and methods of data de-scription 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 stan-dard statistical computer program packages (e.g., SPSS, BMDP, MINITAB). Statistical techniques covered include description of samples, comparison of two sample means and proportions, simple linear regression and correlation.

BIOST 512 Medical Biometry II (4) W Breslow, DeRouen

Brestow, Dexouen Statistical aspects of the design of experiments, further analysis of qualitative data, basic epidemiologic statis-tics, and an introduction to the analysis of variance. Ex-amples from the biomedical literature are stressed. Prerequisite: 511 or 473 or equivalent.

BIOST 513 Medical Biometry III (4) Sp Feigl

Analysis of covariance and multiple regression, including stepwise multiple regression, are emphasized in this course. Other topics presented include elements of sur-vival table analysis, classification procedures, and clus-tering in time and space. Prerequisite: 511 or 473 or equivalent.

BIOST 519 Data Analysis (3) A R.D. Martin

Techniques of exploratory data analysis; plotting and dis-play techniques, QQ and PP plots; parameter estimation and confidence intervals; data transformations, Box-Cox transformations; techniques for multivariate samples, estransformations; techniques for multivariate samples, es-timating correlations, high-dimensional plots, principal components; two-way tables; regression, regression residuals analysis, regression diagnostics for outlier de-tection; smoothing; clustering; introduction to robust-resistant techniques for parameter estimation, confidence intervals, regression and smoothing. Offered jointly with E B 519. Prerequisite: E B 505 or equivalent.

BIOST 520 Nonparametric Methods (3)

BIOST 520 Nonparametric Methods (3) D.C. Martin Methods course in nonparametric statistics with some discussion of robust data analysis. No advanced matho-matics or statistics required. Useful to nonmajors with only a statistical methods course background and some research experience. The level is about that of J. V. Bradley's Distribution-Free Statistical Tests or Hollander and Wolf's Nonparametric Statistical Methods. Primary emphasis on rank tests, correlations and confidence inter-vals, and a few selected topics. Prerequisite: 511 or enuivalent or permission of instructor. equivalent or permission of instructor.

BIOST 522 Applications of Vital and Health Statistics (3) Sp

Lee

Lee Analysis of routinely collected data on the health status and care of populations, with emphasis on the potential and limitations of this approach. Stressed are the impor-tance of such data for the development and the evaluation of programs and the recognition of new hazards. Offered jointly with EPI 522. Prerequisite: 472 or equivalent or preprint of instructor permission of instructor.

BIOST 523 Computer Applications in Biostatistics (3) A Diehr

Multiple regression emphasized. Other topics (analysis of variance, analysis of covariance, path analysis, and dis-criminant analysis) treated in less detail as subsets of multiple regression. Factor analysis and automatic inter-action detector (AID) also used. Examples from the health services and social science literature stressed. Modified case-method approach used, with each student assigned a data set to analyze throughout the class. Prerequisite: 511 or 473.

BIOST 524 Design of Medical Studies (3) A Fisher, Peterson

Printer, Peterson Design of medical studies, with emphasis on randomized controlled clinical trials. Bias elimination, controls, treat-ment assignment and randomization, precision, replica-tion, power and sample size calculations, stratification, uon, power and sample size calculations, straincation, and ethics. Suitable for graduate students in biostatistics and research-oriented graduate students in other scientific fields. Offered jointly with STAT 524. Prerequisites: 511 and one of 512, 513, EPI 512, or STAT 473. (Offered even-numbered years.)

BIOST 528 Special Topics in Intermediate

Biostatistics (3) Intermediate-level topics in biostatistics offered by regu-lar and visiting faculty. Prerequisites: 472 and 473, or 511, or equivalent.

BIOST 529 Sample Survey Techniques (3) Sp Thompson

Thompson Design and implementation of selection and estimation procedures in sample surveys. Emphasis on the sampling of human populations, although principles apply to other sampling problems. Topics include simple, stratified, and cluster sampling, multistage and two-phase pro-cedures, optimal allocation of resources, estimation the procedures optimal allocation of resources, estimation the ory, replicated designs, variance estimation, national samples and census materials. Offered jointly with QMETH 529 and STAT 529. Prerequisite: 511 or permission of instructor.

BIOST 571 Applied Regression Analysis (3) A Kronmal, Martin, Wahl

Kronnal, Martin, Wahl Advanced statistical methods course for biostatistics and other graduate students already familiar with the general linear hypothesis. Develops extensions of usual linear least squares theory and discusses effects of departures from this theory. Examples of analyses for nonstandard problems are presented and computers are used for home-work assignments. Analyses of residuals, use of transfor-mations, polynomial models, methods of model selec-tion, and robust methods. Offered jointly with STAT 571. Prerequisites: 513, STAT 485, a matrix algebra course, or permission of instructor.

BIOST 572 Multivariate Statistical Methods (3) W Bell, Fisher, Martin

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 multivariate ANOVA and reast squares, discriminant analysis, principal components, factor analysis, robust-ness, and some special topics. Some computer use in-cluded. Prerequisites: course in matrix algebra, 571, STAT 485, or permission of instructor.

BIOST 573 Statistical Methods for Categorical Data

(3) Sp Breslow Exact and asymptotic methods of analysis for 2x2 contingency tables. Maximum likelihood estimation of logistic gency tables. Maximum inkelinood estimation of logistic regression models for binary response variables, and se-lected examples of the use of these models in epidemio-logic and clinical research. Introduction to the theory and applications of loginear models for discrete data. Se-lected special topics. Offered jointly with STAT 573. Prerequisites: 513, STAT 473, and STAT 581, or permis-tion of instructor. sion of instructor.

BIOST 574 Statistical Computing (3) W Kronmal, Martin, Wahl

Introduction to topics in statistical computing: application of numerical methods to statistical problems; generation of pseudorandom numbers; design and execution of Monte Carlo studies; comparative evaluation of statistical algorithms; matrix methods and least squares; computa-tion of probabilities; data structures; and data base man-agement. Offered jointly with STAT 574. Prerequisites:

BIOST 575 Population Models (3) Polissar

Polissar Models in demography, using real and simulated data. Estimation of demographic rates, the life table; station-ary, stable, and quasistable populations; determinants of the age-structure of a population; age-specific models of mortality, fertility, and nuptiality. Offered jointly with. STAT 575. Prerequisite: STAT 473 or permission.

BIOST 576 Statistical Methods for Survival Data (3) A

Breslow, Prentice, Peterson

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. Offered jointly with STAT 576. Prerequisites: 513 or Q SCI 383, STAT 473, and STAT 581 or permission of instructor. (Offered alternate years.)

BIOST 577 Design of Medical Studies (3) Fisher, Peterson

Review of the classical principles of experimental design, Review of the classical principles of experimental design, followed by discussion of the specific problems of prospective observational studies and clinical trials. De-termination of sample size, randomization methods, se-quential designs, and data-management systems. Some knowledge of experimental design is assumed. Offered jointly with STAT 577. Prerequisites: 512 and STAT 473. (Offered alternate years.)

BIOST 578 Special Topics in Advanced Biostatistics

(*, max. 3) Advanced-level topics in biostatistics offered by regular and visiting faculty. Offered jointly with STAT 578. Prerequisite: permission of instructor.

BIOST 580 Seminar in Biostatistics (*, max, 9) AWSp

Presentation and discussion of special topics and research results in biostatistics. Speakers include resi-dent faculty, visiting scientists, and advanced graduate students. Re-quired of students in the Biostatistics Pathway of the Biomathematics Group.

BIOST 590 Biostatistical Consulting (*) AWSpS Feigl, van Belle

Feigl, van Belle Training in consulting on the biostatistical aspect of re-search 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 sub-sequent review by faculty of resulting design and analy-sis. Required of doctoral students in the Biostatistics Pathway of the Biomathematics Group. Prerequisite: per-mission of instructor. mission of instructor.

BIOST 600 Independent Study or Research (*) AWSpS

Prerequisite: permission of instructor.

BIOST 700 Master's Thesis (*) AWSpS Prerequisite: permission of instructor.

ENVIRONMENTAL HEALTH

Courses for Undergraduates

ENVH 411 Introduction to Environmental Health (3) AW Hatlen, VanDusen

Relationship of people to their environment, how it af-fects their physical well-being and what they can do to in-fluence the quality of the environment and to enhance the protection of their health. Emphasis on environmental factors involved in transmission of communicable dis-cases and hazards due to exposure to chemical and physical materials in our environment.

ENVH 430 Methods in Environmental Sampling and Analysis I (3) A Wetzler

Field sampling methods and selected laboratory analyses of various waters and wastes are conducted. Official methods for characterizing physical and chemical quality of water and wastes are demonstrated. Microbiological criteria are emphasized for student participation, includ-

ing: enumeration of sub groups in populations, selective inhibitor, characteristics of normal flora, rationale of "indicator" organisms, etc. Prerequisites: junior stand-"indicator" organisms, etc. Prerequisites: junior stand-ing, 440, which may be taken concurrently, MICRO 301 and 302, and permission of instructor.

ENVH 431 Methods in Environmental Sampling and Analysis II (3) W Wetzler

Wettler Pertinent methods for collection of food and foodstuff samples are demonstrated. The usual official analytical procedures of FDA, USDA, and/or AOAC are presented or demonstrated for foods and dairy products. Criteria for wholesomeness, safety, and inhibition of spoilage are examined in detail. Pertinent samples and analyses of typical physical environments surrounding stored foods are examined. Prerequisites: 430, MICRO 301 and 302, and permission of instructor and permission of instructor.

ENVH 440 Water and Waste Sanitation (4) A DeWalle, Hatlen

Study of the health implications of water use and sewage disposal methodology. Focal concerns include water-quality evaluation, pollution factors, individual and pub-lic water and sewage facilities, site selection criteria, and legislative and agency activities. The knowledge and skills required for effective field performance by the en-vironmental health specialist are emphasized.

ENVH 441 Food Sanitation (3) W Hatlen

Advanced study of the sanitary control of the production, processing, and distribution of food products, emphasiz-ing control of food-borne diseases. Prerequisites: 411, environmental health major, and MICRO 301 and 302, or permission of instructor.

ENVH 442 Vector Control (3) Sp

Hatlen

Advanced study of the impact of and the control of rodents and arthropod vectors of disease, including consid-eration of economic poisons used, their regulation, and safety measures.

ENVH 443 Human Habitat and Health (3) Sp Van Dusen

Examination of the impact of housing on man's total health and well-being; the environmental health problems associated with inadequate housing; the environmental associated with management housing, the environmental health specialist's responsibility in promoting health in both private and public accommodations including schools, migrant housing, jails, and institutions; and the interrelationship of health with existing housing pro-grams. Prerequisites: 411 and environmental health ma-jor, or permission of instructor.

ENVH 444 Institutional Environmental Health (2) Sp Fish

Examination of the environmental health and safety hazards that can adversely affect hospital and nursing home patients, staff, and surrounding community; the means by which hazards can be prevented and controlled; and the interrelationships between administrative and regulatory activities. Prerequisites: 411 and environmental health major, or permission of instructor.

ENVH 445 Solid Weste (2) W

Examination of the public health, environmental, eco-nomic, and materials conservation impact of solid wastes on the environment; the amounts and sources of solid wastes, methods of storage, transportation and disposal, identification of present problems and future needs. Pre-requisite: environmental health major or permission of instructor.

ENVH 448 Environmental Health in the Third World (3)

Appropriate technology for water supply, excreta dis-posal, and pollution control for urban and rural commuposal, and pollution control for uroan and rules contain nities. Program implementation, economic and institu-tional requirements, and health issues related to ent. Prerequisites: graduate standing and permission of instructor.

ENVH 449 Respiration, Circulation, and Environmental Health (2)

Morgan

Morgan Structure and function of the respiratory and cardiac sys-tems and the changes that may be produced by specific air pollutants, such as ozone, carbon monoxide, SQ, etc. Air-quality criteria and the economic costs of disease are discussed. Several classroom demonstrations. Prereq-

SCHOOL OF PUBLIC HEALTH AND COMMUNITY MEDICINE

uisites: sophomore standing, and 450, CEWA 461, or permission of instructor.

ENVH 450 Measurement and Control of Air

Pollution (2) W

Horstman, Morgan Description of methods for air pollution research and control, including field-survey techniques, stack sampling, continuous monitoring, and use of control equip-ment. Administrative problems are also discussed.

ENVH 451 Mechanisms of Cellular Responses to Air Pollution (2) W Luchtel

Designed for students who wish to obtain an insight into the effects of air pollution at the cellular and subcellular levels. Ultrastructural morphology of the lung and patho-logical changes due to air pollutants; biochemical reac-tions of oxidant irritants, hydrocarbons, and particulates; relationships between air pollution and degenerative aging processes. Prerequisites: general and organic chem-istry and introductory biology. Recommended: 449 and 450.

ENVH 453 Industrial Hygiene and Safety (3) A Horstman, Morgan

Review of occupational health and safety hazards, including causes, effects, evaluation, prevention, and leg-islation. Prerequisite: 411 or permission of instructor.

ENVH 454 Industrial Hygiene Laboratory (2) W Montieth, Schumacher

Series of laboratory experiments illustrate the use of a wide spectrum of industrial hygiene sampling equipment. Included are airflow calibration, chemical calibration, detector tubes, personnel sampling devices, both continuous and discrete reading instruments. Instrumentation for noise also covered. Prerequisite: 453.

ENVH 457 Noise and the Environment (2) Sp Morgan

Examination of urban community noise problems, including sources, effects, and control, and legislation.

ENVH 460 Accident Prevention (2) A

Freeman Discussion of the accident process and the classification of accidents, including epidemiologic indices. Analysis of accident statistics and research studies relating to con-trol planning; survey of existing programs and legisla-tion. Term field project and report.

