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This General Catalog is available free of charge to enrolled students and to high schools, colleges, universities, libraries, and educational agencies in the state of Washington. Copies may be purchased from the University Book Store, 4326 University Way Northeast, Seattle, Washington 98105.

The University of Washington, as a standing policy, does not discriminate against individuals because of their race, color, religion, age, sex, national origin, handicap, or status as Disabled Veteran or Vietnam Era Veteran. Any discriminatory action can be a cause for disciplinary action. This policy applies to all University programs and facilities, including, but not limited to, admissions, educational programs, and employment. Such discrimination is prohibited by Titles VI and VII of the Civil Rights Act of 1964, Title IX of the Education Amendments of 1972, Secs. 503 and 504 of the Rehabilitation Act of 1973, Age Discrimination in Employment Act Amendments of 1978, Vietnam Era Veteran's Readjustment Assistance Act of 1974, and other federal and state statutes and regulations. Inquiries regarding the application of these laws and regulations to the University may be directed to the University’s Equal Employment Officer; to the Director, Seattle Regional Office, Office for Civil Rights, U.S. Department of Education; or to the Director, Office of Federal Contract Compliance Programs.
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
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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.
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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

Offices 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

Directory of Offices

College or School
Office of the Dean

International Services Office
461 Schmitz, PB-10

Office of Student Affairs
459 Schmitz, PB-10

Placement Center
301 Loew, FH-30

Registrar's Office
209 Schmitz, PD-10

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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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

Offices of Student Financial Aid
105 Schmitz, PE-20
Summer Quarter Office
103 Lewis, DW-40

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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: May 5-9
- 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 end: August 29

### Autumn Quarter 1980
- Application closing date for all new students entering from high school: May 1
- 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: September 24
- School of Law begins (first-year students): September 26
- All other classes begin: September 29
- 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: August 21
- Regular quarter and Term b classes end: August 21
- School of Law classes end: August 28

### Autumn Quarter 1981
- Application closing date for all new students entering from high school: May 1
- Application closing date for all other new and former students: July 1
- School of Law begins (first-year students): September 25
- All other classes begin: September 28
- Veterans Day holiday: November 11
- Thanksgiving recess: November 26, 27
- Last day of instruction: December 9
- 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.
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.

William P. Gerberding
President
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 one-fifth 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-term-only basis to increase student options and opportunities.
**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 summer-only 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 part-time 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.
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

Forestry 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 Business Administration . . B.A.B.A.

† Graduate program. Certain courses open to undergraduates.
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 ... B.S.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 ... B.S.Occ.Therapy
Bachelor of Science in Pharmacy ............... B.S.Pharm.
Bachelor of Science in Physical Therapy ....... B.S.Phys.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

<table>
<thead>
<tr>
<th>Washington Residents</th>
<th>Undergraduate</th>
<th>Graduate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tuition and fees</td>
<td>$ 687</td>
<td>$ 771</td>
</tr>
<tr>
<td>Insurance</td>
<td>125</td>
<td>125</td>
</tr>
<tr>
<td>Room and board (average)</td>
<td>2,000</td>
<td>2,000</td>
</tr>
<tr>
<td>Books, materials, and supplies</td>
<td>300</td>
<td>300</td>
</tr>
<tr>
<td>Personal expenses (average)</td>
<td>1,500</td>
<td>1,500</td>
</tr>
</tbody>
</table>

Nonresidents

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 19 1/2 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 University, 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 medical-care 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 degree-seeking 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 braille devices, 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 are also 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 all-student 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 benefits, 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 office, 204L HUB, 543-2380.

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

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, lacsrosse, 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/raquetball, innterube 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.
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 grade-point average for freshmen entering from high school in Autumn Quarter 1979 was 3.40; the average college grade-point 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 grade-point 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-English-speaking 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 foreign-language 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 space-available 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.


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.
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” or “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.

<table>
<thead>
<tr>
<th>Subject</th>
<th>AP-5</th>
<th>Art History</th>
<th>Art</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>ART H 201, 202, 203 (9 credits)</td>
</tr>
<tr>
<td>Studio Art</td>
<td>AP-4</td>
<td></td>
<td>Exempt from ART H 201, 202, 203; no credit</td>
</tr>
<tr>
<td>Biology</td>
<td>AP-5</td>
<td></td>
<td>See departmental adviser for placement</td>
</tr>
<tr>
<td>AP-4</td>
<td></td>
<td></td>
<td>5 credits will be granted, plus 5 more if student completes recommended class with grade of 2.5 or above</td>
</tr>
<tr>
<td>AP-3</td>
<td></td>
<td></td>
<td>See departmental adviser; placement in BIOL 101-102 may be available</td>
</tr>
<tr>
<td>Chemistry</td>
<td></td>
<td></td>
<td>See departmental adviser for possible placement and credit</td>
</tr>
<tr>
<td>Classics</td>
<td>AP-5</td>
<td></td>
<td>LAT 305, 306 (6 credits)</td>
</tr>
<tr>
<td>Latin Lyric</td>
<td>AP-4</td>
<td></td>
<td>LAT 305, 307 (6 credits)</td>
</tr>
<tr>
<td>Vergil</td>
<td>AP-5</td>
<td></td>
<td>LAT 305, 306, 307 (9 credits)</td>
</tr>
<tr>
<td>Latin Lyric</td>
<td>AP-5</td>
<td></td>
<td>See departmental adviser</td>
</tr>
<tr>
<td>and Vergil</td>
<td>AP-4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>English</td>
<td>AP-5</td>
<td></td>
<td>ENGL 111, 181 (10 credits)</td>
</tr>
<tr>
<td>AP-4</td>
<td></td>
<td></td>
<td>ENGL 111, 171 (8 credits)</td>
</tr>
<tr>
<td>AP-3</td>
<td></td>
<td></td>
<td>ENGL 171 (3 credits)</td>
</tr>
<tr>
<td>German</td>
<td>AP-5</td>
<td></td>
<td>15 credits; see departmental adviser</td>
</tr>
<tr>
<td>AP-4</td>
<td></td>
<td></td>
<td>10 credits for placement</td>
</tr>
<tr>
<td>AP-3</td>
<td></td>
<td></td>
<td>5 credits</td>
</tr>
<tr>
<td>History</td>
<td>AP-5</td>
<td></td>
<td>HSTAA X (5 credits) if essay is of sufficient quality</td>
</tr>
<tr>
<td>American</td>
<td>AP-4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>European</td>
<td>AP-5</td>
<td></td>
<td>HST 113 (5 credits)</td>
</tr>
<tr>
<td>AP-4</td>
<td></td>
<td></td>
<td>HST 113 (5 credits) if essay is of sufficient quality</td>
</tr>
<tr>
<td>Mathematics</td>
<td>AP-5</td>
<td></td>
<td>Placement into MATH 126; credit for MATH 124 and 125 (5 credits each) is awarded when the student successfully completes MATH 126</td>
</tr>
<tr>
<td>AB Examination</td>
<td>AP-4</td>
<td></td>
<td>Advanced placement into MATH 125; credit for MATH 124 (5 credits) is awarded when the student successfully completes MATH 125</td>
</tr>
<tr>
<td>AP-3</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BC Examination</td>
<td>AP-5</td>
<td></td>
<td>As AP-5 for AB Examination</td>
</tr>
<tr>
<td>AP-4</td>
<td></td>
<td></td>
<td>As AP-4 and AP-3 for AB Examination</td>
</tr>
<tr>
<td>AP-3</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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 examinations. Students may instead take the free University mathematics placement test when they first come to campus to register.

**Musical Appreciation**

See departmental adviser for placement and possible credit

**Theory**

No credit; see departmental adviser for placement

**Physics**

AP-5 | No credit; exemption from PHYS 111, 112 for Physics C Examination, or from PHYS 114, 115, 116 for Physics B Examination |  

**Romance Languages**

See departmental adviser

**University Placement Tests**

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, . . . 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:

<table>
<thead>
<tr>
<th>Letter Grade</th>
<th>Numeric Grade-Point Equivalent</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>4.0</td>
<td>Highest grade.</td>
</tr>
<tr>
<td>B</td>
<td>3.0</td>
<td>Lowest passing grade for graduate students.</td>
</tr>
<tr>
<td>C</td>
<td>2.0</td>
<td></td>
</tr>
<tr>
<td>D</td>
<td>1.0</td>
<td>Lowest passing grade for undergraduates.</td>
</tr>
<tr>
<td>E</td>
<td>0.7</td>
<td>Failure or unofficial withdrawal. No credit earned.</td>
</tr>
<tr>
<td>F</td>
<td>0.0</td>
<td></td>
</tr>
</tbody>
</table>
The following letter grades also may be used:

\[ N \] No grade. Used only for hyphenated courses and courses numbered 600, 700, and 800.

\[ I \] 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 grade-point-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:

<table>
<thead>
<tr>
<th>No. of Credits Earned at UW at</th>
<th>No. of Uncontested Course Drops Permitted</th>
</tr>
</thead>
<tbody>
<tr>
<td>Time of Course Drop</td>
<td></td>
</tr>
<tr>
<td>0-44</td>
<td>3</td>
</tr>
<tr>
<td>45-89</td>
<td>1</td>
</tr>
<tr>
<td>90-134</td>
<td>1</td>
</tr>
<tr>
<td>135-179</td>
<td>1</td>
</tr>
<tr>
<td>180-224</td>
<td>1</td>
</tr>
<tr>
<td>etc.</td>
<td></td>
</tr>
</tbody>
</table>

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 W (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. Not-satisfactory 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 500-level 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

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
<th>Grade</th>
<th>Grade Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGL 171</td>
<td>3</td>
<td>CR</td>
<td></td>
</tr>
<tr>
<td>OCEAN 101</td>
<td>5</td>
<td>2.7</td>
<td>13.5</td>
</tr>
<tr>
<td>HST 111</td>
<td>5</td>
<td>4.0</td>
<td>20.0</td>
</tr>
<tr>
<td>SCAND 100</td>
<td>2</td>
<td>3.3</td>
<td>6.6</td>
</tr>
</tbody>
</table>

Total credits earned toward graduation: 15

Total graded credits attempted (TCA): 12

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

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
<th>Grade</th>
<th>Grade Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGL 121</td>
<td>5</td>
<td>2.3</td>
<td>11.5</td>
</tr>
<tr>
<td>OCEAN 101</td>
<td>5</td>
<td>0.0</td>
<td>0.0</td>
</tr>
<tr>
<td>SPHSC 100</td>
<td>3</td>
<td>2.7</td>
<td>8.1</td>
</tr>
<tr>
<td>H ED 250</td>
<td>3</td>
<td>1</td>
<td>0.0</td>
</tr>
</tbody>
</table>

Total credits earned toward graduation: 8

Total graded credits attempted (TCA): 13

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, 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 credit-only 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 grade-point average is raised to a 2.00, or the student is dropped for low scholarship.

Restatement

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-
Baccalaureate honors exclusive of certificates, quarter's work or a cumulative University of Washington grade-point average of 3.50 or better in twelve graded hours for each of three years, respectively. The Honors Committee determines the academic records for their freshman, sophomore, or junior years. Undermatriculated undergraduate students who have attained a grade-point average of 3.50 or better in twelve graded hours, exclusive of lower-division ROTC courses, have a high-scholarship notation entered on their permanent academic records.

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 lower-division 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 Admissions 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 grade-point 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 grade-point 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 lower-division 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).
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 second-year 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-
requirements 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

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

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) calendar 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 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:

<table>
<thead>
<tr>
<th>Category</th>
<th>Based on Need?</th>
<th>Residency Required?</th>
<th>Other Limitations</th>
</tr>
</thead>
<tbody>
<tr>
<td>World War II veterans who have fully utilized federal benefits</td>
<td>No</td>
<td>No</td>
<td>Enrolled prior to October 1, 1977</td>
</tr>
<tr>
<td>Children of persons who were POWs or MIA</td>
<td>No</td>
<td>No</td>
<td>Parent must have been a domiciliary</td>
</tr>
<tr>
<td>Children of disabled or deceased veterans</td>
<td>No</td>
<td>Yes</td>
<td>Must be between 16 and 22 years old</td>
</tr>
<tr>
<td>Veterans who served in Southeast Asia during the period of August 5, 1964-May 7, 1975</td>
<td>No</td>
<td>Yes</td>
<td>Enrolled prior to May 7, 1983</td>
</tr>
</tbody>
</table>

Students requesting information on the following exemptions should contact the Scholarship and Loan Fiscal Office, 170 Schmitz:

- Blind students
- Students participating in the WICHE Program
- Medical and dental students in the WAMI Program

Students requesting information on the following exemptions should contact the Office of Residence Classification, 320 Schmitz:

- Military personnel
- Student employees
- Nonresident veterans
- Students from British Columbia
- Treaty traders
- Displaced persons
- Children of consular officials

Students requesting information on the following exemptions should contact the Staff Personnel Office, 4045 Brooklyn Avenue Northeast:

- Faculty/Staff
- Children and spouses of staff and faculty

Students requesting information on the following exemptions should contact the Graduate School, 201 Administration:

- TA/RAs having one-half-time appointments

Students requesting information on the following exemptions should contact the Office of Student Financial Aid, 105 Schmitz:

- Undergraduate students (University Tuition Exemption)

* 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.
RULES, REQUIREMENTS, AND PROCEDURES

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 employed 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.

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

The University 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**

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**

A student is defined as any person who is or has been officially 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
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(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 law-enforcement 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 a 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, 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 regental 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 administering 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-
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companyed 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

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Associate Dean for Academic Programs
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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; sev-
eral 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 develop 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:

<table>
<thead>
<tr>
<th>Numeric Grade-point Equivalent</th>
<th>Letter Grade</th>
</tr>
</thead>
<tbody>
<tr>
<td>4.0</td>
<td>A</td>
</tr>
<tr>
<td>3.9</td>
<td>B</td>
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<tr>
<td>3.8</td>
<td>C</td>
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<tr>
<td>3.7</td>
<td>D</td>
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<tr>
<td>3.6</td>
<td>E</td>
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<td>3.5</td>
<td>F</td>
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<td>3.4</td>
<td>G</td>
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<tr>
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<td>H</td>
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<tr>
<td>3.2</td>
<td>I</td>
</tr>
<tr>
<td>3.1</td>
<td>J</td>
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</tbody>
</table>

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 500-level 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.

Withdrawal 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

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Graduate Degree Programs Offered

<table>
<thead>
<tr>
<th>Field</th>
<th>Graduate Degrees Offered</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anthropology</td>
<td>M.A., Ph.D.</td>
</tr>
<tr>
<td>Applied Mathematics</td>
<td>M.S., Ph.D.</td>
</tr>
<tr>
<td>Architecture</td>
<td>M.A., M.P.A.</td>
</tr>
<tr>
<td>Art</td>
<td>M.A., Ph.D.</td>
</tr>
<tr>
<td>Art History</td>
<td>M.A., Ph.D.</td>
</tr>
<tr>
<td>Asian Languages and Literature</td>
<td>M.S., Ph.D.</td>
</tr>
<tr>
<td>Astronomy</td>
<td>M.S., Ph.D.</td>
</tr>
<tr>
<td>Atmospheric Sciences</td>
<td>M.S., Ph.D.</td>
</tr>
<tr>
<td>Biochemistry</td>
<td>M.S., Ph.D.</td>
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<tr>
<td>Biological Structure</td>
<td>M.S., Ph.D.</td>
</tr>
<tr>
<td>Biology Teaching</td>
<td>M.A., M.S.</td>
</tr>
<tr>
<td>Biometry</td>
<td>M.S., Ph.D.</td>
</tr>
<tr>
<td>Biomedical History</td>
<td>M.S., Ph.D.</td>
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<td>Botany</td>
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<td>Business Administration</td>
<td>M.A., M.P.A., M.P.M.</td>
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<td>Classics</td>
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<td>Communications</td>
<td>M.A., M.S., Ph.D.</td>
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<td>Computer Science</td>
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<td>Concurrent Degree</td>
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<td>Drama Arts</td>
<td>Ph.D.</td>
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<tr>
<td>Education</td>
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<tr>
<td>Engineering</td>
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<td>Aeronautics and Astronautics</td>
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<tr>
<td>Ceramic Engineering</td>
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<td>Chemical Engineering</td>
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<td>Nuclear Engineering</td>
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<td>Geosystems</td>
<td>M.S., M.C.S.E., Ph.D.</td>
</tr>
<tr>
<td>Health Services Administration and Planning</td>
<td>M.A., M.S., Ph.D.</td>
</tr>
<tr>
<td>History</td>
<td>M.A., M.P.H., Ph.D.</td>
</tr>
<tr>
<td>International Studies</td>
<td>M.A., M.P.H., Ph.D.</td>
</tr>
<tr>
<td>East Asian Studies</td>
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</tr>
<tr>
<td>Russian and East European Studies</td>
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</tbody>
</table>

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Graduate Degree Programs Offered

<table>
<thead>
<tr>
<th>Field</th>
<th>Graduate Degrees Offered</th>
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<tbody>
<tr>
<td>Kinesiology</td>
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<tr>
<td>Health Education</td>
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</tr>
<tr>
<td>Physical Education</td>
<td>M.A., M.S.Ed.</td>
</tr>
<tr>
<td>Laboratory Medicine</td>
<td>M.A., M.S.Ed.</td>
</tr>
<tr>
<td>Landscape Architecture</td>
<td>M.A., M.S.Ed.</td>
</tr>
<tr>
<td>Law</td>
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</tr>
<tr>
<td>Librarianship</td>
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<tr>
<td>Linguistics</td>
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</tr>
<tr>
<td>Marine Affairs</td>
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</tr>
<tr>
<td>Microbiology and Immunology</td>
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<tr>
<td>Music</td>
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<td>Near Eastern Languages and Literature</td>
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<tr>
<td>Nursing</td>
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<tr>
<td>Nutritional Sciences and Textiles</td>
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<td>Oceanography</td>
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<td>Oral Biology</td>
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<tr>
<td>Zoology</td>
<td>M.A., M.S.Ed.</td>
</tr>
</tbody>
</table>

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 research-oriented 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 foreign-language competence as undergraduates before entering the Graduate School or as early as possible in their graduate careers. The University's language competence requirements in French, German, and Spanish may be satisfied by successful completion of the standardized examinations given by the Educational 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 full-time 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, part-time, 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 part-time 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:

<table>
<thead>
<tr>
<th>Category</th>
<th>Number</th>
<th>Title</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1</td>
<td>Premaster</td>
<td>A premaster has been admitted to the Graduate School, but has not yet completed a master’s degree or the equivalent.</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>Post-master</td>
<td>A post-master has completed the master’s degree or equivalent, but has not yet had a doctoral Supervisory Committee appointed.</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>Precandidate</td>
<td>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.</td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>Candidate</td>
<td>A Candidate has completed the General Examinations, but has not yet completed the dissertation and Final Examination.</td>
</tr>
<tr>
<td></td>
<td>5</td>
<td>Postdoctoral Appointee</td>
<td>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.</td>
</tr>
</tbody>
</table>

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.
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 full- or 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-level-and-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. Residency 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.


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 authorizing 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 fair 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-degree-offering 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 re-enrollment 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 former student 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 post-baccalaureate 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 in-person 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 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

The 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)

<table>
<thead>
<tr>
<th>Title of Appointment</th>
<th>One Month</th>
<th>Academic Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>Teaching Assistant</td>
<td>$582</td>
<td>$5,238</td>
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<tr>
<td>Research Assistant</td>
<td>$528</td>
<td>$4,752</td>
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<td>Graduate Staff Assistant</td>
<td>$582</td>
<td>$5,238</td>
</tr>
<tr>
<td>Predoctoral Teaching</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Associate I</td>
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<td>5,562</td>
</tr>
<tr>
<td>Predoctoral Research</td>
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<tr>
<td>Associate I</td>
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</tr>
<tr>
<td>Predoctoral Staff Associate I</td>
<td>618</td>
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<tr>
<td>Predoctoral Teaching</td>
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<td></td>
</tr>
<tr>
<td>Associate II</td>
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<td>5,904</td>
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<tr>
<td>Predoctoral Research</td>
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<td></td>
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<tr>
<td>Associate II</td>
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</tr>
<tr>
<td>Predoctoral Staff Associate II</td>
<td>656</td>
<td>5,904</td>
</tr>
</tbody>
</table>

*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.*

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 ob-
tained 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 long-term 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 faculty-initiated, 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 contract-supported 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 Paperbacks, 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.


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 non-traditional 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
Information about 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 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-30, 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 developmental-stage 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 Forty-first 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.

CONTINUING EDUCATION

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 four-year 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.
De8n
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.
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, Puntz, Radcliffe, Rohrer, Rosner, Sasanoof, Schneider, Seligman; 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 pre-major 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 two- or 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 two-year 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 pro-
gram 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 ap-
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 grade-point 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 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 admission 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; QMETH 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 grade-point 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-
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 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 Landscape 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:

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 professional 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 of 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 fulfill­
ing graduation requirements rests with the student con­
cerned.

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 l-credit l00-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 Uni­
viversity. 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 fac­
culty of the College of Education.

All students seeking provisional certification are enrolled
initially in the College of Arts and Sciences. Upon the com­
pletion of program prerequisites, they may apply for admit­
tion 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 complete basic degree require­
ments and an academic major in addition to the Teacher
Certification Program.

Information on the requirements for certification and ad­
mission to the certification program is available in the Col­
lege of Education section of this catalog and from an educa­
tional 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 col­
lege sought to encourage experimentation in curriculum de­
velopment 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 possi­
bile 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 some­
times requires completion of prerequisite courses, attain­
ment of a minimum specified grade-point average, or selec­
tion 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 hy­
giene, dentistry, education, landscape architecture, law,
medical technology, medicine, occupational therapy, phar­
macy, physical therapy, podiatry, prosthodontics and orthot­
cias, social welfare, urban planning, and veterinary medicine.
For requirements and additional information, all preprofes­
sional 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 in­
terdisciplinary degree programs under directing commit­
tees. 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 interdisci­
plinary and innovative courses not available in other
departments. It supervises independent study (G ST 391)
and independent fieldwork (G ST 340 through 350). It pro­
vides new courses experimental in content or design (GIS).
It also sponsors the interdisciplinary writing program of­
ered 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—H A&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.

**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. 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**


**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),...
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.


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 produced 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, Grossman (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 advisor 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, Cirtaultas, Cooke, Hawley, Hiraga, Hsia, Knechtges, Li (emeritus), Lukoff, McKimnon, 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 astrophysics, atmospheric sciences, geophysics, or electrical engineering. A knowledge of computer programming is useful.

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, Catallico, Cleland, del Moral, Denton, DiMichele, Halperin, Haskins, Hitchcock (emeritus), Kruckeberg, Leopold, Meeuse, Norris, Suntz (emeritus), Tsukada, J. R. Waaftland, 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. Andersen, Borden, Cady (emeritus), Chilton, Christian, Crittenden, Davidson, Eggers, Eichinger, Epitots, Fairhall, Field, Gourman, Gregory, Halsey, Kowalski, Kwiram, Lingafelter, Macklin, McAllister, Meyer, Nist, Norman, Pocker, Rabinovitich, 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 ½ 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.
Major Requirements: Chemistry requirements through 321 are the same as those listed for the Bachelor of Science degree; CHEM 231, 233, 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 lan-
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, Frazier, 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


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.
Faculty
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, Devlin, Forrester, Galstaun, Gray (emeritus), Haaga (emeritus), Harrington (emeritus), Hobbs, Hostetler, Loper, Lorenzen, Lonsbury (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 Savory

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


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 grade-point 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, Pellegri (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 upper-division 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, natural 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.
GENETICS

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, Kakuichi, 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 compe-
tence 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 degree. Interdisciplinary studies are encouraged or required as, within the purview of 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), Bostron, Cheney, Christensen, Coombs (emeritus), Cowan, Dunne, Evans, Gose, Gresens, Grootes, Hanson, Mallory, McCallum, Misch, Porter, Rensbeiger, Stewart, Stiver, 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.

**GEOPHYSICS**

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, Bostron, Businger, Charison, Christensen, Clark, Criminala, 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 well-known authors and topics, designed especially for the non-major.

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 health-related 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 grade-point 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, Butow, 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 grade-point 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 HSTA 201 or upper-division 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, Prüssin, 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, 378, 379, 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, East-
ern Emphasis; Religion and Society; and Religion in Symbolic Expression.

Faculty


Undergraduate Programs

Bachelor of Arts Degree

Major Requirements: History of Religions, Western Emphasis—RELI 201, 202, 380; one of RELI 210, 220, ENGL 241, HST 307, HST 310; one of CLAS 445, EX 220; one of RELI 410, ANTH 421, PHIL 267, PSYC 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: RELI 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: RELI 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 RELI 202) for students majoring in Western religions: RELI 350, 352, 354, ART H 417, 418, PHIL 417, 418, SISRE 445.

History of Religions, Eastern Emphasis—RELI 201, 202, 352, 380; one of RELI 350, 354, PHIL 418; one of RELI 410, ANTH 421, PHIL 267, PSYC 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). RELI 350, 352, 354, 450, ANTH 422, SISRE 445, PHIL 286, 412, 413, 415, 416, 417, 418, SNKR 491, 492, 493, 494, 495, ANTH 404, 412, ART H 321, 417, 418, 419, SISRE 240, 443, HSTAS 201, 211, 212, 213, 421, 451, 452, 453, INDI 421. Following is a short list of suggested courses in Western religions (in addition to RELI 201) for students majoring in Eastern religions: RELI 210, 220, 320, 321, 325, HST 307, N E 210, 320.

Religion and Society—RELI 201, 202, 380, ANTH 421, SOC 457; two of the following, consisting of one course each in one Western and one Eastern religious tradition: RELI 210, 320, 321, 350, 352, 354, HST 307, N E 210, SISRE 445; four courses from the following: RELI 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, PSYC 448, SISRE 240, 443, 445.

Religion in Symbolic Expression—RELI 201, 202, 380; one of RELI 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: RELI 210, 350, 352, 354, HST 307, N E 210; four of the following: RELI 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, Harssel, 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
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, 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: 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


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


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, Chriot, Cirtautas, Coats, Ellison, Gershevsky (emeritus), Gribanovsky (emeritus), Haney, Jackson, Kapetanic, Konick, Kramer, Legters, Micklesen, Paul, Reshetar, Sokol, Spector (emeritus), Sugar, Swayne, Szefelt (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 300- and 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, Nepal, 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 30-credit 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.
JEWSHD 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; RELIG 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, aesthetic 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 (cardio-pulmonary rehabilitation and exercise prescription or ath
linguistic 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 student 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


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 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, 328, 329, 402, 403, 404 and either 442, 445, 446 or 447, 448, 449 (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).

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 Requirements: 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. Michael 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


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 courses as well as in the entire 30 credits of 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 five-year 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, Chaple (emeritus), Clarke (emeritus), Conlon, Cooper, Cummings, Curtis-Verna, Dempster, Desimone, Eichinger (emeritus), Garfias, Geissmar (emeritus), Grossman, Guerrero, Harman (emeritus), Harnett, Harris (emeritus), Heinitz (emeritus), Hokanson, Irvine (emeritus), Jussila, Kaplan, Keachley, Kind (emeritus), Lieberman, Lishner (emeritus), Lundquist, McColl, McInnes, Moore, Munro (emeritus), O'Doan, Pagliaulung, Palombo, Rafols, Rahn, Rosinbum, Sakata, Saks, Siki, Singer, Skowronek, Smith, Sokol, Starr, Stewart, Storch, C. Terry, M. Terry (emeritus), Thome, Troy, Tufts, Verrall (emeritus), Vokolak, Werner (emeritus), White, Woodcock (emeritus), Zelin (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:

<table>
<thead>
<tr>
<th>Courses</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MUSIC 110, 111, 112</td>
<td>9</td>
</tr>
<tr>
<td>MUSIC 113, 114, 115</td>
<td>3</td>
</tr>
<tr>
<td>MUSIC 210, 211, 212</td>
<td>9</td>
</tr>
<tr>
<td>MUSIC 213, 214, 215</td>
<td>9</td>
</tr>
<tr>
<td>MUSIC 310</td>
<td>3</td>
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<tr>
<td>MUSIC 311</td>
<td>3</td>
</tr>
<tr>
<td>MUSIC 312</td>
<td>3</td>
</tr>
<tr>
<td>MUSIC 313, 314</td>
<td>6</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Courses</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MUSIC theory-history core</td>
<td>55</td>
</tr>
<tr>
<td>MUSIC 191, 291, 391, 491</td>
<td>24</td>
</tr>
<tr>
<td>MUSIC 487, 488</td>
<td>4</td>
</tr>
<tr>
<td>Voice or instrumental instruction</td>
<td>24</td>
</tr>
<tr>
<td>Music electives</td>
<td>6</td>
</tr>
<tr>
<td>Ensembles (twelve quarters)</td>
<td>12-24</td>
</tr>
<tr>
<td></td>
<td>128-139</td>
</tr>
</tbody>
</table>
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
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
MUSAP 461, 462, 463, 464 Accompanying (2,2,2) 6
MUSIC 432, 434, 435, 436 Pedagogy (2,2,2) 6
MUSIC 479 Senior Recital 1
Ensembles (fifteen quarters) 15-30
134-148

STRING INSTRUMENT MAJOR

Courses Credits
Music theory-history core, to include MUSIC 487 Tonal Counterpoint 55
MUSAP 161, 163, 164, 178, 261, 263, 264, 278, 361, 363, 364, 378
Private Instruction: Violin-Viola, Violoncello, Viola da Gamba, Contrabass 27
MUSAP 461, 463, 464, 478 (two years)
Private Instruction: Violin-Viola, Violoncello, Contrabass 18
MUSIC 479 Senior Recital 1
MUSIC 434, 435, 436 Pedagogy (2,2,2) 6
MUSAP 140 Private Instruction: Piano or MUSAP 236 Secondary Piano 6
MUSAP 280 Basic Principles of Conducting 1
Ensembles—chamber (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 MUSAP 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 322 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
139-150

Voice majors should establish proficiency in French, German, 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 Repertoire (2,2,2) 6
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 MUSAP 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:
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 235 (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 (Instrumental 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 performance 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

STRING INSTRUMENT MAJOR

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 MUSAP 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


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 (34 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), Buerger, 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; BIO 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 grade-point average.

Major Requirements: NUTR 321, 340, 341, 400, 414, 421, 422, 440, 460-461; BIO 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 industry, 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—TSCS 327, 429, 439, 482; ART 304; HST 111, 112, 113 or ART H 201, 202, 203. 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, 425, 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, Criminala, 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, Wether, 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


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'alan, 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, Boullwe, 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, Moriyaus, Neddermyer (emeritus), Peierls (emeritus), Peters, Puff, Rehr, Riedel, Rothberg, Rutherfoord, Sanderman (emeritus), Schick, Schmidt, Snover, Stern, Streib, Trainor, Uhling (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 political 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), Roehn, 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 nondenominated 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


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, 213 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, 257, 300, 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.)
Bachelor of Arts Degree

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 grade-point 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. Penelas, Chairperson; Anderson, Cartwright, Christofides, Concha, Creore (emeritus), Dale, David (emeritus), Ellrich, Field, Friedman, Friedrich, Hanseli, Jones, Keller, Klausenburger, J. Leiner, Nostrand, Pace, Penelas, Petersen, Predmore, Rabago, Salinero, Sa porta, Shipley, Simpson (emeritus), Subercaseaux, Vargas-Baron (emeritus), C. Wilson, W. Wilson (emeritus), Worley, Yarbro-Bejarano. A. Pace, graduate program adviser.

Undergraduate Programs

Bachelor of Arts Degree

MAJOR REQUIREMENTS

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

C88 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, Sjvik, 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.

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 grade-point 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, Eble, 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 advisor.

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—AUDIOLGY 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 500-level 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 admission 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 lower-division 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.

ZOONOLOGY

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


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 are 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 biology 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 college-level 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 Examination; dissertation; Final Examination. A full statement covering current graduate programs in zoology is available from the department upon request.
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 3 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
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 first-year 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. program 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 professionally oriented academic environment within which 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 department.
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 grade-point 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


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

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, 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 communication 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.
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 program must 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 app-
Applicant is required to complete the AADSAS application booklet. The deadline for submission of the application is November 1 of the year prior to the one 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 predental 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 dentaly 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 Education 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 one-year 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 third-year 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 third-year 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 predental 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 prosthetics, 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.

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.

Faculty

Peter Milgrom, Chairperson; Chapko, Conrad, Getz, Guld, 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, Sotero, 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

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 provide 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, Schlager (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, Drefeece, 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, Ostdlund, Powell, Stamey, Stibbs (emeritus), Stoddard, Strand, Warwick, 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 soft-tissue 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 basic 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 advisor, 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. 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 Ad-
mission 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 (twenty-four 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 (twenty-one 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.
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
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 Seattle 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.

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 noncertification 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 admission to the University.

Bachelor of Arts Degree

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) transferring 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.

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.
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 upper-division 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 audiovisual 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. Infor-
mation 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 post-baccalaureate 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, GEG 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, 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 Education, 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.

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* Teaching minors only; interested students should inquire at the Office of Certification and Student Services, 211 Miller.
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.

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<th>Field-Oriented Elementary Program Sequence</th>
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<tr>
<td>First Quarter</td>
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<tr>
<td>EDPSY 304, Learning</td>
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<tr>
<td>EDC&amp;I 496, Teaching Strategies</td>
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<tr>
<td>EDC&amp;I 360, Reading</td>
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<tr>
<td>EDUC 302, Practicum (6 hours/week)</td>
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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.

<table>
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<tr>
<th>Field-Oriented Secondary Program Sequence</th>
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<tr>
<td>First Quarter</td>
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<tr>
<td>EDUC 302, Practicum (6 hours/week)</td>
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<td>EDPSY 304, Learning</td>
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<td>EDC&amp;I 496, Teaching Strategies</td>
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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 lower-division 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

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

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
Teaching Middle

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: CLIT 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: CLIT 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; 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.

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: ASTR 101 or 102 or 201 or 301; CHEM 140, 150, 151, 160; PHYS 121, 122, 123; ENGL 101, 102 or 405; GED 101 or 201; HSS 210, 220, 230, 240, 250.

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; ATM S 101 or 201; GEOL 101 or 205; OCEAN 101 or 203.

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; 10 to 14 elective credits in atmospheric sciences or mathematics.

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 field-oriented 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

55 approved credits above the second-year level required.

Teaching Minor: Secondary 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 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 Minor: Secondary School

25 approved credits required. Courses: GEOG 100, 200 or 207 or 277, 205 or 370, 300 or 302 or 402; one upper-division 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.

Geometrics

Grade-point average of 2.50 must be maintained in all Geometrics 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 upper-division 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, 401, 402, 403; 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; Biostream 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

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.
Kinesiology
(Progam 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

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.


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 400-level Latin courses, and 9 credits chosen with the approval of the Department of Classics from courses in Greek, 400-level 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. EDUC 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

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.
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


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; SOJU 430; and 10 approved credits in the social sciences or humanities.

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.

Teaching Minor: Secondary School

30 approved sociology credits required, with a 2.50 grade-point 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; 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 IN EDUCATION
Graduate Program Adviser
Roger G. Oistad
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 specialization 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 major’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.
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 techniques 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 upper-division 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 bioengineering-related 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

<table>
<thead>
<tr>
<th>Courses</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH 124, 125, 126 Calculus With Analytical Geometry</td>
<td>15</td>
</tr>
<tr>
<td>Science, usually chemistry or physics</td>
<td>12-14</td>
</tr>
<tr>
<td>ENGR 141 Introductory FORTRAN Programming</td>
<td>4</td>
</tr>
<tr>
<td>ENGR 130 or college-level writing course</td>
<td>3</td>
</tr>
<tr>
<td>Engineering functional techniques</td>
<td>4</td>
</tr>
<tr>
<td>Humanities, social studies, or electives</td>
<td>5</td>
</tr>
<tr>
<td>Career Planning</td>
<td>1</td>
</tr>
</tbody>
</table>

Second Year

<table>
<thead>
<tr>
<th>Courses</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH 238 Elements of Differential Equations</td>
<td>3</td>
</tr>
<tr>
<td>Additional mathematics</td>
<td>5-6</td>
</tr>
<tr>
<td>Science, usually chemistry or physics</td>
<td>9-11</td>
</tr>
<tr>
<td>Engineering science</td>
<td>12-16</td>
</tr>
<tr>
<td>Humanities, social studies, or electives</td>
<td>9-15</td>
</tr>
</tbody>
</table>

Requirements in the areas of engineering functional techniques and engineering science are usually met by college 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
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

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 are 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, Sarkansen, Seferis, Uveli.

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 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-point average 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 E 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 (3), 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. Sleichet

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 coursework 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

201 More

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 so-
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

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 Geomteronics; 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 engi-
ing 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

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 comput ers, 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 micr oelectronic 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, Afuromowitz, 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), Rogers (emeritus), Siegelmann, Smith (emeritus), Swarn, 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 coursework 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 Humanities-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 advisors, or members of the humanistic-social 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 skills 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 (3), OPSYS 441 (4), approved industrial engineering electives (3), electives (4); total—14.

FOURTH YEAR


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 consis-
tent 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 specifically 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, Dru, 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 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 9-credit 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

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 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 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

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 403 (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.

* Not required if student has completed CER E 198, 202, 203.

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 grade-point 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.

Recommendations for Fulfiling Basic College Require-
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

FOURTH YEAR

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 600-level 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
303 Benson

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 clean-energy 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; thermonics, 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, Ribé, Robkin, Vlasses, Woodruff.

Affiliate Faculty

Clayton, Olsen, Omberg, Schmid, Shen.

Research Faculty

Audenaerde, Knox, Marrs, Pietrzyk, Reynolds, Uveli.

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 thermal-hydraulic 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, laser-plasma 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.
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-
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, municipal-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 Iliaama, 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 programs 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 reactor-produced 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
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 Biometrics 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 resource-management 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 intro-
duce 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 Malika, 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 seineing, 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 Malika.

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.
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 grade-point 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, 4, 4, 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 (5) 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).


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 admission.

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 Scholarships, obtainable from the Office of Student Financial Aid, 170 Schmitz, information concerning graduate student support is available at the office of the Dean. Many scholarships, 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.
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 wood-based 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, Zosaski.

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 grade-point 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 lower-division 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 upper-division 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). Mathematics—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—GBOL 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 fol-

Forest Resource Management Curriculum (MSS)

LOWER-DIVISION REQUIREMENTS


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); 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)


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
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


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.

Pulp and Paper Technology Curriculum (PS)

LOWER-DIVISION REQUIREMENTS

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


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, Mechanisms (4), Electromagnetism and Oscillatory Motion (4), Waves (4). Biological sciences—BO T 110, Plants in the Human Environment (5). Social sciences—ECON 211, General Economics (3); ENGL 171, 172, College Writing (3, 3). Electives10 (24).

UPPER-DIVISION REQUIREMENTS


Wood Products Option

LOWER-DIVISION REQUIREMENTS


UPPER-DIVISION REQUIREMENTS


Forest Engineering Curriculum

LOWER-DIVISION REQUIREMENTS

UPPER-DIVISION REQUIREMENTS

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.


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

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, Bryan, Burke, Dowdle, Field, Gessel, Greulich, Hrutfiord, Jorgensen, Leney, Pickford, Rustagi, Sarkanan, Schreuder, Sharpe, Thomas, Turnbull, Waggeme, 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 twenty-five 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 extracts 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. Markworth 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 recreation 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 Bionie 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, 115 must be taken by interpretation majors.
3. Internship participants substitute FOR M 357, 457.
4. May substitute ENGR 141, Q MATH 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.
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.
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.
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

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) in-depth 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), John-son (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), Pow-ers (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 394, 395 (3, 3) or STAT 511 (5), Probability ................. 5 or 6
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 examina-
tion 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 con-
tinuing 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 op-
tional areas of emphasis. Health Sciences Biology develops
the theory and application of statistics regarding phenom-
ena 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 biomath-
ematics 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 the-
ory, biophysics, optimal foraging theory, ecosystem simu-
lation, bioengineering, and biochemical kinetics.

DEGREE REQUIREMENTS (BIOSTATISTICS PATHWAY)

MATH 394, 395 (3, 3) or STAT 511 (5), Probability ................. 5 or 6
STAT 472, 473 (3, 3) or STAT 512 (5), Statistical Inference ...... 5 or 6
STAT 484, Distribution Free Inference, or
MATH 424, 425, 426 (3, 3, 3), Fundamental Concepts of
Analysis or MATH 427, 428 (3, 3), Topics in Applied Analysis ..... 6 or 9
and
MATH 527, Elements of Real Variables for Scientists ............... 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
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
BMATH 597, Seminar in Quantitative Ecology ..................... 9

Three credits of either of the following

BIOST 590, Biostatistical Consulting ................................ 3
Q SCI 502, Statistical Consulting for the Life Sciences .......... 3
BMATH 800, Doctoral Dissertation .................................. 36
At least three electives from suitable courses in health
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 program-
ing. (2) Research experience. (3) Examinations. All stu-
dents must take and pass a first- and second-year exami-
nation. 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. examina-
tion 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 biol-
ogy examination, which may be oral or written. This exami-
nation covers the knowledge of a student’s biological spe-
cialty 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 comple-
tion of the General Examination, most of a student’s time is
devoted to his or her dissertation. (4) Dissertation.
INTERDISCIPLINARY GRADUATE DEGREE PROGRAMS

DEGREE REQUIREMENTS
(INDEPENDENT PROGRAM PATHWAY)

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH 394, 395, 396, (3, 3, 3), or STAT 511 (5), Probability</td>
<td>5 or 9</td>
</tr>
<tr>
<td>MATH 424, 425, 426, (3, 3, 3), Fundamental Concepts of Analysis, or MATH 427, 428, 429, (3, 3, 3), Topics in Applied Analysis</td>
<td>9</td>
</tr>
<tr>
<td>BIOL 511, 512, 513 (4, 4, 4), Medical Biometry I, II, III or Q SCI 382, 383 (5, 5), Statistical Inference</td>
<td></td>
</tr>
<tr>
<td>in Applied Research</td>
<td>10 or 12</td>
</tr>
<tr>
<td>9 credits of biology consisting of courses that have been approved by a student’s committee.</td>
<td></td>
</tr>
<tr>
<td>BMATH 800, Doctoral Dissertation</td>
<td>36</td>
</tr>
</tbody>
</table>

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.

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH 394, 395, 396, (3, 3, 3), or STAT 511 (5), Probability</td>
<td>5 or 9</td>
</tr>
<tr>
<td>MATH 424, 425, 426, (3, 3, 3), Fundamental Concepts of Analysis, or MATH 427, 428, 429, (3, 3, 3), Topics in Applied Analysis</td>
<td>9</td>
</tr>
<tr>
<td>BIOL 511, 512, 513 (4, 4, 4), Medical Biometry I, II, III or Q SCI 382, 383 (5, 5), Statistical Inference</td>
<td></td>
</tr>
<tr>
<td>in Applied Research</td>
<td>10 or 12</td>
</tr>
<tr>
<td>MATH 438, (3), Elements of Differential Equations, or Q SCI 392, 393 (3, 3), Techniques of Applied Mathematics</td>
<td>3 or 6</td>
</tr>
<tr>
<td>MATH 427, 428, 429 (3, 3, 3), Topics in Applied Analysis, or MATH 587, 588, 589 (3, 3, 3), Techniques of Applied Analysis</td>
<td>9</td>
</tr>
<tr>
<td>STAT 492 (3, 3), Introduction to Stochastic Processes</td>
<td>6</td>
</tr>
</tbody>
</table>

Seven electives from the following courses:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>A A 562, 563, 564 (3, 3, 3), Methods of Partial Differential Equations I, II, III</td>
<td>9</td>
</tr>
<tr>
<td>MATH 464, 465, 466 (3, 3, 3), Numerical Analysis I, II, III</td>
<td>9</td>
</tr>
<tr>
<td>MATH 538, 539 (3, 3), Nonlinear Ordinary Differential Equations</td>
<td>6</td>
</tr>
<tr>
<td>MATH 574, 575, 576 (3, 3, 3), Advanced Partial Differential Equations</td>
<td>9</td>
</tr>
<tr>
<td>At least 9 credits of appropriate electives in biology that have been approved by a student’s committee.</td>
<td></td>
</tr>
</tbody>
</table>

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), Grimmel (Classics and Comparative Literature), Harum (Classics and Comparative Literature), Hruby (Germanics and Comparative Literature), Jones (Romance Languages and Literature, and Comparative Literature), J. Kapetanac (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), Peneléas (Romance Languages and Literature), Reiner (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
On receiving the Master of Arts or Doctor of Philosophy degree, the graduate is qualified for teaching and research in literary, theory and criticism, 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, long-term-care facilities, mental-health-care organizations, government agencies, planning agencies, and other organizational settings in the health field. The curriculum is designed to be 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 grade-point average for the last two years of undergraduate work; successful performance on either the Graduate Record Ex-
INTERDISCIPLINARY GRADUATE DEGREE PROGRAMS

GRADUATE DEGREE PROGRAMS

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 Administration, Mechanical Engineering, and Marine Studies), Wenk (Engineering, Public Affairs, and Social Management of Technology). Marc J. Hershman, graduate program adviser.

Additional information and application materials may be obtained from the graduate program adviser.

Marine Affairs

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 letters 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

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 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, radiocology, 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.

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>FISH 473</td>
<td>Aquatic Radioecology II</td>
<td>3</td>
</tr>
<tr>
<td>PHYS 431, 433</td>
<td>Modern Physics Laboratory</td>
<td>3.3</td>
</tr>
<tr>
<td>NUC E 484</td>
<td>Introduction to Nuclear Engineering</td>
<td>4</td>
</tr>
<tr>
<td>NUC E 485</td>
<td>Nuclear Instruments</td>
<td>3</td>
</tr>
<tr>
<td>or CHEM 410</td>
<td>Radiochemical Techniques and Radioactivity Measurements</td>
<td>3</td>
</tr>
<tr>
<td>NUC E 477</td>
<td>Introduction to Radioactive Tracer Techniques</td>
<td>3</td>
</tr>
</tbody>
</table>

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INTERDISCIPLINARY GRADUATE DEGREE PROGRAMS

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

BIOLGICAL 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 Radioactivity Measurements 3.3
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 ............................ 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

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 Credits
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 Radiation .............. 3
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 Administration), 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 must 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: SOCW 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

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, biostatistics, 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 representa-
tion 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

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)


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


SOPHOMORE YEAR


JUNIOR YEAR


SENIOR YEAR


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 re-
source 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 Ad-
ministration 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 descri-

Social Management

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 undesir-
able side effects. Social management of technology is con-

Student in engineering whose interests embrace social management of technology can design an individualized program leading to either a Bachelor of Science or a Bachel-
or of Science in Engineering degree. Students in the Col-

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lege 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 decision-making 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

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 qualifying 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,
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 exist. 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.
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 institution-centered 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 two-thirds (42 credits) must be taken within the school. Librarianship is generally a nonthesis program.

Degree requirements are detailed as follows:

<table>
<thead>
<tr>
<th>Credits</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>12</td>
<td>Two foundation courses (LIBR 500 and 501), 6 credits each (offered Autumn Quarter only)</td>
</tr>
<tr>
<td>15</td>
<td>One course from each of five areas of concentration, 3 credits each: (1) Managerial Tools (LIBR 510, 511, 512, 599); (2) Organization 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)</td>
</tr>
<tr>
<td>36</td>
<td>Individual selection of courses in librarianship and in other departments, with the approval of a faculty adviser. A maximum of 21 credits may be taken in other departments on campus</td>
</tr>
<tr>
<td>63</td>
<td>Total</td>
</tr>
</tbody>
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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 admission are identical to those for the Master of Librarianship program; the same application forms and procedures are used.

Admission Requirements

The primary criterion for admission 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 multicultural 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 in-state 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 resume preparation, gives advice on job-hunting techniques, and assists students in developing placement files.

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, 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.
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.

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-
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)**
- 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

**SECOND QUARTER (WINTER)**
- HUBIO 514P Molecular and Cellular Biology I
- HUBIO 515P The Ages of Man

**THIRD QUARTER (SPRING)**
- 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

**FOURTH QUARTER (AUTUMN)**
- 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

**FIFTH QUARTER (WINTER)**
- HUBIO 540P Cardiovascular Respiratory System
- HUBIO 541P Gastro-Intestinal System
- HUBIO 542P Introduction to Clinical Medicine
- HUBIO 543P Principles of Pharmacology I

**SIXTH QUARTER (SPRING)**
- 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

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 integral 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 Idaho, 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 Ancorches, 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 semester/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.

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, do not pay 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-
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, Biostatistics, Genetics, Microbiology, Clinical Immunology, Pathobiology, Pharmacology, Physiology, and Biophysics.

Applications 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 acquisition 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 simultane-
ously 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.
ANESTHESIOLOGY

BB1459 Health Sciences

Faculty

Thomas F. Hornbein, Chairperson; Amory, Barsa, Bashein, Batra, Benedetti, Bonica, Buckley, Buffington, Butler, Charlton, Cheney, Colley, Eng, Fink, Freund, 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

TI42 Health Sciences

Faculty

G. L. Van Hoosier, Jr., Chairperson; Cotton, Dennis, DiGiacomo, 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


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, Bolen­

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


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, Hamernylk, Hamlin, Hutchinson, Kadin, Kaplan, Kenny, Labbe, Larson, Lecrone, 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; BI0C 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-to-three-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,
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**


The Department of Microbiology and Immunology is concerned with two branches of natural science. Microbiology deals with microbial 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 is required. 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**


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**


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, Hellstrom, 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

CC314 Health Sciences

Faculty


PEDIATRICS involves the study of the physical and behavioral development of man, in health and disease, from conception to maturity.

Intruction 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 endocrine. 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


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 dyadic, familial, and group interactions. Sociocultural factors include the cultural, social, institutional, and community systems as well as the environment and epidemiology of health and disease.

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 development and growth, 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-
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 or 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


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 non-destructive 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


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 encountered in the field. In addition, the department conducts a residency training program for the specialty of physical medicine and rehabilitation.

The department offers curricula leading to the following degrees: 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 Mas-
ter 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 preprofessional 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.


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,
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


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.
NURSING

Dean
Rheba de Tornyay

Associate Deans
Dorothy Crowley
Florence Gray
Alice Kuramoto
Ida 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, Connan,
Cowan, Craven, Crowley, Cumings, Cunningham, Delecki,
Denton, de Tornyay, Disbrow, Draye, Dye, Edwards,
Ellerbe, Ellison, Estes, Eyres, Fast, Finch, Fine,
Fuller, Gallucci, Gant, Giblin, Goertzen, Grisley, Gray,
F. Gray, Gurel, B. Hall, C. Hall, Hammond, Hanson,
Hasselblad, Hay, Heinemann, Hochn, Hoffman, Holland,
Barbara Horn, Beverly Horn, Houk, J. Jones, M. Jones,
Johnson-Crowley, Kang, Keefer, Kelley, Knapp,
Knight, Kotchek, Kuramoto, Kvidera, La Fargue, L. 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, Nikolausen, 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, Spitz, Spratlen, Stade,
Stevens, Sullivan, Sweeney, Tyler, Underhill, Virden, P.
Walker, W. Walker, Walters, Webster-Stratton, Wenner,
Wheeler, Whitley, Wiegardt, Williams, Wolf-Wilets, N.

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 na-
ture. All persons have a right to competent health-care ser-
vice with positive consideration of, regarding 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 with-
out prejudgment on the basis of sex, color, creed, life-style,
or cultural difference.

Philosophy

The philosophy of the School of Nursing supports the un-
dergraduate and graduate programs within the framework
of the overall philosophy of the University. The faculty as-
sumes responsibility for the quality of the educational pro-
grams 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 be-


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 child-rearing years. The influence of the intergenerational biolog-
ich, 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 health-illness 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
T303 Health Sciences Teaching

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 self-awareness 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.

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 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.

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.
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 are 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.

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 carrels 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, Graduate 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:

| Major: advanced nursing courses | 19 |
| Related field courses in at least two other disciplines | 12 |
| Research: courses in research and thesis | 14 |
| **Total Credits** | **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.

| Major: advanced nursing courses | 19 |
| Minor: courses in another discipline | 12 |
| Research: courses in research and thesis | 14 |
| **Total Credits** | **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 doctoral-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 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:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOL 210, 211, 212</td>
<td>(General Biology)</td>
<td>15</td>
</tr>
<tr>
<td>CHEM 140, 150, 151, and 160</td>
<td>(Inorganic)</td>
<td>14</td>
</tr>
<tr>
<td>CHEM 231, 235, 236, 241, and 242</td>
<td>(Organic)</td>
<td>15</td>
</tr>
<tr>
<td>ENGL 171, 172</td>
<td>(College Writing)</td>
<td>9</td>
</tr>
<tr>
<td>or</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ENGL 181</td>
<td>(Expository Writing)</td>
<td>9</td>
</tr>
<tr>
<td>or</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MATH 105</td>
<td>(Elementary Functions)</td>
<td>5</td>
</tr>
<tr>
<td>MATH 157 or 124</td>
<td>(Calculus)</td>
<td>5</td>
</tr>
<tr>
<td>Microbiology or bacteriology</td>
<td></td>
<td>5</td>
</tr>
<tr>
<td>Electives from the humanities and/or social sciences (recommended: sociology, psychology, anthropology, economics, interpersonal communications)</td>
<td></td>
<td>9</td>
</tr>
<tr>
<td>Other electives (applicants who have not completed one year of high school physics are required to complete two quarters of physics)</td>
<td></td>
<td>13</td>
</tr>
<tr>
<td></td>
<td></td>
<td>90</td>
</tr>
</tbody>
</table>

Total credits not fewer than 90.

270
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 Calculations (1 credit); PHARM 331, General and Physical Principles (3); PHARM 340, Pharmacy Health and Society (3); PHARM 369, Pharmacy Experience Project I (1); P BIO 360, General Human Physiology (5); elective (0-3); total—16.

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, 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.

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-
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 pharmacuetics, 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

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 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

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 Biometrics Group, in which the Department of Biometrics participates, offers training in statistical theory, mathematics, and statistical analysis leading to a Master of Science degree. The Biometric 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 Interdisciplinary Graduate Degree Programs, page 215.

Doctor of Philosophy Degree
The Ph.D. degree is offered both by the Department of Epidemiology and by the Biometrics Group. In addition, the Department of Health Services offers a "doctoral op-

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 health-related areas, such as epidemiology, biology, or health services research. (See also description of biometrics 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; prop-
erly 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. Pre-environmental 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, food-borne-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. Breyssse, 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 pro-
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

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

gram 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.
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.
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 lieutenant 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 two-year 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

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 second-year 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 coursework 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 scholarships are limited, they are distributed on a first-come-first-served 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 retain 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 four-year 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 four-year 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 tuition.
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 five-year programs of study, must be received prior to April 15. Those selected by a central selection board 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 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.
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

Dean
Scott Briar
204 Eagleson

Associate Dean
Naomi R. Gottlieb
207 Eagleson

Faculty

Adjunct Faculty
Jameo.

Clinical Faculty
Armstrong, Blackard, Buyagawan, Castle, Clement, Coughlin, Davis, Durgin, Evans, Gelzer, Golosman, Graham, Holland, Hull, Lawson, LeConte, Lytle, Manaio, Miller, Muench, Mykut, Ousley, Peterson, Rice, Richards, Rivara, Robinovitch, Schilling, Smith, Sprague, Stevens, Tomita, Twersky, Ware, West, C. Williams, V. Williams, Wilson.

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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 objec-
tives 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 in-
formed 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 intro-
ductive 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 ac-
companied by an extended practicum in a number of social
agencies in which students participate directly in the provi-
sion 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 re-
quirements 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 ad-
vised 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 Fi-
nancial 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 adminis-
trative activities. Consistent with its responsibility to the
profession and to the public, the school exercises discre-
tionary judgment concerning the suitability of students
for admission to, or continuation in, the degree program.

The curriculum is composed of courses concerned with is-
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 ed-
ucational program are required during both years. Thus,
through a blending of theory and practice, the student ac-
quires 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 com-
munity and organizational development.

Requirements for the degree include completion of the pre-
scribed 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 num-
ber 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
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**  
Lower-division courses primarily for freshmen and sophomores.

**300-499**  
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).

**500-**  
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)**  
5 credits are received for the quarter.

**ART 101-102 (5-5)**  
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.)

**ART 100- (5-)**  
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. Specific amount is determined by school or college offering the course. The Time Schedule may indicate 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 description, giving permission for repetition of the course for credit.

**Background Required**

**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:**

**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.
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 130, 151 Appreciation of Architecture I, II (2 or 3, or 3) Sp,WS Benavente, Fundi

Historical survey of the architecture of Western civilization. For nonmajors.

ARCH 152 Environmental Design Professions (3) Bosworth

Since professional role in shaping physical environment. For nonmajors.

ARCH 250 American Architecture and Urban Environment (2) Sp Fundi

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 student 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; introduction to design synthesis sections. Entry card required.

ARCH 303-304-305 Introduction to Design (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 program in architecture with baccalaureate degrees in fields other than architecture. Entry card required.

ARCH 310, 311, 312 Introduction to Design Graphics (2,2,2) AWSp,AWSp,AWSp Donnette, Zuberbuhler

Lectures and laboratory in theories and processes of graphic communication for design; lettering, drafting, multiview and parallel drawing, photographic simulation, descriptive geometry, perspective, shade and shadow, computer graphics, and freehand drawing. Entry card required.

ARCH 313 Introduction to Architectural Photography (2) AWSp Sniad

Introduction to the basic elements and processes of architectural photography to include: camera controls, exposure technique, and photo processing. Student must provide own camera with lens, shutter, and aperture controls. Entry card required.

ARCH 314 Introduction to Architectural Sketching (2) AW Skill development in conceptualization of forms and their relationships through observation and recording in freehand graphic manner. The course deals with proportion, scales, light effect, value texture, and various perspective techniques. Entry card required.

ARCH 315 Architectural Sketching (2) AWSp See 314 for course description. Entry card required.

ARCH 320 Introduction to Structural Theory I (3) AS

Albrecht, Lebert, Onosye, Torrence

Lectures on vectors, equilibriums 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, Onosye, Torrence

Nature of structural materials, their reactions to forces and force systems, their strengths and elastic properties and methods of designing and joining structural members. Prerequisites: 320 and permission.

ARCH 322 Introduction to Structural Theory III (3) WSp

Albrecht, Lebert, Onosye, Torrence

Simple building structural systems and elements. Beams and posts. Trussed structures. Introduction to lateral force and vertical-resisting systems. Prerequisites: 321 and permission.

ARCH 350 Survey of Environmental Arts I (3) A Fundi

Survey of architecture, city, and land form, from earliest times to circa 1510.

ARCH 351 Survey of Environmental Arts II (3) W Fundi

Survey of architecture, city, and land form, from circa 1510 to 1750.

ARCH 352 Survey of Environmental Arts III (3) Sp Fundi

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) AWSp,AWSp,AWSp

Registration for credit in these courses permits the student to choose from among a number of sections that introduce architectural design theories and processes. Sections are given in various studio-seminar-lecture formats and include subjects in several groups: introduction to architectural design sections; case studies, and design studios; and introduction to urban design. Entry card required.

ARCH 410, 411, 412 Design Graphics Laboratory (2,2,2) AWSp,AWSp,AWSp

Donnette, Zuberbuhler

Continuation of design graphics laboratory with emphasis on advanced architectural graphics. Entry card required.

ARCH 413 Architectural Photography Projects (2) AWSp Sniad

Projects involving the study of illumination and perspective 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 line, proportion, values, and composition. Studies programs and sections for geometric to nongeometric forms. Entry card required.

ARCH 415 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 utilized, including an introduction to the use of color in watercolor sketching. Entry card required.

ARCH 420 Structural Design I (4) AS

Albrecht, Lebert, Onosye, 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, Onosye, Torrence

Development of basic reinforced and prestressed concrete design programs and design of continuous structures in reinforced concrete, employing beams, girders, and slabs. Entry card required.

ARCH 422 Structural Design III (4) WS

Albrecht, Lebert, Onosye, Torrence

Design of reinforced concrete structures, including flat slabs and plates, columns, footings, shearwalls and retaining walls. Entry card required.

ARCH 426 Structural Unit Masonry (3) Sp Lebert

Structural behavior and design of reinforced brick, tile, and masonry structures. Offered jointly with CEEM 487. Entry card required.

ARCH 427 Architectural Problems (3-7) AWSp

Entry card required.

ARCH 430 Materials and Processes (3) AWSp Fundi

Lectures, field trips, and laboratory sessions directed toward the nature, potentials, and limitations of a variety of materials (wood, metal, plastics, inorganic cementing materials) and the production and design theory 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, acoustic, and thermal phenomena. Lectures, laboratory work, and student presentations. Entry card required.

ARCH 435 Principles and Practices of Environmental Lighting (3) Millar

A 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 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 analysis and measurement, but is not quantitative in application of measures to class projects data. Involves reading and application of research techniques including: multivariate statistics; direct assessment, through interview and survey, simulation and experimental observation, and phenomenological research. Entry card required.

ARCH 442 Intermediate PER Research and Analysis (3) Sp Wise

Extends material introduced in 440 to include multivariate studies and a more thorough treatment of statistical decision procedures. Understanding simulation and quantitative modeling procedures as a means of predicting and evaluating design proposals is stressed along with the use of statistical information appropriate decision-theoretic methods. Aggled research problems as a means of developing the techniques. Entry card required.