ENVH 462 Laboratory Management and Safety (1) W

Brevsse

Designed for laboratory management safety, to consider chemical and physical hazards; their control and management.

ENVH 479 Environmental Research Design (1) AWSp

VanDusen

Designed to assist in the development of environmental health research projects. Common research designs, methodology, principles, and problems with emphasis on effective research problem definition, implementation, and data presentation.

ENVH 480 Environmental Health Problems (*, max. 6) AWSpS VanDusen, Staff Individual projects involving library, laboratory, or field study of a specific environmental health problem. Prereq-uisite: environmental health major or permission of instructor.

ENVH 482 Field Practice—Technology (2-6) AWSpS

Assignment to a local health department for supervised application of public health practices and environmental control techniques. Prerequisites: environmental health major and permission of departmental adviser.

ENVH 483 Field Practice-Program Planning (6) AWSp6

Assignment to a local health department for supervised observation and experience in environmental health pro-gram planning. Prerequisites: environmental health major and permission of departmental adviser.

ENVH 484 Field Practice-Community Resources (3) AWSoS

Assignment to a local health department for training in

the utilization of community resources. Prerequisites: environmental health major and permission of departmental adviser.

ENVH 497 Environmental Health Special Electives *) AWSpS

Off-campus course for non-environmental health majors.

ENVH 499 Undergraduate Research (*) AWSpS VanDusen, Staff

Individual research on a specific topic in environmental health upon which specific conclusions, judgments, or evaluation can be made or facts can be presented. Prereq-uisite: environmental health major or permission of instructor.

Courses for Graduates Only

ENVH 511 Environmental Health (3) A Faigenblum

Consideration of the health effects of environmental exposures using a problem-oriented approach embracing the natural, community, air pollution, and working envi-ronments. Group discussion by didactic instruction where appropriate.

ENVH 521 Environmental Components and Problem Identification (3) A. Faigenblum

Faigenblum Examination of the physical components that influence people's health and their efficiency of performance. Ap-plication of techniques for the gathering of information and identifying environmental problems in the commu-nity or in industry. The techniques used include: ques-tionnaire and interview schedule development, issue analysis, nominal group process, and environmental impact statements. Prerequisite: environmental health grad-uate student or permission of instructor.

ENVH 522 Environmental Program Planning (3) W Faigenblum

Environmental programs are examined with regard to determination of needs, establishment of controls, and the legal and organizational framework within which they exist. The operational aspects of programs are explored, considering organization, planning, staffing, financing, and evaluation. Agencies are visited and studied, and a report is presented. Prerequisites: 521, environmental health graduate student, or permission of instructor.

ENVH 523 Environmental Health Program Management (3) Sp Fish. Hatlen

Examination of environmental health programs for the identification of management practices and problems. Specific problems considered include program organization. communications and coordination, supervision, decision making, and personnel recruitment, utilization, and evaluation.

ENVH 545 Drinking Water and Health (3) W DeWalle

Study of health implications of drinking water collection, study of neutrin impreasions of dimining water contection, treatment, and distribution, including presence of organic and inorganic pollutants, toxicants, and biological agents in water supplies; their entry, prevention of their entry, and removal by treatment processes. The conceptual design and operation of the system will be related to the size of the water supply (Class I-IV) and surface water or groundwater origin. Routine and incidental monitoring requirements in light of the Safe Drinking Water Act are evaluated. Intended to develop skills and knowledge for sanitarians, engineers, or operations supervisors to func-tion effectively to ensure the community a safe water supply. Prerequisite: 440 or CEWA 456.

ENVH 553 Industrial Hygiene Instrument Laboratory (3) W Horstman, Schumacher

Laboratory focuses on theory and practical use of various sampling instruments utilized to evaluate potential industrial hazards. Prerequisite: 453 or permission of instructor.

ENVH 555 Industrial Hygiene Chemistry Laboratory (3) Sp

Horstman

Laboratory focuses on theory and practical use of various chemical analytical instruments utilized to evaluate po-tential industrial hazards. Prerequisite: 453 or permission of instructor.

ENVH 557 Industrial Ventilation I (3) W Hibbard

Principles of control of the industrial environment, including noise and hazardous chemicals, with special em-phasis on design of exhaust-ventilation systems. Pre-requisite: 453 or permission of instructor.

ENVH 558 Industrial Ventilation II (2) Sp Hibbard

Laboratory exercises, case study problems, and field surveys emphasize the practical application of the princi-ples of industrial ventilation as the major control method of airborne health hazards in the industrial environment. Prerequisite: 557.

ENVH 560 Organizing Industrial Safety Programs (3) A Freeman

Organization of safety programs in major industries is ex-plored; governmental, management, and union motiva-tions are related to safe working conditions; and func-tions and responsibilities of line and staff safety are described in detail. Industrial accident prevention plan is developed.

ENVH 561 Administering Industrial Safety Programs (3) W

Freeman

Focus on day-to-day operation of industrial safety pro-grams with emphasis on workman's compensation, uses of statistics, protective equipment, hazard analysis, behavioral aspects of accident causation, safety communica-tions, and accident investigation and reporting. Pre-requisite: 560 or permission of instructor.

ENVH 562 Technical Aspects of Industrial Safety (3)Sp Freeman

Explores specific hazards associated with major industries, as well as the general hazards common to all indus-tries. Fire protection, machine guarding, systems safety techniques, functional testing, and explosives safety.

ENVH 563 Psychological Foundations of Safety and Health (2)

Heatin (2) Overview of contemporary psychological models ex-plaining accident etiology and subsequent counter-measures. The three major schools of psychological thought (psychoanalytic, phenomenological, and behav-ioral) discussed in relation to accident etiology. Special topics: risk taking, psychophysics, stress, attitudes, and ergonomics.

ENVH 564 Health and Safety Problems in Industry (2) A Freeman. Horstman

Provides wide spectrum of practical examples of indusproblems, as practiced in an industrial examples of indus-problems, as practiced in an industrial milieu; serves as a case-study sequence for the didactic course work in sev-eral programs. Provides opportunity to approach and ana-lyze health and safety problems using a multidisciplinary approach.

ENVH 567 Recognition and Evaluation of Industrial Carcinogens (2) W Breysse, Horstman

Emphasis on cancers of industrial significance. Classification of occupational carcinogens according to human and animal experiences, along with the concept of permissible exposure levels.

ENVH 568 Organization and Management of Occupational Health Programs (2) A

Breitenstein, Dunphy

Brettenstein, Lumpny Conceptual framework for occupational health programs, surveys management trends affecting these programs, and outlines strategy for planning, implementation, and eval-uation. Practical problems discussed. Offered on credit/no credit basis only. Prerequisite: 453 or permis-tion of instructor sion of instructor.

ENVH 569 Management of Industrial Carcinogens (2)Sp

Breysse, Hibbard, Horstman

Identification of an agent as an industrial carcinogen, a highly virulent micro-organism, or a highly radioactive compound. Emphasis on the most effective controls and administrative procedures to minimize the health impact for those finding it necessary to handle these agents. In-formation on the design requirement of closed-circuit ventilation systems along with administrative practices agents. Prerequisite: 567.

ENVH 571 Occupational Physiology and Toxicology (3)W

Goble, Milner, Wilson

Study of the function of bodily systems in relationship to potential occupational disease, including methods used to evaluate potentially toxic or hazardous exposures and their known effects. Prerequisites: CHEM 232, ZOOL 301, or permission of instructor.

ENVH 573 Health Problems of the Natural Environment(2)Sp Milner

Considers the methods of prevention and treatment of environmental trauma. Major emphasis on environmental abnormalities encountered in the Pacific Northwest dur-ing sporting activities. Topics include frostbite, heat-stroke, high-altitude disease, SCUBA problems, etc.

ENVH 574 Occupational Exposure to Excessive Sound and Hearing Loss (2) Sp

Breysse, Nelson

Industrial sources of noise and the auditory and nonaudi-tory effects of exposure. Noise standards, hearing evalua-tion, hearing protection and engineering controls.

ENVH 575 Occupational Lung Diseases (2) Sp Reviews the epidemiology, clinical features, diagnosis, and prevention of occupational lung disorders, including pneumoconiosis, industrial bronchitis, occupational asthma, and cancer. Discussion of pulmonary function tests, health effects of smoking, irritant gases, and occupa-tional infections. Primarily for physicians and medical stu-dents. Prerequisite: permission of instructor.

ENVH 576 Occupational Dermatology (2) A Milner

Anatomy, physiology, and pathology of skin from the point of view of occupational health practitioners: diag-nosis and treatment of a variety of industrial skin dis-eases; plant surveys, medical-legal problems, dermatitis prevention, and rehabilitation problems.

ENVH 580 Environmental Seminar (1, max. 6) AWSpS

Current environmental health research and environmental control programs. Offered on credit/no credit basis only.

ENVH 581 Environmental Reading (1, max. 6) AWSpS

Critical reading of selected basic and applied research publications on environmental health problems and pro-grams. Offered on credit/no credit basis only.

ENVH 590 Selected Topics (1-6) AWSpS In-depth study of a current environmental health topic.

Independent study special summer format presenting in-troductory material. May be taken with HSERV 590 and EPI 590. Offered on credit/no credit basis only. For more information and permission, consult department program adviser.

ENVH 599 Field Studies (2-6, max. 6) AWSpS Assignment to an environmental research or service pro-

gram for application of evaluation techniques. Offered on credit/no credit basis only.

ENVH 600 Independent Study or Research (*) AWSpS

Offered on credit/no credit basis only. Prerequisite: permission of departmental adviser.

ENVH 700 Master's Thesis (*) AWSpS

Offered on credit/no credit basis only. Prerequisite; permission of departmental adviser.

EPIDEMIOLOGY

EPI 420 Introduction to Epidemiology (3) A Hoover

Descriptive, analytic, and experimental epidemiology, as presented in examples from infectious and chronic nonin-fectious disease. Includes descriptive statistics as applica-ble in epidemiology. Prerequisite: HSERV 411, MICRO 301 or permission of instructor, or graduate standing.

EPI 497 Epidemiology and International Health Special Electives (*) AWSpS Off-campus course for medical students. Prerequisite: permission of adviser.

EPI 499 Undergraduate Research (*) AWSpS Prerequisite: permission of adviser.

Courses for Graduates Only

EPI 510 Applications of Epidemiology (4) Sp

Foy Foy Introduction of epidemiologic principles and examples of the application of these principles to the monitoring of disease occurrence, epidemiologic investigation, disease control, and health program evaluation. Examples from acute and chronic diseases, environmental health, and health-care delivery are used. Recommended for graduate students whose primary interests lie in areas other than epidemiology. Prerequisites: graduate standing and permission of instructor.

EPI 511 Principles of Epidemiology (3-4) AS

Gale, Peterson Lectures and discussions covering evolution and meaning of epidemiology, concepts of disease causation, basic ep-idemiologic methods, and descriptive, analytic, and experimental epidemiology. A term paper on the epidemiol-ogy of a selected disease is required. Prerequisite: permission of instructor.

EPI 512 Epidemiologic Methods in Chronic Diseases (3) W Weiss

Study of the principles and practices of epidemiology as applied to the noncommunicable diseases. Prerequisites: 511 and BIOST 511, or permission of instructor.

EPI 513 Epidemiology of Infectious Diseases (3) Sp Study of the principles and the practices of epidemiol-ogy, as derived from a study of communicable diseases. Prerequisite: 511 or permission of epidemiology graduate program adviser.

EPI 521 Epidemiology of Maternal and Child Health Problems (3) W Emanuel

Consideration of the contribution of epidemiology to the Consideration of the contribution of epidemiology to the understanding of the etiology of various perinatal prob-lems, including congenital malformations, fetal, infant, and maternal mortality, abortion, neonatal morbidity, complications of pregnancy, prematurity, and mental re-tardation, together with the evaluation of control prob-lems. Prerequisites: graduate, medical, or dental school standing and 510 or 511, or permission of instructor.

EPI 522 'Applications of Vital and Health Statistics (3) Sp Lee

Lee. Analysis of routinely collected data on the health status and the care of populations, with emphasis on the poten-tial and the limitations of this approach. Stressed are the importance of such data for the development and the evaluation of programs and the recognition of new haz-ards. Offered jointly with BIOST 522. Prerequisite: BIOST 472 or equivalent or permission of instructor.

EPI 524 Epidemiologic Studies of Cancer Etiology and Prevention (3) W Thomas

Current knowledge of the role that chemicals, radiation, viruses, familial factors, immunodeficiencies, and benign diseases play in the etiology of various cancers, as determined from studies in human populations; the epi-demiologic characteristics of most major types of cancer; applications of epidemiologic principles to planning and evaluating programs of primary, secondary, and tertiary cancer prevention. Prerequisite: 511.

EPI 525 Advanced Seminar in Cancer Epidemiology (2) Sp

Lee

Explores current areas of controversy and doubt with the aid of various faculty members: the carcinogenic properand of values includy meaners, the calculogence proper-ties of exogenous estroyens; the interaction between life-long and shorter-term factors in the etiology of human cancers; the relationship of microbiological agents to the etiology of carcinoma of the cervix. Offered on credit/no credit basis only. Prerequisites: 511, BIOST 511, and permission of instructor.

EPI 531 Problems in International Health (3) A

Survey of the relationship of the sociocultural, political, economic, and demographic characteristics of developing countries to disease occurrence and to the solution of health problems. Prerequisite: graduate or medical student standing.

EPI 542 Clinical Epidemiology (2) S Weiss

Elaboration of selected topics introduced in 512. Offered on credit/no credit basis only. Prerequisite: 512.