ARCH 443 Experimental Design Notation (3) AWSp Sniad

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 Bosworth, Grey Development and application of techniques for appraisal of the built environment so as to imply planning and design criteria for urban open spaces. Offered jointly with URBB 444. For students in behavioral field studies in architecture, landscape architecture, and urban planning; others by entry card.
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, psychological, and visual problems, followed by five weeks of individual or team photographic projects resulting in completed 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 AKT H 446 and CL AR 446. Entry card required. (Offered alternate years; offered 1980.)

ARCH 447 Physical Structure and Human Interaction (3) W
Sonnoff
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 architecture, and urban planning. Historical evolution with special 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
Forwood
Study and critical analysis of major architectural achievements 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 required. (Offered alternate years.)

ARCH 456 History of Chicago School Architecture (3) WS
Pundt
Study and critical evaluation of the contribution of major 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 evaluation of European and American architecture and urban design from 1750 to 1850. Entry card required. (Offered alternate years.)

ARCH 458 South Asian Architecture (3) W
Curtis
Introduction to South Asian architecture, its generating forces, parameters, and consequent environment. Pre-requisite: HISTAS 201. Entry card required.

ARCH 459 American Utilitarian Architecture (3) Sp
Hildebrand
Examination of significant American environmental design 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; interactions of philosophical concepts and architectural form and expression. Fundamentals of architectural criticism. Entry card required.

ARCH 461 Recent Developments in Architectural Theory (3) WSp
Seligman
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 468 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 in general architectural design synthesis, in special projects examining particular architectural determinants in detail, and in architectural research. Entry card required.

ARCH 513 Design Communication I (3) AWSpR
Rehor
Classwork in design illustration techniques together with workshop experiences in developing individual experiments 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. Topics 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, techniques of testing and measurement. Offered jointly with CSEMS 477. Entry card required.

ARCH 522 Skin-Resistant Structures (3) A
Albrecht
Resistence mechanisms, structural systems employing plates, folded plates, shells, and membranes with applications to the structural design process. Entry card required.

ARCH 523 Industrialized Building Systems (3) A
Rosen
Consideration of the evolution of prefabrication, building products, components, construction methods, and building systems through the nineteenth and twentieth centuries. Entry card required.

ARCH 526 Advanced Architectural Studies (6) A
WSpS
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 communities for investigation in depth of lighting, acoustic and thermal conditions, as well as other related research interests. Entry card required.

ARCH 535 Graduate Seminar, Study Topics in Environmental Lighting (3) W
Millet
Focus on individual student projects involving research and design for lighting. Entry card required.

ARCH 536 Acoustics Seminar (2) W
Principles of acoustical design. 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
Seligman
Recent developments in architectural theory, urban design theory, criticism, and the methodology of criticism. Entry card required.

ARCH 571 Building Economics (3) A
Milton
Social, political, and economic factors affecting the location, construction, financing, and marketing of buildings. Entry card required.

ARCH 572 Specifications and Contracts (3) W
Detail 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 particular emphasis on investigative procedures for graduate students in architecture; includes a review of methodologies from related disciplines as applied to recent and ongoing 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 educators that are impacting on educational facilities. Directed readings and informal discussion of the people, processes, programming, planning, and evaluation of means 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
Comprehensive exploration of housing design: developing the ability to distinguish and apply appropriate referents—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 total planning process for health care facilities, with individual parallel studies in selected topics. Entry card required.

ARCH 596 Field Work in Professional Practice (9) V
On-location study under the supervision of a practicing professional involved in an aspect of environmental de-
LANDSCAPE ARCHITECTURE

Courses for Undergraduates:

L ARC 300 Landscape Architecture Proficiency Program (16) S
Nakano

L ARC 301 Site Planning (6) A
Buchanan, Haag, Nakano
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.

L ARC 302 Landscape Design Studio (6) W
Buchanan, Haag
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, Zoos 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, urban, and neighborhood recreation areas; the design, policies, and behavioral studies of existing parks, playgrounds, public places, and commercial recreational areas; Design projects dealing with the environmental for all ages.

L ARC 311 Landscape Communications (3) A
Nakano
Introduction to communication techniques for various phases of the design process. Many techniques are introduced and their suitability and appropriateness for different 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 alignment, 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
Kerr

L ARC 341 Site Planning (3) A
Streetfield
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 in relation to the culture of each period. Open to nonmajors.

L ARC 401 Landscape Design Studio (6) A
Furado
Scenic roads and linear parks, riverways, and trails as design studies dealing with policy and planning implications 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 development. Identification of landscape character, resources, and problems of site, cost factors, design alternatives and implications for architectural direction, policy for land acquisition. Project to maximize site utilization, and preservation of natural attributes.

L ARC 403 Landscape Design Studio (6) Sp
Streetfield, Streetfield
Environmental and technological aspects of site development. Project design studies in areas of "critical concern," related to environmental restraint, natural systems, landscape character, and capacity of site to recover from human intervention. Generally deals with use of natural systems in the planning/design process, environmental issues in relation to federal, state, and local legislation.

L ARC 404 Landscape Design Studio (6) A
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 recommendations and detailed design study for typical problem areas, from metropolitan to neighborhood scale.

L ARC 405 Landscape Design Studio (6) W
Streetfield
Landscape planning and policies utilizing natural systems. Examination of the ecological restraints and the design criteria for selected land use and development categories. Some studies dealing with landscape types, features, amenities, and resources; their identification, classification, and assessment, and interpretation for design planning, program development, and policy decisions. Metropolitan to regional scale.
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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 to majors in landscape architecture with faculty permission and one quarter prior notice.

L ARC 411 Landscape Graphics (2) A Buchanan
Delineation techniques and office presentation methods for landscape perspectives, sections, rendering of plant materials, use of appropriate symbols and associations generally used in landscape architecture. Discussion of historical and contemporary examples of landscape drawing.

L ARC 412 Landscape Graphics (2) W Nadler
Office presentation techniques for various phases of landscape 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
Visual recognition of woody ornamental plants (native and introduced species) suitable for use in Pacific Northwest landscapes. Plants with significant autumn characteristics and those most popular in the landscape trade. Emphasis on design characteristics and horticultural requirements of each plant or plant group. Field study with laboratory examination to nonmajors. Prerequisite: BOT 110, 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. Courses 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 selection, climate, and cultural suitability; maintenance, costs, and availability. History and theory of composition and abstract design qualities of plants. Open to nonmajors.

L ARC 423 Planting Design (5) Sp Gutter
Utilization of plants in the urban areas and as major elements of project design. Technical considerations for selection, climate, and cultural suitability; maintenance, costs, and availability. History and theory of composition and abstract design qualities of plants. Open to nonmajors.

L ARC 433 Large-Scale Site Construction (4) A Buchanan
Includes studies of natural determinants and restraints on large-scale construction, development affected by social and utility systems, physiographic suitability of site, cost-benefit analysis, and critical path methodology for site construction. Prerequisites: surveying and 331, or permission of instructor.

L ARC 462 Site Planning for Housing (3) W Small/Utilities
Large-scale site planning concerned primarily with housing as it relates to physical environmental conditions. Lectures deal with understanding and manipulating the land and the house, plus insights into other issues relevant to the site-planning process. Open to landscape architects, planners, engineers, and business administration students interested in methods, procedures, rationale, and decision-making techniques in the physical planning of large projects. Emphasis on high-density, low-rise housing.

L ARC 463 Natural Processes as Planning and Design Determinants (3) Sp Streetfield
Introductory lecture course relating methods, procedures, and rationale for use of natural process information—soils, vegetation, hydrology, physiography, wildlife, and geology. A design process covers areas of critical concern, environmental restraints, natural systems, 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) Tutor
Tutorial course concerned with various aspects of project organization, programming, scheduling of work loads, graphic and verbal communications, data collection methods and interpretation, methodologies for landscape planting and design. Prerequisites: fourth- or fifth-year 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 projects. Emphasis on landscape subareas and social/environmental uses of site: design master plan and details, planting and construction documents, and professional presentation of material. Prerequisite: fifth-year standing in the department or permission of instructor.

L ARC 476 Professional Operations (3-6, max. 6) Sp Utzmann
Practical 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 professional relationship of the landscape architect as a consultant to University students in other design planning and management disciplines (architects, planners, urban designers, forest resources, etc.). Focus is on site analysis, master planning, schematic design, and detailed design, working drawings, and planting plans associated with student projects. Prerequisites: fourth- or fifth-year standing as a major in the Department of Landscape Architecture, permission of facility sponsor, and 3.00 grade-point average in previous landscape architecture course work.

L ARC 495 Landscape Architectural Studies Abrahad (1-10, max. 30) AWSpS
Studies conducted under faculty supervision in various locations throughout 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 research leading to special problems, theories, or issues of landscape architecture and environmental issues. Prerequisites: permission of instructor and one quarter prior notice.

L ARC 523 Landscape Technology (3) Sp Toole/Landscape Technology (3) Sp Lecture/seminar on design philosophy and construction technology related to landscape habitat development. Technical and social problems, materials, landscape design. Prerequisite: permission of instructor.

L ARC 523 Landscape Technology (3) Sp
Lecture/seminar on design philosophy and construction technology related to landscape habitat development. Technical and social problems, materials, landscape design. Prerequisite: permission of instructor.

L ARC 523 Landscape Technology (3) Sp Lecture/seminar on design philosophy and construction technology related to landscape habitat development. Technical and social problems, materials, landscape design. Prerequisite: permission of instructor.

L ARC 530 Urban Planning (3) Sp Lecture/seminar on design philosophy and construction technology related to landscape habitat development. Technical and social problems, materials, landscape design. Prerequisite: permission of instructor.

L ARC 551 Regional Landscape Planning and Design (2) A Buchanan
Seminar on objectives, philosophy, history, and theory of regional landscape planning and design. Overview of the contrast of regional landscape planning and examination of critical issues in the Pacific Northwest region, and opportunities 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 subject matter, including history, technology, implementation, 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. Concepts and logic of planning as a community process and professional activity. Evolution of planning ideas in response to changing social, economic, and environmental conditions within the American political framework. Development of case studies of urban and public policies and roles of public and private decision-makers. 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) AwSpS
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 importance, environmental (bicultural) impact, and planning 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) AWSpS
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) W Legal aspects of modern land utilization including the urban growth boundary, growth management, 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 Traffic, energy, population trends, and land use development. Study of possible future patterns of human use of the environment from apocalyptic to glorious. Review of landscape planning. Problems of regional and national planning. Offered jointly with GEGO 399. Prerequisite: GEOG 207 or 271, or permission of instructor.

URB P 401 Urban Planning Policies and Programs (3) Sp Norton
Goals, processes of policy formulation, methods of plan-
URB P 407 Urban Planning Studio (5) Sp Arenas, Norton, Shin
Synthesis of urban planning problems and methods in a laboratory setting. Prerequisite: 441 or permission of instructor.

URB P 411 Planning Process and Methods (3) Sp Miller
The urban plan and plan making. Emphasis on comprehensive, coordinative urban planning. Methods and analytical techniques used in planning public actions and policies. Various planning surveys and methods discussed. 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, morphological 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 environmental 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 planning. Emphasis placed upon linear and dynamic programming, critical path methods, queuing models, networks and the Bayesian approach to decision making under uncertainty. Stress placed upon the underlying models 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. Prerequisites: 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
Survey of on-line planning applications; use of various on-line planning facilities to solve urban systems design problems; investigation of hardware/software trade-offs; human factors in man-computer systems design theory as it relates to problem-solving activity. Offered jointly with CETC 429.

URB P 433 Introduction to Urban Transportation (3) A Harwood
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 Bonneel, Grey
Development and application of techniques for appraisal of the built environment so as to imply planning and design 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. 6) 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 (3) 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 concurrently.

URB P 448 Directed Social Change (3) A Amos
General course for both undergraduate and graduate students 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) A Course objective is to enable student to acquire an understanding of the complex factors operating in urban communities that give rise to and sustain the inner-city ghetto and black city. Emphasis has 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, Rabnowitz

URB P 452 Urban Development Location Determinants (4) W Practical workshop on empirical methods to conduct and evaluate locational studies. Offered jointly with U D 405.

URB P 460 History of City Development (3) A Johnson
Analysis of city forms and designs emphasizing their relation to the culture of each period.

URB P 461 History of Urban Planning in the United States (3) W Hancock
Survey of the origins, development, and significance of the American planning movement and the profession that emerged from it, as defined by some of its seminal innovators, theories, practices and achievements; and as evaluated by cultural realities thereby served. Emphasis on the twentieth-century American urban record, foreign influences, and planning as an instrument for societal change.

URB P 465 Land Use (3) W Stahl
Substantive presentation of land use as a focus for planning issues. Development of problem-solving consideration of the planning process. Emphasis on the distribution and structure of economic activities and settlement patterns is also studied and evaluated. Offered jointly with GEGO 466.

URB P 466 Regional Planning and Development (5) Sp Teter Emphasis placed primarily on the process of implementing regional development policies in economically advanced and lesser-developed countries. Resultant phenomena within the distribution and structure of economic activities and settlement patterns are also studied and evaluated. Offered jointly with GEGO 466.

URB P 467 Urban Planning Uses of Remote Sensing (3) Sp Grey
Using aerial photography, related data, and maps in urban planning. Urban change analysis, land-use classification systems, other planning applications. Scale and resolution considerations. Development of proficiency through laboratory exercises. Prerequisite: 300 or equivalent; 465 recommended.

URB P 468 Land Use From Satellite Data (3) W Steffen
Digital data from Landsat, etc., are used to determine land-use and land-cover classification in urban and rural areas. Plot and map preparation, statistics, land-use classification and verification are incorporated. Prerequisite: 465, 467 or permission of instructor.

URB P 470 Introduction to Urban Design (3) Sp Ryan
Definitions and examples of urban design; importance of urban planning form in the attainment of social objectives; heritage of urban design; designing parts of the city; theories of city building; roles 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 Johnson
Aspects of form, pattern, and space that mark efforts of individuals and groups to express their values and goals in the design of cities. Special attention given to both historical and modern examples.

URB P 472 Graphite Communication in Urban Planning (3) A Shin
Intended to introduce the non-design student to the use of graphical other forms of representation as means of conceptualizing and expressing ideas, and for recording, analyzing, and controlling the environment. Course covers the use of drawing, three-dimensional models, mapping, diagrams, report layout, photography, exhibit preparation, etc., as tools for the effective communication of ideas.

URB P 475 Town as Artifact (3) Sp Wolfe
Studies of contemporary and historic towns, utilizing work in cultural anthropology and settlement geography to examine urban form and structure. Focus on the physical 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 that shape 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 characteristics of different urban forms, and processes by which they have developed; emphasis on urbanization and metropolitanism. Offered only with POL 5 480. POL 5 101 or 202 recommended.

URB P 481 Legal Basis for Planning (3) A Bagne
Political, legal, and administrative institutions closely related to the planning process; issues of authority and public representation and participation. Legal basis for planning and associated regulation. Prerequisite: 300.

URB P 485 Special Topics (1-6, max. 15) AWSp Special study of specialized subject matter. Topics for each quarter vary, depending upon current interest and needs, and are announced in the preceding quarter. Prerequisite: permission of instructor.

URB P 499 Special Projects in Urban Planning (1-6, max. 9) Independent/tutorial study for undergraduates. Individual reading, research, field work, or other special project of current or pressing professional interest. Prerequisites: senioh standing and permission of the supervising instructor.

Urban Planning
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 to solve a local study area. 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 An introduction to areas of specialized study in environmental planning and policy programming. Organization for planning in the Senate region; range of activities and emphases, established and changing roles. Required of new graduate students; open to others.

URB P 502 Metropolitan Planning Analysis (3) A Investigation and analytical techniques appropriate to plan preparation at metropolitan or regional scales, including consideration and evaluation of methodologies and organizing concepts derived from other disciplines.

URB P 506- General Urban Planning (3-2-6) A Aranas, Norton, Ryan

Introduction to applied professional planning. Consideration of analysis, programming, and implementation methods in preparation for urban planning laboratory. Prerequisites: 500 and 501.

URB P 507 General Urban Planning Laboratory (4-8) Sp Aranas, Norton, Ryan

Laboratory exercise in applied professional planning, utilizing course study to examine the realities of problem solving in situations of functional and normative conflict. Integration of analysis, programming, implementation, and presentation phases of the planning process. Prerequisite: 506.

URB P 508 Specialized Planning Laboratory (5, max. 10) A Several different sections or options are to be offered each year in regional-environmental planning, urban systems analysis, housing, metropolitan planning, urban design, and community services and organization. Prerequisites: urban planning laboratories and seminar. Some sections may have prerequisites urban planning lecture or seminar courses.

URB P 510 Theories and Methodologies of Planning I (4) W Aranas, Ludwig, Ryan

Survey of trend, methods, and analytical techniques used in planning public actions and policies, with emphasis on the logic and assumptions on which these are based. Prerequisite: 506. Topics and methods discussed. 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 Aranas

Factors relating to the timing, phasing, and programming of urban development. The bearing of anonymity, density, etc., on the actual development process. Prerequisite: 510.

URB P 512 Research Seminar (3) A Aranas, Wolfe

Development and presentation of advanced topics of individual investigation.

URB P 515 Evaluation in Urban Planning (3) W D. Miller

Methods and techniques for a priori assessment of physical improvement plans, program designs, public policies. Includes cost effectiveness and matrix goal achievement, as well as more conventional cost/benefit and cost/revenue forms of analysis. Emphasis on understanding the planning issues and 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 Horvath

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 geographic 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 Horvath, 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 GEOG 529.

URB P 530 Land-Use Planning Models (3) A J. B. Schneider

Review of theoretical basis of several existing models used to forecast urban growth patterns and their associated land-use implications. Related to 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 Shin

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 524.

URB P 540 Seminar in Citizen Participation (3) W Amos

Seminar on modes of citizen participation in public decision making, advocacy planning, participant democracy, and community development are considered in terms of contemporary problems.

URB P 548 Minority Community Development (2) Sp Problems associated with the directed and planned development of urban minority communities: analysis of planning policy and its role in the development process; examination of specific areas of development, such as health, education, housing, and economics; and evaluation of certain current developmental programs.

URB P 546 Practicum (4, max. 8) AWsp Amos

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. Offered on credit/no credit basis only. Prerequisite: permission of instructor.

URB P 550 Benefit-Cost Analysis Applied to Urban Development (3) Sp Scafeid

Practical application of traditional-cost methodology to the decision-making processes for urban development projects. 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 objectives, to identify and to measure benefits and costs, and to specify decision criteria in terms of the public interest. Offered jointly with U D 550.

URB P 551 Allocation Processes in Urban and Regional Planning (3) A Grey, Rabnowitz


URB P 552 Survey of Urban Development (3) A Horvath

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 policy and strategy, offered jointly with U D 552. Prerequisite: permission of instructor.

URB P 553 Capital Investment in Urban Development (3) W D. Miller

Develops principles for evaluating opportunities to invest in urban development. Focuses on determining the cost of capital for such investments, investigates some problems in the application of appropriate investment criteria to decide types of opportunities, and explores some aspects of urban renewal policy. Offered jointly with U D 551 and FIN 515. Prerequisites: 552, U D 552, or permission of instructor.

URB P 554 Seminar in Urban Development Location Determinants (3) Sp Advanced workshop on empirical methods to conduct and evaluate locational studies. Offered jointly with U D 552. Prerequisite: one of the following: U D 551, U D 552, FIN 515, or permission of instructor.

URB P 557 Economics of Land-Use Regulation (3) W Norton, Ryan

Taxation, subsidy, and other means to further public purposes in land utilization and development. Open space, transfer of development rights, tax allocation financing. Resource allocation and market effects of controls. Offered jointly with U D 557. Prerequisite: 551 or 552 or permission of instructor.

URB P 558 Comparative Urbanism (3) 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 559 Regional Planning Seminar (3) W Thomas

Regional planning and development theories and methodologies. Critical evaluation of regional planning in urban and "economically advanced" and "lesser developed" countries. Offered jointly with GEOG 556. Prerequisite: 466 or GEOG 466.

URB P 561 Research Seminar: Geography and Development (3, max. 6) A Thomas

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. Prerequisite: specialization in urban design 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 considerations of the location of structures, open space, movement channels, and methods of implementing public policy decisions affecting urban design. Prerequisite: specialization in urban design or permission of instructor.

URB P 580 Legal and Administrative Framework for Planning (3) A Bagne, Rabnowitz

Political, legal, and administrative institutions closely related to the planning process. Issues of devolution of authority and public representation and participation. Legal aspects for planning and associated regulation.


Research 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 to be awarded 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) AWsp

Survey course of specialized subject matter. Topics vary for each quarter, depending upon current interest.
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/Exkimo art. Traditional and contemporary forms; principles of form, style, and techniques; values that influence Indians/Exkimo art styles. Not open for credit to students who have taken ART 101.


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, including 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 334, 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 entirely 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 literature 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 cultures 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 Indians with emphasis on the reservation; heirship, land ownership and use; mineral, water, fishery, 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 canoes, rock panels, ceremonial objects, etc.)

AIS 413, 414, 415 Landscape and Literature (5, 5, 5) 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 core issues in Indian law and legal development (e.g., tribal sovereignty, treaty law, jurisdiction) from the perspective of emerging case law. Emphasizes legal analysis. Knowledge of basic Indian law required. Prerequisite: 335 or permission of instructor.

AIS 450 - American Indian Song and Dance Traditions: 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 area.

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) Introduction to the subfields of archaeology, physical anthropology, and sociocultural anthropology through the examination of selected problems in human physical, cultural, and social evolution. Not recommended for students who have had other courses in anthropology, archeology, or physical anthropology. May not be counted toward the 60 credits required for the major in anthropology.

SOCIOCULTURAL ANTHROPOLOGY

ANTH 202 Principles of Social Anthropology (3) Introductions 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 (3) 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 classification.

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 variation in the cultural values and beliefs of human groups. Appraisal of the anthropological notion of cultural relativism.

ANTH 302 Plants, Animals, and People (3) Huna
Emphasis on the knowledge of, and attitudes toward, plants and animals of non-Western peoples. Role of resource 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 ethnology 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. Focuses primarily on the integration of peasant, urban, and nomadic societies in the traditional culture and economy; the second half concentrates on the transformation of the traditional life styles through the process of westernization and modernization.

ANTH 321 Introduction to the Anthropological Study of Religion (3) Introduction to the comparative study of religion as approached by the discipline of anthropology. Examination of various types of religious systems recognized by anthropology. Recommended primarily for non-anthropology 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 area with emphasis on esthetic principles, techniques, 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 Kwakwurl people. Offered jointly with ART H 335: Prerequisite: sophomore standing.
ANTH 350 Ecological Anthropology: Civilized and Primitive (3)
Ecological and social forms. Development of urban modes of life in the light of the common and distinctive social and cultural characteristics of cities, peasants, and tribal peoples in the process of urbanization, disappearance of truly primitive peoples, and emergence of the peasant. Selected case studies from the past and the present.

ANTH 352 Buddhism and Society: The Theravada Buddhist Tradition in South and Southeast Asia (5) A. Keyes
Introduction to the religious tradition of Theravada Buddhism (as practiced in Sri Lanka, Burma, Thailand, Laos, Cambodia, and Vietnam) and examination of the variations in ethical orientations developed through Theravada Buddhist ideas. Offered jointly with RELIG 350. Recommended: 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 cultural context and the anthropological theories used to account for them. Topics include: Is biology destiny? study of primates, women the gatherer, work in preindustrial and industrial societies, women in folklore and music, marriage and matrilineal kinship, childhood, and the meaning of menstruation. 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
Comares 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
Survey of strategies for dealing with the fact of aging in various cultural systems. Relates the varieties of cultural solutions to the problem of aging, drawn from psychology and medicine, with emphasis on non-Western societies. Prerequisite: 202 or permission of instructor.

ANTH 360 Ecological Anthropology: Introduction to Cultural Ecology (5) Hum, Spain, Watson, Winans
Ecology of subsistence economy. Examines and compares primitive and preindustrial subsistence strategies (e.g., hunting/gathering, maritime, pastoralism, agriculture) in the following contexts: interaction of subsistence strategies; agricultural environment; population size and distribution; population control; productivity and cultural evolution; dynamic factors and prospects for man's future. Prerequisite: junior standing or permission of instructor.

ANTH 371 Political Anthropology (3) Ottenberg, Winans
Theories of the development of political forms and of the social structural analysis of political organization. Authority, power, and concepts of politics and administration. Prerequisite: 202.

ANTH 372 Anthropology of Law (3) Ottenberg, Winans
Major theories and studies in legal anthropology. Dispute settlement, judicial process, 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 (3)
Historical background and contemporary life of cultural groups in eastern and southern Africa with special study of selected cases of political and developmental organization and cultural change. Prerequisite: 202 or permission of instructor.

ANTH 403 Traditional Chinese Society (5)
Institutional forms of late traditional China—society, political, economic, and religious—in light of contemporary social science theory. Attention is also given to modernizing change. Offered jointly with SIS EA 443. Prerequisite: 202 or permission of instructor.

ANTH 404 Mainland Southeast Asian Societies (5) Interactions of the kinship systems, religious institutions, ecology, and sociopolitical systems of the peoples of mainland Southeast Asia. Prerequisite: 202 or permission of instructor.

ANTH 408 New Guinean Societies (5)
Indigenous and interior New Guinea and adjacent islands: their aboriginal cultures and modern development in spatial and temporal perspective. The study deals intensively with the selected general problems of sociocultural method and ethnological and sociological 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. Prerequisites: 202, and either 216 or permission of instructor.

ANTH 410 Polynesian Societies (3)
Comparative study of high and low islands of Polynesian, including the Polynesian outliers in Melanesia and Micronesia. History, ecology, economics, political and religious 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 (5)
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 in the past and present use of aboriginal data in social science theory. Prerequisites: 202, and either 216 or permission of instructor.

ANTH 412 South Asian Social Structure (5)
Castes, political control, economic organization, and religion in Hindu-village India. Prerequisite: 202 or permission of instructor.

ANTH 415 North American Indians: Eastern Native America (5) Amoss, Nason
Survey 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, economic, language, and art cultures (the Subarctic, Northeast, Southwest, and Plains). Prerequisite: 100 or 202 or a background in introductory anthropology.

ANTH 416 North American Indians: Western Native America (5) Amoss, Nason
Survey of traditional cultures of the West Coast and intermountain regions, using anthropological perspectives and data. Insights from Native America that articulate human differences and similarities. History, economic, language, and art cultures (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 from southern Alaska to northern California; significant areal features such as rank, totemic crests, guardian spirits, the potlatch, haida, totem pole, and anthropological implications by comparisons and by selected ethnoographic sketches; the contemporary 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-American; 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 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 RELIG 201 and 202.

ANTH 422 Religious Systems (5) Sp Amoss, 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 selected by permission of instructor.

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 approaches to the study of peasant society and culture. Comparative analysis of selected cases illustrating the relationship of peasant societies to other types of social systems. Prerequisite: 202 or permission of instructor.

ANTH 427 Anthropology in Urban Settings (5) Sp Chrisman, Jacobs, Spain
Comparative examination of theoretical issues in anthropology as they have been studied in urban places. Discussion focuses on ethnic identity and the formation of urban ethnic group boundaries, and urban consequences; family and kinship organization as an adaptation to urban complexity; the nature of urban voluntary associations; law and politics; and the development in anthropological method. Prerequisite: 202 or permission of instructor.

ANTH 428 Anthropological Perspectives on Ethnicity (3) Keyes, Ottenberg
Survey and evaluation of anthropological approaches to ethnicity and ethnic group relations, with reference to other models including sociological and regional groupings, national, regional, and stratification. Discussion of research design for each approach. Data drawn from precolonial, colonial, and postcolonial periods. Prerequisite: 202 or permission of instructor.

ANTH 429 Expressive Culture (5)
Anthropological view of the expressive aspects of culture: plastic-graphic arts, myth and folklore, music, dance, drama, and traditional charades 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 oral 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
Descriptive and analytical treatment of homosexuality and culture in the United States. Cultural bases for the stigma of homosexuality; heterosexual love of the "mas­culate" and "feminize"; cultural definitions of intra- and inter-sexual roles and their relationship to the heterosexual stigma. Homosexuality and cultural alienation. Homosexual modes of communicating and expressing the stigmatized preference; institutionalized settings. Symbolism of homosexual ritualized behaviors. Prerequisite: 202 or permission of instructor.

ANTH 434 Comparative Morals and Value Systems (3)
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 econ­omy. The impact of monetary economy and industrial technology on preindustrial systems and those of limited monetary circulation. Prerequisite: 202 or permission of instructor.
ANTH 435 Comparative Family Organization (5)
Harrell
Various forms of family organization and marriage arrangements in nondustrial 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)
Analytical studies of local-level politics in colonial, modernizing, and encapsulated societies. Processual approaches 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 control of growth, and the health care of children and adolescents in different societies. Comparative approaches, diverse theoretical postures, and empirical research findings are used to study socialization practices and their implications for cultural, social, and health systems 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 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 product of traditional Chinese society and the changes wrought upon it by the impact of the West and by the revolution of the late 1940s and the Chinese Communist Party. Offered jointly with SISEA 444. Prerequisite: 403 or SISEA 443 or another acceptable course on Chinese society, or permission of instructor.

ANTH 445 Quantitative Methods in Anthropology (5)
Akin, Huan
Introduction to elementary computer processing of typical anthropological data. Intended for students of anthropology. Prerequisite: 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 anthropology, 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 doctrinal and procedural elements of the historic folk religion, the 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, sociolingustic, or typological problems. Students carry out projects demonstrating their ability to apply theory and method to data gathered on a specific linguistic group in one of these areas. Prerequisite: 203 or equivalent.

ANTH 451, 452, 453 Phonology (3,3,3) A, WS
Prerequisite: 490 (W=Sp. Brane. Connerets, Kaiiss)
Speech sounds, mechanism of their production, and structural aspects of phonology in linguistic societies: 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)
Prerequisites: ANTH 200, LING 200.
Linguistics analysis of the linguistic properties of a selected area. Offered jointly with LING 455.

ANTH 458 Cross-Cultural Perspectives on Textiles and Costumes (3)
Rydel
Technological, economic, social, ideological, aesthetic, and communicative aspects of textiles and costume of non-Western societies, analyzed from perspectives derived from anthropology and other social sciences. Modifications in the design and use of textile products due to 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)
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 (5,3,3)
Newcomer
Study of the structural properties of language; introduction 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)
Ezerman, Schiffman
Experiences linguistic policies of the modern national state and their impact on cultural identity, especially of linguistic minorities. In the United States, for example, demands for non-English medium schools and other use of non-English are compared with language policy in other societies. Asian, African, and Latin American communities are paid to attitudes underlying second-language instruction, bilingualism, and language loyalty among Americans of non-English language background. Examines the persistence of language 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 466 Special Studies in Anthropology (3)
Delineation and analysis of a specific problem or related problems in anthropology. Offered occasionally by visitors or resident faculty. May be repeated for credit by permission. Prerequisite: 202 or permission of instructor.