EPI 583 Epidemiology Seminar (1, max. 3) AWSp Promotes critical reading of scientific papers and in-creases knowledge and understanding of principles and methods in epidemiology.

EPI 587 Genetic Epidemiology (3) Sp Ward

Epidemiology of genetic disease and genetic aspects of the epidemiological distribution of disease in a variety of different populations. Factors influencing reproductive outcome and subsequent growth and development. Inter-action of genetic and environmental factors to produce multifactorial diseases. Biological cost of cultural transiintuitational unseases, biological cost of cultural natisfi-tion: interaction of changing demographic profiles with rapid environmental change (including the influence of public health programs and medical care) to produce new profiles of disease. The genetic consequence of such changes. Prerequisite: PHY A 482 or permission of instructor.

EPI 590 Selected Topics in Epidemiology or International Health (2-6, max. 6) AWSpS 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 for-mat. Prerequisite: 511. Also a special summer format presenting introductory material. May be taken with ENVH 590 and/or HSERV 590. For more information and permission, consult the department program adviser.

EPI 598 Teaching Methods in Epidemiology and/or Preventive Medicine (1-3) AWSpS Fov

Supervised teaching experience in public health and in epidemiology. Student formulates an outline for a course in epidemiology or related subject. Student makes one or more formal presentations to class and is encouraged to use modern educational methods and teaching media. Student constructs test questions on lecture subjects. Prerequisite: EDPSY 449 or equivalent.

EPI 600 Independent Study or Research (*) AWSpS

Offered on credit/no credit basis only. Prerequisite: permission of departmental adviser.

EPI 700 Master's Thesis (*) AWSpS Offered on credit/no credit basis only. Prerequisite: permission of departmental adviser.

EPI 800 Doctoral Dissertation (*) AWSpS Offered on credit/no credit basis only. Prerequisite: permission of departmental adviser.

HEALTH SERVICES

HSERV 411 Introduction to Health Services and Community Medicine (3) AW

Broad survey of key elements in public health and per-sonal health services. The objective is to create familiar-ity with major issues, terminology, and selected specific programs in the health-care field. For future health pro-fessionals and others wanting a broad exposure to health issues. issues.

HSERV 451 Anatomy and Physiology for the MEDEX Practitioner (6) A

Students are taught the anatomy and physiology of the Students are taught the anatomy and physiology of the following organ systems: EENT, respiratory, cardio-vascular, gastrointestinal, genitourinary, gynecologic (in-cluding normal pregnancy), integumentary, musculo-skeletal, and neurologic. Focus on clinical examples of anatomic and physiologic principles encountered in pri-mary-care practice. Prerequisite: admission to the MEDEX program.

HSERV 452 Basic Clinical Pathology for the MEDEX Practitioner (3) W Lester

Basic pathological and pathophysiological concepts of diseases commonly encountered in primary-care practice. Pathophysiology studied per organ system. Prerequisites: 451, 453, 457, or permission of instructor.

HSERV 453 Basic Clinical Skills for the MEDEX

HSERV 453 Basic Clinical Skills for the MEDEXX Practitioner (6) A Provides the student with mastery of a screening history and physical examination and thoroughness in data-col-lection skills. Branching examinations of major organ systems and medical record-keeping and verbal presenta-tion skills by the problem-oriented method are taught. Prerequisite: admission to the MEDEX program.

HSERV 454 Principles of Clinical Problem Solving for the MEDEX Practitioner (3) A Lester

Students learn to define and to use a problem-solving process in performing patient assessments of common primary-care problems. These problems are covered by organ system. Prerequisites: 451, 453, 457, or permission of instructor...

HSERV 456 Pediatrics for the MEDEX Practitioner (3) W Stoll

Stoll Designed to acquaint students with basic primary-care pediatrics: includes pediatrics physical diagnosis and his-tory taking; child development; and common pediatric problems. Concepts of health maintenance for children and well-child care are covered. Prerequisites: 451, 453, 457, or permission of instructor..

HSERV 457 Behavioral Science Skills I for the **MEDEX Practitioner (2) A** Lurie

care practice, assessment skills needed for primaryof emotional problems, and management skills used in primary-care practice to deal with these problems. Pre-requisite: admission to the MEDEX program.

HSERV 458 Behavioral Science Skills II for the MEDEX Practitioner (2) W Lurie

Larice In-depth coverage of common emotional problems seen in primary care. Topics include crisis intervention, child abuse, death and dying, life planning, behavioral modifi-cation, human sexuality, alcohol and drugs, and family therapy techniques. Prerequisites: 451, 453, 457, or permission of instructor.

HSERV 459 Principles of Patient Management for the Primary-Care Practitioner I (2)

the Frimary-Care Fractuoder 1(2) Systematic approach to patient management applicable to a primary-care setting. Half of course devoted to drug therapy and its administration with text developed specif-ically for the course; other half includes record keeping by a problem-oriented system, health maintenance, risk factor identification, and nonpharmacological therapeutic modes. Prerequisite: admission to MEDEX program.

HSERV 460 Principles of Patient Management for the Primary-Care Practitioner II (2) Drug therapy syllabus is extended, using a programmed text approach. Major chronic disease states and their comprehensive management discussed as examples of the principles enunciated in 459. Role of the primary-care practitioner in preventive practice. Prerequisites: 451, 453, 457, 459, or permission of instructor.

HSERV 462 Emergency Medicine and Technical Skills for the Primary-Care Practitioner (2) Bruneau, Harmon

Student learns to assess emergency conditions, what im-mediate actions to take, and how to organize a manageuscuase accuons to taxe, and now to organize a manage-ment and referral plan for major and minor emergent con-ditions. Topics include life support, CPR, intravenous fluids, head injuries, respiratory distress, burns, environ-mental injuries, poisonings, shock, wound care, sutur-ing, and casting. Prerequisites: 451, 453, 457, or permis-sion of instructor.

HSERV 466 Family Practice Clerkship for the MEDEX Practitioner I (19) Sp

Harmon

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 medex in practice. Students write protocols for primary-care problems and complete a programmed text in pharmacology. Offered on credit/no credit basis only. Prerequisites: 451, 452, 453, 454, 456, 457, 458, 459, 462, or permission of instructor.

HSERV 467 Family Practice Clerkship for the MEDEX Practitioner II (19) S Harmon

Purther experience in primary-care practice with empha-sis on independent patient management by the student su-pervised by family practitioners. Offered on credit/no credit basis only. Prerequisite: 466.

HSERV 497 Health Services Special Electives (*) AWSpS

Off-campus course for medical students.

HSERV 498 Undergraduate Thesis (*) AWSoS

HSERV 499 Undergraduate Research (*) AWSpS

Courses for Graduates Only

HSERV 511 Health Services and Medical Care (3-4) AS Day, Williams

Intensive introduction to the subject, including measure-ment of need and demand, the resources for health care, private and public efforts to provide health services, eleprivate and public efforts to provide health services, ele-ments of medical care, program planning and evaluation, the biological basis of organized public health activities, public health programming, health behavior and its modi-fication, social science applications in health services and medical care, and related topics. Prerequisite: graduate standing or permission of instructor.

HSERV 512 Medical Care (4) W

Richardson

Intensive treatment of aspects of medical care, including institutional and provider arrangements, private and pub-lic programs to supply care, access, quality, and financ-ing of care, and issues of regulation. Prerequisite: 511 or equivalent or permission of instructor.

HSERV 522 Community Organization for Health (4) W

Anderson Emphasis on the diagnosis of community health problems and various organizational practices utilized for effective solution. Review and analysis of the community organization process; resources; role of the community health workers, relationship to the practice of community health education. One-half day of fieldwork required. Prerequi-

HSERV 531 Special Studies in Community Medicine (1-12) AWSpS

site: permission of instructor.

Gilson

Experience in variable time blocks in community health activities in agencies delivering and planning health ser-vices. Sites include neighborhood clinics, health planning bodies, medical practice settings, public health agencies, special problem clinics and facilities, environ-mental programs and services. Prerequisite: medical stu-dent standing or permission of instructor.

HSERV 540 Ambulatory Care Organization and Management (3) W Williams

Organizational and managerial aspects of ambulatory medical services. The organizational focus relates to the ambulatory services provided within the structure of the United States health services system. The managerial aspect relates to specific administrative issues involved in the operation of health services facilities, including finan-cial control, marketing, personnel, evaluation, and regu-lation. Prerequisites: 511, 512.

HSERV 541. The Organization and Role of Hospitals (3) A Dowling

External environment and internal organization of hospi-tals; community-hospital relationships, hospital owner-ship, governing board and medical staff functions and or-ganization; and the role of hospitals in the delivery of health services and their relationship with other elements of the hospital community. of the health-care system. Emphasis on issues and trends. Prerequisite: 511.

HSERV 542 Long-Term Care (3) A

Winn

Winn Provides a learning experience for graduate students in health services administration and planning and other graduate students that will increase their ability to iden-tify and solve the problems related to long-term care with which they will be confronted in their employment. Stu-dents are exposed to available knowledge in the field; ef-fective problem-solving attitudes and techniques for organizing information and/or developing strategies, and present actors and agencies in the field. Prerequisites: 511 and/or permission of instructor.

HSERV 543 Mental Health Services (3) W

In-depth examination of the specific area of mental health care as it relates to all of health services delivery. Offers a descriptive as well as analytic approach to the manage-ment and organization of mental health-care delivery. Topics include costs, alternative treatment programs, current fusion programs, current fusion of instance of instance of the second s current issues. Prerequisite: 511 or permission of instructor.

HSERV 544 Seminar: Health Manpower (3) W

Review of current status of health manpower in the United States and growth in health professions in this century. Discusses approaches to health manpower planning. Limited to twenty students by prior arrangement with instructor.

HSERV 545 Quality of Health Care: Evaluation and Assurance (3) Sp

LoGerfo, Riedel

LoGerfo, Riedel Survey of methods used to assess components of medical care services and an analysis of their application to care by physicians, nurses, physician extenders, social ser-vices, hospitals, nursing homes, and emergency services. An overview of legal and professional quality assurance mechanisms also is presented, with analysis of their ac-tual and potential impact. Prerequisite: 511, BIOST 511, or environment. or equivalent.

HSERV 546 Problems in Contemporary Public Health Practice (2)

History and development of local public health depart-ments. Traditional versus new roles and critical interactions with public and private agencies. Examples drawn from areas of current concern (e.g., prostitution and ven-ereal disease; health promotion and disease prevention; dental health; environmental programs; alcoholism; emergency medical services; mental health services; jail medical care). Prerequisite: 511 or permission.

HSERV 550 Economic Studies of Health Care (3) WSp

McCaffree, Watts

MCC affree, Waits Examination of health-care issues from an economic per-spective, including supply and demand factors, health in-surance, industry organization, and government regula-tion. Offered jointly with ECON 546. Prerequisite: ECON 400 or equivalent or permission of instructor.

HSERV 551 Hospital and Medical Law (4) Sp Dolan

Philosophy and application of law as it relates to the hos-pital and other health-care facilities. Discussion of legal process and the relation of the law and public policy. Prerequisite: 511.

HSERV 552 Politics of Health Care (3) Sp Bice

Provides analytical skills for viewing health-care delivery within the context of the American political system. Dis-tinctive characteristics of the health field are examined as these relate to the formulation and implementation of health policy, as well as the areas that health shares in common with other policy areas. Emphasis in the course is on the political processes underlying the ever-expand-ing role of government in health care. Prerequisite: 511 or permission of instructor.

HSERV 553 Hospital Financial Management (3) Sp Tiscornia

Third course in a three-course sequence dealing with the Initial course in a three-course sequence dealing with the management of health services institutions and programs. Topics covered are: health services law, hospital and pro-gram policy decisions, financial planning, and hospital design and architecture; and the presentation of hospital survey and health services research project reports. Pre-requisites: 551 and permission of instructor.

HSERV 554 Sociology of Health and Illness: An Organizational and Managerial Perspective (3) A Shortell

Critical examination and discussion of sociological approaches—methodological, theoretical, and empirical— in the health-care field. Particular attention is paid to applied studies in the field and, more broadly, to the impli-cations for decision making from the sociological per-spective. Offered jointly with SOC 561. Prerequisite: 511 or undergraduate major in sociology or permission of instructor.

HSERV 556 Quantitative Methods for Health Services (3) Sp Trivedi

Applications of various quantitative techniques for prob-lem solving, monitoring, controlling, and decision mak-ing in health services. Emphasis on identifying problem area, communications with consultant at a technically so-phisticated level, and evaluation of the quality and applicability of analyst's work. Quantitative methods in-clude statistical, mathematical, operations research, and industrial engineering techniques. Prerequisites: QMETH 500 or BIOST 511, and OPSYS 500 or permission of instructor.

HSERV 560 Advanced Seminar in Health Economics (3) Sp Watts

Selected topics in health economics, including risk and insurance, medical malpractice, the market for physician services, and industry regulation. Offered jointly with ECON 547. Prerequisites: 550 or ECON 546 and ad-vanced-level microeconomic theory, or permission of instructor

HSERV 563 Advanced Health Services Financial Management (3) Sp Lehman

Lehman Develops financial management skills through case stud-ies in budgeting, pricing, and monitoring the total finan-cial requirements for health-care institutions. Topics in-clude budgeting principles, cost analysis, rate setting, reimbursement, profit planning, short- and long-term capital financing, and financial feasibility analysis. Pre-requiring 521 and/or commission of institutions. requisites: 553 and/or permission of instructor.

HSERV 564 Advanced Seminar on Medical Sociology (3) Sp Cook, Shortell

Cook, Shortell Development and testing of theories related to illness be-havior, health occupations, and professions, and the or-ganization of health services. Emphasis on provider-patient relationships and the sociology of health-care-delivery organizations. Offered jointly with SOC 563. Prerequisite: 554 or admission to health services doctoral concerturities program or graduate status in sociology or opportunities program or graduate status in sociology or permission of instructor.

HSERV 570 Seminar in Health Services Management (4) W Dowling

Dowling Examination of decision making, change implementa-tion, and control processes in health services delivery or-ganizations. Emphasizes (1) behavioral, organizational, and situational factors affecting the management role in health organizations, and (2) management strategies for analyzing problems and implementing changes to im-prove organizational performance. Seminar/case study format. Prerequisites: 511, 551 and A ORG 550, and permission of instructor. permission of instructor.

HSERV 571 Technical Planning of Health Services and Facilities (4)

MacStravic

MacStravic Basic planning model involving seven steps and five technical capabilities. Application of the model and em-ployment of specific techniques in making decisions and programming action with respect to health services and facilities, with emphasis on inpatient and ambulatory care programs. Prerequisites: 511, 512, or permission of instructor.

HSERV 572 Health Planning: Implementation and Goals (4) W Blackman

How to design realistic implementation strategies at the beginning of a planning process to optimize the impact of planning on real world of problems. Students prepare several sets of strategies dealing with planning in community, organizational, and committee settings. Course munity, organizational, and commute settings. Course presents techniques that can be used in designing plan-ning programs. Demonstrates relationship between change implementation strategies and development of goals for change. Students learn how change is brought about, how decisions are made, and how things get done at both the organization and community levels. Prerequi-site: 511 or substantial experience in an operating setting or agency.

HSERV 573 Program Evaluation (3) W Bergner, Shortell

Bergner, Shoriell Theory, practice, and politics of evaluation. All types of evaluative activities considered from simple feedback mechanisms to the evaluation of large-scale ongoing pro-grams and social experiments. Emphasis on development of familiarity with and applications of experimental and quasiexperimental evaluation. Case studies drawn from the health field used to illustrate the various types of eval-uation. Descruisity, headermund in guantities methods. uation. Prerequisite: background in quantitative methods (e.g., BIOST 512 or 513) and permission of instructor.

HSERV 581-582 Research Design and Problem Analysis in Health Services I-II (2-2) W,Sp

Riedel Problem definition, theory construction, research design, Adata collection and analysis in health services research. Offered on credit/no credit basis only. Prerequisites: 511 and admission to doctoral opportunities program, or permission of instructor.

HSERV 590 Selected Topics in Health Services (*) AWSpS By individual arrangement, the student and faculty mem-

ber(s) develop a program of reading and conference ap-propriate 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 ENVH 590 and/or EPI 590. For more information and permission, consult department program adviser.

HSERV 591, 592 Seminar in Special Topics I, II (1-4, max. 4; 1-4, max. 4) AWSpS, AWSpS

Special topics related to current issues in health services. Topics determined by expressed interest of students and faculty; also includes participation of health profession-als. Prerequisite: 511.

HSERV 595, 596, 597 Field Analysis Project/Research Project (1-3,3,3) A,W,Sp Supervised research in a selected topic related to stu-dent's concentration in graduate study. Includes survey of literature, development of approach, and written paper on conclusions. Prerequisite: successful completion of first-year curriculum and internship in graduate program in health services administration and planning.

HSERV 599 Field Practice in Public Health (*) AWSpS

Individually assigned and supervised student field place-Individually assigned and supervised student near place-ments in agencies and programs related to areas of con-centration. Health education, medical-care organization and administration, public health program areas, and as-sociate placements are developed, depending on student interest and educational needs. Prerequisite: graduate standing in the School of Public Health and Community Medicine others hu reprinting of instructors. Medicine; others by permission of instructor.

HSERV 600 Independent Study or Research (*) AWSpS

Prerequisite: permission of instructor.

HSERV 700 Master's Thesis (*) AWSpS Prerequisite: permission of instructor.

PATHOBIOLOGY

UCONJ 420 Biological Safety Practices (1) A Kenny See University Conjoint Courses.

PABIO 451 Laboratory Diagnosis of Viral Infections (4) Sp

Cooney

Lecture and laboratory covering diagnostic procedures for etiologic diagnosis of viral infections: upper respira-tory, lower respiratory, systemic, and central nervous system. Symptomatology: indications for specimen col-Jection, types of specimens for examination, methods for virus isolation, identification of agents, serologic meth-ods, interpretation of results. Prerequisites: MICRO 441, 442 or equivalent.

PABIO 497 Pathobiology Special Electives (*) AWSpS

Off-campus course for medical students.

PABIO 499 Undergraduate Research (*) AWSpS

Courses for Graduates Only

PABIO 511 Pathobiological Frontiers (3) Kenny

Kenny Study and discussion of the present concepts of pathobiology as related to disease, presented in a format suitable for graduate students knowledgeable in health-related areas, but who are not in biologically oriented programs. Topic areas include: host-parasite interactions, host responses, pathogenesis, and methods of biological experimentation. Prerequisite: permission of instructor.

PABIO 521 Mammalian Cell Culture as a Tool for Virus Research (3) A Kenny

General concepts, techniques and applications of cell cul-Uture. The nutrition, growth characteristics, and metabolism of animal cell cultures are considered in detail. Lab-oratory includes a special problem of the student's choice. Prerequisite: permission of instructor.

PABIO 522 Antigenic Analysis of Micro-organisms (3) W Kenny

Theory, techniques, and strategy for antigenic analysis of micro-organisms. Emphasis is placed on the use of recent electrophoretic methods for quantitative analysis of complex antigenic mixtures. Prerequisite: permission of instructor.

PABIO 524 Methods for Ultrastructure of Micro-organisms (3) W

Boatman

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Specific methods for the investigation of the ultrastruc-ture of micro-organisms are described following discussion of the design and operation of the electron midiscussion of the design and operation of the electron mi-croscope. Lectures cover the morphology and structure of bacteria, mycoplasmata, and bacterial and animal vi-ruses. Instruction is given in operating the electron mi-croscope, in the examination of specimens, and in producing photographic data. Students are expected to pursue a small topic of their choice. Prerequisite: permis-sion of instructor sion of instructor.

PABIO 525 Cell Surface Membrane in Cell Sociology and Immunology (2) Sp Hakomori

Structure and function of cell surface membranes in rela-tion to various immunobiological and pathobiological phenomena (differentiation, organization, infection, cancer, etc.) are covered. Offered jointly with MICRO 525. Prerequisites: BIOC 440, 441, 442 and MICRO 447, and permission of instructor.

PABIO 527 Immunology of Parasitic Diseases (2) Stibbs Review of mechanisms of vertebrate immunity to path-

ogenic protozoa and helminths; strategies by which these parasites evade the immune response and immunosuppress; and attempts and successes at immunization. Stu-dent presentation of topics required. Entry card required.

PABIO 580 Pathobiology Seminar (1, max. 9) AWSpS

Research reports from both students and faculty members are presented and discussed. Topics include immuno-chemistry, viruses, membranes, infectious diseases, immune response. Prerequisite: permission of Kuo.

PABIO 581 Current Literature in Pathobiology (1, max. 12) AWSpS Critical evaluation of recent articles on infectious agents.

Emphasis on literature dealing with immunological, biochemical, and molecular studies of selected patho-genic micro-organisms and viruses. Prerequisite: gradu-ate student standing in pathobiology; others by permission of Conney.

PABIO 590 Selected Topics (1-6, max. 6) AWSpS Buchanan, Chen, Cooney, Hakomori, Kenny, Kuo, Rausch, Stibbs, Wang In-depth study of disease agents and host response, usu-ally related to a current problem, and focusing on charac-

teristics of the disease agent. Seminar format. Small groups of students by arrangement with faculty member. Offered on credit/no credit basis only. Prerequisites: en-rollment in pathobiology graduate degree program and permission of instructor.

PABIO 598 Didactic Pathobiology (*, max. 12) AWSp

Kenny Supervised lecture and laboratory teaching experience for Ph.D. Candidates. Teaching is in pathobiology labora-tory courses, depending on interests of the student. Pre-

PABIO 600 Independent Study or Research (*) Offered on credit/no credit basis only. Prerequisite: permission of department Chairperson.

PABIO 700 Master's Thesis (*) Offered on credit/no credit basis only. Prerequisite: permission of department Chairperson.

RESERVE OFFICER TRAINING PROGRAMS

AEROSPACE STUDIES

Courses for Undergraduates

A S 101, 102, 103 Aerospace Studies 100 (1,1,1) A,W,Sp

Examines the role of United States military forces in the contemporary world, with particular attention to the United States Air Force, its organization and mission. The functions of strategic offensive and defensive forces, general purpose forces and aerospace support forces are covered. One classroom hour and one hour of leadership laboratory per week.

A S 211, 212, 213 Aerospace Studies 200 (1,1,1)

A,W,Sp Introduction to the study of air power. The course is de-veloped from a historical perspective starting before the Wright brothers and continuing through the early 1970s. The development and employment of air power in military and nonmilitary operations to support national objec-tives is covered. One classroom hour and one hour of leadership laboratory per week. Prerequisites: 103 or equivalent for 211; 211 for 212; 212 for 213 or permission of the department.

A S 331, 332, 333 Aerospace Studies 300 (3,3,3)

A,W,Sp Study of Air Force leadership and management. Includes professional responsibilities, military justice system, leadership theory functions and practices, management reaction principles and functions, and problem solving. Three classroom hours and one hour of leadership laboratory per week. Prerequisites: 213 or equivalent for 331; 331 for 332; 332 for 333.

A S 430 Flight Instruction Program Ground School

(2) Sp Ground school to supplement flight training for Air Force ROTC cadets in light aircraft; includes weather, naviga-tion, and Federal Aviation Agency regulations. Prerequi-site: permission of the department.

A S 431, 432, 433 Aerospace Studies 400 (3,3,3) A,W,Sp Study of United States defense policy with respect to those political, economic, and social constraints involved in its formulation and implementation. Includes an exam-ination of the military professional, his role and civil-mil-itary relationship in a democratic society. Three class-room hours and one hour of leadership laboratory per week. Prerequisites: 333 or equivalent for 431; 431 for 432; 432 for 433.

MILITARY SCIENCE

Courses for Undergraduates

M SCI 101, 102, 103 Military Science I: Basic (1,1,1) AWSp,AWSp,AWSp History, organization, and mission of the United States Army and the ROTC. Relationship to the citizen's military and civilian obligations. Functions and organization of the United States defense establishment. Interrelationof the United States defense establishment. Internetation-ships among the services under the Department of De-fense. Fundamentals of leadership and management in military environment. Evolution of modern warfare. Weaponry of the future and impact of modern weaponry on tactical doctrine of the future. One-day field trip re-uted during the use quired during the year.

M SCI 201, 202, 203 Military Science II: Basic (2,2,2) AWSp,AWSp,AWSp Develops proficiency in delivering and evaluating oral in-struction. Presents a perspective on the American mili-tary tradition and post-World War II, foreign policy, and strategy. Significant military conflicts are examined as they impact on the nature of warfare for the future. Fun-damentals of military map reading, aerial photography, compass and field navigation are taught and applied. One weekend field trip required during the year.

M SCI 301, 302, 303 Military Science III: Advanced (3,3,3) AWSp,AWSp,AWSp Small-unit tactics, emphasizing the importance of fire-power, movement, and communications. Duties, respon-sibilities, and methods of employment of basic military units. Leader's role in directing and coordinating individunits. Leader's role in directing and coordinating individ-uals 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 com-mand, control, military management, and leadership are taught and practiced throughout the academic year. Three wastend field tring remuted during the ware weekend field trips required during the year.

M SCI 401, 403 Military Science IV: Advanced

(2,2) AWSp,AWSp 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 re-sponsibilities and official relationships of an Army officer. Organization and functions of command. Staff relacer. Organization and functions of command. Staff rela-tionships. Coordination of administration, logistics, and planning for military operations. Basic concepts of legislative and executive authority for Uniform Code of Military Justice (to include a study of UCMJ and the offi-cer's authority and responsibility within the military jus-tice system). Problem-solving techniques used by small-unit leaders, emphasizing coordination and planning by the junior officer. Three weekend field trips required each year. each year.

NAVAL SCIENCE

Courses for Undergraduates

N SCI 111 The Naval Service (3) A General introduction to the Navy, its organization, mis-sions, roles, tasks, and operating methods. The relation-ship to the other services within the Department of Defense is emphasized.

N SCI 112 Naval Ship Systems I (3) W Study of the varied ship systems operational in the Navy today, including the principles of characteristic pro-pulsion systems and auxiliary machinery and the elements of ship stability and damage control. An introduction to nuclear propulsion.

N SCI 113 Naval Ship Systems II (3) Sp Continuation of 112.

N SCI 211 Naval Weapon Systems (3) A Concept of naval weapons systems and the systems ap-proach, the techniques of linear analysis of ballistics and weapons, the dynamics of basic components of weapons control systems. The tools are provided for understanding the basic principles that are involved in all modern naval weapon systems.

N SCI 212 Sea Power Practicum I (2) W

Seminar-type course in which discussion centers on the role of sea power in the history of the United States, 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 imple-mentation of national security policy, and the economic effects of the elements of sea power (the Navy, the merchant marine, port facilities, fisheries, and oceano-graphic capabilities).

N SCI 213 Sea Power Practicum II (2) Sp Continuation of 212.

N SCI 311 Navigation (3) A

Comprehensive study of the science of terrestrial navigation, including dead reckoning, piloting, and elec-tronic means. The laws for prevention of collision at sea (rules of the nautical road) are covered.