ANTH 480 Introduction to Museology (3)
Nawic
Museum history, philosophy, and basic operations, including organization, income, collection management, conservation, exhibition, security, education, research, and ethics. Prerequisite: upper-division standing or permission of instructor.

ANTH 481 Museum Collection Management: Ethnology (3)
Lecture and work experience in museum collection management in the ethnology collections of the Burke Memorial Washington State Museum, including: identification, cataloguing, inventory, storage, cleaning, inventory, and specific provenance aspects of exhibition. Work involves both archival and nonarchival museum specimens from North America, the Pacific, and Pacific Rim areas. Prerequisite: 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 nonindustrial conservation and restoration problems faced by curatorial personnel. Prerequisites: 480, 481 or permission of instructor.

ANTH 486 Human Family Systems: Biological and Social Aspects (3)
van den Bergh
Survey of the biological bases for human mating and reproduction, and an examination of the range of cross-cultural variation 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, ecologic-al, and sociocultural factors in determining the structure and function of human families. Offered jointly with SOC 486. Prerequisites: 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 (3-5, max. 15)
AWSpS
Student-supervised off-campus internships in organizations with anthropological mission. May be repeated for credit. Non-academic settings. Assistance with establishing educationally valuable individual projects for internships given by the supervising sponsor. Supervised internships include museums, social service and other governmental agencies, and private non-profit service agencies. Prerequisites: 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 expressive 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)
Oonberg, Winsum
Seminar in the interrelationships of law and politics. Political aspects of procedural and substantive law. Law as a basis of political power and authority. The interrelationship 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 format. Prerequisite: 20 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)
Haus
Discussion and practical experience in the collection and analysis of data. Exemplary cognitive anthropological studies are replicated as class projects. The project provides 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 Psychiatric Anthropology (3)
Prerequisite: two courses in medical studies; cultural construction of illness categories and behaviors; health-seeking behavior; comparisons of indigenous and cosmopolitan traditions in both medical and non-medical areas; the influence of colonial and postcolonial cultural changes in the healing process; cultural analysis of affective and behavioral disorders; and applied clinical relevance of anthropological concepts and findings. Offered jointly with FBSCI 497. Prerequisites: 321 and permission of instructor.

ANTH 499 Undergraduate Research (*, max. 12; max. 18 for honors students only)
Prerequisite: permission of instructor.

Anthropology
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 Paleolithic and Neolithic 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 Mesoamerica, Egypt, China, Europe, Peru, and Mexico. Students may not be counted toward the 60 credit hours required for the major in anthropology.

ARCHY 205 Principles of Archaeology (5) [Prerequisite: permission of instructor]
Introduction to the aims of archaeology and methods of reconstructing prehistory. Significance of various methods of food collection and food production, of domestication of plants and animals, and of agricultural systems. Techniques of dating archaeological remains.

ARCHY 270 Field Course in Archaeology (12) Methods and techniques of field excavation as demonstrated through field experience. Prerequisite: permission of department. (Offered Summer Quarter only.)

ARCHY 303 Prehistoric Cultures of the Old World (5) Beginnings of culture in the Old World to the Early Iron Age in Western Europe.

ARCHY 304 Prehistoric Cultures of the New World (5) Beginnings of culture in the New World from Pleistocene times until European exploration and conquest.

ARCHY 320 Prehistory of the Northwest Coast of America (3) Greeno
Prehistoric development of life-ways in the Pacific Northwest from the late Pleistocene Age to contact with Euro-Americans. Strategies employed to adapt to the major kinds of environment, as well as to stylistic systems in various types of artifacts and art forms. Individual illustration and at least one field trip. 205 ANTH 100 recommended.

ARCHY 371 Analysis of Archaeological Data (3) Introduction to the presentation of data in archaeological analysis. Data analysis, emphasizing stylistic and functional analyses of lithic, ceramic, and other artifacts, attribute recognition, and standard techniques for data manipulation. Includes the theoretical bases for techniques and their uses and limitations in cultural, historical, and processual accounts. Prerequisite: 371 or permission of instructor.

ARCHY 468 Issues in Cultural Resource Management (1) Sp Johnson
Review of federal and state cultural resource management policies and the effects of these policies on the conduct of projects that may impact cultural resources on public lands. Survey of related issues in museum management. Prerequisite: 205, ANTH 200, or permission of instructor.

ARCHY 469 Special Studies in Archaeology (5, max. 6)
Consideration in detail of specific archaeological topics, either methodological or substantive in content, of current interest. Offered occasionally by resident, new, or visiting faculty. For advanced undergraduate and graduate students. Prerequisites: 205 and permission of instructor.

ARCHY 471 Trans-Pacific Contacts in Pre-Columbian Times (3) Bronson
Investigation of numerours parallels in agricultural techniques, architecture, religious symbolism, astronomical and calendrical systems, and various implements of specific form between North, Middle, and South America beginning with the third or fourth millennium before Christ. Prerequisites: 304 and permission of instructor.

ARCHY 472 Early Man in the New World (3) Bolling
Examines the archaeological evidence for early human occupation of North and South America, with attention to geological, palaeontological, climatic, and other environmental changes. Discussion of cultural patterns and occupation sequences 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 America civilizations 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) [Prerequisite: permission of instructor]
Archaeological history of the Andean region from the beginnings of agriculture to the culmination of Incan civilization, and related civilizations in Colombia, Ecuador, Peru, Bolivia, Chile, and Argentina. Archaeological history of some tropical and subtropical regions of South America. Prerequisites: 304 and permission of instructor.

ARCHY 475 Archaeology of the Maya Civilization (3) Pre-Hispanic culture history of the Mayan peoples of Guatemala, the Yucatán peninsula, Honduras, and Chiapas (Mexico). Prerequisites: 304 and permission of instructor.

ARCHY 476 Middle America Prehistory: Seminar Text (5) 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 districts of Mexico, Hidalgo, Morelos, Guerra, 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) [Prerequisites: 304 and permission of instructor]
Archaeological history of the various regions of North America. Examinations of the late Pleistocene and of the Rocky Mountains with primary emphasis on the far western area. Prerequisite: 304 or permission of instructor.

ARCHY 480 Advanced Archaeological Analysis: Tools (6) Dunnell
Combination of lecture and practical laboratory instruction in the presentation of archaeological data for analysis, emphasizing stylistic and functional analyses of lithic, ceramic, and other artifacts, attribute recognition, and standard techniques for data manipulation. Includes the theoretical bases for techniques and their uses and limitations in cultural, historical, and processual accounts. Prerequisite: 371 or permission of instructor.

ARCHY 481 Advanced Archaeological Analysis: Environmental Remains (6) Dunnell
Combination of lecture and practical laboratory instruction in the preparation of archaeological data for analysis, emphasizing faunal, botanical, and other environmental 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) [Prerequisites: 371 or permission of instructor]
Introduction to quantitative approaches to archaeological problems: data screening, numeric methods of classification and identification, graphical and computer-based seriation techniques, and the analysis of spatial patterning in artifact distributions. Prerequisites: 205, an introduction to quantitative statistics course, and permission of instructor.

ARCHY 497 Archaeological Method and Theory I: Formal Theory (5) [Prerequisite: permission of instructor]
Examination of theoretical constructs in the analysis of archaeological data. Terminology, techniques, and logical frameworks. Prerequisites: 205, 20 additional credits in anthropology, and permission of instructor.

ARCHY 498 Archaeological Method and Theory II: Explanatory Theory (5) [Prerequisite: permission of instructor]
Combination of courses employed by archaeologists in obtaining explanation in the three major areas of culture history, cultural reconstruction, and explanatory prehistory, considering the nature of explanation as conceived in these areas, the basic assumptions employed in achieving these aims, and an introduction to the methods employed. Prerequisites: 205 and 497.

ARCHY 499 Undergraduate Research (1, 2, 3, max. 10) Undergraduate research directed by instructors with permission of department. (Offered on a rotating basis.) 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, patterns and locomotion, sexual and intraspecific differences, special sense organs, oral cavity, skin and hair, behavior, and major evolutionary trends. Prerequisite: 201.

PHY A 375 Biology of Human Race (3) [Prerequisite: permission of instructor]
Worldwide survey of the distribution and causes of variation in human biology: the distribution of human body shape and size, and skin and eye color, genetic systems such as blood type and ABO, and resistance 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 variability. Prerequisite: 201 or permission of instructor.

PHY A 381 Biological Aspects of African Populations (3)
Origin and biological nature of African populations with emphasis on the interaction of genetics, ecology, and sociocultural 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) [Prerequisite: permission of instructor]
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, physical anthropology, and culture. Prerequisites: 211, 212 and 213. Study of the first people to arrive in the New World and upon the historical background through analysis of skeletal remains in their proper archaeological setting. The extant populations of living black and white peoples are considered in terms of their cultural and biological parameters, and the relationship of their quality of life to their biobehavioral welfare. Prerequisites: 201 or BIOL 210, 211, 212.

PHY A 387 Ecological Anthropology: Ecological and Biological Adaptation in Man (5) [Prerequisite: permission of instructor]
Hurlbut
Man's biological legacy and present adaptability viewed from various aspects of human ecology: the cultural past, climate and geography, nutrition and disease, and polluting and contaminating. Oriented in terms of natural and cultural selection of those who are to live 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) [Prerequisite: permission of instructor]
Presentation of the major trends in the evolution of human morphology and behavior. The remains of fossil man and their archaeological and paleontological context, age, and relationship to archaeological and geological setting, and how this information has been used to reconstruct man's early history. Changes in both morphology and adaptations to environment. Prerequisites: 201 or BIOL 210, 211, 212.

PHY A 390 Ecological Impact of Cities on People (3) [Prerequisite: permission of instructor]
Interdisciplinary, integrative approach to the effects of urban stresses upon the behavioral characteristics of city people in both developed and underdeveloped coun-
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trials: pollution, poor nutrition, disease, social breakdown, maladaptive lifestyles, anonymity, and overstimulation. 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, Hultich, Newell, Swindler
Dealing with specific technical problem or a more general area in physical anthropology. Offered occasionally by visitors or resident faculty. Prerequisite: permission of instructor.

PHY A 472 Biological Adaptability of Human Populations (5) W
Hultich
Human variability in body composition, stature, skin and eye color, metabolic processes, reproductive rates, and circulatory physiology. Implications of these environments that are at the extremes with respect to cold, heat, altitude, nutritional deprivation, and urban concentration. Prerequisites: 201 and general physiology, or permission of instructor.

PHY A 478 Dental Anthropology (5)
Intensive study 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)
Structure of various primates studied in detail with special reference to structural and functional relationships. The evolution and present ecology of primates as they relate to the fossil record. The laboratory consists of dissection of a specified primate and a study of the dentition and osteology. Prerequisite: 201 or permission of instructor.

PHY A 482 Physical Anthropology: Population Genetics (3)
The population as a unit of study defined, and methods of analyzing the forces of evolutionary operative in human populations presented. Prerequisites: 201, 382, GENET 451 and statistics, or permission of instructor.

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 maturation. The evolutionary aspects of human growth and development. Prerequisites: 201 and BIOL 210, 211, 212, or permission of instructor.

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 primate systems studied 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 communicatory gestures and vocalizations, tradition, kinship, and social roles in maintaining and structuring groups over generations; the relationship among mating systems, foraging strategies, ranging patterns, and ecological separation/resource partitioning and their contribution to species survival and population growth. Field data and current sociological theories of primate social structure. Prerequisite: 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
Major trends in nonhuman primate evolution through the Cenozoic. Discussion of the specimens, geological context, age of the fossil taxa and their relationship to modern taxa. Practical experience in analyzing fossil material. Prerequisites: 201 and 370, GENET 361, or permission of instructor.

PHY A 489 Early Evolution of the Hominidae (5) A
Eck
Data and interpretations basic to the Flacceo and early Pleistocene evolution of the family Hominidae. Presentation of the geological contexts, ages, faunal associations, fossil and cultural remains of the hominid lineages. Practical experience with the hominid fossil material, and explanation of the morphological and contextual similarities and differences. Prerequisites: 201 and 370, GENET 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. Practical experience with the hominid fossil material and explanation of the morphological and contextual similarities and differences. Prerequisites: 201, 370, and 489, GENET 361, or permission of instructor.

PHY A 491 Molecular Aspects of Primate Evolution (3) Sp
Newell
Primate evolution from the perspective of molecular evolution. Mechanisms of change affecting informational and structural macromolecules, and their contributions to evolving primate diversity. Concordances and discordances between phylogenetic inferences based on biochemical and palaeontological 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
Significant physical and behavioral changes that occur from infancy to death with emphasis on the role of ontogeny in the evolution of primates. Prerequisites: 201, 370, and statistics.

PHY A 499 Undergraduate Research (4, max. 12; max. 18 for honors students only) AW&SP
Prerequisite: permission of instructor.

Courses for Graduates Only

GENERAL

ANTH 600 Independent Study or Research (*)
AW&SP

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 adequate training in the problems, principles, and methods involved in the analysis and comparison of social and cultural systems. Not open to graduate students in the sociocultural anthropology program.

ANTH 503 Preceptorial Reading in Linguistic Anthropology (6)
For beginning graduate students who have not had prior training in the problems, principles, and methods involved in linguistic anthropology. See also course description for 203. Not open to graduate students in the linguistics program.

ANTH 507-508-509 Methods of Sociocultural Research (5-5-5)
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 collection 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 (5, max. 9)
Advanced seminar in the anthropological study of religion designed for students who have a background in the theory and applications of theory developed in the anthropological study of religion. Seminar topics vary each quarter. Prerequisites: 422 and graduate standing; permission of instructor for graduate students in Comparative Religion.

ANTH 524 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 interrelationships. 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 methods and emphasis is placed on the relation 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)
Instruction in specific aspects of culture. Prerequisite: permission of instructor.

ANTH 590 Seminar in Museum Theory (3)
Nnaos
Fundamental theoretical issues involved in current museum administrative and operations work, including
administrative structure, organizational conflicts, museum-community relations, and museum educational programming. Prerequisites: permission of instructor.

ANTH 591 Seminar in Museum Operations (3) Nasir, Quincy
Designing museum exhibits and creating a first year of operations. Design elements include architectural plan, staffing plan, initial and recurrent budgets, security system, record system, educational plan, and policy making. Prerequisite: 590 or permission of instructor.

ANTH 592 Seminar in Museum Specimen Documentation (3)
Seminars and lectures of museum specimen documentation research approaches, including technological and raw material analyses, contextual studies, and esthetic studies. Documentation of a collection and reference work. Prerequisites: 590, 591, or permission of instructor.

ARCHAEOLOGY

ARCHY 501 Preceptorial Reading (6)
For beginning graduate students who have not had adequate training in the problems, principles, and methods involved in the reconstruction of prehistory. Not open to graduate students in the archeology 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 excavation and analysis 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 America. 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 Dunlop
Systematic examination of methods and techniques of field research in archaeology, acquainting students with sources of information and techniques of broad applicability. Practical experience in archaeological map preparation, sampling design manufacture, and interpretation. Prerequisite: permission of instructor.

ARCHY A 579 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 A 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 adequate training in the study of primate principles, and methods involved in the study of evolution, human genetics, and the evolutionary modern man. Not open to graduate students in the physical anthropology program.

PHY A 570 Principles of Primate Taxonomy (3)
Problems in primate classification involving considerations of living and the extinct to which application of taxonomic principles can aid in both the definition 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 adaptation. Topics vary from quarter to quarter. Prerequisite: 483 or permission of instructor.

PHY A 588 Topics in Primate Evolution (3)
Emphasis on fossil taxa and their importance in understanding the morphologies and distributions of members of the order primates. Prerequisites: 458 and permission of instructor.

PHY A 589 Topics in Hominid Evolution (3)
A seminar 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 (4, max. 15)
Biweekly presentation by participants and guest lecturers of current literature and ongoing research in topics pertaining to human and nonhuman primate evolution, biology, anatomy, genetics, variation, and behavior. Prerequisite: graduate standing in physical anthropology or permission of instructor.

PHY A 600 Independent Study or Research (*)
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 which are basic to a child's general education. Prerequisite: 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, Production
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 study of investigation and implementation. Prerequisite: 205.

ART 207 Graphic Design: Visual Methods (3, max. 6)
First in a series of courses that apply the fundamentals of photography to design processes. 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 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 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 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. 15)
Integrated approach to drawing and painting for three consecutive quarters with the same instructor. Prerequisites: 107, 110, and permission.

ART 230 Introductory Photography I (3)
Introduction to the basic theory, techniques, and processes of still photography. Emphasis on camera, film, and equipment. Students should have a good camera, 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 processes, equipment, and techniques. Emphasis on darkroom printing and the camera. Students must provide camera with lens, shutter, and aperture 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 development 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 intaglio, wood engraving, collagraphy, lithography, silk screen, linoleum, photographic plate making. 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 fabrication techniques. Usage of hand and power tools. Prerequisites: 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 construction techniques with a variety of textile fibers. Prerequisites: 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 casting 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. Prerequisites: 162 and permission for 261; 261 and permission of Art advisory office for 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, 3, 3)
Fundamentals 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)
Locomotion and illustration of historic, ethnic, and contemporary crafts analyzing design, materials and techniques. Open to art majors and non-art majors. Prerequisite: upper-division standing.

ART 301 Art Education: Crafts (3)
Design in leather. Exploration of techniques and processes 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 drawings, mood and presentation. Prerequisites: 256 and TSCS 428 for 310; 310 for 311; 311 for 312.

ART 316, 317, 318 Design for Industry (5, 5, 5)
Product design, working drawings, models, presentation drawings, product analysis, display, marketing. Prerequisites: for seniors 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.

ART 328 The Film as Art (3)
Historical development of film as an aesthetic 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. Prerequisite: 6 credits in 272.

ART 335 Metal Casting (5)
Introduction to foundry techniques as applied to fine arts casting of nonferrous material. Prerequisites: 6 credits in 272.

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 cayacryl, electric arc, and heliarc. Prerequisites: 6 credits in 272.

ART 339 Film Making (5, max. 15)

ART 340 Design for Printed Fabrics (3, max. 9)
Hand-block and silk-screen printing; mass-production design. 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 execution, intaglio, drypoint, mezzotint, and relief etching. Prerequisites: 107, 110.

ART 346 Collagraph (5)
Fundamentals of positive plate buildup with hard, soft, and pliable materials. The interrelationship of individual graphic ideas, prints, and printing techniques. Prerequisites: 107, 110.

ART 347 Lithography (5)
General survey of historical and contemporary lithography. Studio problems using a variety of stone, plates, paper, ink, press, and pressroom techniques. Prerequisites: 107, 110.

ART 348 Woodcut (5)
Basic Eastern and Western approaches to the art of the woodcut. Various techniques of printing woodcuts. 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 (5)
Survey of printmaking from the first forms of incised surfaces through Chinese and European artists, the Japanese woodcut, the Expressionists, and twentieth-century artists. Prerequisites: 107, 110.

ART 353 Advanced Ceramic Art (5, max. 15)
Advanced work in forming, decorating, and glazing. Prerequisites: permission of Art advisory office.

ART 357 Metal Design (5)
Processors: metal bending, forging in copper, pewter, silver. Prerequisites: 107, 110.

ART 358 Jewelry Design (5)
Intermediate jewelry designs, such as etching, reticulation, mokume, electroforming, repousse, chasing, and advanced stone-setting methods. Prerequisite: 258.

ART 359 Enameling (5)
Enamel design for jewelry, metal, or wood jewelry, Champleve, Plique-a-jour, Limoges, cloisonne on copper, silver, or gold. Prerequisite: 357 or 358.

ART 360 Life (3, max. 9)
Drawing and painting from the model. Prerequisite: 9 credits in 265 and 6 credits in 272.

ART 361 Art Techniques (3, max. 9)
Study of the materials and techniques of the artist and their application in 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; 368 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. Prerequisites: 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. Includes preparation of prints for exhibition. Prerequisites: 231 and permission of Art advisory office.

ART 375, 376, 377, 378 Graphic Design (5, 5, 5)
Intermediate graphic design. Specialized investigations. To be taken concurrently with 366, 367, 368. Prerequisites: 207 and 208 for 376; 376 for 377; 377 for 378.

ART 411 Advanced Photography (5, max. 15)
Topics in advanced photography including: color printing, 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 435 Sculpture Composition (5, max. 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. Prerequisites: 15 credits in 339 and permission of Art advisory office.

ART 445, 446, 447 Advanced Industrial Design (5, 5, 5)
Market analysis and selected professional problems in industrial design. Consultation with sociological, psychological 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; combining of techniques. Integration of the individual ideas 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 Silkscreen (5)
Advanced problems in the art of silkscreen. Individual creativity stressed. Prerequisite: 349.

ART 455 Advanced Printmaking (5)
Advanced problems integrating various processes and techniques. Matting, framing, multiples, exhibiting, studio arrangement, shipping, dealers, museums, collecting, cataloging. Prerequisite: 30 credits in printmaking.

ART 457 Advanced Metal Design (5)
Individual problems in metal design and construction. Prerequisite: 357.
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 Ceramics 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 movements of art and architecture in the Western tradition, from the Greeks to the twentieth century, studied in relation to the intellectual background of the ages and civilizations that produced them. Lecture presentations and related assignments in philosophical, religious, scientific, political, literary, and artistic texts.

ART H 202 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 203 Survey of Western Art—Medieval (5)
The arts of the Byzantine Empire, Islam, and Western Christendom through the fifteenth century.

ART H 204 Survey of Western Art—Modern (5)
European art and its extensions from 1500 to the present.

ART H 205 Survey of Asian Art (5)
Origins and interplay of major movements of South and East Asian cultures.

ART H 208 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 (1, max. 15)
General introduction to art and art history through the study of objects in London's museums, in buildings in and near London, and through selected readings and research projects. Specific course content is announced in Study Abroad bulletins. Prerequisite: permission of undergraduate adviser.

300-level courses cover narrower themes, spaces, and types of art than 200-level surveys and constitute the core curriculum for majors (although most non-majors come from other majors). Good basic university preparation (equivalent to the college-level satisfactions 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 Neolithic 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, Istanbul, Isfahan, Delhi-Fatehpur-Sikri) and the art and architecture, literature, religion, and science 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 aesthetics and its relation to the major varieties of Chinese philosophy; and an indication of the larger patterns of development in the arts of China and their relation 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 331 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 (5)
Emphasis on the structure and style of two-dimensional art of the Northwest Coast with an emphasis on the Northwest Coast art and culture area, with emphasis on aesthetic principles, techniques, and cultural functions. Offered jointly with ANTH 333. Prerequisite: sophomore standing.

ART H 334 Art of the Northwest Coast Indian (5)
Three-dimensional art of the Pacific Northwest coast culture area, with emphasis on aesthetic principles, techniques, and cultural functions. Offered jointly with ANTH 334. Prerequisite: sophomore standing.

ART H 335 Art of the Northwest Coast Indian (5)
Northwest coast Indian art related to drama and dance, with special attention to the Southern Kwakwuitl. 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)
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 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 period; illustrated by slides. Principal sites and monuments, as well as techniques and methods of excavation, are examined in an attempt to reconstruct the material culture of antiquity. Offered jointly with CL AR 341.

ART H 342 Roman Art and Archaeology (3)
Roman architecture and art, with emphasis on the innovations of the Romans; illustrated by slides. Offered jointly with CL AR 342.

ART H 343 Hellenistic Art and Archaeology (3)
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 AR 343.

ART H 356 Early Medieval and Byzantine Art (5)
Christian art and architecture of the Romans and Byzantine empires and of Western Europe through the eighth century.

ART H 357 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)
Mainstream of European art and architecture from about 1710 to about 1830. Attention is given to Central and Eastern Europe, Scandinavia, and the colonial Americas.

ART H 380 Nineteenth- and Twentieth-Century Art (5)
Arts and architecture of Europe and America from Realism to the present, with emphasis on stylistic and theoretical issues in the various art movements and the development of modernism and contemporary art.

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, multiplication 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 decoration 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)
Advanced or specialized work in art history based on manuscripts and rare books, private collections, libraries, and buildings of London, conducted through lectures, reading, and research projects. Specific course content is determined by the guiding faculty member and is announced in Study Abroad bulletins. Prerequisite: permission of undergraduate advisor.

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, Osaka, Nara, and their vicinities.

ART H 398 Study Abroad: Art in Provence (5, max. 15)
Monuments in and around Avignon. Emphasis on Roman and Renaissance architecture and sculpture, later medieval French painting, great works of all periods and countries in regional museums, and the Provencal landscape. Prerequisite: permission of undergraduate advisor.

ART H 399 Study Abroad: Individual Projects (3-10, max. 20)
For participants in Study Abroad programs. Prerequisite: permission of undergraduate advisor.

400-level courses are intensive, quite narrow in scope, and addressed to current scholarly problems. A relatively 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; French language; and 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 405 Islamic Art: The Book (3)
Hagiographic calligraphy, Illumination, Arab, Persian, Turkish and Indian painting, bookbinding, and papermaking. Prerequisite: permission of undergraduate advisor.

ART H 407 Islamic Religious Art: Mosques (3)
Survey of Islamic religious art 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 embodied in the mosque.

ART H 408 -Royal Images: Byzantium, Sassanid Iran, Islam (3)
Signs and symbols of royal kingship in Byzantium, Sassanid 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 Yuan (3)
Study of the changing styles and attitudes accompanying the development of landscape 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 on 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-sixteenth centuries; woodblock technique from the Heian period through the early Edo period. Emphasis on the changing styles and subject matter in Ukiyo-e Hangga from Momochi by Kuniyoshi.

ART H 421 The Yamato-e Tradition (3)
Oldest (twelfth-to-fourteenth-century) narrative handscrolls 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-e Tradition (3)
Link paintings of Japanese Zen priests from the fourteenth century onward, and the works of professional artists belonging to those families (Kano, Hasagawa, Uoukoku, and Katoh) 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 either Yuge or Hirohiko.

ART H 428 East Asian Calligraphy (3, max. 9)
Classical calligraphy traditions of China and Japan in history and practice. Prerequisite: permission of undergraduate advisor.

ART H 431 Pre-Columbian Art (3)
Stylistic and contextual study of the arts of pre-Columbian cultures of Central and South America from prehistoric times to 1492.

ART H 432 Oceanic Art (3)
Stylistic and contextual study of the arts of Oceania, through a survey of the cultures of Polynesia, Micronesia, Melanesia, and Australia.

ART H 435 Arts of Sub-Saharan Africa I (3)
Stylistic and contextual study of the traditional arts of the Western Sudan and the Western Pacific building program in the nineteenth century. Offered jointly with CL AR 442. (Offered alternate years; offered 1980-81.)

ART H 437 Arts of Sub-Saharan Africa II (3)
Survey of the traditional arts of the Central Guineas 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, Angola, the Swahili coast, and southern Africa.

ART H 442 Greek and Roman Painting (3) A Lambda
Painted decoration on Greek vases, and Roman wall painting, with emphasis on the historic and stylistic development of each. Offered jointly with CL AR 444. (Offered alternate years; offered 1980-81.)

ART H 444 Greek and Roman Sculpture (3) B Beethoven
History and development of Greek sculpture and sculptors, their Roman copyists, and Roman portrait and sarcophagi. Emphasis on Greek sculpture of the fifth century 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 construction program of 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 centuries, focusing on monuments along the pilgrimage routes to Compostella in France and Spain.

ART H 459 Late Medieval Art of Germany and Central Europe (3)
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 Nether­lands 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 1520. Leonardo, Raphael, the early Michelangelo, Sarto, Correggio, Bellini, and the early Titian.

ART H 463 Italian Renaissance Sculpture (3)
From Nicola Pisano to Gliamogena.

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)
Outline of English art, primarily of painting, and to a lesser extent of architecture. Emphasis on patronage, the conditions (such as the cult of the portrait, the preference for foreigners, and the accompanying disregard for national art), the Victorian picturesque, and the decided peculiarities of English art, and the final triumph of the 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 Iberians.

ART H 473 Age of Rembrandt and Vermeer (3) Art of the Dutch Republic in the late sixteenth and seventeenth centuries, concentrating on painting, prints, and drawings.

ART H 474 Studies in American Colonial Art (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 Revolutionary War. Key figures and developments in English art 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 successive 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 Counter-Reformation, high Baroque, and Romantic styles; continued development of Andean art in the eighteenth and Churriguerean.

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, Germany, 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) Post-Impressionism and the great revolution of early twentieth-century art, with emphasis on painting. From the first revisions of Impressionism around 1880 (Cézanne, Seurat, Van Gogh, and Gauguin) to Fauvism, Cubism, Futurism, the Blue Reiter, and the final burst of antirealism with Dadaism. 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 nude; women in art; the crisis in surrealism. Prerequisite: 283 or 380 or permission of graduate 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) Continuation of the history of the national style in the nineteenth and twentieth centuries in portraiture, genre, and history painting; the persistence of naive art; the proto-modernist, the modernist, and the post-modernist painting 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 Pacific Northwest. What is naive art? When did it arise, and how does one define it?

ART H 491 Esthetics of Modern Architecture (3) Focuses 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 group; who is influential to the extent that must please. Prerequisite: upper-division standing.

ART H 499 Individual Projects (3, max. 9) Not offered for graduate credit. Prerequisite: permission of graduate adviser.

ART H 500 Methods of Art History (3) Introduces the critical methodologies of art historical research and to the wide variety of approaches to art historical problems of all periods and regions. Prerequisite: 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) 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 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 Japan. Prerequisite: permission of graduate program adviser.

ART H 531 Seminar in Indian Art (3, max. 9) Critical appraisal of the principal research methods, theories, and types of literature dealing with the art of India. Prerequisite: 321 or permission of graduate program adviser.

ART H 531 Seminar in Tribal Art (3, max. 9) Metaphorical and critical analysis of 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 varies. Style, iconography, cross-cultural comparison, methodology, attribution, and history of research and collections 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 556 Seminar in North European Art (3, max. 9) Deals with problems of style and iconography of the northern European masters of the fourteenth through seventeenth 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) Concepts of the art world and appropriate critical methodology. Prerequisite: 581.

ART H 600 Independent Study or Research (1, 2, 3) Prerequisite: permission of instructor.

ART H 600 Master’s Thesis (1, 2, 3) Prerequisite: permission of instructor.

ART H 600 Doctoral Dissertation (1, 2, 3) Prerequisite: permission of instructor.

ASIAN AMERICAN STUDIES

Courses for Undergraduates

AAS 108 Language and Study Skills (3-5) AWR/s Development of reading, writing, listening, speaking, and study skills. For EOP students who have been approved by the 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 and assimilation, evacuation, internment, race 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 movements and politics, and cultural diversity. Prerequisite: AAS 205.

AAS 305 Asian American Cultures for Teachers (5) W Bacho Specially designed for teachers who wish to learn more about the history, culture, and current concerns of Asians in the United States. Emphasis is on elementary and secondary school are considered. Not open to students who have taken GIS 305 or 306. Prerequisite: permission of instructor.