N SCI 312 Celestial Navigation (3) W Theory and practice of celestial navigation. The student performs the complete "day's work" of the ship's naviga-

N SCI 313 Naval Operations (3) Sp

Introduction to naval operations (5) sp Introduction to naval operations, the employment of na-val forces, naval tactics, formulation of operations plans and orders, employment of detection equipment, and meteorology. The subject of operations analysis as a tool for decision making is introduced.

N SCI 411 Psychology of Leadership (3) A

Introduction of the theory and techniques of naval leader-ship based on those principles of behavioral science that are pertinent to understanding individual and group behavior of adults. It introduces the student to the management process and the relationship of management func-tions to leadership. Acceptance of a traditional deep sense of moral responsibility on the part of the aspiring leader is stressed.

N SCI 412 Naval Organization and Management I (3) W

Study of organization, systems, and techniques employed in the Navy for management of its human, financial, and material resources. Some of the work relates to the ad-ministration of discipline in the Navy under the Uniform Code of Military Justice. Emphasis is placed on the backerbined areas and the first state of the transformed of the state of the st leadership and management role of the junior officer in the fleet.

N SCI 413 Naval Organization and Management II (3) Sp Continuation of 412.

MARINE CORPS OPTION COURSES

N SCI 321 Evolution of Warfare I (3) A Introduction to the art of war, the evolution of warfare from the earliest recorded battles to the present day.

N SCI 322 Evolution of Warfare II (3) W Continuation of 321.

N SCI 323 Marine Corps Operations (3) Sp Introduction to the basic tactics employed by the Marine Corps. Covers the roles and the missions of the Marine Corps, its relationship to the other services, and its employment in the implementation of national policy. Familiarizes the student with Marine Corps organization.

N SCI 421 Amphibious Warfare I (3) A

Historic review of the great amphibious operations con-ducted in the Pacific theater of operations during World War II and of the doctrine for amphibious warfare that evolved.

N SCI 422 Amphibious Warfare II (3) W Continuation of 421, covering the amphibious operations in the European theater of operations during World War II, the Korean War, Lebanon, Cuba, Santo Domingo, and Vietnam. Planning for amphibious operations, in-cluding command relationships, task organization, and other aspects.

N SCI 423 USMC Leadership and Administration of Justice (3) Sp

Concepts, objectives, characteristic qualities, and practical techniques of leadership as exercised by the Marine Corps officer are studied. Emphasis is placed on the leadership and management role of the junior officer in the fleet marine forces.

SCHOOL OF SOCIAL WORK

Courses for Undergraduates

SOC W 200 Introduction to Social Work Practice (5) Sp

Dixon. Ellis

Dixon, Ellis Introduction to the practice of social work, theoretical concepts and institutional framework that guides prac-tice, and the conceptual organization of the discipline of social work. Three weekly lectures and two hours per week in field observation sessions. Lectures supple-mented by audiovisual aids and by special guest practi-tionser. tioners:

SOC W 300 Historical Approaches to Social Welfare (3) AW

Berleman, Duplica

Berleman, Duplica Stresses the origins and development of social welfare policy and programs, starting with the Elizabethan Poor Law (1601) and ending with the Social Security Act of 1935. The issue of poverty and the development of pub-licly funded income maintenance programs are central concerns. Prerequisite to 320; open to nonmajors and re-quired of social welfare majors.

SOC W 310-311 Social Welfare Practice (3-3) WSp Duplica, Hanneman, Leigh Provides a conceptual framework for social work practice

with individuals, families, small groups, and communities; an introduction to the roles, tasks, and functions of the social welfare practitioner and to theories and meth-ods of intervention; and develops skills in problem assessment, intervention, termination, and evaluation. Open only to social welfare juniors.

SOC W 320 Contemporary Approaches to Social Welfare (3) WSp

Berleman, Duplica

Policy and program developments in the social welfare field since 1935. Current income maintenance proposals, the emergence of programs to treat specific social dysfunctioning (e.g., mental health services), and the growth of a service-oriented society are typical course concerns. Open to nonmajors and required of social welfare majors. Prerequisite: 300.

SOC W 360 Working With Volunteers in Social Work Settings (2) W

Bryant, Kelley

Bryan, Kelley Historic role of the volunteer, current functions per-formed by volunteers, and the probable roles of volun-teers in the future. Those anticipating becoming volun-teers or interested in the role of the volunteer within social work settings gain a perspective on their organiza-tional place and function.

SOC W 370 Social Work and Sex-Related Problems

(3) Undergraduate introductory seminar course offering basic approaches and issues in social work practice and sex-ual problems in American society. Readings and discussions related to current issues, research, and social work approaches. Topics include social work perspective on sex, sexual development, cross-cultural perspective, sexually oppressed, etc.

SOC W 390 Introduction to Social Welfare Research (3) AWSp

Introduction to the logic of the scientific method as ap-plied to research in social work/social welfare; a begin-ning understanding of the interrelated steps in the conduct of a research study; and development of skills in the critical consumption of social welfare research and the relationship of this research to social welfare practice. Open to social welfare majors; others by permission of instructor.

SOC W 395 Program Evaluation in Social Welfare (3) W Roffman

Program evaluation with the purpose of orienting the stu-dent to the dynamics and functions of evaluation in social action programs. Objectives are: to develop an underaction programs. Objectives act, to develop an indective standing of the variety and character of various evalua-tive techniques, to develop competence in evaluating social programs, and to grasp an appreciation of the vari-ous alternatives for using the results of evaluation studies in improving organizational performance.

SOC W 401 Principles of Interviewing (3) AWSpS Kelley, Miller

Kelley, Miller Focus on identification and understanding of fundamen-tals of successful interviewing, with special emphasis on the helping interview. Acquisition of beginning skills and techniques in conducting initial interviews. Open to majors and nonmajors. Prerequisite: upper-division standing.

SOC W 402 Human Service Counseling (3) W Kelley

Builds basic interviewing skills learned in 401. Emphasis on short- and long-term counseling skills, such as goal setting for clients, goal attainment and revision, referral and termination. Seminar/laboratory; participation in role playing and simulations. Prerequisite: 401 or permission of instructor.

SOC W 405-406-407 Fieldwork Seminar (2-2-2)

A,W,Sp Two-hour seminar meeting weekly. Student integrates social work practicum experiences with prior and concurrent course work in the social sciences, social work, and rent course work in the social science, social work, and research. Includes discussion of class presentations and simulations or practice situations that combine knowl-edge and skill utilization. Student logs provide a basis for individual goal identification and achievement. Required for, and open only to, social welfare seniors. Prerequi-sites: 310-311; to be taken concurrently with 415. SOC W 409 Readings in Social Welfare (1-5, max. 15) AWSp Prerequisite: permission of instructor.

SOC W 415 Beginning Fleid Instruction (4-6, max. 12) AWSp Students are placed in selected social service agencies and accept beginning social service assignments under the supervision of competent agency personnel. Offered on credit/no credit basis only. Prerequisites: social wel-fare major standing and 300, 310-311.

SOC W 419 Adult Development and Aging (3) AW Hooyma

Designed to introduce the student to the field of adult development. Interdisciplinary perspective stressing the in-teraction of psychological, social, and physiological factors affecting the aging process. Goals are (1) to help the student understand and accept self-aging, and (2) to provide a framework of understanding for working with adult persons. Required for social welfare majors.

SOC W 420 Social Gerontology (4) Generational component in social work practice. Discus-sion of value differences across generation lines, life stage development into the later years, social role loss and acquisition in retirement, and confrontation with is-sues of death and dying as they affect the design and pro-vision of social work services. Analysis of specific intervention techniques and discussion of policy issues and social action procedures useful in implementing social change on behalf of the aged. Prerequisite: upper-division standing.

SOC W 421 Methods of Child Care and Treatment (3) Whittaker

Major foci include an introduction to the continuum of child welfare services, as well as some practical ap-proaches to working with children and adolescents in a wide variety of practice settings.

SOC W 422 Human Growth and Behavior: Childhood and Adolescent Development (5) W Maier

Study of the beginning continuum of human development relative to the sociocultural influences of an individual's life experiences. Focus includes cognitive, affective, and behavioral dimensions of development, their interrela-tionship and their influence upon a person's capacity to deal with his or her life requirements. Emphasizes the practical application of such knowledge for work with children and adolescents in a variety of human services settings (e.g., ways of observing and studying children, relationship skills, use of play, etc.). Open to majors and nonmaiors.

SOC W 424 Chemical Dependencies and Society (3) Treatment and control approaches and the assessment of Treatment and control approaches and the assessment of their effectiveness. Several concurrent "topic seminars" dealing with feminism, crisis management, drug philoso-phy, minority cultures, drug counseling, regional plan-ning, and residential programs offered each quarter. Pre-requisite: permission of instructor.

SOC W 426 Conceptions of Basic Institutional Change (3) Sp Herrick

How basic cultural change may be brought about and How basic cultural change may be brought about and specifically how such change may affect the institution of social welfare. Focus on (1) a critical assessment of the dominant cultural values and particularly those values un-derlying social welfare; (2) prerequisites for a change to occur in these values; and (3) dangers and dilemmas in implementing such a change. Recommended: 300 and ECON 200.

SOC W 430 Child Care Work Practice (3) WSp Whittaker

Whitaker Specialized practice with emotionally disturbed and de-linquent 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 interven-tions; parental involvement; organizational requisites and community linkages. Prerequisite: 310 or permission of instructor instructor.

SOC W 433 Community Resources in the Treatment of Alcohol and Other Drug Problems (3) Sp Roffman

Survey of available community resources. Includes the premises upon which treatment approaches are built and the desirable components of appropriate client referral. Prerequisites: upper-division standing and 20 credits in the social sciences, preferably sociology and psychology.

SOC W 470 Crisis Intervention in Social Welfare (3) A

Introduction to: interventive methods and response to persons in crisis; use of crisis to produce positive change, concepts of crisis and crisis intervention; and the epideconcepts of crisis and crisis intervention; and the epice-miology and demography of suicide. Learning experi-ences include didactic presentation of materials by in-structor, use of role play, films and tapes, discussions led by social workers from centers for persons in acute personal circumstances. Open to majors and nonmajors.

SOC W 475 Introduction to Social Work Practice in Health Care (3) AS

Social impact of illness described, including issues in service delivery and interdisciplinary team functioning. Evaluation of social workers' contribution to comprehen-sive health care. Prerequisite: upper-division standing.

Courses for Graduates Only

SOC W 501 Problems of Social Welfare in Ethnic Minority Communities (3, max. 6) Northwood

Examination of selected social welfare problems as re-Examination of Selected social weiter protects as the lated to specific ethnic and racial minority groups. Atten-tion is given to understanding of minority populations and the effective delivery of social work and social welfare services in those communities.

SOC W 502 Income Maintenance and Health Care

(3) AW Dear, Duplica, Patti, Weatherley Advanced course in policy stemming from the Social Se-curity Act with particular reference to programs of income maintenance and health; social assistance, social vate approaches to health care. Emphasis on the develop-ment of analytic skills that help to address questions about benefits, comprehensiveness of coverage, financ-ing, gaps in service, and options and alternatives for the future improvement of these programs.

SOC W 503 Social Services and Social Policy (3) AW

Dear, Duplica, Patti

Dear, Duplica, Pain Provides in-depth knowledge of social welfare policies and services that meet societal problems, the needs of specific client groups, and analytic tools for evaluating various policies. Understanding of the network of institutions that employ social workers to better serve their clientele is a prerequisite if needed changes and improve-ments are to be made by professional social workers in these institutions and if feasible options are to be selected to rectify inadequacies at the policy level.

SOC W 504 Social Problems and Social Welfare (3, max. 9)

Dear, Ellis, Herrick, Roffman

Dear, Ellis, Herrick, Roffman Analysis of major social problems and social welfare service systems providing a systematic approach to as-sessing the scope, causes, social cost, and public policy alternatives in the provision of services related to such problems, selected social problems such as poverty and ill health, juvenile delinquency, drug and alcohol addic-tion, and neglect of the aging are studied and related to the student's field experiences.

SOC W 507 Seminar (3, max. 6) AWSp Bryant, Duplica, Roffman

Prerequisite: permission of instructor.

SOC W 508 Integrative Seminar (1-3)

SOC W 509 Readings in Social Work (*) AWSpS May be repeated for credit. Prerequisite: permission of instructor.

SOC W 515 Field Instruction (2-8, max. 12) AWSpS

Social work majors only. Prerequisite: permission of instructor.

SOC W 529, 530-531 Introduction to Human Services Practice (3,4-5)

Farber, Hanneman, Miller, Mundt, Richey, Teather Topics covering various helping methods used in practice with individuals, families, and small groups.

SOC W 532 Additive Human Service Methods (3) AWSp

DeLange, Miller, Mundt, Norton, Richey Focus is either on various methodologies employed in work with clients with specific presenting problems (physical disability, chemical dependency) or on a spe-cific counseling practice stance (behavioral therapy, group treatment). Prerequisites: 529 or 310-311.

SOC W 533 Advanced Human Services Practice

(3, max, 9) Griswold, Hanneman, Leigh, Maier, Miller, Mundt, Norton, Resnick, Richey, Teather,

Whittaker

Advanced human services practice in special areas. Intensive study of practice materials with emphasis upon development of appropriate interventive and methodological skills

SOC W 535 Advanced Field Instruction (2-10, max. 24) AWSpS Prerequisite: 515.

SOC W 541 Human Behavior and the Social Environment (3) A

DeLange, Ishisaka, Maier, Resnick, Stier, Takagi Introduction to a social systems perspective on human behavior and social environment. Emphasis upon four social systems (the individual, group, organization, and community), their interactions, and effects upon human behavior. Required for M.S.W. degree candidates and offered only Autumn Quarter of the first year.

SOC W 543 Problem-Focused Human Development (3) AWSp

(3) AWSp Allen, Farber, Norton, Roffman Focus on the social and developmental determinants of specific human problems and their impact on individual development, families, and social institutions. Some time given to examining the nature of organized social re-sponses that are designed to deal with the specified hu-terment the production of the specified hu-terment the production of the specified hu-terment the specified hu-terment the specified hu-terment the specified hu-terment the specified hu-terment the specified hu-terment the specified hu-terment the specified huter the specified hu-terment the specified huter the spe man problem. Prerequisite: graduate standing.

SOC W 544 Etiology and Epidemiology of Alcoholism and Drug Abuse (3) A Intensive survey of the historical evolution of etiological concepts pertaining to alcoholism and drug abuse; review and critique of current research on testing etiological hypotheses; emphasis on the unique problems of applying epidemiological research methodologies to the study of alcohol and other drugs. Offered jointly with PSYCH 580 and PBSCI 544. Prerequisites: graduate or postdoctoral standing in social, behavioral, or biological sciences and permission of instructor.

SOC W 560 Introduction to Social Welfare Planning (3) A Austin, Stier

Methodologically based course providing for the acquisition of professional analytic and interventive skills associated with social work practice in planning and policy analysis.

SOC W 561 Introduction to Social Welfare Administration (3) A Austin, Weatherley

Methodologically based course considers implications of alternative organizational structures and administrative practices from differing perspectives of client, worker, and administrator. Focus on the ways structure and administrative practices may be manipulated to alter the manner in which clients are served by an agency. Prerequisite: permission of instructor.

SOC W 563 Organizational Analysis (3) Patti

Provides conceptual base for analysis and action in human-service organizations. Emphasis on utilization of conceptual tools of organization theory for problem solv-ing in social welfare organizations. Students learn to describe and analyze selected organizational problems and contribute to their solutions. Prerequisite: permission of instructor.

SOC W 564 Group Process (3) AWSp Resnick

Provides tools for students to understand dynamics and development of group, to increase awareness of behavior of participants and leaders, and to improve effectiveness as participants and leaders. Prerequisite: permission of instructor.

SOC W 565 Seminar on the Economics of Social Welfare (3) W

Page Analysis of social welfare economics as affecting the environment of the business firm. Topics may include income maintenance, welfare, labor, and demand and sup-ply of social services, crime, and human capital. Offered jointly with B ECN 531 and ECON 518. Prerequisite: B ECN 500 or ECON 500 or permission of instructor.

SOC W 566 Specialized Community and Organizational Services Skills (3) AWSp

Bryant, Dear, Ellis, Patti, Stier, Valdez

Methodologically based course providing graduate social work students with professional analytic and interactional skills associated with administration, planning, and pro-gram development in social welfare. Content drawn from research in social work and related social science disciplines. Prerequisites: graduate status and permission of instructor.

SOC W 570 Advanced Planning Seminar (3) W Austin Stier

Methodologically based course for students in secondyear graduate program, providing criteria and methods appropriate for designing, developing, and planning so-cial welfare programs, including such elements as build-ing citizen support, legislative sanction, etc. Prerequisite: permission of instructor.

SOC W 571 Advanced Seminar in Social Welfare Administration (3) W Austin, Patti, Weatherley

Requisite concepts and practice skills necessary for the management of social welfare organization, with empha-sis on management practice in those settings offering clinical social services. Includes analysis of treatment settings and auspices, the management of interdiscipli-nary professional teams, overview of clinical practice technology, and planning, implementing, controlling, and budgeting in a human-services agency context. Builds upon material presented in 561. Prerequisites: 560, 561, and 535 taken concurrently.

SOC W 575 Special Topics in Social Welfare Policy (3, max. 6)

Anderson, Northwood

Analyzes new or expanding areas of social welfare poli-cies and services. Emphasis on developing the student's knowledge of, and ability to assess, social welfare pro-grams. The role of social work is examined in these expanding legislative and program directions.

SOC W 585 Systematic Theory Building (3)

Northwood Study of research methodology as used in the construction of theory relevant to social work practice. Focus is on selected problems requiring theory production, as related to individual theses and to the assessment of research studies and policy papers.

SOC W 586 Statistics in Social Work (3) Levy

SOC W 588 Research in Community and Organizational Settings (3)

Study of selective research methods and techniques useful in measuring organizational performance, evaluating program effectiveness, and determining community need and demand for various types of social welfare services.

SOC W 590 Social Welfare Research (3)

Griswold, Herrick, Jaffee, Northwood Three major objectives: (1) to introduce the student to the logic of the scientific method as applied to research in social welfare. (2) to provide the student with a beginning understanding of the interrelated steps in the conduct of research: and (3) to equip students for roles as consumers of, and participants in, social welfare research.

SOC W 591-592 Individual or Group Research Project (3-3) AWSp,AWSp

Field practice in a group or individual project in lieu of a master's thesis (except for students in the special pro-gram). Includes development of research design, collec-tion of date, tabulation and article and the state of the state. tion of data, tabulation and analysis, and report writing. Prerequisite: 590 or equivalent.

SOC W 594-595 Advanced Social Work Research (3-3)

Gottlieb, Herrick, Jaffee; Levy, Northwood, Schinke Principles and procedures for the evaluation of direct practice interventions (for human services students). Research methods involved in community-needs assessment, program evaluation, and management-information systems (for community and organizational services stu-dents). Separate sections of these courses are available for students in human services and in community and organizational services.

SOC W 600 Independent Study or Research (*) ASWpS

SOC W 700 Master's Thesis (*) AWSp

SOCIAL WELFARE

See Interdisciplinary Graduate Degree Programs.



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FACULTY INDEX

The first date following a name indicates the beginning of academic service at the University. When two dates are given, the second, in parentheses, is the date of promotion to present academic rank. Members of the Graduate School faculty are designated by an asterisk.

All appointments shown are as of December 1979.

AAGAARD, GEORGE N.,* 1954 (1967), Professor of Medicine and Pharmacology; B.S., 1934, M.B., 1936, M.D., 1937, Minnesota

AAGAARD, KNUT N.,* 1968 (1978). Research Professor of Oceanography: A.B., 1961, Oberlin; M.S., 1964, Ph.D., 1966, Washington

ABBOTT, ROBERT D.,* 1975 (1979), Professor of Education: B.A., 1967, California Western; M.S., 1968, Ph.D., 1970, Washington

ABERNATHY, RUTH, 1966 (1973), Professor Emeritus of Physical and Health Education; A.B., 1929, Oklahoma; M.A., 1931, Ph.D., 1943, Columbia

ABRAMS, ROBERT EDWARD,* 1971 (1973), Assistant Professor of English; B.A., 1965, Dartmouth; Ph.D., 1973, Indiana

ACKER, WILLIAM C., 1957 (1979), Research Associate Professor of Electrical Engineering; Senior Engineer, Applied Physics Laboratory; B.S.E.E., 1957, M.S.E.E., 1963, Washington

ADAMS, HARMON F., 1974, Assistant Professor of Restorative Dentistry; D.D.S., 1960, Washington

ADAMS, HÁZARD SIMEON,* 1977, Professor of English; B.A., 1948, Princeton; M.A., 1949, Ph.D., 1953, Washington ADAMS, JOHN B.,* 1975 (1979), Professor of Geological Sciences; Chairperson, Department of Geological Sciences; B.S., 1956, Stanford; M.S., 1958, Ph.D., 1961, Washington

ADAMS, ROBERT PARDEE.* 1947 (1966), Professor of English; B.A., 1931, Oberlin; Ph.D., 1937, Chicago

ADAMSON, JOHN W., 1962 (1978), Professor of Medicine; A.A., 1956, Stockton; B.A., 1958, California; M.D., 1962, California (Los Angeles)

ADEE, BRUCE H.,* 1970 (1976), Associate Professor of Mechanical Engineering; B.S.E. in A.&M.S., 1966, Princeton; M.S. in N.A., 1968, Ph.D., 1972, California (Berkeley)

ADELBERGER, ERIC G.,* 1970 (1975), Professor of Physics; B.S., 1960, Ph.D., 1967, California Institute of Technology

ADMAN, ELINOR T., 1971 (1977), Research Assistant Professor of Biological Structure; B.A., 1962, Wooster; M.A., 1964, Ph.D., 1967, Brandeis

ADOLPHSON, ALAN CARL,* 1974 (1976), Assistant Professor of Mathematics; B.S., 1971, Western Washington State; Ph.D., 1974, Princeton

ADOLPHSON, DONALD L.,* 1970 (1978), Associate Professor of Quantitative Methods; B.A., 1966, California (Berkeley); M.S., 1968, Ph.D., 1973, Wisconsin

AFFLECK, JAMES Q.,* 1967 (1974), Professor of Education; B.A., 1955, Washington; M.A., 1963, San Francisco State; Ed.D., 1968, Columbia

AFROMOWITZ, MARTIN A.,* 1975 (1978), Research Associate Professor of Electrical Engineering; B.S., 1965, M.S., 1966, Ph.D., 1969, Columbia

AGABIAN, NINA,* 1973 (1978), Associate Professor of Biochemistry; B.A., 1966, M.S., 1968, Adelphi; Ph.D., 1971, Albert Einstein College of Medicine

AGEE, JAMES K., 1979, Assistant Professor of Forest Ecology (Fire); B.S., 1967, M.S., 1968, Ph.D., 1973, California (Berkeley) AHLERS, ELEANOR E., 1966 (1976), Professor Emeritus of Librarianship; A.B., 1932, Washington; B.L.S., 1942, Denver; M.A., 1957, Washington

AHMED, SAIYED 1.,* 1973 (1978), Research Associate Professor of Oceanography; B.S., 1960, D.J. Science College (Karachi); Ph.D., 1963, J.W. Goethe (Frankfurt)

ALAVEDRA, MONTSERRAT, 1978, Assistant Professor of Music; Mozarteum (Salzburg); Escuela Superior de Canto (Spain)

ALBERS, JOHN J., 1971 (1976), Research Associate Professor of Medicine; A.B., 1965, M.S., 1965, Ph.D., 1969, Illinois

ALBERT, RICHARD K., 1976 (1977), Assistant Professor of Medicine; B.A., 1967, M.D., 1971, Colorado

ALBERTS, WILLIAM W.,* 1967 (1972), Professor of Finance and Business Economics; B.A., 1948, M.A., 1956, Ph.D., 1961, Chicago

ALBRECHT, ROBERT G.,* 1960 (1967), Associate Professor of Architecture; B.S.C.E., 1956, Washington; M.S.C.E., 1960, Massachusetts Institute of Technology

ALBRECHT, ROBERT WILLIAM,* 1961 (1979). Professor of Electrical Engineering and Nuclear Engineering: B.S.E.E., 1957, Purdue; M.S.N.E., 1958, Ph.D., 1961, Michigan

ALBRECHT, TERRANCE L., 1979, Assistant Professor of Speech Communication; B.A., 1974, M.A., 1975, M.L.I.R., 1978, Ph.D., 1978, Michigan State

ALDEN, DAURIL,* 1959 (1969), Professor of History and Latin American Studies; A.B., 1950, M.A., 1952, Ph.D., 1959, California (Berkeley)

ALDEN, RICHARD S.,* 1961 (1969), Associate Professor of Architecture; B.Arch., 1957, Washington; M.Arch., 1960, Yale; Ph.D., 1971, Pennsylvania

A

ALEXANDER, EDWARD,* 1962 (1969), Professor of English: B.A., 1957, Columbia; M.A., 1959, Ph.D., 1963, Minnesota

ALEXANDRO, FRANK J.,* 1964 (1968), Associate Professor of Electrical Engineering: B.E.E., 1956, M.E.E., 1959, Eng.Sc.D., 1964, New York

ALKIRE, DURWOOD L., 1973, Lecturer in Accounting; B.A., 1935, Washington; C.P.A., 1939, State of Washington

ALLAN, G. GRAHAM,* 1966 (1973), Professor of Fiber and Polymer Science and Chemical Engineering; Diploma, 1951, Associate, 1952, Strathclyde; B.Sc., 1952, Ph.D., 1956, Glasgow; D.Sc., 1970, Strathclyde

ALLAN, THOMAS NOEL, 1973, Assistant Professor of Radiology; F.R.C.S., 1961, Newcastle-Upon-Tyne; D.M.R.D., 1971, Bristol, England

ALLEN, ALLETHIA LEE,* 1966, Assistant Professor of Social Work; B.A., 1947, M.S.W., 1950, Boston

ALLEN, CAROLYN RAND JOHNSON,* 1972 (1979), Associate Professor of English; B.A., 1965, Washington; M.A., 1966, Claremont Graduate School; Ph.D., 1972, Minnesota

ALMERS, WOLFHARD,* 1974 (1978). Associate Professor of Physiology and Biophysics; Ph.D., 1971, Rochester

ALMES, GUY THOMAS, 1979, Assistant Professor of Computer Science; B.A., M.E.E., 1972, Rice; Ph.D., 1979, Carnegie-Mellon

ALPS, GLEN,* 1945 (1962), Professor of Art; B.A., 1940, Colorado State College of Education; M.F.A., 1947, Washington

ALTIERI, CHARLES F.,* 1975 (1977), Professor of English and Comparative Literature; A.B., 1964, Le-Moyne; Ph.D., 1969, North Carolina (Chapel Hill)

ALTIERI, JOANNE S., 1977, Lecturer in English; A.B., 1962, Boston; M.A., 1964, Ph.D., 1969, North Carolina (Chapel Hill)

ALTMAN, GAYLENE, 1976 (1979), Research Assistant Professor of Psychosocial Nursing; B.S., 1967, Kansas; M.N., 1971, Washington

ALTMAN, LEONARD C., 1975 (1979), Associate Professor of Medicine: B.A., 1965, Pennsylvania; M.D., 1969, Harvard