AAS 350 Chinese-American History and Culture (3) D Lee Experience of the Chinese in America from 1850 to the present. Special attention to the transformative process from being an immigrant community to an ethnic society. Immigration pattern and problems, racism and the anti-Chinese movement, ethnic sociopolitical and economic institutions, community issues, Chinese-American culture, ethnic politics involving the community, China and America, local variations in Chinese America. Prerequisite: 205 or equivalent or permission of instructor.

AAS 360 Filipino American History and Culture (3) S Bacho History and culture of the Filipino in America and the influence of an admixture of Filipino, Spanish, and American traditions on the Filipino immigrant and his or her descendants. Not open to students who have taken GIS 360. Prerequisite: 205 or permission of instructor.

AAS 370 Japanese American History and Culture (3) S Kashima Historical roots and subsequent changes in the Japanese American group examined through an interdisciplinary approach. Topics include historical events, culture, values, social and community structures, institutions, occupations, and future orientations. Prerequisite: 205 or equivalent or permission of instructor.

AAS 400 Asian American Literary Expression (5) Bacho Explores the writings of contemporary Chinese, Korean, Japanese, and po­ etry by Asian Americans, with emphasis on the past quarter-century. Offers a wide range of ideas, attitudes, and concerns with which to explore the role of the writer in a minority culture, the relation of literature to self and identity, and the specific experience and perception of the Asian American writer. Prerequisite: 205 or 405, or permission of instructor. (Last time offered: Spring Quarter 1982.)

AAS 405 Asian American Culture (5) Kashima, D. Lee, Staff Historical roots and subsequent changes in the Asian American community. Prerequisite: 205 or permission of instructor. (Last time offered: Spring Quarter 1982.)
### ASIAN LANGUAGES AND LITERATURE

#### Courses for Undergraduates

**ALTAIC**

**ALTAIC 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: permission of instructor. (Offered alternate years.)

**ALTAIC 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 emphasis 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**

**Kosow**

Instruction in a major dialect, stressing phonology and grammar, and using basic dialogues and cultural materials. 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 if 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' language 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 writing techniques is emphasized. Oral practice and structural drill are continued. No credit if 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 111 and 211. In conjunction with 212 and 223, allows completion of two years' language study in one school year. No credit if 113, 211 taken. Prerequisite: 121 or equivalent.

**CHIN 223 Accelerated Chinese (10) Sp**

Covers same material as 212 and 213. In conjunction with 212 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 Quarter 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 student 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 articles, 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. Prerequisite: 213 or equivalent and permission of instructor.

**CHIN 407 Chinese Reference Works and Bibliography (3) A Lo**

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 interest. 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 Republic of China. Prerequisite: 313 or equivalent.

**CHIN 441, 442, 443 Structure of Chinese (3,3,3) A,W,Sp**

Practical phonology with special application to the problems of articulation improvement. Morphology with application to vocabulary building, use of particles and syntax. Prerequisite: 313 or equivalent.

**CHIN 451, 452, 453 First-Year Classical Chinese (5,5,5) A,W,Sp**

**Serreau**

Study of classical language based on selected texts of pre-Han literary works. Focus on systematic sentence analysis and distinctive functions of grammatical particles. To be taken in sequence. Prerequisite: 213 or equivalent.

**CHIN 454 Accelerated Classical Chinese (10) S**

**Serreau**

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**

**Brendy**

Modern literary texts in the original language, concentrating 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, historical, and social significance with an introduction to bibliographic and reference resources. Prerequisite: 313 or equivalent.

**CHIN 499 Undergraduate Research (3-5, max. 15) A,W,Sp**

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.)


Shawky, 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**

**Shawky, 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) A,W,Sp**

Primarily for Hindi language and literature majors. Prerequisite: permission of instructor.

**INDIAN**

**INDN 400 Practicum in South Asian Languages (3, max. 18) A,W,Sp**

**Rugg, Schimmack, Shapiro, Thresher**

Introduction to any one of various South Asian languages (e.g., Kannada, Nepali, Punjabi, Sindhi, Marathi, Telugu, Bengali) 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 instructor for more information. Prerequisite: permission of instructor.

**INDN 401, 402 Pall (3,3) W,Sp**

**Rugg**

Introduction to Pall language and literature. Prerequisite: SNRT 401 or equivalent, or specialization in a relevant south/southeast Asian language.

**INDN 499 Undergraduate Research (3-5, max. 15) A,W,Sp**

Primarily for South Asian language and literature majors. Prerequisite: permission of instructor.

**JAPANESE**


**Niva**

Introduction to spoken Japanese, pronunciation, conversation, oral composition, and grammar; reading of modern written Japanese. In 113. No credit if 134 or 331 taken.

**JAPAN 134 First-Year Intensive Japanese (15) S Niva**


**JAPAN 211, 212, 213 Second-Year Japanese (5,5,5) A,W,Sp**

**Niva**

Reading and translation of modern Japanese. Continued oral work in Japanese. No credit if 234 or 332 taken. Prerequisite: 113 or equivalent.
JAPAN 331 312, 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 332 or 333 taken. Prerequisite: permission or equivalent.

JAPAN 333 Intensive First-Year Japanese (15) A, W, Sp Miller Equivalent of 111, 112, 113 requiring full-time commitment by the student. In conjunction with 331 and 332, allows completion of three year's language study in one school year. No credit if 111, 112, 113, or 134 taken. Prerequisite: permission of instructor or equivalent.

JAPAN 332 Intensive Second-Year Japanese (15) W, Sp Miller Equivalent of 211, 212, 213, requiring full-time commitment by the student. In conjunction with 331 and 332, allows completion of three year's 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, W Miller Equivalent of 311, 312, 313, requiring full-time commitment by the student. In conjunction with 331 and 332, allows completion of three year's language study in one school year. No credit if 311, 312, 313 taken. Prerequisite: 332 or equivalent, and permission of instructor.

JAPAN 405, 406 History of the Japanese Language (3,3) W, Sp Miller Introduction to the history of Japanese, including phonology, morphology, syntax, and lexicography. Prerequisite: 213 or equivalent, and ASIAN 401. (Offered alternate years.)

JAPAN 451, 452, 453 Readings in Modern Japanese Literature (5,5,5) A, W, Sp Miller Introduction to the history of Japanese, including phonology, morphology, syntax, and lexicography. Prerequisite: 213 or equivalent, and ASIAN 401. (Offered alternate years.)

JAPAN 451, 452, 453 Readings in Japanese for China and Korea Specialists (5,5,5) A, W, Sp Miller. Reading of scholarly prose on China and Korea, especially 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 department majors in Chinese and Korean. Prerequisite: 113; and (for China specialists) CHIN 313 and 453, or (for Korea specialists) KOR 467; or permission of instructor.

JAPAN 461, 465, 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 Miller Identical readings in prose, poetry, and drama, antiquity to nineteenth century. Prerequisite: 313 or equivalent.

JAPAN 499 Undergraduate Research (3-5, max. 15) AWS/Sp For Japanese language and literature majors. Prerequisite: permission of instructor.
THAI 411, 412, 413 Readings in Thai (3,5,5) A, W, Sp
Cook
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
Norga
Introduction to phonology, morphology, and syntax of spoken Tibetan, Lhasa dialect. (Offered alternate years.) (Formerly 201, 202, 203.)

Norga
Instruction and drill in advanced colloquial sentence patterns 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
Norga
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
Norga
Reading of selections from Tibetan philosophical literature. 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.

TURKIC
TKIC 301, 302, 303 Introduction to Uzbek (3,3,3) A, W, Sp
Circaunt
Introduction to the modern written and spoken language.

TKIC 341, 342, 343 Introductions to a Second Turkic Language of Central Asia (3,3,3) A, W, Sp
Circaunt
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
Circaunt
Continuation of Turcic 301, 302, 303. Oral work, grammar, and readings in Uzbek literature. Prerequisite: 303 or permission of instructor.

TKIC 404 Introduction to Turkic Studies (3) A, W, Sp
Circaunt
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
Circaunt
Continuation of 401, 402, 403. Readings from selected Uzbe(h 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
Brandt
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
Knatchbusch
Introduction to basic concepts of Chinese thought (Confucianism, Taoism, and Buddhism) as reflected in philosophical writing 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 poetry, prose, and narrative and philosophical prose; major themes and ideas, with special emphasis on Confucianism and Taoism; reference to the political and social context, and religious 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
Knatchbusch
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-verses" (yu), the classical essay, and classical short story; major themes and ideas, with special emphasis on Confucianism, Taoism, and Buddhism; political and social context, and religious 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
Brauer
Historical survey of the major works of modern Chinese literature (thirteenth century A.D. to the present), including introduction to the development of vernacular literature such as the short story, drama, and novel; major themes and ideas, with special emphasis 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.

INDN 420 Classical Indian Literature in English (5) A
Holway
Major classical works in Indian literature, both South and North, up to the thirteenth century: epics, dramas, and lyric poetry. Major themes, their philosophical and religious backgrounds, and correlation with music and the visual arts.

INDN 421 Modern Indian Literature in English (5) W
Holway
Major works in Indian literature from the medieval period onward, considered against their cultural background. Special attention to medieval lyric and other forms of the modern period, especially novels and short stories.

JAPAN 321 Japan in Literature and Film: I (5) W
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 reflecting 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 nineteenth centuries, with readings from Zen-influenced warrior culture and townsman culture, plus films on the No, Bunraku puppet, and Kabuki theaters, and other aspects of medieval 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 readings 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 322.

JAPAN 425 The Japanese Novel in English (5) A
McKinnon
Close examination and discussion of several classical and modern Japanese novels on themes and intellectual and internal structure and their relationship to the Japanese prose tradition. Prerequisites: 321, 322, 323, or permission of instructor.

JAPANESE 426 Japanese Poetry in English (5) W
McKinnon
The wake tradition: its sources, developments, and deviations, including Haiku; poetic theory and criteria and their significance for the Japanese literary vision, both ancient and modern. Prerequisites: 321, 322, 323, or permission of instructor.

JAPANESE 427 Japanese Drama in English (5) Sp
McKinnon
Examination of the Noh, Kyogen, Joruri, and Kabuki 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.

KORE 320 Korean Literature in English (5) Sp
Ko
Recommended: for students of Slavic literature. Special consideration of the relationship with Chinese and Japanese literature.

TKIC 320 Eastern Turkic Literature in English (5) Sp
Circaunt
Covers both the historical (Chagatai XV-XIX Centuries) and the modern (mainly Uzbek) periods of Eastern Turkic literature. History, types of literature, and characteristic elements of prose and poetry are presented by using selected material translated into English. (Offered alternate years.)

Courses for Graduates Only

ALTAIC

ALTAT 579 Comparative Altai Languages (3)
Norman
Comparative phonology and morphology of Mongolian, Turkish, and other Altei languages. Offered jointly with LING 579. Prerequisite: permission of instructor.

ASIAN LANGUAGES AND LITERATURE

ASIAN 585 Seminar in Buddhist (3, max. 27) AWSp
Resseguier
Study of Buddhist thought with special reference to their technical terminology. Original sources are used. Combines the methods of specialists in South, Central, and East Asian Buddhism with those of historians of religion and philosophy. Prerequisite: permission of instructor.

ASIAN 600 Independent Study or Research (*) AWSpS

ASIAN 700 Master's Thesis (*) AWSpS
ASIAN 800 Doctoral Dissertation (*) AWSp

CHINESE

CHIN 540 Seminar on Chinese Linguistics (3, max. 9) WSp Norman
Problems of Old and Middle Chinese phonology; dialectology. Prerequisites: 453 and ASIAN 401.

CHIN 542, 543, 544 Ancient Script (4,4,4) Sp,Sp,Sp Serruya
Structure of Chinese characters, development of Chinese script, and related problems; selected texts of inscriptions. 542: Shuo Wen; 543: bronzes; 544: bone inscriptions. Prerequisite: permission of instructor. (Offered summer semester.)

CHIN 551, 552 Second-Year Classical Chinese (5,5) A,W,S
Continuation of 451, 452, 453. Problems of textual criticism and grammar. 551: focus on early Chao texts. 552: focus on texts of Han times. Prerequisite: 453 or equivalent.

CHIN 553 Second-Year Classical Chinese (5) Sp Knechges
Readings in middle and late classical Chinese texts. Emphasis on hsü-wen prose and historical texts. Prerequisite: 453 or equivalent.

CHIN 560 Proseminar in Chinese Literature (5, max. 15) AWSp
Knechges
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.

561: literature of the Chou and Han periods. 562: literature 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 Barendse
Readings and discussion of traditional vernacular texts. Emphasis on Sung, Yuan, and Ming short stories, such as those found in the Sun-yen collections and on Ming and Ch'ing full-length novels, such as the Shu-hu chuan, Hai-yu chi, and Hang-lou meng. Prerequisite: permission of instructor.

CHIN 582 Seminar in Chinese Fiction (5, max. 15) W Barendse
Directed study of selected works of fiction, focusing on the vernacular short story and novel. Prerequisite: permission of instructor.

Directed readings in selected traditional philosophical texts (Chuang-tzu, Han-fei-tzu, Lun-heng, Shih-shuo hsia-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 grammarians. Prerequisite: 403 or permission of instructor. Recommended: course in linguistics.

INDIAN

INDN 530 Readings in Pali Literature (3, max. 18) AWSp Rieu
Readers 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 principal bibliographical sources in the social sciences and the humanities pertaining to Asia. Reports on selected topics and problems. Prerequisite: 413 or permission of instructor. (Offered alternate years.)

505: introduction to Kambun, 506: readings in documents 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
531, 532: reading and discussion of literature and cultures. 533: focus on texts of late Tokugawa period. Prerequisite: permission of instructor. (Offered alternate years.)

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 541 Seminar in Japanese Theatre (3) A McKinnon
Major Japanese theatrical traditions and related folk theatre traditions. Individual works as literature and as theatre. Study of classical Japanese theatre; Nō, Kyogen. Prerequisite: 473.

JAPAN 542 Popular Japanese Theatre (5) W McKinnon
Major Japanese theatrical traditions and related folk theatre traditions. Individual works as literature and as theatre. Popular theatre forms: Kabuki, Bunraku, and related folk art forms. Prerequisite: 473.

JAPAN 543 Twentieth-Century Japanese Theatre (5) Sp McKinnon

JAPAN 571, 572, 573 Advanced Readings in Classical Japanese Literature (5,5,5) A,W,Sp McKinnon
Continued readings in classical literary texts. Prerequisite: 473 or permission of instructor.

JAPAN 590 Seminar in Japanese Literature (15, max. 15) AWSp McKinnon
Close examination of selected periods, writers, or genres, including problems of literary criticism in Japanese literature. Prerequisite: permission of instructor.

KOREAN

Topics in Korean linguistics. Prerequisite: permission of instructor.

KOR 521, 522, 523 Modern Korean Literature (5,5,5) A,W,Sp Rieu
Readings in important works in Korean literature of the twentieth century. Prerequisite: 413 or permission of instructor. (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, poetry, and drama. Prerequisite: permission of instructor. (Offered alternate years.)

KOR 541, 542, 543 Readings in Hamnut 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. Prerequisite: 543 or 523 or permission of instructor. (Offered alternate years.)

SANSKRIT

SNKRT 559 Seminar on Sanskrit Literature (3, max. 9) Thrasher
Close examination of selected authors, periods, or traditions, 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 methodology of Panini's grammar. Prerequisite: 403 or permission of instructor. (Offered alternate years.)

SNKRT 561 Readings in Philosophical Sanskrit (3, max. 9) WSp 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) WSp 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

Schiff
Introduction to Tamil literature, beginning with Sangam poetry and culminating in modern post-independence fiction. Prerequisite: 403 or permission of instructor.

TIBETAN

TIB 511, 512, 513 Advanced Literary Tibetan (3,3,3) A,W,Sp Wiley
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 Ruegg
Reading and analysis of Tibetan Buddhist texts and associated literature. Selections vary each quarter and may be taken out of sequence. Prerequisite: 413 or permission of instructor.

TURKIC

TKIC 542, 543 Comparative and Historical Grammar of Turkic Languages (5,5) WSp Cirinciglu
Classification of the Turkic languages; alphabet used; phonology, morphology, and syntax; lexical composition; structure change; developments. Prerequisites: 303 and 404, or TRISH 105. (Offered alternate years.)
TKIC 546 Old Turkeic (3) W
Cirtiass
Introduction to Runic script; phonology, morphology, and syntax of the earliest form of Turkeic; reading and translation of seventh- and eighth-century inscriptions of historical importance. Prerequisite: permission of instructor. (Offered alternate years.)

TKIC 547 Old Uighur (3) Sp
Cirtiass
Introduction to script systems; phonology, morphology, and syntax. Reading and translation of mainly Buddhist texts in Uighur script, eighth through eleventh centuries. Prerequisite: background in a Turkic language or permission of instructor. (Offered alternate years.)

TKIC 561, 562 Middle Turkeic (3,3) A, W
Cirtiass
Introduction to the phonology, morphology, and syntax of the Middle Turkic languages; reading and translation of texts in Kazakh, Khwarezmic Turke, Kipchak, and Chagatay. Prerequisite: permission of instructor. (Offered alternate years.)

TKIC 563 Seminar on Turkic Literature (5) Sp
Cirtiass
Topics in oral and written literature. Prerequisite: permission of instructor. (Offered alternate years.)

ASTRONOMY

Courses for Undergraduates

ASTR 101 Astronomy (5) A/SWp
Emphasis on the astronomical concepts fundamental to our present understanding of the universe: the solar system, stars, galaxies, and cosmology. No credit for students who have taken 102, 201.

ASTR 102 Introduction to Astronomy (5) Sp
Open to 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 appreciation of modern cosmological ideas in the context of Greek and Renaissance thought, as well as current scientific concepts of 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 emphasis 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 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 intelligent 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 sciences. Prerequisite: PHYS 123.

ASTR 321 Solar System (3) A
A solar system; planetary atmospheres, surfaces and interiors, 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 Content of Our Galaxy (3) W
Introduction to astronomical basic properties of stars, stellar systems, interstellar dust and gas, and the structure of our galaxy. Prerequisites: PHYS 221, 222, 223 or equivalent.

ASTR 323 Extragalactic Astronomy and Cosmology (5) Sp
Galaxies, optical and radio morphology and properties. Clusters and galaxies, the red shift controversy, radio sources, and quasars. Observational cosmology. Prerequisites: PHYS 322 or 323, 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, and PHYS 221, 222, 223, or equivalent.

ASTR 433 Interstellar Material (3) Sp
Interstellar gas, temperature, density, and ionization. Interstellar molecules. Properties of interstellar dust. Active galactic nuclei and quasar spectra and their interpretation. Prerequisites: 101 or 102 or 322, 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)
A/SWp
Special astronomical problems and observational projects, by arrangement with instructor. Prerequisite: permission of instructor.

Courses for Graduates Only

ASTR 500 Seminar in Elementary Astronomy
1 instruction (1, max. 5)
Emphasis on development of lecture and workshop materials 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 of an astronomer's point of view: black body radiation, basic radiative transfer, equation of state, degenerate gases, crystallization of high density, introduction to hydrodynamics and gas dynamics 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 plasma 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 galaxies.

ASTR 512 Extragalactic Astronomy (3)
Types of galaxies. Integrated properties, content, and dynamics. Extragalactic distance scales, groups and clusters. Radio sources. Observational cosmology.

ASTR 513 Cosmology (3)

ASTR 521, 522 Stellar Atmospheres (1,3)
Theory of continuous radiation and spectral line formation. Applications to the sun and stars. Prerequisite: PHYS 421 or equivalent.

ASTR 523 Solar Physics (3)
Sun as a star, solar photosphere and outer convection zone, granulation, sunspots and associated phenomena, solar chromosphere, 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 mass distribution in stars. Equation of state, opacity, nuclear energy generation. Models of main sequence stars. Prerequisite: PHYS 421 or equivalent.

ASTR 532 Stellar Evolution (3)
Thermal, nuclear and observational approaches to stellar evolution. Structure of red giants and white dwarfs. Prerequisite: 531.

ASTR 541 Interstellar Matter (3)
Physical conditions and motions of neutral and ionized gas in interstellar space. Interstellar dust, magnetic fields, formation of grains, clouds, and stars. Prerequisite: modern physics or permission of instructor.

ASTR 555 Planetary Atmospheres (3) A
Levy
Properties of origin, evolution, and structure of planetary atmospheres, emphasizing elements common to all planetary 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 GST 555 and GPHYS 555.

ASTR 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 implications of solar system history. Analysis of data from earth-based telescopes and from manned and unmanned space missions. Offered jointly with GST 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

ASTR 582 Techniques In Radio Astronomy (3) S
Theory and practice in the use of radio telescopes and receivers of all kinds. Course includes experiments using 30'-X'0 student radio telescope in Sunbelt locations. Theory: basic definitions, and place of radio astronomy; basics of Fourier transforms; general antenna theory; theory and practice of parabolic collectors, other filled-aperture, 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 (*) A/SWp

ASTR 800 Doctoral Dissertation (*) A/SWp
ATMOSPERIC SCIENCES

Courses for Undergraduates

ATM S 101 Survey of the Atmosphere (5) AWsp Composition and structure of earth's atmosphere; relation of earth to sun and consequent geographical temperature distributions. Study of the atmosphere that produces rain, snow, and other condensation phenomena: tropical and extratropical storms, thunderstorms, ch- nick, and drought, and 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 LaChapelle 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 use. 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 designed for beginning majors or minors in physical science, engineering, and other technical fields. Composition 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, House Describes the major phenomena in the atmospheric sciences and related fields. Composition and structure of the atmosphere. Control of weather. Physical processes 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 Harmann Evolution and present state of Earth's climate. Climates of the planets used as examples to show importance of primary climate controls: radiations, planetary dimensions, 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 Fritsche Study of the interaction of biological and meteorological processes with applications to forestry, recreation, wildlife, landscape design, and architecture. Surface energy balance, radiation, exchange of carbon, water, and soil temperature, rain and humidity in the lower layer of the atmosphere. Effects of plane, concave, and convex surfaces, clearings, temperature and wind distribution. Offered jointly with FOR B 329. Prerequisite: 101 or 201 or 301, or permission of instructor.

ATM S 340 Introduction to Atmospheric Physics (5) Sp Sp Hobbs Earth's field of gravity. Atmospheric thermodynamics; properties and distribution of atmospheric gases. Prerequisite: MATH 125 or permission of instructor.


ATM S 362 Instruments and Observations (3) A Principles of operation of instruments for measuring pressure, temperature, humidity, wind, solar and infrasonic radiation, precipitation amount 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. Prerequisites: 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. Presentation 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 PHYS 403-407). Structure and composition of the atmosphere, atmospheric radiation, use of meteorological data, humidity and cloud processes, structure and analysis of large-scale weather systems. Offered jointly with PHYS 406. Prerequisite: PHYS 404 or permission of instructor.

ATM S 431 Atmospheric Physics (5) A Businger, Plumb Introduction to cloud and rainfall processes with emphasis on the microphysics. Solar and terrestrial radiation, transfer processes, applications. Prerequisites: 340 or PHYS 222, and MATH 327 or equivalent.

ATM S 432 Atmospheric Physics (3) Sp Businger, Plumb Electromagnetic principles and application to the atmosphere, properties of waves, atmospheric probing, natural signal phenomena, effects of nuclear explosions. Prerequisites: 340 or PHYS 222 or equivalent, and MATH 327, or equivalent.


ATM S 441 Atmospheric Motions (5) A Harmann, Holton, House, Reed, Wallace Fundamentals of pressure, basic conservation laws, elementary applications of the equations of motion, circulation, vorticity, planetary boundary layer. Includes laboratory exercises. Prerequisites: 301, MATH 327.

ATM S 442 Atmospheric Motions (5) W Harmann, Holton, House, Reed, Wallace Diagnostic analysis, linear wave theory, numerical prediction, baroclinic instability, the general circulation. Includes laboratory exercises. Prerequisite: 441.

ATM S 450 Atmospheric Data Analysis (5) W Reed, House Statistical and other methods employed in atmospheric data analysis. Frequency distributions, sampling theory, linear regression, elementary time-lapse, and one-dimensional, objective map analysis. Prerequisites: 351, ENGR 141, or equivalent.

ATM S 452 Forecasting Laboratory (5) Sp Reed, Wallace Daily practice in map analysis and forecasting, using current 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 truce atmospheric constituents, both natural and man-made, and referred jointly with CEEW 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 problems used by manufacturing concerns and control agencies rather than on theory. Prerequisites: MATH 124, ENGR 141, concurrent registration in 458 or CEEW 458.

ATM S 462 Sea-Air Transfer Processes (5) S Classroom work and field observations relating to the physical processes occurring at ocean-atmosphere boundary, transfer of energy, moisture, and other effects. 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 510 Physics of Ice (3) A Hobbs, Raymond 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 in the atmosphere. Offered jointly with PHYS 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 PHYS 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 glaciers. Mechanical laws of glaciers. Steady flow, dynamic response to changing climate, and ages. Deformation and drift of sea ice. Snow and avalanche dynamics. Offered jointly with PHYS 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 structural change and relation between structures and bulk physical properties. Offered jointly with PHYS 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. Climatological and mass budgets. Glacier features. Emphasis on instrumentation, field techniques, and data analysis. Offered jointly with PHYS 514. Prerequisite: 511 or 512 or permission of instructor.

ATM S 521 Seminar in Atmospheric Dynamics (*) AWsp Holton Directed at current research in the subject. For advanced students. Prerequisite: permission of instructor.

ATM S 523 Seminar in Cloud Physics (*) A Sp 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 Pollution (2) W Charlson, Harrison Seminar for both engineers and atmospheric scientists in the atmospheric pollution related to air pollution. A wide variety of topics is covered. Offered jointly with CEEW 525. Prerequisite: 301 or permission of instructor.
ATM S 526 Seminar in Glaciology (*) 3Sp
LaChapelle
See 521 for course description.

ATM S 531 Structure of the Upper Atmosphere (3) A
Levy
Structure of atmosphere above the tropopause. Roles of
tochemistry, diffusion, and escape in determining
tropy and atmospheric exchange. Role of
and reflection, and thermal structure. Formation and properties of the iso-
sphere. Offered jointly with GPHYS 531. Prerequisite: PHYS 324.

ATM S 533 Atmospheric Radiation I (3) Sp
Principles of radiation exchange in planetary at-
ospheres with emphasis on emission and absorption of
and microwave radiances. Applications to atmos-
pheric remote sensing. Prerequisite: PHYS 221 or permission of instructor.

ATM S 534 Atmospheric Radiation II (3) A
Levy
Principles of radiative transfer in planetary atmospheres
emphasis on single and multiple scattering of visible
and infrared radiation. Applications to surface energy
balance and radiative transfer. Prerequisite: 533 or per-
mission of instructor.

ATM S 535 The Physics of Clouds (3) Sp
Hobbs, House
Studies in the dynamics and microphysics of cloud and
precipitation systems, with emphasis on numerical mod-
els and their validation. Prerequisite: 435 or permission of
structor.

ATM S 541 Dynamic Meteorology (3) W
Holton, Levy
Fundamental conservation laws, hydrostatic approx-
imation, primitive equations, vorticity and divergence
equations, correlation theory, potential vorticity,
gavity waves, Rossby waves, Ekman layer. Prerequisite: 501, A A 567 or equivalent.

ATM S 542 Dynamic Meteorology (3) Sp
Holton, Levy
Quasi-geostrophic motions, baroclinic instability, num-
erical prediction, internal waves, convection, tropical mo-
tions. Prerequisite: 541.

ATM S 543 Planetary Fluid Dynamics (3) A
Horton
Spectral modeling, two-dimensional turbulence, pre-
diction of 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
duced by surface forcings and observations. A study of the physical pro-
ces through which these budgets are satisfied. Prereq-
site: 442 or permission of instructor.

ATM S 546 Introduction to Atmospheric Turbulence (3) A
Budyko, Businger
Review of derivation of Navier-Stokes equations; turbu-
ent and laminar flow; Reynolds averaging and statistical
tribution of turbulent flow; characteristics of isotropic turbulence; mixing length
models; closure and standard variance equation models. The closure
problem and some examples of how to do it; ob-
ervation evidence.

ATM S 547, 548 Atmospheric Turbulence (3,3)
W, Sp
Budyko, Businger
547: turbulent flux of heat, momentum, and moisture in the
layer below the tropopause. Emphasis on the Richard-
son’s stability criterion; free convection. 548: diffusion
in the atmosphere; application of Fickian and
analogous theories of diffusion; use of Lagrangian
and Eulerian correlation functions. Prerequisite: 546 for 547.

ATM S 551 Synoptic Analysis (3) W
House
Analysis of synoptic charts. Practice in weather forecast-
ing using guidance from numerical prediction models.
Laboratory exercises to illustrate fundamental dynamic
principles, develop analytical skill. Examples from litera-
ture of nonroutine types of synoptic analysis. (Offered odd-numbered years.)

ATM S 552 Objective Analysis (3) W
Wallace
Review of objective analysis techniques commonly ap-
pied to atmospheric problems; examples from the meta-
ological literature and class projects. Superposed epoch
analysis, cross-spectrum analysis, filtering, eigenvector
analysis, optimum interpolation techniques. Prerequisite: FORTRAN programming. (Offered even-numbered years.)

ATM S 555 Planetary Atmospheres (3) A
Levy
Problems of origin, evolution, and structure of planetary
ospheres: emphasis elements common to all plan-
etary atmospheres: roles of radiation, chemistry, and
dynamics in determining the results on the atmospheres of Ve-
us, 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
GPHYS 555.

ATM S 565 Seminar in Atmospheric Science Policy Problems (1-3)
Plumb
Decision making and policy determination in major na-
tional atmospheric programs. Case studies of policy de-
velopment for the Global Atmospheric Research Pro-
gram, studies involving other modifications, and air
quality. Individual student study of selected topics, with
emphasis on developing and evaluating alternate policies.
Prerequisite: SMT 565. Offered jointly with SMT 540 or permission of
structor.

ATM S 571 Theoretical Climatology (3) W
Harmann
Theoretical and dynamical aspects of climatology; re-
ponse of the atmosphere to perturbations of the extran-
ctic climatic controls; feedback loops, development of a hier-
archy of physical and mathematical models describing climactic states and transitions; critical evaluation of clim-
ate forecasting. Prerequisites: 441 and 442, or permis-
sion of instructor.

ATM S 580 Atmospheric Photochemistry and
Chemical Kinetics (3) W
Harrison
Stratospheric and tropospheric chemical processes. Concepts of
chemical rate processes and photoactivation. Photoactive
species in the atmosphere. Interactions between chemis-
try and atmospheric motions. Ozone, nitrogen oxides,
carbon oxides, sulfur oxides. Very minor species. Hydro-
theses 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 Zool-
ogy.

BIOL 100 Introductory Biology (5) AWSp
Clark, Tinsdale
Introduction to biological principles and concepts, and
the application of biological knowledge to problems of
man and society; development of an awareness of
Biology. 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 are viewed at levels from the
subcellular to the community. Emphasis on structural and
functional analysis of biological organization—its adapt-
ability, its genetic makeup, and 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 receive credit.

BIOL 103 Introduction to Biology (5) AWSp
Pieracki
Introduction to basic biological concepts within the con-
text of human biology. Primarily for students in the Ed-
cational Opportunity Program. No credit allowed if 100
has been taken. Prerequisite: permission of instructor.

BIOL 104 Biology for Elementary School Teachers (5) AWSp
Pieracki
Basic concepts of biology, with emphasis on background
need for confident use of the new science curriculum
materials in the elementary school. Prerequisite: permis-
sion of instructor.

BIOL 210, 211, 212 Introductory Biology (5,5,5)
AWSp, AWSp, AWSp
Introduction to the phenomena of life for students intend-
ging to go on to more advanced biology courses and into
preprofessional programs. Emphasis on features common
to all living things: molecular and subcellular phenomena;
cellular structure, metabolism and energy, chemical and
hydrologic regulation of development; the nature, functional
properties, and evolution of plant and animal organisms
and groups of organisms. Writing lab for 210 is maint-
ained in 226 Johnson two quarters in advance. Prerequi-
tives: two quarters of college chemistry; organic chemis-
try or equivalent; one per-1210 (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, 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 Mechanics (3) W
Krackeberg, Sluitkin
Evolutionary changes are determined by mutation, recom-
bination, and selection. Effects of the genetic system,
selecting mechanisms, hybridization, and polyplody on
evolution. Examples of microevolution and phe-
evolutionary changes from plant and animal kingdoms.
For advanced undergraduate and graduate students in the biological sciences. Prerequisites: GENET 451 or equiva-
ent.

BIOL 460 Biology of Eukaryotic Micro-organisms (5)
A, W
Whaler
Introduction to the comparative biology of the algae,
fungi, and protozoa. Emphasis on the life history, physi-
ology, and morphology of these organisms. Prerequisites:
15 credits in biological sciences and upper-division standing, or permission of instructor.

BIOL 473 Limnology (3) A
Eddleman
Biological, physical, and chemical features of lakes and
other inland waters. Prerequisites: 15 credits in biological sciences, 10 credits in college chemistry and upper-di-
vision standing, or permission of instructor.

BIOL 474 Ecology Laboratory (3)
Eddleman
Students may be required to share a portion of the trans-
portation costs of field trips. Prerequisites: 472 and per-
mission of instructor.

BIOL 475 Limnology Laboratory (2)
Eddleman
Examination of biota of fresh waters, survey of limnological methods, and analysis of data. Prerequisi-
tes: 473 and 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) 
Whitley 
The cell membrane and permeability, cytoplasmic physiology, intracellular energetics and biosynthesis, physiology 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) 
Whitley 
Chemistry and physiology of the intercellular 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) 
Whitley 
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.

BIOL 575 Topics in Physical and Chemical Limnology (3) W 
Stuer 
Current limnological, hydrological, and environmental problems, such as biogeochemical cycling and the dating of sediments. Emphasis on carbon, oxygen, and sulfur isotope ratios 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 gastrulation, gastrulation, cell and tissue movements, induction and cytodifferentiation. Prerequisites: 456 and BIOL 442, or permission of instructor.

BIOL 587 Analysis of Development Laboratory (1-5, max. 5) WSp 
Series of intensive workshops in developmental biology, each extended 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) 
Clark 
Seminar in biological instruction; teaching techniques, course and laboratory 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 innovations. Design of college science courses at different levels. Prerequisite: graduate standing.

BLACK STUDIES

Courses for Undergraduates

BLK S 200 Seminar 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. Field of Black dialect from its West African roots. Detailed linguistic description of its salient syntactic, phonological, and semantic features; exploration of its linguistic uses through poetry, folktales, oral histories, oral street traditions, and Black sermons. Discussion of the future of Black English. Introduction to the subject in 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 (3) 
Law in the Constitution as interpreted 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 is working with professional community organizations. Recommended: junior or senior standing.

BLK S 310 Philosophy of West Africa (3) 
Emphasis on the study of African thought in the context of West Africa. Prerequisites: 360 or permission of instructor.

BLK S 320 Resources in Afro-American Research II (3) 
Wright 
Compilation of annotated subject bibliography of Black Studies topics, with emphasis on secondary sources, general reference sources, and social sciences.

BLK S 350 The Afro-American and the U.S. Supreme Court (3) 
Law in the Constitution as interpreted by the Supreme Court, dealing with the conditions of Afro-Americans in the United States.

BLK S 400 The Black Esthetic (3) 
The Black esthetic as distinct from the mainstream of American cultural esthetics. Emphasis is on the Black in America. Focuses on the various art forms (e.g., theater, music, and literature) from historical, social, and political perspectives.

BLK S 410 Issues in Black Communication (3-5, max. 10) 
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 design their areas of interest and subsequently pursue research and problem solving. Prerequisite: permission of instructor.

BLK S 492 Special Topics in Black Studies (3-5, max. 15) 
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. May vary. Prerequisite: 200 or permission of instructor.

BOTANY

Courses for Undergraduates

Students may be required to pay part of the transportation costs of field trips for the following courses: 113, 313, 311, 355, 421, 446, 452, 462, 464, 543, 547, 554.

BOT 110 Plants in the Human Environment (5) AWSp 
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) ASp Denison 
Introduction to plant classification; field study and laboratory identification of the common plant families and the conspicuous form of western and central Washington. Two full-day field trips required of all students.

BOT 301 Plant Propagation (2) AWSp 
McGinnis 
Practical course in methods of plant propagation by seeds, cuttings, budding, layering, bulbs, divisions, and other special structures. Includes consideration of care and handling of plants in the home, garden, and greenhouse. Prerequisites: BIOL 101-102 or equivalent.

BOT 310 Plants, Man, and Ecology (5) W 
Botany 
Emphasis on major ecological principles, stressing plant dominated systems and their interactions with human populations. Topics include the distribution, structure, and function 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 requirement.

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 
Tuckner 
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 nonmajors, teaching majors in biology, and students in forestry and landscape design. Prerequisite: 113 or 10 credits in biological science.

BOT 350 Introduction to Plant Geography (4) W 
Sedgwick 
Field study of woody species used in Pacific Northwest landscapes; plant exploration and origins of ornamentals. For nonmajors, teaching majors in biology, and students in forestry and landscape design. Prerequisite: 113 or 10 credits in biological science.

BOT 355 Plant Ecology Laboratory (2) A 
Bliss, del Moral 
Field, greenhouse, and laboratory studies in plant ecology, including introduction to computer-assisted data analysis. Prerequisite: 354, which may be taken concurrently.

BOT 360 General Mycology (5) W 
Ammerman, White 
General survey of the fungi with emphasis on life cycles, structure, physiology, ecological importance. Prerequisite: 10 credits in biological science or permission of instructor.

BOT 371 Elementary Plant Physiology (5) 
Rothchild, Cleland, Holperin, Meerwein, S. Woodland, Walker 
Study of nutrition, assimilation, transport, growth, photosynthesis, and metabolism of plants, with emphasis on the role of plant physiology and chemical principles. For nonmajors. Prerequisites: BIOL 211 or 101-102, and CHEM 103, or permission of instructor.

BOT 380 Economic Botany (5) A 
Tuckner 
Plants useful or harmful to man; their taxonomic and morphological characteristics, and chemical constitutents; history, distribution, production, usage, and roles in pre-
Botany

historic 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, recognition, 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. 3) Kruckeborg Topics include selected families or genera of ornamental importance, urban storm, hardiness, propagation, plant breeding, plant introduction, and diseases of ornamentals. Prerequisite: 331 or equivalent.

BOT 433 Advanced Systematics (5) J. Denton, Kruckeborg Study of taxonomic principles, emphasizing the bases for classification and the analysis of characters used in taxonomic studies. Major plant families studied. Prerequisites: 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 projects. Prerequisites: 433 and permission of instructor. (Offered alternate years; offered 1981-82.)

BOT 441 Comparative Morphology of Vascular Plants (5) A D.Michele, Halperin Details of anatomy of the morphology (structures and life cycles) of the angiosperms, gymnosperms, ferns, and other nonseeded vascular plants. The history of each group is reviewed 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 D.Michele 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, habits, adaptations, and trophic interrelationships. Offered at Friday Harbor Laboratories. Prerequisites: appropriate credits in biological sciences, concurrent registration in ZOOL 430, and permission of instructor. Offered at Friday Harbor Laboratories.

BOT 446 Algology (5) Sp Catto, J. R. Woolard Examination of algal flora from the viewpoint of morphological 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 geography and ecology of economic importance. Prerequisite: 320 or BIOL 211 or permission of instructor.

BOT 448 Marine Algal Ecology (3) A J. R. Woolard 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 phycogeography. Prerequisite: 445 or 446, or permission of instructor. (Offered alternate years; offered 1981-82.)

BOT 453 Vegetation of Western Washington (5) S del Moral, Kruckeborg Intensive field courses in vegetation systematics applied methods to several distinctive Washington vegetation types; focus on unusual habitats, biogeographic patterns, and rare plants. Practicum projects are spent in three locations (Mount Baker region, Mount Rainier region, and Cle Elum River area). Fee to defray costs of transportation, breeding and lodging. Prerequisites: 113 or equivalent, and permission of instructor.

BOT 456 Plant Community Ecology (5) Sp del Moral Development of plant community theory; theory of vegetation structure and typal identification; numerical methods for vegetation description and pattern analysis; gradent analysis, plant community ecology in complex systems; vegetation dynamics; niche theory. Laboratory emphasizes sampling design and field and computer methods to characterize vegetation and vegetation processes. Two-weekend field trips required. (Offered alternate years; offered 1980-81.)

BOT 460 Slime Molds (5) Haskins Life history, development, genetics, physiology, and taxonomy of slime molds. Prerequisites: 360 or MICRO 400, or permission of instructor.

BOT 463 Basidiomycetes (5) A Ammirati Structure and classification of the basidiomycetes. Prerequisite: 360 or permission of instructor.

BOT 465 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 466 Ascomycetes (5) Sp Structure and classification of the ascomycetes. Prerequisite: 360 or permission of instructor. (Offered alternate years; offered 1980-81.)

BOT 467 Alphophylosporangia (5) A Structure and classification of major groups of the Alphophylosporangia (Blastomycetales), with emphasis on their economic and ecological importance and on the most recent developments in their taxonomy. Prerequisite: 360 or permission of instructor.

BOT 468 Fungi Imperfecti (5) WS Structure and modern bases for classification of the imperfect 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. Prerequisite: BIOL 101-102 or 211. Offered at Friday Harbor Laboratories.

BOT 475 Reproductive Biology of the Flowering Plants (5) Sp Meeuse Strategies and tactics of plant dispersal and pollination; morphological, physiological, and behavioral adaptations of animal pollinators and dispersers; physiology of seed dormancy and germination in an ecological context; biochemistry and physiology of plant fertilization; practical and theoretical implications of all the above. Prerequisite: 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 media for the growth of plants considered in theory and practice. Prerequisite: 371 or 472, or equivalent. (Offered alternate years; offered 1980-81.)

BOT 478 Plant Morphogenesis (3) A Halperin Covers progress from a general review of the subcellular machinery controlling development (information storage, macromolecular assembly, metabolic regulation, cellular differentiation, 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 scientific literature. Prerequisite: BIOL 211 or BOT 371 or equivalents.

BOT 480 Plant Cytology (3) W Haskins, J. R. Woolard Analysis of structure and function of plant cells. Emphasis on the ultrastructure of plant cells and cell components. Prerequisite: 15 credits in biological science.

BOT 481 Plant Cytology Laboratory (2) W Haskins, J. R. Woolard Bright-field and phase-contrast microscopy; cytochemical 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) ASp Students with suitable background in botany may enroll for special study in algalogy, anatomy, botiology, cytology, mycology, or taxonomy. Prerequisite: permission of instructor.

Courses for Graduates Only

BOT 501 Tutorial in Botany (1-5, max. 10) ASp 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) A Sp Prerequisite: permission of instructor.

BOT 531 Topics in Plant Physiology (2, max. 10) A Sp Bendich, Cleland, Halperin, Meeuse, Walker Modern trends and methods in plant physiology. Prerequisite: permission of instructor.

BOT 532 Seminar in Morphology and Taxonomy (2, max. 10) A Sp Bendich, D.Michele, Kruckeborg Current research and trends in morphology and taxonomy of higher plants. Prerequisite: permission of instructor.

BOT 533 Selected Topics in Mycology (2, max. 10) A Sp Ammirati, Whisler Selected topics from all phases of mycology. Prerequisite: permission of instructor.

BOT 534 Topics in Algology (2, max. 10) A Sp Norris, J. R. Woolard Selected topics from all phases of algology. Prerequisite: permission of instructor.

BOT 535 Topics in Plant Ecology (2, max. 10) A Sp Bendich, Catto, Meeuse Selected topics from various phases of plant ecology. Prerequisite: permission of instructor.

BOT 536 Topics in Palynology (2, max. 6) A Sp Leopold, Tsukuda Discussion and review of literature in pollen structure, disposition in sediments, and paleoecology. Prerequisite: permission of instructor.

BOT 538 Plant Nucleic Acids and Subcellular Regulation (3) A Bendich, Catto Current research and trends in plant nucleic acids, including such topics as plastid and nuclear genomes, regulation 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. Students are split into two groups. Offered in the field and on specimen grown in laboratory culture. Not open to students who have taken 445. Prerequisite: 320 or permission of instructor. (Offered alternate years; offered 1980-81.)

BOT 546 Marine Algae (9) S Norris, J. R. Woolard 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 phyttoplankton morphology with emphasis on characteristics important to their taxonomy. Emphasis on individual species, their life histories, adaptive morphological characteristics, and isolation and culture of phyttoplankton organisms. Prerequisite: 445 or 446, or permission of instructor. (Offered alternate years; offered 1981-82.)

BOT 549 Advanced Algalogy (9) S
Norris, J. R. Waterland
Varied marine algal flora of the San Juan region. Topic changes from semester to semester. Individual research projects. Prerequisites: 445 or equivalent and permission of the Director 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 Colombia, including principles of plant geography, floristics, climax communities, edaphic phenomena, life histories, adaptive morphological characteristics, and community patterns. Prerequisite: 350 or 450.

BOT 554 Palynology and Quaternary Geology (5) A
Walker
Study of fossil and recent pollen and spores, including pollen analysis, spore morphology, spore diagnostics, and soil pollen composition. Prerequisite: 350 or 445, or permission of instructor. (Offered alternate years; offered 1980-81.)

BOT 565 Marine Micology (9) Whittier
Taxonomy and morphology of aquatic fungi with emphasis on marine forms. Prerequisites: 320 or 360 or 2 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
J. Waterland
Survey of developmental systems in algae and fungi. Comparative study of control of development with an emphasis on the action of hormones, wall interactions, and cellular differentiation. Prerequisite: 320 or permission of instructor. (Offered alternate years; offered 1980-81.)

BOT 570 Plant Metabolism (3) A
Meuse
Metabolism of organic compounds, 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
Meuse
Prerequisite: concurrent registration in 570.

BOT 572 Water Relations (3) Sp
Walker
Permeability and water relationships, with special emphasis on influences of climate, soil, and roots on the food field. (Offered alternate years; offered 1981-82.)

BOT 573 Water Relations Laboratory (2) Sp
Walker
Prerequisite: concurrent registration in 572. (Offered alternate years; offered 1981-82.)

BOT 574 Physiological Plant Ecology (5) Sp
B. Walker
Theory and practice of the measurement of important environmental variables in plant ecology (radiation, temperature, light, wind, humidity) and the basic responses of the plants. Some aspects of plant interactions, especially albedo; 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 permission 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 Subcellular and Macromolecular Analysis (3) A
Bendich, Cattolico
Introduces the theory underlying basic laboratory techniques used in the isolation and quantification of subcellular and macromolecular components. Theoretical problems in applying techniques such as radioisotope 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 radiolabeling of plant materials. Extraction of proteins and nucleic acids, as well as their fractionation by gel electrophoresis, column chromatography, and density gradient centrifugation. In vitro translocation of RNA. Prerequisite: permission of instructor.

BOT 600 Independent Study or Research (9) A

BOT 700 Master's Thesis (*) A

BOT 800 Doctoral Dissertation (*)

CHEMISTRY

Courses for Undergraduates

CHEM 100 Chemical Science (5) Sp
Terminal course in general chemistry. 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) A
Prerequisites: for science and engineering majors who plan to terminate their study of chemistry with 101 or 102: Molecular Theory, Quantitative relationships in chemical processes, solutions, theoretical chemistry, acids, bases, and salts. Chemistry of combustion. Chemistry of metals and nonmetals. Chemistry of hydrogen and strong elements. Students planning to take 103 or 104 should not take 102. Prerequisite: I. 01 or 101 exemption examination.

CHEM 105 Introduction to General Chemistry (3) A
This course is designed for students who have no previous college chemistry. Prerequisite: 101 or 101 exemption examination.

CHEM 140 General Chemistry (4) A
Prerequisites for science, engineering, and other majors who plan to take a year or more of chemistry courses. Chemical reactions, basic principles, equilibrium systems, structure and bonding, properties of matter. Prerequisites: high school chemistry or physics (both recommended), or 101 or 102; and the passage of the 140 placement test (consult Educational Assessment Center).

CHEM 145 General Chemistry (4) A
Parallel 140. For science, engineering, and other majors who plan to continue their study of chemistry through physical chemistry. Assumed strong high school background in chemistry, or 105 and good aptitude for study of science. Mathematics prerequisite the same as for 140.

CHEM 150 General Chemistry (4) A
Prerequisites: 101 or 102; concurrent registration in 151 recommended. Prerequisite: 140 or 145.

CHEM 151 General Chemistry Laboratory (2) A
AWSpS
Experiments illustrating quantitative relationships in chemistry. Permission of instructor: prior completion of 150, or prior completion of 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 advisor.

CHEM 160 General Chemistry (4) A
Prerequisites: 101 or 102 (offered alternate years; if taken concurrently, credit given to those who have taken one unit or more of high school chemistry.

CHEM 164 General and Introductory Environmental Chemistry (5) A
Prerequisites: 101 or 102: Additional material emphasizes environmental 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
Prerequisites: 101 or 102. Analysis for common cations and anions; separation and identification procedures. Prerequisites: 151 and 150 (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 undergraduates. Not to be taken concurrently with 199. Prerequisites: permission of chemistry adviser and grade-point average of 3.00 for freshmen, 2.50 for sophomores.

CHEM 199 Special Problems (1, max. 6) A
AWSpS
Problems relating to experimental chemistry. For chemistry majors only. Prerequisites: permission of chemistry adviser and a chemistry grade-point average above 3.50.

CHEM 231 Organic Chemistry (3) A
Prerequisites: 101 or 102. For students planning two or three quarters of organic chemistry. Structure, functional groups, reactions, and synthesis of the main types of organic compounds. Prerequisite: 150 or 155.

CHEM 232 Organic Chemistry (3) A
Prerequisites: 231 for students planning only two quarters of organic chemistry. Prerequisite: 231.

CHEM 235 Organic Chemistry (3) A
Prerequisite: 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) A

CHEM 241 Organic Chemistry Laboratory (3) A
Prerequisite: 231. Preparation of 231 for students planning only two quarters of organic chemistry. Prerequisite: 231.

CHEM 242 Organic Chemistry Laboratory (3) A
Prerequisite: 235 for those desiring three quarters of organic chemistry. Preparation of 235 for students planning only two quarters of organic chemistry. Prerequisite: 231.

CHEM 321 Quantitative Analysis (5) A
AWSpS
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 planning three or more quarters of organic chemistry. Structure, nomenclature, reactions, and synthesis of organic compounds. Theory and mechanisms 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. Prerequisites: 337, which may be taken concurrently, and 346.

CHEM 350 Elementary Physical Chemistry (3) WS
Survey of some major topics in physical chemistry. Prerequisites: two quarters of general chemistry, PHYS 116, and MATH 125 (126 recommended) or 157.

CHEM 351 Elementary Physical Chemistry (3) Sp
Continuation of 350. Prerequisite: 350.

CHEM 410 Radiochemical Techniques and Radioactivity Measurements (3) Sp
Introduction to general service course for students planning further work in nuclear or tracer applications. Safety procedures, detection and measurement of nuclear radiations, 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 periodic 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 considerations, 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, 252 or 236 or 337, and 457.

CHEM 435 Introductory Biophysical Chemistry (3) W
Survey of the statics and dynamics of biophysical biochemical 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, nucleic acid intermediates, mevalonic acid) and secondary natural products (nootegenops, alkaloids, flavonoids, 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 multicomponent systems, ionic solutions, nonequilibrium solutions and gases, surface chemistry and catalysis, and thermodynamic calculations using tabulated data. Primarily for undergraduates in related fields, but accessible for chemistry majors. Prerequisite: 350 or 456. Recommended: 335 or 457.

CHEM 455 Physical Chemistry (3) A/S/P
Introduction to quantum chemistry and spectroscopy. Theory of electronic transitions presented at the 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 equilibrium, chemical equilibrium, and kinetics. Prerequisites: 150 or 155, MATH 126 (238 recommended), and college physics. May be taken without 455. Honors section available Autumn Quarter.

CHEM 457 Physical Chemistry (3) A/S/P
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) A/S/P
Observation and interpretation of infrared, ultraviolet, NMR, and mass spectra with emphasis on the determination of structure of polyatomic molecules. Noise rejection and small signal problems, statistics, feedback and control, data processing, and design of experiments. Prerequisites: two quarters of organic chemistry, 350 or 455 or 456, either of which may be taken concurrently.

CHEM 461 Physical Chemistry Laboratory (2-3) AWS/P
Physical measurements in chemistry. Vacuum and high-temperature techniques, calorimetry, spectroscopic methods, electrical measurements. Prerequisites: 455, 457 or 351. Recommended: 460.

CHEM 462 Techniques of Synthetic Chemistry (3) A/S/P
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, radiochemical synthesis, gas phase reactions, etc. Chromatography and separation techniques. Prerequisite: 347 or 242.

CHEM 463 Separations and Analysis (2-3) AWS/P
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 elasticity, solid-state morphology, and viscoelastic behavior of high polymers. Prerequisites: 457 or 351 or equivalent, and FOR 488 or CH E 570. (Offered alternate years.)

CHEM 471 Physical Chemistry of Macromolecules (3) W
Classical hydrodynamic methods, and modern optical correlation and pulse techniques for studying dynamical motions and conformations of macromolecules, especially biopolymers, in solution. Cooperative thermal transitions, optical properties, and electrooptical effects. Prerequisites: 457 or 351 and 455. Recommended: 470. (Offered alternate years.)

CHEM 498 Teaching Experience in Chemistry (1, max. 6) AWS/P
Students may be 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 standing.

CHEM 499 Undergraduate Research *(1, max. 12) AWS/P
For qualified chemistry majors in the bachelor of science curriculum, especially those planning graduate work. Prerequisite: admission to major 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 spectroscopy, electronic, infrared, and Raman spectroscopy, magnetic susceptibility measurements, Mossbauer spectroscopy 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
For doctoral candidates in inorganic chemistry. Current topics (e.g., acid-base theory; halogens; hydrides; groups III and IV; interstitial, cluster, and high-temperature chemistry; inorganic free radicals.

CHEM 520 Current Problems in Analytical Chemistry (2, max. 12) AWS/P
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 chemometric and mass spectrometric techniques for topics covered during any particular quarter. Prerequisite: gradate standing. (Offered alternate years.)

CHEM 530 Advanced Organic Chemistry (3) A
Electronic mechanisms in organic chemistry. An introduction to 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. Transformation 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) AWS/P
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 magnetic exchange; angular momentum and group theory; spectroscopic selection rules. Prerequisite: 550.

CHEM 552, 553 Statistical Mechanics (3.5) 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 equivalent for 552; 552 for 553.

CHEM 559 Chemical Kinetics (3) Sp

CHEM 560 Current Problems in Physical Chemistry (3, max. 9) AWS/P
For doctoral candidates in physical chemistry. A discussion of topics selected from active research fields. See the department for instructor and topic during any particular quarter.
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. Topics include Oaxaca, Michoacan, Norte, and Jalisco. Not open to students who have taken GIS 110.

CHSTU 202 Intermediate Chicano Studies (3) AW Gamboa
Interdisciplinary course designed to deepen the understanding of the Chicano experience: deals primarily with 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 (AW Aguirre
Coordinates Chicano economic history with contemporary economic problems of Chicanos, emphasizing social, 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 310 Beginning/Intermediate Mexican Dance (W) Gonzalez-Radke
Interdisciplinary course covering a restricted number of topics dealing with regional Mexican folk dances. Topics are dance, costumes, music, and customs, with concentration on the regions of Oaxaca, Michoacan, and Jalisco. Not open to students who have taken GIS 112.

CHSTU 305 Advanced Chicano Studies (3) S Gamboa
Advanced interdisciplinary course that looks at a restricted number of topics dealing directly with Chicanoism as a developmental process and its stabilization within the United States. Curandero, Chicanos in magic, and its relation to contemporary Chicano values; a study of the barrio, its problems and proposed solutions; the marginal, his life and myth within the society; 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) S Gonzalez-Radke
Expands the knowledge of Mexican folklore through research, dance, and music, enables the student 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
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 Gonzalez-Radke
Interdisciplinary course that provides the opportunity to concentrate on one specific aspect of the Chicano Experience, and to gain full mastery of the same at the undergraduate level.

CHINA REGIONAL STUDIES
See International Studies.
CLAS 101 Latin and Greek in Current Use (2)  
AWSp  
Designed to improve and increase English vocabulary through a study of the Latin and Greek elements in English, with emphasis on words in current literary and scientific use. No auditors. Knowledge of Latin or Greek is not required.

CLAS 205 Bio-Scientific Vocabulary Building From Latin and Greek (3) AWSp  
Designed to help the student master the scientific vocabulary 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 310 Greek and Roman Classics in English (5) AWSp  
Biquez, Grimmel, Harman, Langdon, MacKay, McDermid, 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  
Biquez  
Study of the civic and social practices and institutions of everyday Greek and Roman private and public life, including the family, social classes, the courts and legal system, 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 (2) SP  
Northrup  
Development of Greek thought from mythic and poetic formulations to description, analysis, and systematic abstraction; based on the study of a variety of poetic, historical, and philosophical texts, from Homer to the Hellenistic age.

CLAS 420 Roman Politics: The Rise and Fall of Political Freedom (3)  
Grimmel  
The political theory of the Romans, the realities of republicanism and the tensions and conflicts that brought about the loss of political freedom. Special attention is given to contrasts and comparisons with our own political institutions as they were conceived by the framers of the Constitution and as they function today.

CLAS 422 Greek Historians and Philosophers in English (3)  
Readings, lectures, and discussion of selected 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 Aeneid; the Roland or a comparable work from the medieval oral tradition; pre-Greek forerunners, other Greco-Roman literary epics, and later medieval and Renaissance developments and adaptations of the genre. Choice of reading material varies according to instructor's preference and may include Germanic, Asian, etc. Offered jointly with C LIT 424.

CLAS 427 Greek and Roman Tragedy in English (5) W  
McDermid  
Study of the development of Greek and Roman tragedy, with extensive readings in representative plays of Aeschylus, Sophocles, Euripides, and Seneca.

CLAS 428 Greek and Roman Comedy in English (3) A or SP  
Pascal  
Readings from the comedies of Aristophanes, Plautus, and Terence.

CLAS 430 Greek and Roman Mythology (3) AWSp  
Grimmel, 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) Grimmel  
Literary theories of the Greeks and the Romans as seen in the writings of Plato, Aristotle, Longinus, and other major classical authors. Attention is given to their influence on modern literary批评.

CLAS 445 Greek and Roman Religion (3) A  
Langdon  
Religion in the social life of the Greeks and Romans, with emphasis placed on their public rituals and festivals. Attention is given to the圪 источник, personal piety, ritual of purification and healing, and the conflict of religions in the early Roman Empire. Many lectures illustrated by slides. Prerequisite: one course in ancient 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 before 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  
Biquez, 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. The history, techniques, and results of significant excavations 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 innovations of the Romans; illustrated by slides. Offered jointly with ART H 342.

CL AR 343 Hellenistic Art and Archaeology (3) Sp  
Biquez, Langdon  
Survey of the art of Greece and the eastern Mediterranean from the time of Alexander the Great to the Roman conquest. Principal sites with their sculpture, painting, mosaics, and minor arts examined in lectures illustrated with slides. Offered jointly with ART H 343.

CL AR 442 Greek and Roman Painting (3) A  
Langdon  
Study of painted decoration on Greek vases, and Roman wall painting, with emphasis on the historical and stylistic 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 sculptors, their Roman copies, and Roman portraits and sarcophagi. Emphasis on Greek sculpture of the fifth century 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: an intensive study of grammar, with reading and writing of simple Attic prose; 102: reading of selections from classical Greek literature. Prerequisite: 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 advisor; 300 for 301.

GRK 305, 306 Attic Prose (3, 3) A, W  
Selections from Attic prose, including Plato's Republic, Book 1, Plato's Apology, and the oaths of Lycurgus. To be taken concurrently with 310, 311. Prerequisites: 103 for 305; 305 for 306.

GRK 307 Homer (3) SP  
Selections from the Iliad or Odyssey. To be taken concurrently with 312. Prerequisite: 306.

GRK 308 Introduction to Koine Greek Texts (3) SP  
Williams  
Reading and discussion of selected religious and philosophical 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  

GRK 401-402-403 Elementary Modern Greek (5-5-5)  
Introduction to spoken modern Greek, with emphasis on conversational skills. Reading of contemporary works of modern Greek. The artificial literary language (Katharevousa) 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 advisor.

GRK 413 The Pre-Socratic Philosophers (3)  
McDermid  
See above. (Offered alternate years; offered 1980-81.)

GRK 414 Plato (3) W  
MacKay, McDermid  
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  
Biquez  
See above. (Offered alternate years; offered 1981-82.)

GRK 424 Thucydides and the Peloponnesian War (3) W  
Biquez  
See above. (Offered alternate years; offered 1981-82.)

GRK 426 Attic Orators (3) SP  
Biquez, Hannon  
See above. (Offered alternate years; offered 1981-82.)

GRK 442, 443, 444 Greek Drama (3, 3, 3) A, W, SP  
Harmen, McDermid  
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  
Grimmel  
See above. (Offered alternate years; offered 1980-81.)

GRK 453 Pindar: The Epidianic Odes (3) Sp  
McDermid  
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.
G RK 490 Supervised Study (*, max. 18) AWSp
Special work in literary and philosophical texts for graduates and undergraduates. Prerequisite: permission of under-graduate adviser.

G RK 499 Undergraduate Research (*, max. 18) AWSp
Prerequisite: permission of undergraduate adviser.