ALVARES, OLAV,* 1974 (1976), Research Associate Professor of Oral Biology; B.D.S. (D.D.S.), 1960, Bombay; M.S., 1963, Detroit; Ph.D., 1971, Illinois

ALVORD, ELLSWORTH C., JR.,* 1960 (1962), Professor of Pathology; B.S., 1944, Haverford; M.D., 1946, Cornell

AMES, WILLIAM E.,* 1957 (1970), Professor of Communications; B.S., 1948, South Dakota State; M.S., 1952, Iowa State; Ph.D., 1962, Minnesota

AMMERLAHN, HELLMUT H.,* 1968 (1972), Associate Professor of Germanics and Comparative Literature; Abiur, 1957, Konigstein; M.A., 1960, Vermont; Ph.D., 1965, Texas

AMMIRATI, JOSEPH FRANK.* 1979, Assistant Professor of Botany; B.A., 1965, M.A.; 1967, San Francisco State; Ph.D., 1972, Michigan (Ann Arbor)

AMMONS, WILLIAM F.,* 1970 (1974), Associate Professor of Periodontics; B.A., 1955, Texas Christian; D.D.S., 1959, Texas; M.S.D., 1970, Washington

AMORY, DAVID W.,* 1971 (1975), Associate Professor of Anesthesiology; B.S., 1952, M.S., 1955, Saint John's University (New York); Ph.D., 1961, Washington; M.D., 1967, British Colümbia

AMOSS, HAROLD L.. * 1965 (1968), Professor of Urban Planning; B.A., 1942, North Carolina; M.A., 1947, New Mexico; Ph.D., 1951, California (Berkeley)

AMOSS; PAMELA T.,* 1972 (1973), Assistant Professor of Anthropology; B.A., 1953, M.A., 1961, Ph.D., 1971, Washington ANDERSEN, JONNY,* 1967 (1978), Professor of Electrical Engineering; B.S.E.E., 1960, Colorado; M.S.E.E., 1962, Ph.D., 1965, Massachusetts Institute of Technology

ANDERSEN, MARION ALMA, 1974, Assistant Professor of Dance

ANDERSEN, NIELS H.,* 1968 (1976), Professor of Chemistry; B.A., 1963, Minnesota; Ph.D., 1967, Northwestern

ANDERSEN, WILLIAM R.,* 1964 (1967), Professor of Law; B.S.L., 1954, LL.B., 1956, Denver; LL.M., 1958, Yale

ANDERSON, ARTHUR G., JR.,* 1946 (1957), Professor of Chemistry; A.B., 1940, Illinois; M.S.; 1942, Ph.D., 1944, Michigan

ANDERSON, DONALD L.,* 1947 (1964), Professor of Mining Engineering; Head, Division of Mining Engineering; B.S., 1938, Saint Francis Xavier; B.Sc. in Min.E., 1941, Illinois

ANDERSON, FARRIS.* 1967 (1973), Associate Professor of Romance Languages and Literature; B.A., 1960, M.A., 1962, Duke; Ph.D., 1968, Wisconsin

ANDERSON, FREDERICK N.,* 1945 (1968), Professor of Art; B.A., 1944, Washington; M.F.A., 1954, Minnesota

ANDERSON, GEORGE C.,* 1958 (1977), Professor of Oceanography; Associate Chairperson for Research; B.A., 1947, M.A., 1949, British Columbia; Ph.D., 1954, Washington

ANDERSON, JAMES R., JR.,* 1968, Associate Professor of Social Work; Director, Social Work and Family Medicine Project; B.S., 1952, A.M., 1954, Indiana

ANDERSON, JAY W., 1956 (1961), Assistant Professor of Mechanical Engineering; B.S.M.E., 1955, M.S.M.E., 1961, Washington

ANDERSON, LYLE S., 1976, Instructor in Psychiatry and Behavioral Sciences; B.A., 1970, Washington; M.S., 1973, Ph.D., 1975, Oklahoma State

ANDERSON, MARC W., 1970 (1976), Lecturer in Pedodontics; B.A., 1965, Augustana; D.D.S., 1969, Illinois; Certificate, 1970, Washington

ANDERSON, MARJORIE E.,* 1971 (1978). Associate Professor of Rehabilitation Medicine and of Physiology and Biophysics; B.S., 1963, Michigan State; Ph.D., 1969, Washington

ANDERSON, ROBERT ARNOLD.* 1965 (1973), Professor of Education; Director, Bureau of School Service and Research; B.S., 1952, Ph.D., 1964, Minnesota

ANDERSON, VIRGINIA K., 1956 (1979), Lecturer in Dental Hygiene; B.S., 1952, M.A., 1971, Washington

ANDREWS, HENRY D., 1975 (1976), Instructor in Restorative Dentistry and Dental Hygiene; B.A., 1967, D.D.A., 1973, Washington

ANDREWS, RICHARD L.,* 1968 (1971), Associate Professor of Education; B.S., 1962, Indiana State; M.S., 1965, Ph.D., 1968, Purdue

ANDREWS, WALTER G.,* 1968 (1976), Associate Professor of Near Eastern Languages and Literature and of Comparative Literature; B.A., 1961, Carleton; M.A., 1963, M.A., 1965, Ph.D., [970, Michigan

ANKELE, FELICE, 1927 (1952), Assistant Professor Emeritus of Germanics; B.A., 1925, M.A. 1926, Ph.D., 1936, Washington

ANSELL, JULIAN S., 1959 (1965), Professor of Urology; Chairperson, Department of Urology; B.A., 1947, Bowdoin; M.D., 1951, Tufts; Ph.D., 1959, Minnesota

APPELBAUM, FREDERICK, 1978, Assistant Professor of Medicine; A.B., 1968, Dartmouth; M.D., 1972, Tufts

ARCHBOLD, THOMAS F.,* 1961 (1973), Professor of Metallurgical Engineering; B.S.Met.E., 1955, M.S.Met.E., 1957, Ph.D. (Met.E.), 1961, Purdue

ARENAS, CLAUDIO,* 1975, Associate Professor of Urban Planning; B.A., 1958, Texas: M.U.P., 1961, Washington; M.B.A., 1965, California (Berkeley)

AREND, WILLIAM P., 1964 (1975), Associate Professor of Medicine; B.A., 1959, Williams; M.D., 1964, Columbia

ARESTAD, SVERRE, 1937 (1972), Professor Emeritus of Scandinavian Languages and Comparative Literature; B.A., 1929, Ph.D., 1938, Washington

ARMSTRONG, DAVID A.,* 1978, Assistant Professor of Fisheries; B.S., 1969, California (Irvine); M.S., 1973, Oregon State; Ph.D., 1978, California (Davis)

ARMSTRONG, HUBERT E., 1966 (1972), Associate Professor of Psychiatry and Behavioral Sciences; B.A., 1957, Willametie; Ph.D., 1963, Syracuse

ARNOLD, RICHARD R.,* 1977, Professor of Art; Director, School of Art; B.F.A., 1947, Wayne State; M.F.A., 1948, Cranbrook Academy of Art

ARONS, ARNOLD B.,* 1968, Professor of Physics; M.E., 1937, M.S., 1940, Stevens Institute of Technology; M.S. (Hon.), 1953, Amherst; Ph.D., 1943, Harvard

ARONSON, ROBERT H., 1975 (1978), Associate Professor of Law; B.A., 1969, Virginia; J.D., 1973, Pennsylvania

ARSOVE, MAYNARD GOODWIN,* 1951 (1961). Professor of Mathematics; B.S., 1943, Lehigh; Sc.M., 1948, Ph.D., 1950, Brown

ASHWORTH, CLARK, 1978, Research Assistant Professor of Maternal and Child Nursing; B.S., Old Dominion; M.S., 1975, Ph.D., 1978, Washington

ATKINS, JOHN R.,* 1964 (1973), Associate Professor of Anthropology; B.S., 1950, Northwestern; M.A., 1954, Pennsylvania

ATKINSON, MICHAEL K., 1975, Assistant Professor of Medicine; M.B., B.S., 1968, London; M.R.C.P., 1972, Royal College of Physicians

ATTNEAVE, CAROLYN L.,* 1975, Professor of Psychology; B.A., 1940, B.A., 1941, Chico State; M.A., 1947, Ph.D., 1952, Stanford

AUGEROT, JAMES E.,* 1969 (1972), Associate Professor of Slavic and Balkan Linguistics and Languages and of Russian and East European Studies; Director, Language Learning Center; B.A., 1956, M.A., 1959, New Mexico Highland; Ph.D., 1968, Washington

AUSTIN, MICHAEL J.,* 1976, Professor of Social Work; Director, Social Welfare Research Center; B.A., 1964, M.S.W., 1966, California (Berkeley); M.S.P.H., 1969, Ph.D., 1970, Pittsburgh

AUTH, DAVID C.,* 1969 (1977), Professor of Electrical Engineering; A.B., 1962, Catholic University of America; M.S., 1966, Ph.D., 1969, Georgetown

AVANN, SHERWIN PARKER, 1946 (1978). Associate Professor Emeritus of Mathematics; B.S., 1938, Washington; M.S., 1940, Ph.D., 1942, California Institute of Technology

B

BABB, ALBERT LESLIE.* 1952 (1960), Professor of Nuclear Engineering and Chemical Engineering: Chairperson, Department of Nuclear Engineering; B.A.Sc., 1948, British Columbia; M.S., 1949, Ph.D., 1951, Illinois

BABB, WARREN, 1955 (1979), Associate Professor Emeritus of Music; B.A., 1938, M.A., 1939, Harvard

BACHARACH, JERE L.,* 1967 (1973), Associate Professor of History, B.A., 1960, Trinity; M.A., 1962, Harvard; Ph.D., 1967, Michigan



BACKUS, FRANK I., 1968 (1978), Assistant Professor of Psychiatry and Behavioral Sciences; B.S., 1958, Washington State; M.D., 1962, Washington

BADGLEY, FRANKLIN I.,* 1950 (1967), Professor of Atmospheric Sciences; Chairperson, Department of Atmospheric Sciences; B.S., 1935, Chicago; M.S., 1948, Ph.D., 1951, New York University

BAER, JEAN-LOUP,* 1969 (1979), Professor of Computer Science; Diplomes d'Ingenieur, 1960, Doctorat 3e Cycle, 1963, Grenoble; Ph.D., 1968, California (Los Angeles)

BAGNE, CONRAD N.,* 1976, Assistant Professor of Urban Planning; B.A., 1968, Washington; J.D., 1971, Idaho; LL.M., 1972, Missouri (Kansas City)

BAILEY, WARREN W., 1979, Assistant Professor of Surgery; B.S., 1966, Montana State; M.D., 1970, Tufis

BAIN, LINDA L., 1979, Assistant Professor of Military Science; B.A., 1970, Keuka; M.A., 1972, Michigan State

BAINBRIDGE, WILLIAM S.,* 1975, Assistant Professor of Sociology; B.A., 1971, Boston; Ph.D., 1975, Harvard

BAKER, D. JAMES, JR.,* 1973 (1979), Professor of Oceanography; Chairperson, Department of Oceanography; B.S., 1958, Stanford; Ph.D., 1962, Cornell

BAKER, D. JAMES, JR., * 1973 (1979), Professor of Oceanography; Chairperson, Department of Oceanography; B.S., 1958, Stanford; Ph.D., 1962, Cornell

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EXPLANATION OF ABBREVIATIONS

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Listed below are abbreviations that are frequently associated with references to academic administrative units or that are used as course number prefixes. Following each abbreviation is an explanation, the name of the department or other subordinate administrative unit responsible for the abbreviation, and the parent school, college, or other major administrative unit.