L A T I N
L A T 1 0 1 , 1 0 2 , 1 0 3 Elementary Latin (5,5,5) A,W,Sp
101: An intensive study of grammar, with reading and writing of simple Latin prose; 103: reading of selections from classical Latin literature. Prerequisites: 101 for 102, 102 for 103.

L A T 3 0 0 , 3 0 1 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. Prerequisite: for 300, permission of undergraduate adviser; 300 for 301.

L A T 3 0 5 Introduction to Latin Literature (3) A,W,Sp
Readings in prose and poetry from various Latin authors. To be taken concurrently with 310. Prerequisite: two years of high school Latin or 103.

L A T 3 0 6 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.

L A T 3 0 7 Vergil (3) Sp
Selections from the first six books of the Aeneid. To be taken concurrently with 312. Prerequisite: 306.

L A T 3 1 0 , 3 1 1 , 3 1 2 Grammar and Composition (2,2,2) A,W,Sp

L A T 4 0 1 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 under-graduate adviser.

L A T 4 1 2 Lucretius (3) A
Grunnel
See above. (Offered alternate years; offered 1981-82.)

L A T 4 1 3 Cicero's Philosophical Works (3) W
Grunnel
See above. (Offered alternate years; offered 1981-82.)

L A T 4 1 4 Seneca (3) Sp
Grunnel
See above. (Offered alternate years; offered 1981-82.)

L A T 4 2 2 Livy (3) A
Rutiland
See above. (Offered alternate years; offered 1980-81.)

L A T 4 2 3 Cleoer and Sallust (3) W
Rutiland
See above. (Offered alternate years; offered 1980-81.)

L A T 4 2 4 Tacitus (3) Sp
Rutiland
See above. (Offered alternate years; offered 1980-81.)

L A T 4 4 7 Roman Lyric (3) A
Harmon
See above. (Offered alternate years; offered 1981-82.)

L A T 4 4 9 Roman Elegy (3) W
Harmon
See above. (Offered alternate years; offered 1981-82.)

L A T 4 5 1 Roman Satire (3) Sp
Bliquez, Rutiland
See above. (Offered alternate years; offered 1981-82.)

L A T 4 5 7 Roman Drama (3) A
Pascal
See above. (Offered alternate years; offered 1980-81.)

L A T 4 5 8 Roman Epic (3) W
Harmon
See above. (Offered alternate years; offered 1980-81.)

L A T 4 5 9 Roman Pastoral (3) Sp
Grunnel
See above. (Offered alternate years; offered 1980-81.)

L A T 4 6 1 Latin Literature of the Republic (3-5, max. 15) S
Readings and discussion of selected authors from the era of the Roman Republic.

L A T 4 6 2 Latin Literature of the Augustan Age (3-5, max. 15) S
Readings and discussion of selected authors from the Augustan era.

L A T 4 6 3 Latin Literature of the Empire (3-5, max. 15) S
Readings and discussion of selected authors from the Roman Empire.

L A T 4 7 5 Improvement of Teaching: Latin (3) S
Grunnel, Pascal
Examination and evaluation of the various methods of teaching Latin: conventional aids; testing materials; text-books; relation of Latin to other languages; Latin derivatives in English vocabulary. Offered jointly with EDC&I 438. (Offered Summer Quarter only.)

L A T 4 7 6 Caesar for High School Teachers (3) S
Grunnel, Pascal
Interpretation of Caesar's works in the light of their historical, 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.)

L A T 4 9 0 Supervised Study (*, max. 18) AWSp
Special work in literary and philosophical texts for graduates and undergraduates. Prerequisite: permission of undergraduate adviser.

L A T 4 9 9 Undergraduate Research (*, max. 18) AWSp
Prerequisite: permission of undergraduate adviser.

Courses for Graduates Only

CLASSICS
CL A 7 0 Master's Thesis (*).

CL A 8 00 Doctoral Dissertation (*).

CLASSICAL ARCHAEOLOGY
C L A R 5 1 1 Mycenaean Archaeology (3)
The art, architecture, and culture of Greece in the late Bronze Age, with emphasis on recent archaeological and linguistic discoveries.

C L A R 5 1 3 Athenian Topography (3)
Langdon
Detailed consideration of the topography and monuments of ancient Athens from the beginning of the Roman period.

C L A R 5 1 5 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.

C L A R 5 4 1 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
C L L I 5 0 1 Comparative Phonology of Greek and Latin (3)
Phonological developments of Greek and Latin from Indo-European to the classical periods of both languages.

C L L I 5 0 3 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.

C L L I 5 0 5 History of the Latin Language (3) Sp
Morphological and syntactical development of the Latin language; the development of Latin as a literary language.

C L L I 5 0 6 Italic Dialects (3)
Principal remains of the non-Latin languages and dialects of ancient Italy.

C L L I 5 0 8 Greek Dialects (3)
Non-Attic dialects of ancient Greece, based on a study of inscriptions and the literary remains.

C L L I 5 1 0 Mycenaean Greek (3)
Study of the Linear-B tablets found in Crete and on the Greek mainland.

GREEK
G RK 5 2 0 Seminar (3, max. 27) AWSp
Bliquez, Harmon, Mackay, McDiarmaid, Northrup
In the courses numbered 580 through 589, graduate students read extensively in texts appearing on the Ph.D. Greek reading list.

G RK 5 8 0 Greek Tragedy (3) A
Bliquez, McDiarmaid
(Offered alternate years; offered 1980-81.)

G RK 5 8 2 Herodotus and Thucydides (3) W
Bliquez
(Offered alternate years; offered 1980-81.)

G RK 5 8 4 Plutarch, Xenophon, Demosthenes (3) Sp
Bliquez
(Offered alternate years; offered 1980-81.)

G RK 5 8 5 Plato, "Republic" (3) A
Mackay, McDiarmaid
(Offered alternate years; offered 1981-82.)

G RK 5 8 7 Aristotle, Politics or Ethics (3) W
Mackay, McDiarmaid
(Offered alternate years; offered 1981-82.)

G RK 5 8 9 Aristophanes (3) Sp
Bliquez
(Offered alternate years; offered 1981-82.)

G RK 5 9 0 Supervised Study (*, max. 18) AWSp
Prerequisite: permission of graduate adviser.

G RK 6 0 0 Independent Study or Research (*)

L A T I N
L A T 5 2 0 Seminar (3, max. 27) AWSp
Grunnel, Harmon, Pascal, Rutiland
In the courses numbered 580 through 589, graduate students read extensively in texts appearing on the Ph.D. Latin reading list.

L A T 5 8 0 Roman Rhetoric (3) A
Grunnel
(Offered alternate years; offered 1980-81.)

L A T 5 8 2 Augustan Poetry (3) W
Grunnel, Harmon
(Offered alternate years; offered 1980-81.)

L A T 5 8 4 Survey of Latin Poetry (3) Sp
Pascal
(Offered alternate years; offered 1981-82.)

L A T 5 8 5 The Civil War: Caesar, Cicero, Lucan (3) A
Grunnel
(Offered alternate years; offered 1981-82.)

L A T 5 8 7 Roman Comedy, Menander, and Petronius (3) W
Pascal
(Offered alternate years; offered 1981-82.)

L A T 5 8 9 Prose of the Roman Empire (3) Sp
Rutiland
(Offered alternate years; offered 1981-82.)
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)
Inclued print press, motion pictures, radio, and television. Role of the press in the development of the American nation, democratic systems, and Western culture. Open to nonmajors.

CMU 220 Interpersonal Communication (3)
Communication across cultures and subcultures. Coding techniques, modes of self-perception, and symbolic representation 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, programming. 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 relationships: intimate; employer-employee; instructor-student; client-helper; 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 selection, direction, and conceptions. News values. Prerequisites: major standing, typewriting.

CMU 322 Reporting (4)
News gathering and writing. Open only to majors. Prerequisite: 321.

CMU 323 Special Reporting Topics (4, max. 12)
Topics vary with instructor. Open only to majors. Prerequisite: 322.

CMU 324 Critical Writing for the Mass Media (4)
Editorial, opinion columns, 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 sessions, go to 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 editorial internship. Designed to extend the student's knowledge of professional perspectives. Does not apply to required 20 credits in communications. Open only to majors. Prerequisites: 320, 321, 322, and permission of instructor.

CMU 415 Production Editing (4) Sp 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 permission of instructor.

PUBLIC RELATIONS

CMU 328 Public Relations (3)
Special communication problems in business and industry, 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 local businesses and agencies. Prerequisite: 338.

ADVERTISING

CMU 340 Introduction to Advertising (5)
Advertising as a marketing and promotional tool. Advertiser, 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 experimental ad.

CMU 342 Advanced Advertising Copy and Layout (3)
Multimedia creative and writing experience. Open only to majors.

CMU 343 Advertising Media Planning (3)
Characteristics of the media. Demographic, geographic, and psychographic research in developing a target audience. 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 service. 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 20 credits in communications. Prerequisites: 341 or 344, depending on nature of internship; 120 credits completed.

CMU 348 Advertising Research (3)
Problems relevant to advertisers, agencies, media, and syndicated services. Conceptualization in mass communication context. Review of literature. Open only to majors. Prerequisite: 340.

CMU 449 Advertising Seminar (3)
Presentations by industry professionals of current practice. 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 videotape in production. Recommended: relevant courses in broadcast news and production.

CMU 356, 357 News Broadcasting (3)
Preparation and presentation of news broadcasts; editing radio news program; use of visuals; television newscast presentation. Open only to majors. Prerequisite: 355.

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. 6)
Advanced program planning, research, direction, and production; on-the-air presentation. Prerequisite: 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 station. Internship credits may not be applied to fulfill specific 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 of WA 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 professional 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

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: 200 or permission of instructor.

CMU 402 Government and Mass Communication (3)
The Anglo-American concept of freedom of communications; its evolution under federal and state constitutions. Tension areas, judicial decisions, statutes, and administrative regulations affecting publishing, broadcasting, etc.

CMU 406 Structure and Process of the Mass Media (5)
Organization for information and entertainment. Consequences of public policy. Place in American political economy. Prerequisite: 150 or 214 or permission of instructor.

CMU 407 Content Analysis (3) W
Techniques used in the systematic study of messages.

CMU 409 Experimentalism in Communication (3)
Techniques of experimentation in the study of communicating. Prerequisite: elementary statistics.
Courses for Graduates Only

CMU 500, 501 Seminar in Theory of Communication (5,5) Procedures for analyzing concepts and theoretical material to provide basis for one's research. How to make productive use of the literature. Procedures for theorizing about empirical findings and generalizations. Typologies, 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 508 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 research. Foundation 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 513, 514 Seminar in History and Communications (3,3) Development of the historical approach to communications research. Study of historical method, bibliography, and criticism.

CMU 543 Seminar in Advertising in Society (3) Fruter Interacting historical, social, economic, and legal influences shaping institutional character. Prerequisite: permission of instructor.

CMU 547 Seminar in Communication and Consumer Behavior (3) Directed reading and research in communication and consumer behavior. Emphasis on conceptualization and original research. Prerequisite: permission of instructor.

CMU 550 Advanced Communication Methods (1-3, max. 3) Direct study of selected research topics in mass communications or selected area of interest or special research project. Prerequisites: 500 and permission of instructor.

CMU 570 Seminar in the Theory and Criticism of Broadcasting (3) Criticism of the function and performance of broadcasting. 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 phenomena. 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 systems. Interdisciplinary focus.

CMU 584 Seminar in Regional Communication Systems (3, max. 6) Communication as a factor in economic, sociocultural, and political relations among nations of a region. Focus varies with special direction of instructor. Commit graduate secretary for details. Interdisciplinary focus.

CMU 585 Seminar in Comparative Methodologies (3) Conceptual and methodological approaches to comparative 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 communication 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 faculty member. Prerequisites: 501, 509.

CMU 598 Selected Readings (1-5, max. 10) Prerequisite: permission of Supervisor Committee chairperson.

CMU 600 Independent Study or Research (*) Individual readings or study, including independent study in preparation for dissertation. 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) L. Yarbro Study of the "Ring," considering the interrelationships of music, drama, text, and philosophy within the unity of the work. Major themes and symbols, with particular attention to the relationship of the work to Jutland archetypes and the Herzen cycle. Not open to students who have taken IDS 542.

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 function, the relationship of thought to other human activities, ways they develop and change, and effects of such change; problem of the transmission of ideas; and some representative studies of particular ideas. Prerequisites: advance study in the history of ideas and permission of instructor.

CHID 491 Senior Thesis (5) AWSp Preparation of a senior thesis under the direction and supervision 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 credits in literature or general 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 Comparative Literature office for quarterly course descriptions.
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 literature and methodologies. 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 (3) A
Introduction to world literature, from the Renaissance to modern times, based upon the theme of "parents and children." Selections drawn from European, English, American, and African 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, 5-5-5, 5-5) A, W, Sp
African literature from the colonial period to the present with special emphasis on the impact of colonialism, rebellion, and humanism. Representative works in prose, poetry, and drama. Among authors studied: Achebe, Mphahlele, Oyono, Paton, Senghor, Soyinka, Tutuola.


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 treatments of the revolutionary theme.

C LIT 315 Literature of Absurdity (5) French, German, British, and American absurd novels and plays (e.g., Beckett, Ionesco, the absurd plays of Ibsen, Strindberg, Goldoni, the absurd plays of Ibsen, Strindberg, Goldoni, the absurd plays of Beckett, Ionesco) and, generally, the techniques of the absurd employed in non-prosaic art forms.

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 literature 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. Course content varies.

C LIT 401 Modern European Drama (5)
Selected plays, read in English, by Ibsen, Strindberg, Chekhov, Pirandello, Brecht, Camus, Ionesco, Beckett, Albee, Pinter, and others. Background lectures in philosophy and literature.

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 Literatur der Kompromisse (5)
Selected novels, stories, poems, and plays by Pet, Gar­ shin, Chekhov, Crane, Conrad, James, Bunin, and Proust, which are frequently identified with the impressionist trend in Western literature from 1830 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, appear to have a profound and universal significance for the human imagination. Course content varies.

C LIT 415 The Comic in Literature (5)
Masterspieces of the genre, emphasizing various modes and uses of the comic.

C LIT 434 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 Roman epics, other Greco-Roman literary epics, and epic with the film

C LIT 440 The Novel (3-5, max. 10) The novel as a genre. Material varies with individual faculty members who offer the course, but, namely, the larger technical and stylistic questions are illustrated through intensive study of novels by two or more writers from different national literatures.

C LIT 472 Studies in Narrative (3-5, max. 10) Narrative structures 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, Italian, and Spanish poets from the Romantic period to the present.

C LIT 490 Directed Study or Research (1-5, max. 10) AWS (5) Individual study of topics in comparative literature by arrangement 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 information on the quarter and year the courses below will be offered. Graduate-level course numbers merely distinguish courses and do not indicate a more advanced 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. Emphasis on comparative topics relevant 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 developed from the Middle Ages to the present. Emphasis on the philosophical background from which the literary ideas emerged.

C LIT 515 Recent Trends in Literary Criticism (5-5) Recent trends in literary criticism; in particular, structural, and philosophical approaches.

C LIT 521 Twentieth-Century Literature (3-5) Selected movements, and one or more trends of significance in literature of Europe and the Americas during the twentieth century. Phenomena such as surrealism, existentialism, and post-modernism will be considered.

C LIT 522 The Baroque in Criticism and Literature (3-5, max. 15) Origins and history of the term as used in literary criticism, and studied by a representative Baroque literature in various countries. Included are such works as Don Quixote, Père, and French, Spanish, Italian, and Comparative availability is 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 themes of the Romantic movement in Europe and America. Course content may vary.

C LIT 550 European Realism (3-5) European Realism (Balzac, Flaubert, Turgenev, Dostoevsky, Tolstoy, the representatives of naturalism, and the writers of "poetic realism") in connection with various aesthetic doctrines and subsequent critical approaches.

C LIT 551 The Symbolist Movement (3-5, max. 10) The Symbolist movement from its beginnings in nineteenth-century French poetry through later developments in European poetry, fiction, and drama. Related developments 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 the importance of classical rhetoric in European literary works from the eighteenth to the 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 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 cultural periods (e.g., French, German, and Italian literature). 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 multicultural 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 significance for the human imagination. Course content varies.

C LIT 575 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
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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. Prerequisite: 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, psychology, 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 Intercollege or Interschool Programs.

DANCE

Courses for Undergraduates

DANCE 101, 102, 103 Ballet Technique I (3, max. 6; 3) A, W, Sp

Boris, Green

Introduction to basic vocabulary of ballet technique. Emphasis on flexibility, strength, balance, endurance, rhythmic awareness, and spatial perception. Prerequisites: permission of instructor for 103; 102 or permission of instructor for 101.

DANCE 104, 105, 106 Modern Dance Technique I (3, max. 6; 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 102; 101 or permission of instructor for 102.


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; 106 or permission of instructor for 108; 105 or permission of instructor for 106.

DANCE 123, 124, 125 Contemporary Dance I, II, III (1,1,1) A, W, Sp

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. Expansion 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 I (1, max. 6) AWSpS Fundamentals of the technique of dancing on the toes (es pointe). Prerequisites: 103 or permission of instructor and concurrent registration in a ballet technique course.

DANCE 223 Men’s Special Techniques (1, max. 6) AWSpS Special 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 Cultures (1, max. 6) Folk dances of Western cultures (i.e., Irish, American square, Scandinavian, or Scottish). See quarterly Time Schedule for specific offering. Prerequisite: 103 or permission of instructor.

DANCE 232 Folk/Ethnic Dances of Eastern Europe 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) The common meters (4/4, 2/4, 3/4, 6/8), note values, tempo, and musical terminology. Modes of study are form, rhythm, meter, phrase length, and form. Basic principles of choreography and notation. Prerequisites: 103 or permission of instructor.

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, rhythm, meter, phrase length, and form. Prerequisites: 103 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, Prokofiev, etc.) and contemporary scores written specifically for dance. Involves analysis in terms of rhythm, meter, phrase length, and form. Prerequisite: 241 or permission of instructor.

DANCE 250 Exploring the Articulate Body (3) AWSpS Hackney

Basic body connections and joint articulations. Principles of dynamic body alignment, patterning efficient lines of movement, weight distribution, connections from lower to upper body support. Based on the Barre and Martineau models of movement as developed by Rudolf Laban and others. Prerequisite: 251; 251 or permission of instructor for 252; 252 or permission of instructor for 253.

DANCE 254 Effort/Shape (3) AWSpS 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 (3, max. 6) AWSpS

Logical extension of the basic dance techniques, folk-ethnic, and special techniques classes to provide a performing 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) A, W, Sp

Boris, Green

Advanced-intermediate level: continued development and expansion in all areas of technique. Prerequisites: 206 or permission of instructor 301; 301 or permission of instructor for 303; 302 or permission of instructor for 303.

DANCE 304, 305, 306 Modern Dance Technique III (3, max. 6; 3, max. 6) A, W, Sp

Andersen, Skinner, Evans Company

Intermediate-advanced. Increased refinement of kines­thetic 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) AWSpS

Evans Company

Introduction to performing pieces from professional dance repertoires, including reconstructions from notated scores. Prerequisites: permission of instructor and concurrent registration in a dance technique course.

DANCE 324 Partnering Techniques (1, max. 6) AWSpS

Partnering: technique and practice necessary for two or more persons dancing together. Prerequisites: 206 or permission of instructor and concurrent registration in a dance technique course.

DANCE 355 Pre-Classical Dance Forms I, (1, max. 6) AWSpS

Court, social, and country dance forms originating in western Europe between the fourteenth and seventeenth centuries that serve as auxiliary models of period form and style. Prerequisite: 103 or permission of instructor.

DANCE 356 Jazz Technique (2, max. 12) AWSpS

Boris, Green

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 359 Top and Soft-Shoe Technique (1, max. 6) AWSpS

Evans Company

Study and practice of tap and soft-shoe technique. Prerequisite: permission of instructor.

DANCE 345 History of Dance (3) Sp Skinner

Roots of contemporary dance as an art form and its relationship to developments in ballet and other art forms since the turn of the century.

DANCE 365 Dance Composition I, (3, max. 9) AWSpS

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 Technique IV (3, max. 6; 3, max. 6) A, W, Sp

Andersen, Skinner

Advanced professional level. Prerequisites: 303 or per-

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mission of instructor for 401; 401 or permission of instructor 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 adapted to longer dance sequences; development of a personal style; projection of mood, emotion, or dramatic situation; readiness of response to a choreographer's wishes. Prerequisites: 306 or permission of instructor for 404; 404 or permission of instructor for 405; 405 or permission of instructor for 406.

DANCE 464 Contemporary Dance Workshop (1, max. 3) A,W,Sp
Skinner
Improvisation as an art skill; indeterminacy and chance procedures in choreography. Prerequisite: permission of instructor.

DANCE 465 Experimental Dance Workshop (3, max. 9) A,W,Sp
Workshop laboratory designed to explore experimental approaches to dance. Prerequisite: permission of instructor.

DANCE 470 Dance Production Activities (1-3, max. 12) A,W,Sp
Green
Participation in dance productions, either studio showings or public performances, conducted under faculty direction or supervision. Prerequisite: permission of instructor.

DANCE 471 University of Washington Dance Theatre (3) A,W,Sp
Andersen
Performing company for advanced-level students. Open only by audition and/or invitation of the artistic director. Maintains a seven- to nine-week rehearsal schedule with regularly scheduled performances during the academic year. Prerequisites: audition and permission of instructor.

DANCE 499 Undergraduate Independent Study (*, max. 6) A,W,Sp

DRAMA

Courses for Undergraduates

DRAMA 101 Introduction to the Theatre (5) A,W,Sp
Introduction to the theatre as an art form with emphasis on the play on the production. The role of the various theatre artists: actors, directors, designers, and playwrights. Requisite: English 101 or permission of instructor. Open to nonmajors.

DRAMA 102 Play Analysis (5) Lorentzen, Winnchell, Woocot
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) Lorentzen, Winnchell, Woocot
Theory and practice of fundamentals. Prerequisite: 151 for 152; 152 for 153.

DRAMA 200 Drama and the Child (3) A,W,Sp
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 (3,3,3) A,W,Sp
McCoy
Historical survey of Black theatre. 201: African ritual and contemporary prototype; Black theatrical activity in nineteenth-century America; minstrelsy; the Negro renaissance; Negro theatre during the Depression; Negro theatre during World War II; Negro theatre and "Big Business." 202: Revolutionary Black theatre; the 1960s; Black women in the theatre; a new image; new audience and contemporary trends. Prerequisite: 201 for 202 or permission of instructor.

DRAMA 210, 211, 212 Theatre Technical Practice (3,3,3) A,W,Sp
Intensive lecture-laboratory in basic techniques, 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 philosophies 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 skills; 252: the creative role, sensual 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.

Laboratory course involving specific production assignment, either in-shop or in-theatre or both. Prerequisites: 210 for 250 or concurrent registration; 211 for 251 or concurrent registration; 212 for 252 or concurrent registration.

DRAMA 298 Theatre Production (1-3, max. 9) A,W,Sp
Laboratory course for students participating in School of Drama productions. Prerequisite: being cast in a production or receiving a crew assignment.

DRAMA 314 Beginning Design for the Theatre (3) A,W,Sp
Dahstrom
Introduction to the concepts of developing and presenting designs for theatre environments. Focus on developing facility in simple perspective drawing, basic rendering and drafting techniques, and basic theatre design concepts and practices. Individual design project required. Prerequisite: 210.

DRAMA 316 Theatrical Makeup (2) A,W,Sp
Galistan
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) A,W,Sp
325: fundamentals of scenery, lighting, and costume design and construction. 326: fundamentals of directing, especially for high school, with scene acting. Open to nonmajors.

DRAMA 330 Children's Theatre (3) W Zeder
History, theory, and techniques of performance for children's theatre. Emphasis on play selection, critical analysis, and rehearsal procedures. Prerequisite: 230 and sophomore standing, or permission of instructor.

DRAMA 331 Puppetry (3) A,W,Sp
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) A,W,Sp
Theory and practice of fundamentals of playacting as they relate to teaching children through improvisation and practical solving. Emphasis on 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 dramatics. Intensive personal involvement in activities and experiments that form the foundations of learning through drama. Emphasis on sensory awareness, play theory, creativity, and playmaking through improvisation. Prerequisite: 230 or permission of instructor.

DRAMA 338 Creative Dramatics (3) A,W,Sp
Analysis of basic principles and techniques of the creative 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: audition for 351; 351 for 352; 352 for 353.

DRAMA 361 Chicano Drama (3)
Focuses on the impact of the religious, economic, political, 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 Lorentzen, Winchell, Woocot
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 relationship of playhouse to performance of dramatic texts. Primarily for drama majors; open to others with a background in the history and/or literature of the period.

DRAMA 372 History of the Western Theatre and Its Literature 1400-1700 (5) W Lorentzen, Winchell, Woocot
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 neoclassical theatre and the underlying neoclassical ideas to the theatre of the English Restoration, the theatre of Shakespeare, the court masques of Inigo Jones, and the theatrical activity of the English Restoration. Primarily for drama majors; open to others with a background in the history and/or literature of the period.

DRAMA 373 History of the Western Theatre and Its Literature 1700-1860 (5) Sp Lorentzen, Winchell, Woocot
Theatre history and dramatic literature of Europe, England, and America. Development of the modern playhouse, 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.

DRAMA 374 History of the Greek Theatre and Its Drama (5) Woocot
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 plays that influenced the theatre of the period. Prerequisite: 371 or permission of instructor.

See 374 for course description. Prerequisite: 372 or permission of instructor.

DRAMA 378 History of the English Theatre and Its Drama 1500-1700 (5) Sp Lorentzen
See 374 for course description. Prerequisite: 372 or permission of instructor.

DRAMA 401 Summer Theatre (15, max. 30) S
Directed readings and practical work in selected plays, periods, and practices of the theatre arts. A modified stock company engages in extensive rehearsal and performance of selected plays, participates in workshop productions in all areas of the theatre arts. Prerequisite: permission of instructor.

Production-related apprenticeship, under faculty-staff supervision. 410: scene construction and scene painting. 412: lighting. Prerequisites: 210 or 418 or permission of instructor for 410; 210 or permission of instructor for 411; 212 or permission of instructor for 412.

DRAMA 430, 431, 432 Production (2,2,2) A,W,Sp
Loper, Winnchell
Practicum in directing, with specific concentration in directing. Prerequisites: permission of instructor or director.
DRAMA 431 Advanced Scene Construction (3) A Special problems in scene construction materials and rigging. Prerequisites: 210, 212, 290, 292, 410 or equivalent practical experience, and 420.

DRAMA 434 Playwriting for Young Audiences (3) W Zelder Basic principles of dramatic structure and play construction, 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 Zelder Practical experiences in researching, devising, rehearsing, and presenting 'after-school' 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.

DRAMA 436 Creative Drama Teaching Methods (3) W Pearson Analysis of basic principles and techniques of leading informal drama. Examination of relationship between drama and selected theories of child development. Practical experience in planning and leading plays in drama classes 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 nonmajors. Prerequisite: 338.


DRAMA 457 Studio I (12, max. 36) AWSp Hobs, Turner, Yorke Skill development in acting, voice, speech, and movement necessary for professional training in acting. Prerequisite: admission to the Professional Actor Training program.

DRAMA 458 Studio II (12, max. 36) AWSp Hobs, Turner, Yorke 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 Hobs, Turner, Yorke 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. Prerequisites: 102, 223, 253, 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 IdeC. Theatre workshop experience in the emerging dramas of American ethnic minorities through in-class and production participation. Prerequisite: permission of instructor.

DRAMA 466 Directing Apprenticeship (2-5, max. 15) AWSp Hobs, Hosteder Apprenticeship with professional director or association with thesis director as stage manager or assistant. Prereq-

DRAMA 472 History of the English Theatre and Its Drama: 1700-1900 (5) Lorenzo Examination of the relationship of the physical theatre and the productions that took place within that theatre. Particular emphasis on the text performed; styles of acting, scenic elements, and the critical theories that influenced the theatre of the period. Prerequisite: 373 or permission of instructor.

DRAMA 473 History of the European Theatre and Its Drama From 1875 (5) Sp Winer, Wolfson 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, Yacht, Wollcott 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, Edward 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) Zelder Professional course. Prerequisite: ENGL 374 or permission of instructor.

DRAMA 494 Special Studies in Theatre and Drama of the European Theatre Productions Hostetter, Loper, Lorenzo, Wincell, Wolfson 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 instructor.

DRAMA 495 Stage Costume Problems (2, max. 8) Crider Series of specialized courses directed to specific areas and problems of costume design and execution; accessories, textiles, masks, wigs, and analysis of construction of historic clothing and/or specialized clothing. Prerequisites: 211, 416, and permission of instructor.

DRAMA 497 Theatre Organization and Management (3) Sp Dye Theoretical and practical examination of the professional theatre organization and management: legal structures, funding, business practices, unions, and operational procedures. Open to nonmajors.

DRAMA 498 Theatre Production (1-2, max. 9) AWSp 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
Three-quarter sequential investigation of space, light, texture, and color in total theatre design, concentrating on mastery of the media and methods of presentation 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. Projects and outside reading may be required. Prerequisites: 510, 517, 518, 519.

DRAMA 512 Advanced Stage Lighting Design (3, max. 6) Dein
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 - Dein
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 selected historic periods. Prerequisites: 517 for 518; 518 for 519; or permission of instructor.

DRAMA 520 Advanced Theatre Practice (1-5, max. 15) AWSp
Professional student internship with professional theatre: scenery, lighting, scene painting, costuming, acting, directing, stage management, theatre management. Prerequisite: permission of instructor.

DRAMA 530 Directing for Young Audiences (3) W Pearman
Practical experience in directing plays for young audiences, with particular attention to story theatre, development of performances using improvisation, and participation plays. Exposure to young audiences 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 - Cramer, 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 management of children's theatre and related children's arts programs. Emphasis on economic, social, and psychological implications 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
Analysis, discussion, and critique of special studies, productions, 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 (3, 4, 4) AWSp - Pearson, Zeder

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 exercises. 552 and 553: supervision of scene work for students required in 552, 553. Prerequisite: permission of instructor.

DRAMA 555 Special Problems in Acting (6, max. 18) AWSp - Hobbs, Turner, York
Advanced study of certain techniques, style problems, popular entertainment techniques. Prerequisites: 458 and completion of the second year of the Professional Actor Training Program.

DRAMA 562 Advanced Directing Projects (3, max. 18) AWSp
Prerequisite: 462 or permission of instructor.

DRAMA 563 Seminar in Directing (2, max. 18) AWSp
Syndics
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.

Prerequisites: 571 for 572, 573. Prerequisites: 571, 572, 573.

DRAMA 575, 576, 577 Seminar in The History Theatre (3, 3) A, W, Sp - Loper, Winchell
Prerequisites: 571, 572, 573.

DRAMA 581, 582, 583 Analysis of Dramatic Literature (3, 3, 3) A, W, Sp - Loper, Winchell
Prerequisites: 571, 572, 573.