AA:	Aeronautics and Astronautics (Engineering)	DAN:	Danish, Scandinavian Languages and Literature (Arts and Sciences)
AAS:	Asian American Studies (Arts and Sciences)	DANCE:	Dance, Music (Arts and Sciences)
ACCTG:	Accounting (Business Administration)	DENT:	Dentistry (Dentistry)
ADMIN:	Administration (Business Administration)	D HYG:	Dental Hygiene (Dentistry)
AIS:	American Indian Studies (Arts and Sciences)	DRAMA:	Drama, Drama (Arts and Sciences)
AKKAD:	 Akkadian, Near Eastern Languages and Literature (Arts and 		
	Sciences)	FOON	Economics Economics (Arts and Sciences)
ALTAI:	Altaic, Asian Languages and Literature (Arts and Sciences)	ECON.	Educational Administration (Education)
AMATH:	Applied Mathematics (Interdisciplinary Graduate Degree Programs)	EDADM.	Educational Automotive and Instruction (Education)
ANEST:	Anesthesiology (Medicine)	EDColl.	Educational Calific Indian (Education)
ANTH:	Anthropology, Anthropology (Arts and Sciences)	EDEFS:	Higher Education (Education)
A ORG:	Administrative Theory and Organizational Behavior (Business	EDRED.	Figure Education (Education)
	Administration)	EDCBE.	Educational Education (Education)
ARAB:	Arabic, Near Eastern Languages and Literature (Arts and Sciences)	EDSFE.	Independent Study, December and Field Experience (Teaching
ARAM:	Aramaic, Near Eastern Languages and Literature (Arts and	EDUC.	Desetiment Study, Research, and Field Experience (Teaching
	Sciences)		Flacticully (Education)
ARCH:	Architecture (Architecture and Urban Planning)		Electrical Engineering (Engineering)
ARCHY:	Archaeology, Anthropology (Arts and Sciences)	ENDO:	Endudunius (Denusiry) English (Arts and Science)
ART:	Art, Art (Arts and Sciences)	ENGL:	English, English (Ans and Sciences)
ART H:	 Art History, Art (Arts and Sciences) 	ENGK:	Engineering, Conege Courses (Engineering)
AS:	Aerospace Studies (Reserve Officers Training Programs)		Environmental Realth (Public Realth and Community Medicine)
ASIAN:	Asian Languages and Literature, Asian Languages and Literature	ELV V J.	Enidemiology (Dublic Health and Community Medicine)
	(Arts and Sciences)	EFI:	EbreauoioRA (Lapite Hearin and Community Memorie)
ASTR:	Astronomy, Astronomy (Arts and Sciences)		•
ATM S:	Atmospheric Sciences, Atmospheric Sciences (Arts and Sciences)	FAMED:	Family Medicine (Medicine)
		FD SC:	Food Science (Fisheries)
n .	Produce Addition of a Point of Addition of A	FIN:	Finance (Business Administration)
BA:	Business Administration (Business Administration)	FINN:	Finnish, Scandinavian Languages and Literature (Arts and Sciences)
BA KM:	Research Methods (Business Administration)	FISH:	Fisherics (Fisheries)
B CMU:	Business Communications (Business Administration)	FOR B:	Biological Sciences (Forest Resources)
BCON:	Building Construction (Architecture and Orean Planning)	FOR M:	Management and Social Sciences (Forest Resources)
BECN:	Business Economics (Business Administration)	FOR P:	Physical Sciences (Forest Resources)
BG&S:	Business, Government, and Society (Business Administration)	FREN:	French, Romance Languages and Literature (Arts and Sciences)
BIOC:	Biochemistry (Medicine)		
BIOEN:	Bioengineering (Interschool or Intercollege Programs)	CENICE.	Constine Constinue (Anto and Colonian)
BI HS:	Biomedical History (Medicine)	CENET:	Constants, Ochevics (Arts and Sciences)
BIOL:	Biology, Biology (Arts and Sciences)	CEOU:	Geologiaphy, Geography (Arts and Sciences)
BIOST:	Biostanstics (Public Health and Community Medicine)	CEDL:	Geological Sciences, Geological Sciences (Ans and Sciences)
BLK S:	Black Subdies (Arts and Sciences)	CIC.	Control and Interdisciplings: Studies, Control and Interdisciplings
BMAIN:	Biomainematics (Interuisciplinary Graduate Degree Programs)	015.	Studies (Arts and Sciences)
BUI:	Business Boling (Ans and Sciences)	COUVE	Geophysics (Alts and Sciences)
B PUL:	Business Policy (Business Administration) Biological Structure (Medicine)	CPK:	Group Classics (Arts and Sciences)
BSIK:	Bilorgical Structure (Medicine)	C ST.	Green Studies (Arts and Sciences)
BULUK:	Arts and Sciences)	031.	Ochician Statules (Artis and Sciences)
	(Alls and Schuces)	U A 9-C.	Honom Arts and Salanass (Arts and Salanass)
,	•	ITACO:	Honors-Arts and Sciences (Arts and Sciences)
CATA:	Catalan, Romance Languages and Literature (Arts and Sciences)	HEDK:	Health Education Mealth Education (Arts and Sciences)
CER E:	Ceramic Engineering, Mining, Metallurgical, and Ceramic		Vindi Asian I anguages and Literature (Arts and Sciences)
	Engineering (Engineering)	UDCVC.	Human Basanasa Sustanas (Business Administration)
CESM:	Structural Engineering and Engineering Mechanics, Civil	HEEDV.	Halith Services (Dublic Health and Community Medicine)
•	Engineering (Engineering)	HOERV:	Health Services (Fublic Health and Community Medicine)
CETC:	Transportation, Construction, and Geometronics, Civil Engineering	ПЗЭ: ЦСТ.	History Consent History (Arts and Sciences)
	(Engineering)	HOTA A.	History, General, History (Arts and Sciences)
CEWA:	Water and Air Resources, Civil Engineering (Engineering)	ISTAA:	Ansient and Medicual History, History (Arts and Sciences)
CH E:	Chemical Engineering (Engineering)	HSTAN.	History of Asia History (Arts and Sciences)
CHEM:	Chemistry, Chemistry (Arts and Sciences)	UCTEI	Modern Furnness History History (Arts and Sciences)
CHIN:	Chinese, Asian Languages and Literature (Arts and Sciences)	LUIBIO.	Human Riology (Medicine)
CHSTU:	Chicano Studies, Chicano Studies (Arts and Sciences)	HIM.	Humanities, Humanities (Arts and Sciences)
CINE:	Cinema Studies, Cinema Studies (Arts and Sciences)		Trainannues, Trainaindes (Files and Secoloco)
CIVE:	Core Courses, Civil Engineering (Engineering)	I DUG.	Internetional Dusinger (Dusinger A destations)
CL AR:	Classical Archaeology, Classics (Arts and Sciences)	IBUS:	International Business (Business Administration)
CLAS:	Classics, Classics (Arts and Sciences)	ICEL:	Icelandic, Scandinavian Languages and Literature (Arts and
CLIT:	Comparative Literature, Comparative Literature (Arts and Sciences.	TATISAL.	Sciences)
	Interdisciplinary Graduate Degree Programs)	INDN:	Insulan, Asian Languages and Literature (Arts and Sciences)
CL LI:	Classical Linguistics, Classics (Arts and Sciences)	IMD:	Insurate for Marine Staties (Interschool of Intercollege Programs)
CMU:	Communications, Communications (Arts and Sciences)	irnv:	Graduate Decree Programs)
COM D:	Community Dentistry (Dentistry)	TTAL .	Utalian Domance I anguages and Literature (Arts and Colonace)
CONJ:	Conjoint (Medicine)	1176.	variant, volitatice ranguages and raterature (vite and services)
C SCI:	Computer Science (Interschool or Intercollege Programs)	<u> </u>	
CZECH:	Czech, Slavic Languages and Literature (Arts and Sciences)	JAPAN:	Japan, Asian Languages and Literature (Arts and Sciences)

KIN: KINPE: KOR:	Kinesiology, Kinesiology (Arts and Sciences) Kinesiology—Physical Education, Kinesiology (Arts and Sciences) Korean, Asian Languages and Literature (Arts and Sciences)	000
LAB M:	Laboratory Medicine (Medicine)	R
L ARC:	Landscape Architecture (Architecture and Urban Planning)	R
LAT:	Latin, Classics (Arts and Sciences)	R
LAW:	Librarianshin (Librarianshin)	R
LING:	Linguistics, Linguistics (Arts and Sciences)	R
		R
MATH:	Mathematics, Mathematics (Arts and Sciences)	R
MED	Medicine (Medicine)	P
MED P:	Medical Practice (Medicine)	
MED T:	Medical Technology (Medicine)	R
MET E:	Metallurgical Engineering, Mining, Metallurgical, and Ceramic	R
MICRO:	Microbiology and Immunology (Medicine)	
MINE:	Mining Engineering, Mining, Metallurgical, and Ceramic	
	Engineering (Engineering)	S
MKTG:	Marketing (Business Administration) Military Science (Becarie Officer Training Programs)	
MISCI: MILE:	Materials Engineering (Engineering)	S
MUSAP:	Music Applied, Music (Arts and Sciences)	5
MUSIC:	Music, Music (Arts and Sciences)	
NE.	Nece Fostern I annuages and I iterature Near Fostern I annuages	S
NE:	and Literature (Arts and Sciences)	S
NORW:	Norwegian, Scandinavian Languages and Literature (Arts and	S
•	Sciences)	Š
NR:	Neurological Surgery (Medicine)	S
NUCE	Nuclear Engineering (Engineering)	
NURS:	Nursing (Nursing)	3
NUTR:	Nutrition, Foods, Dietetics, Nutritional Sciences and Textiles (Arts	S
	and Sciences)	S
OB GY:	Obstetrics and Gynecology (Medicine)	S
OCEAN:	Oceanography, Oceanography (Arts and Sciences)	2
ODTP:	Oral Diagnosis and Treatment Planning (Dentistry)	Š
O ENG:	Ocean Engineering (Engineering)	S
OPSYS:	Operations and Systems Analysis (Business Administration)	
ORALB:	Oral Biology (Dentistry)	3
ORALM:	Oral Medicine (Dentistry)	S
ORTHO:	Orthogonatics (Dentistry)	S
OS:	Oral Surgery (Dentistry)	6
OTOL:	Otolaryngology (Medicine)	S
DADÍO.	Pathakialaan (Dublic Harlth and Catemusity Madiaira)	
PABIO:	Pathobiology (Public realth and Community Medicine)	
PB AD:	Public Administration (Public Affairs)	<u> </u>
P BIO:	Physiology and Biophysics (Medicine)	T
PB PL:	Public Policy (Public Affairs)	Ť
PBSCI:	Psychiatry and Benavioral Sciences (Medicine) Bedodontics (Dentistry)	Ť
PEDS:	Pediatrics (Medicine)	T
PERIO:	Periodontics (Dentistry)	T
PHARM:	Pharmacy Practice (Pharmacy)	1
PHCOL:	Pharmacology (Medicine) Philosophy Philosophy (Arts and Sciences)	
PHSCI:	Pharmaceutical Sciences (Pharmacy)	U
PHY.A:	Physical Anthropology, Anthropology (Arts and Sciences)	Ŭ
PHYS:	Physics, Physics (Arts and Sciences)	U.
POLS: POISH	POINTCAL SCIENCE, POINTCAL SCIENCE (Arts and Sciences) Polish Slavic Languages and Literature (Arts and Sciences)	U,
PORT:	Portuguese. Romance Languages and Literature (Arts and Sciences)	1
P PSY:	Physiology-Psychology (Interdisciplinary Graduate Degree	Ŭ
-	Programs)	W
PROS:	Provencel Domonos I anomages and I iterature (Arts and Sciences)	Ŵ
PROV:	Persian, Near Eastern Languages and Literature (Arts and Sciences)	
PSYCH:	Psychology, Psychology (Arts and Sciences)	Z

QMETH:	Quantitative Methods (Business Administration)
Q SCI: Oliat-	Quantilative Science (Interschool or Intercollege Programs)
QUAL.	Quaternary biolics (mersencer of merconege r fograns)
RADGY:	Radiology (Medicine)
RAD S:	Radiological Sciences (Interdisciplinary Graduate Degree Programs)
REHAB:	Rehabilitation Medicine (Medicine)
RELIG:	Comparative Religion, International Studies (Arts and Sciences)
RES D: D INC.	Restorative Denustry (Denustry)
RMN.	Romanian Romance Languages and Literature (Arts and Sciences)
ROM:	Romance Linguistics and Literature, Romance Languages and
	Literature (Arts and Sciences)
ROMAN:	Romance Languages and Literature, Romance Languages and Literature (Arts and Sciences)
RÖMN:	Romanian, Slavic Languages and Literature (Arts and Sciences)
RUSS:	Russian, Slavic Languages and Literature (Arts and Sciences)
SCAND:	Scandinavian, Scandinavian Languages and Literature (Arts and
SER C:	Serbo-Croatian, Slavic Languages and Literature (Arts and
	Sciences)
SIS:	International Studies, International Studies (Arts and Sciences)
SISAF:	Airican Studies, International Studies (Arts and Sciences)
515EA:	Studies, International Studies (Arts and Sciences)
SISLA:	Latin American Studies, International Studies (Arts and Sciences)
SISRE:	Russian and East European Regional Studies, International Studies
SISSA:	South Asia, International Studies (Arts and Sciences)
SLAV:	Slavic, Slavic Languages and Literature (Arts and Sciences)
SLAVC:	Slavic Languages and Literature, Slavic Languages and Literature
SMT:	Social Management of Technology (Interschool or Intercollege
	Programs)
SNKRI:	Sanskrit, Asian Languages and Literature (Arts and Sciences)
SOC W.	Social Work (Arts and Sciences, and Social Work)
SOCWL:	Social Welfare (Interdisciplinary Graduate Degree Programs)
SO JU:	Society and Justice, Society and Justice (Arts and Sciences)
SPAN	Spanish, Romance Languages and Literature (Arts and Sciences)
SPCH:	Speech Communication, Speech Communication (Arts and Sciences)
SPHSC:	Speech and Hearing Sciences, Speech and Hearing Sciences (Arts
стат.	Statistics Statistics (Arts and Sciences)
STC:	Scientific and Technical Communication, Humanistic-Social
, .	Studies (Engineering)
SURG:	Surgery (Medicine)
SWED:	Swedish, Scandinavian Languages and Literature (Arts and
	Sciences)
TACIC	Tanalan Asian I an anana and I itamana (Asta and Esianaa)
TAMILO:	Tagalog, Asian Languages and Literature (Arts and Sciences)
THAI:	Thai, Asian Languages and Literature (Arts and Sciences)
TIB:	Tibetan, Asian Languages and Literature (Arts and Sciences)
TKIC:	Turkic, Asian Languages and Literature (Arts and Sciences)
TKISH:	Turkish, Near Eastern Languages and Literature (Arts and Sciences)
TRANS:	Transportation (Business Administration)
1505:	Textile Science, Costume Studies, Nutritional Sciences and Textiles
	(Arts and Sciences)
UCONJ:	University Conjoint (Interschool or Intercollege Programs)
UD:	Urban Development (Business Administration)
UGAR:	Ugaritic, Near Eastern Languages and Literature (Arts and Sciences)
UKR:	Ukrainian, Slavic Languages and Literature (Arts and Sciences)
UKB P:	Urban Flanning (Architecture and Urban Flanning)
URUL:	Olology (Weatche)
WLFS:	Wildlife Science (Interschool or Intercollege Programs)
WOMEN:	Women Studies, Women Studies (Arts and Sciences)
ZOOL:	Zoology, Zoology (Arts and Sciences)



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