DRAMA 585, 586, 587 Seminar in Drama (3, 3, 3) A, W, Sp - Loper, Winchell
Prerequisites: 571, 572, 573.

ECONOMICS

Courses for Undergraduates

INTRODUCTORY COURSES

ECON 211 General Economics (3) AWSp
Survey of basic principles of economics; determination of national income, price and the allocation of resources. Primarily for engineering and forestry students. No credit if 200 has been taken.

ECON 260 Economic History of the Western World (3)
Analysis of the sources of long-run economic change from Neolithic times to the present. Develops basic analytical concepts of economic change and applies them to human history. First half of the course deals with economic development up to the 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, which are then applied to problems of current interest. Emphasis on teaching students how to approach and analyze 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 permission of instructor.

GENERAL THEORY

ECON 300 Intermediate Price Theory (5) AWSp
Principles and concepts. Demand, supply, market price, and the determination of price under competitive and monopolistic conditions; relation between prices and costs. Prerequisites: 201 and MATH 157 or 124, or equivalent.

ECON 301 National Income Analysis (5) AWSp
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 350 Development of Economic Thought (5)
From the early modern period to the present, with some discussion of its relation to natural science and other social sciences. The main subjects treated are Adam Smith and the classical school, Karl Marx, later Marxists, and the transition to J. M. Keynes. Prerequisites: 200, 201, or equivalent.

ECON 400 Fundamentals of Microtheory (3)
Fundamentals of microeconomics for students majoring in fields other than economics. No credit if 300 has been taken for credit. Prerequisite: permission of undergraduate adviser. Recommended: 200 or equivalent.

ECON 491 Fundamentals of Macroeconomics (3)
Fundamentals of macroeconomics for students majoring in fields other than economics. No credit if 300 has been taken for credit. Prerequisite: 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 examination of theoretical and empirical work. A list of topics for the seminars is available in the Department of Economics 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, Nord
Graduate seminar in political economy with focus on Marxian and public-choice approaches to political economy. Explores the questions raised by each approach, posing a number of questions, and applies these approaches to a number of problems in political economy. Offered jointly with POL 5 409. Prerequisites: 200, POL 5 201, and permission of instructor.

ECON 491 Introduction to Mathematical Economics (4) AWSp
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 set, se-
ECO 411 Introduction to Mathematical Economics II (5)
Introduction to the functions of several variables with applications to economics. Partial derivatives, the implicit function theorem, theory of minima and maxima. Economic applications to money supply and bank reserves. Theory of the multiplier and the business cycle. Prerequisite: 410 or MATH 124.

ECO 412 Introduction to Mathematical Economics III (5)
The linearization of simple real equations and the application of linear algebra and matrix methods with special emphasis on problems originating in economic theory. Prerequisite: 411 or MATH 124.

ECO 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 GEOG 416. Prerequisite: 201 or 400 or equivalent.

MONEY, BANKING, AND CYCLES

ECO 421 Money, Credit, and the Economy (5)
Supply and use of money, bank deposits, and bank reserves. Relationship of Treasury, Federal Reserve, and commercial bank policies, and the value of money. Factors affecting money aggregates and the economic cycle. Prerequisites: 300 and 301 or B ECON 300 and 301; or equivalent.

ECO 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 decision (compositions, determinants 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

ECO 430 Government and Business (5) AWSp
Analysis of the economic effects of various governmental regulatory agencies and policies. Emphasis placed upon the observed economic effects of policies intended to regulate business practices, control prices, conserve resources, or promote competition. Examination of antitrust legislation as a means of promoting desired market performance. Prerequisite: 201 or equivalent.

ECO 404 Industrial Organization and Price Analysis (5)
Study of the economic determinants and consequences of various forms of industrial market structures. The relationship between market structure and economic behavior is studied. Topics include the theory of the firm, oligopoly, imperfectly competitive markets. The empirical basis for theories of market behavior also is studied. Prerequisite: 300 or equivalent.

ECO 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 economy. Emphasis on its special attention given to government, large corporations, and socioeconomic problems. Prerequisites: 300 and 301, or permission of instructor.

ECO 435 Natural Resource Utilization and Public Policy (5) AWSp
Specific emphasis on elements of economic theory relating to resource-oriented industries. Case studies in the theory and practice of resource management dealing with water, forests, soil, mineral, and other natural resources. Benefit-cost analysis and the evaluation of multipurpose resource projects. Prerequisite: 201 or 400 or permission of instructor.

LABOR ECONOMICS

ECO 430 Labor Economics (5) AWSp
Analysis of labor markets with emphasis on factors determining the size of the labor force, unemployment, distribution of income, unionization, 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 non-economic aspects of trade union activity. Prerequisites: 200 and 201.

ECO 436 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, private profit versus not-for-profit, and governmental regulation and health-economic development. Prerequisite: 200 or equivalent.

ECO 437 Introduction to Population and Economic Dynamics (5)
Dynamic interrelations of population and economics. Analysis of the problems of modelling population and economic development with a discussion of the major approaches. A look at the historical record, focusing upon 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.

ECO 443 Labor Market Analysis (5)
Factors that determine wage rates and employment levels in the labor markets. Emphasis on the union in the labor market. Prerequisite: 300 or equivalent.

ECO 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

ECO 350 Public Finance (5) AWSp
Elementary treatment of the theory of public finance; theory of nonmarket decisions, welfare and allocative effects of taxation, principles of fiscal policy, problems of the public debt. Prerequisites: 200 and 201 or equivalent.

ECO 450 Theory of Public Finance and Fiscal Choice (5)
Advanced treatment of the theory of taxation and public spending. Emphasis on tax structure and implications for economic policy; and for graduate students majoring in economics and for graduate students majoring in fields other than economics. Prerequisite: 300 or equivalent.

ECO 452 Economic Approaches to Political Analysis (5)
Application of economic theory and methodology to political phenomena. Emphasis on theory construction with application in the American context. Offered jointly with POL S 416. Prerequisite: 201 or 400 or equivalent.

ECONOMIC HISTORY

ECO 460 Economic History of Europe (5)
Origins of the modern European economy: historical analysis of economic change and growth from medieval times to the present. Prerequisite: Prefor, 101 or equivalent.

ECO 462 Economic History of the United States to the Civil War (5)
Systematic study of the changing pre-Civil War economic institutions and the consequences for the American society. Prerequisites: 200 and 201 or equivalent.

ECO 463 Economic History of the United States From the Civil War to the Present (5)
Systematic study of the changing pre-Civil War economic institutions and the consequences for the American society. Prerequisites: 200 and 201 or equivalent.

ECO 465 Economic History of South Asia (5)
Historical and economic analysis of the development of South Asia. Focuses on the economic development and growth of the region and its relationship to the world economy. Prerequisite: 200 or equivalent.

ECO 466 Economic History of China: 1840-1949 (5)

INTERNATIONAL TRADE

ECO 370 Introduction to International Economics (5)
Introduction to the structure of international trade, commercial policy, and the balance of payments in a theoretical context and used to examine current problems such as international monetary reform, trade and less-developed countries, and regional economic cooperation. Prerequisites: 200 and 201. Highly recommended: 201.

ECO 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 commercial policies. Role of foreign trade and investment in economic growth. Prerequisites: 300 or equivalent.

COMPARATIVE SYSTEM AND DEVELOPMENT

ECO 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 systems are developed and then illustrated by case studies of selected countries. Prerequisites: 200 and 201 or equivalent.

ECO 391 Economic Development (5)
Critical appraisal of theories and problems of growth with emphasis on the last 100 years in countries of the world today. Prerequisites: 200 and 201.

ECO 493 Economy of Modern China (5)
Analytical survey of economic development of modern China, with special emphasis on the objectives, performance, and problems of the modern Chinese economy under socialism. Prerequisites: 200, 201, or permission of instructor.

ECO 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 industrialization, various effects of sustained economic growth, and significant contemporary issues are investigated. Prerequisites: 200 and 201, or permission of instructor.

ECO 495 The Economy of Soviet Russia (5)
Analytical survey of economic development of the Soviet Union, with special emphasis on the objectives, performance, and problems of the modern Chinese economy under socialism. Prerequisites: 200, 201, or permission of instructor.

STATISTICS AND ECONOMETRICS

ECO 281 Introduction to Economic Statistics (5) AWSp
Essential statistical concepts; characteristics of economic data; statistical analysis of economic data. Prerequisites: 200 and 201.

ECO 480 Economic Statistical Analysis (5)
Application of statistical techniques to economic problems with emphasis on applications. Prerequisite: 281 (calculus at level of MATH 115 or ECON 410 may be used).

ECO 482 Introduction to Regression Analysis (5)
Specification and estimation of economic problems by multiple regression equation. Prerequisites: 201 and 480.

ECO 483 Econometric Modeling (5)
Nelson, Rao
Availability of Washington State economic statistics, published and unpublished, and econometric models. Build econometric models to meet stated assumptions to forecast regional economic variables. Prerequisites: 281, 482.

GENERAL

ECO 495 Honors Seminar (5) W
Courses, readings, and research topics are given to qualified students. Prerequisite: 281.
GOVERNMENT REGULATION AND INDUSTRIAL ORGANIZATION

ECON 530 Government Regulation of Business (3) Public policy in the United States with respect to industrial organization and business conduct. Recent issues in public control of business.

ECON 532 Economics of the Regulation of Technology (3) AWSp
General political-economy framework for analyzing regulation and regulatory reform applied to questions of regulating technology. Aspects of regulating transportation, product safety, energy, and medicine are considered as specific examples of general previsions previously derived. Offered jointly with SMS 552. Prerequisite: 300 or 400 or 500. (Last time offered: Spring Quarter 1981.)

ECON 533 Price Policy and Industrial Organization (3) AWSp
Advanced analysis of market structures and industry performance; selected empirical studies; principles of conservation and benefit-cost analysis; issues in public policy. Prerequisite: 500.

ECON 535 Economics of Natural Resources (3) AWSp
Pricing, allocation, and utilization of natural resources; externalities; public investment criteria; technological relationships; alternative principles of public decision making; benefit-cost analysis; case studies. Prerequisite: 435 or 500 or permission of instructor.

ECON 536 Economics of Natural Resources II (3) AWSp
The second of two-course sequence. One applied area selected 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)
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 income maintenance, welfare, labor, the demand and supply of social services, citizen human capital, etc. Offered jointly with B ECS 531 and SOC W 565. Prerequisite: 500 or B ECS 500 or permission of instructor.

ECON 541, 542 Labor Economics (3, 3)
Selected topics in labor economics.

ECON 543 -Population Economics (3) Sp Edelmann
Economic determinants and consequences of population growth with emphasis on formal theoretical models and empirical analysis. Topics include: introduction to formal geography models; the welfare implications of population change, including analyses of population effects on consumption, savings, investment, and technical change; and introduction to the determinants of mortality, fertility, and migration. Prerequisite: 300.

ECON 546 Economic Studies of Health Care (3) Maguire, Wann
Examination of issues related to the economics of health care, including supply and demand factors, financing of care, efficiency and cost of delivery, and allied areas. Offered 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 Wann
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 Resource (3) Sp
Hashimoto
Economic analysis of policy-related topics in human resources. Topics include: demand and supply, education and occupation, wage structures and income inequality, discrimination, and poverty. Offered jointly with PSY 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 public 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) Theory of collective action; welfare economics, with special 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; welfare and welfare consequences of inflation. Prerequisites: 500, 502, and 550.

ECON 553 Economic Analysis and Government Programs (3)
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
For students in social management of technology, economics, engineering, public affairs, environmental studies, 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 SMS 554. Prerequisite: 500 or 400. (Last time offered: Spring Quarter 1981.)

ECONOMIC HISTORY

ECON 504 Economic History and Economic Development (3) A Page
Analysis of determinants of long-run development, emphasizing institutional, demographic, and technological change and 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; constitution of selective action; issues in current research. Prerequisites: 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 description.

ECON 590 Theory and Practice of Economic Planning (3)
Theoretical issues and success criteria; models, techniques, and applications of planning in the allocation of
COLLEGE OF ARTS AND SCIENCES

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 514 General Equilibrium Analysis (3) Study of the existence, uniqueness, and stability of general equilibrium models under the assumptions of competition. Emphasis is on recent developments in the literature with consideration given to both positive and normative economics.

ECON 517 Foundations of Econometric Analysis (3) Study of the sources of meaningful comparative statics theorems in economics, with special emphasis on extremum problems, qualitative analysis, and dynamic stability. 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 500.

GENERAL

ECON 600 Independent Study or Research (*) AWRSP

ECON 700 Master's Thesis (*) AWRSP

ECON 800 Doctoral Dissertation (*) AWRSP

ENGLISH Courses for Undergraduates

The 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 all courses are published by the Department of English prior to preregistration.

FRESHMAN ENGLISH

ENGL 104-105 Introductory Composition (5-5) AWRSP, AWRSP 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 of the Office of Minority Affairs.

ENGL 106 Practical Forms of Writing (5) Sp Instruction in writing essay examinations, reports, reviews, and research papers. For Educational Opportunity Program students only, upon recommendation of the Office of Minority Affairs. Prerequisites: 104 and 105, or special placement.

ENGL 111 Writing About Literature (5) AWRSP Interpretative and critical writing based upon selected works in fiction, drama, and poetry.

ENGL 121 Issues, Topics, and Modes (5) AWRSP Argumentative and persuasive writing, based upon reading drawn from a variety of sources—ancient and modern English translation; others (especially later works) are read in Middle English.

ENGL 122 Issues, Topics, and Modes (5) AWRSP Content varies. See quarterly departmental descriptions.

ENGL 171 College Writing (3) AWRSP Development of writing skills. Students are encouraged to develop their own resources and to acquire new techniques for more insightful and effective expression. Related readings in expository prose.

ENGL 172 The Research Paper (3) AWRSP Includes study of library resources, the analysis of reading materials, and writing preparatory papers as basic to writing a research paper. Open to all undergraduates. Prerequisite: one of 111, 121, 122, 171, or 181.

ENGL 181 Expository Writing (5) AWRSP Emphasis upon clear, coherent, correct writing. Not recommended for students who have taken 171.

LOWER-DIVISION COURSES

VARIETIES OF LITERATURE FOR GENERAL READERS

ENGL 211 Reading Fiction (5) AWRSP Emphasis on American and European fiction of the nineteenth and twentieth centuries. Not a historical survey; however, students must have an opportunity to consider the nature and forms of fiction, as well as their cultural context, and to frame their own responses to fiction, the "lie which tells truths." 5

ENGL 212 Reading Poetry (5) AWRSP 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 poetic techniques by which ideas and moods are shaped.

ENGL 213 Reading Drama (5) AWRSP Introduction to the understanding and enjoyment of dramatic literature. Not a course in the history of drama. Explores 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) AWRSP Emphasis on the study of the ways and means of making a poem. Further development of fundamental skills. Emphasis on revision. Prerequisite: 274 for 386; 386 for 387; or permission of instructor.

ENGL 232 Intermediate Short Story Writing (5) AWRSP Exploring and developing continuity in the elements of fiction writing. Methods of extending and sustaining plot, setting, character, point of view, and tone. Recommended: 277 or permission of instructor.

ENGL 421 Special Studies in Expository Writing (5) AWRSP Individual projects in nonfiction, including short biography, essay, narrative, and opinion writing. Recommended: 271 or 272.

ENGL 422, 423, 424 Advanced Expository Writing (5,5) AWRSP, AWRSP, AWRSP, AWRSP Intensive study of ways and means of making a poem. Further development of fundamental skills. Emphasis on revision. Prerequisites: 386 or 387 or permission of instructor.

ENGL 425, 426 Advanced Short Story Writing (5,5) AWRSP, AWRSP Experience with the theory and practice of writing the short story. Prerequisites: 386 or permission of instructor; 425 or 426.

ENGL 427, 428, 429 Novel Writing (5,5) AWRSP 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 a completed draft. Prerequisite: permission of instructor.

UPPER-DIVISION COURSES

Upper-division courses are open to all undergraduates. Most count for humanities distribution. Courses with a quarter designation are usually offered once every two years. For an accurate description of courses for the year, please consult the departmental description booklets available in the department during registration periods.
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 attention 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, Beumont, Fletcher, and Ford, with some medieval liturgical plays, cycles, and moralities.

ENGL 313 Renaissance Literature (5) Poetry and prose by such writers as Wyatt, Surrey, Spen- ser, Sidney, Marlowe, Shakespeare, with attention to the religious, intellectual, and literary contexts.

ENGL 314 Shakespeare to 1603 (5) WSp Shakespeare's career as dramatist before 1603 (including Hamlet): Study of history plays, comedies, and tragedies.

ENGL 315 Shakespeare After 1603 (5) WSp Shakespeare's career as poet 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- well, Herbert, Dryden, Bacon, Hobbes, and Bunyan, with attention to the religious, intellectual, and literary contexts.

ENGL 322 Milton (5) WSp Milton's early poems and the prose; Paradise Lost, Paradise Regained, 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 Defoe, Addison, Steele, Gay, and Thomson.

ENGL 326 Later Eighteenth-Century Literature (5) AW Works by Johnson, Boswell, and representative dramatists, novelists, and poets.


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) ASp Austen, the Brontës, Dickens, Thackeray, 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, Auden, and such other poets as Lawrence, Muir,奥斯, 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, and such others as Lessing, Pinter, Greene, Durrell, Backett, 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, Franklin, and others.

ENGL 352 American Literature: Early Nineteenth Century (5) AW Conflicting visions of the national destiny and the individual identity in the early years of America's nationhood. Works by Emerson, Thoreau, Hawthorne, Melville, and such other writers as Poe, Cooper, Irving, Whitman, Dickinson, and Douglass.

ENGL 353 American Literature: Later Nineteenth Century (5) AWP 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 355 American Literature Since 1945 (5) AWP Works by such writers as Ellison, Warren, West, William, Wright, Conner, Mailer, Vonnegut, Barth, Baldwin, Hawkes, Oates, Morrisson, 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) AW Works by such poets as Frost, Stevens, Williams, Pound, Moore, 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 Modernism and the History of Ideas (5) W Various modern authors, from Wordsworth to the present, in relation to such major thinkers as Kant, Hegel, Darwin, Marx, Nietzsche, Bergson, and Wittgenstein, who have helped create the context 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 Translation (5) ASp Fiction, poetry, and drama from the development of modernism to the present. Works by such writers as Mann, Proust, Kafka, Olds, Hasse, Bliko, Brecht, Sar- tre, and Camus.

ENGL 372 Modern Jewish Literature in Translation (5) Survey of Jewish experience and its expression during the past hundred years. Typical writers studied are Sholem 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 women's image, social role, and psychology.

ENGL 376 Women Writers (5, max. 15) AWP 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, Longinus, Horace) and major writers of English criticism, such as Sidney, Jonson, Dryden, Pope, Johnson, Words- worth, Coleridge, Arnold, Wilde, Richards, Keats, and Trilling.

LANGUAGE COURSES

ENGL 390 English Language Study (5) AWP Wide-angle introduction to the study of written and spoken English. The nature of language; ways of describing language; the use of language study as an approach to English literature and the teaching of English.

ENGL 391 English Syntax (5) AWP Description of sentence, phrase, and word structures in present-day English. Recommended: 390.


ENGL 393 History of the English Language (5) Evol-ution of English sounds, forms, structures, and word meanings from Anglo-Saxon times to the present. Recommen­ded: 390.

ENGL 394 The Language of Literature (5) Sp Review and explicit description of 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 405 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 Romance 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)

Studies Techniques of classification, geographic-historical distribution, theories of origin and interpretations, and related areas of investigation of the oral prose folk narrative of literate peoples. 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 cultivation 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 basic 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 aesthetic grasp of reality through language; relates language development to reading skills, literary interpretation, 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) A

AWSp, AWSp

Individual study by arrangement with instructor. Prerequisite: permission of undergraduate chairperson.

ENGL 492 Major Conference for Honors (5) ASp

Individual study (reading, paper) 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) ASp, AWSp

Tutorial arranged by prior mutual agreement between individual student and instructor. Revision of manuscripts is emphasized. New work may be undertaken. Prerequisite: permission of director of creative writing.

ENGL 495 Major Conference for Honors in Creative Writing (5)

Special projects available to honor 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 (3, max. 10) ASp, AWSp

Topics and topics offering special approaches to literature.

COURSES IN ENGLISH FOR FOREIGN STUDENTS

(These courses are administered by the Committee on Language Learning.)

ENGL 150 Intermediate Oral English for Foreign Students (5) ASp

Intermediate course with concentration on the basic grammatical patterns of English, lecture comprehension, and reading skills in English. For students who need to review the grammatical structures or whose oral English is relatively fluent. Prerequisite: placement examination.

ENGL 151 Advanced Oral English for International Students (5) ASp

Advanced course in English as a second language, with emphasis on lecture comprehension, note taking and oral class participation together with review of selected grammar 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. 12) ASp

Emphasis on writing expository prose as found in research 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. Emphasis on groundwork in oral English. Concentration on (1) application of rhetorical concepts most frequently used in scientific and technical writing, (2) grammatical analysis and use for foreign students, and (3) grammatical- rhetorical analysis of scientific 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) undergrada
tute 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.

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.

ENGL 308 Introduction to Teaching Composition (4) ASp

Readings in composition theory and discussion of practical 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 445, 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 (5-5, max. 11)

AWSp, AWSp

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)
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, natural selection, and dynamics of plant and animal populations and the communities they form. For students wishing to obtain a broad picture of basic processes of ecosystems and their interactions for human populations 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 W)
Significance of psychology, sociology, political science, anthropology, and cultural values over geography for development of awareness 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, and weather on plant and animal populations and dynamics on the structure and functioning of ecosystems. Field trips to natural and human modified ecosystems; weekend field trips required. Prerequisite: 204.

ENV S 352 Environmental Assessment (5) W
History of concepts, methods, and practice of environmental assessments to provide a comprehensive understanding of problems of environmental assessment. Emphasis on integrating environmental assessment into planning processes. Prerequisites: 204, 205, 206, or permission of instructor.

ENV S 361 Environmental Values and Perceptions (5) W
Lecture and seminar with focus on the way individual and group values affect our perception of, and relation to, the environment. Explores role of individual characteristics in perceptual acuity and value formation, conflicting values within and between societies, implications 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, Charters, Harrison
Descriptive and quantitative aspects of the earth as a biogeochemical system. Fundamental methods for study of geological, 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 PHYS 408. Prerequisites: CHEM 150, 350, MATH 238.

ENV S 415 Environmental Toxicology (5) W
Eaton
Principles and experimental procedures used to assess the toxic effects of chemicals on human health and the environment. Biological effects and disposition of pesticides, heavy metals, and other environmental contaminants. Prerequisites: methods used to identify environmentally damaging chemicals, validity and interpretation of such tests, and use of such data in regulatory decision making. Prerequisites: BIOL 212, CHEM 232; ZOOL 301 or equivalent.

ENV S 425 Ecology of Population and Food Production (5) A
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, ecosystem functioning, and quality of human life. For students with background in one of the following areas: food, population, or policy. Prerequisite: 204 or permission of instructor.

ENV S 441 Economics of Environmental Management (3-5) Sp
Alternative economic policies for managing man's use of the environment. Economics of pollution and residual control, recreation, common pool resources, conservation of renewable resources. Prerequisite: ECON 201 or permission of instructor.

ENV S 453 Practicum in Environmental Assessment (3-5) Sp
Udvardy
Understands preparation of model environmental impact statements and impact statements of various departments from multidisciplinary 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
Legge, 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. Includes: 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
Examines 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. Prerequisite: 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)
Study and research in advanced topics of environmental studies, with focus on unexplored areas of research; conducted by visiting professors and instructor or department 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 cannot enter into the formulation and application of public policy. Requirements: concurrent registration in 531 and ECON 435. (Last time offered: Autumn Quarter 1981.)

ENV S 531 Science and Environmental Policy: Case Histories (2) AW
Orlans, Saff
Examples of development of scientific analyses and environmental policies. Prerequisite: concurrent registration in 530. (Last time offered: Autumn Quarter 1981.)

ENV S 532 Internship Seminar (5) A
Dwight
Field internship seminar with focus on a detailed analytical paper concerning the role of science in analysis and decision 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 studies. Subject matter varies from quarter to quarter. Prerequisite: permission of the instructor and institute director.

ETHNICITY AND NATIONALITY

See International Studies.

GENERAL STUDIES

G ST 340-341 Community Fieldwork: Law (5-5) A, W
Iglin
Interdisciplinary seminar-fieldwork course in the arena 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
Iglin
Interdisciplinary seminar-fieldwork course in health-care area, including work in hospitals, free clinics, nursing 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
Iglin
Interdisciplinary seminar-fieldwork course in the social service area. Students do counseling in mental health clinics, work with physically or mentally disabled people, in nursing homes, and in other 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 Sciences. Prerequisite: permission of Director, Fieldwork Studies, C14 Padelford.

Iglin
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 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 348-349 Community Fieldwork: Special Topics (5-5) A, W and/or W,Sp
Iglin
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. Prerequisite: permission of Director, Fieldwork Studies, C14 Padelford.

G ST 350 Independent Fieldwork (1-6, max. 18)
Iglin
Off-campus independent fieldwork in community agencies, apprenticeships, internships, as approved for College 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 351 Supervised Study in Selected Fields (*, max. 15) AWSpS
Iglin
Special supervised study in a field represented in the College of Arts and Sciences. Prerequisite: permission of supervisor of study and Office for Undergraduate Studies.

G ST 493 Senior Study (5) AWSpS
For General Studies majors only. Prerequisites: permission 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 curricular innovations. Descriptions of GIS course offerings
COLLEGE OF ARTS AND SCIENCES

are available during preregistration and in-person registration in the Office for Undergraduate Studies, 114 Paffleford.

GENETICS

Courses for Undergraduates

GENET 398 Human Genetics: The Individual and Society (3) WSp
Hartwell, Stadler
Principles of molecular Mendelian and population genetics 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 environmental mutagens. Appropriate for nonscience majors, but not recommended as a substitute for 451 for majors in biological sciences. Open for credit to all un-enrolled students who have not taken 451 or the equivalent.

GENET 451 Genes (4) AWSp
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)
Barrett
Contributions of genetics to the understanding of evolution. Processes of mutation, selection, and random genetic events as they affect the genetic architecture of natural populations and the process of speciation. Emphasis on experimental data and observation, rather than mathematical theory. Prerequisite: 451. (Offered alternate 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 222, or permission of instructor.

GENET 456 Genetic Mutation (3) W
Stadler
Measurement of mutation rates and dose-response relationships; model systems; molecular mechanisms of mutation and DNA repair; mutation method for measurement of genetic size; hazard of environmental mutagens. Prerequisite: 451 or equivalent. (Offered alternate years.)

GENET 457 The Genetic Analysis of Complex Biological Systems (3)
Sandler
Fernald genetic analysis designed to follow 451. Consideration given to genes; chromosomes, dominance and overdominance; nondisjunction; nondisruption, the elucidation of three complex biological systems—cell division, embryological development, and some aspects of behavior—by the discovery and analysis of mutations that cause these systems to function abnormally. Prerequisite: 451.

GENET 461 Genetics Laboratory (3) Sp
Doerman
An unsolved problem in microbial genetics is investigated collaboratively by the whole laboratory section. Prerequisite: 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 distributions, measures of variation, transformation of variables, theory of estimation, hypothesis testing, tests on small samples, regression and correlation, analysis of variance. Prerequisite: graduate standing and permission of instructor. (Offered alternate years; offered Winter Quarter 1982.)

GENET 499 Undergraduate Research (3) AWSp
Prerequisite: permission of instructor.

Courses for Graduates Only

GENET 501 Introduction to Research Materials (3, max. 9) AWSp
The seminar 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 advisor.

GENET 520 Seminar (1, max. 15) AWSp
Prerequisite: permission of graduate program advisor.

GENET 531 Human Genetics (3) W
Gentile, Artal, Wray
General course in human genetics for graduate students. Areas covered: cytogenetics, statistical problems including pedigree analysis, and biochemical effects 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, mutagens, structure of DNA molecules, fine-structure genetics, enzymeology and genetics of recombination, DNA transformation. Prerequisite: 451 or permission of instructor.

GENET 552, 553 Structure and Function of Genetic Material I, II (3, 3)
Chromosomes, structure and DNA replication; formal genetics of gene expression; physical analysis of DNA; gene expression in relation to DNA structure. Prerequisite: 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
Sander
Properties of mitotic chromosomes with special emphasis on recombination and segregation. Prerequisite: permission 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 chromosomes and its response to mutagenic agents. Prerequisite: permission of instructor. (Offered alternate years; offered Summer Quarter 1982.)

GENET 562 Population Genetics (3) A
Sander
Mathematical and experimental approaches to the genetics of natural populations, with particular emphasis on the role that these processes play in evolution. Emphasis on theoretical populaton genetics. Prerequisite: permission of instructor.

GENET 564 Molecular Cytogenetics (3) Sp
Byers
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
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 eukaryotic cells. Cell-cell interactions, histocompatibility, host resistance to infectious disease, and evolution of the immune system. (Offered alternate years; offered Spring Quarter 1982.)

GENET 575 Mammalian Developmental Genetics (3)
Sibley
Explores the genetic control of early mammalian development, emphasizing the importance of the cellular and molecular approaches have made significant contributions 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 structures, with emphasis on genetic systems. Prerequisite: permission of instructor.

GENET 590 Population Genetics Seminar (1) AWSp
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 repeated for credit. Prerequisite: 562 or permission of instructor.

GENET 600 Independent Study or Research (*)
AWSp

GENET 700 Master's Thesis (*) AWSp

GENET 800 Doctoral Dissertation (*)

GEOGRAPHY

Courses for Undergraduates

Prerequisites: In addition to specified 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 background in geography or in related fields.

INTRODUCTION TO GEOGRAPHY

GEOG 100 Introduction to Geography (5)
Basic patterns of human occupation of the earth; analysis of population, settlement, and resource-use problems; introduction to geographic theories pertaining to spatial organization, internation, and environmental perception.

GEOG 200 Introduction to Human Geography (5)
Velikonja

INTRODUCTION TO FIELDS IN GEOGRAPHY

GEOG 205 Introduction to the Physical Environment (5)
ZumBrunnen
Major atmospheric, hydrologic, and geologic processes and the effect of these processes on 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 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 include defining geographic problems, methods of analysis, seeking, organizing, and analyzing spatial data, and modeling spatial processes.

GEOG 227 Geographic Perspectives on Minorities in the United States (5)
Hodge, Merrill
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 these 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 special uses; map reading and interpretation.

GEOG 277 Geography of Cities (5) Hodges
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) Krumme
The region viewed as a major concept in geography. An intensive examination of major physical and biotic regions seen in the light of human occupancy 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-environment dualism and dialectics 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 agricultural 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 century. Emphasis on the evolving settlement, land use, landscape, and regional patterns.

GEOG 342 Geography and Inequality in the United States (3) Morrill
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, including regional and ethnic discrimination, from Indian reservations to ghettos, as well as religious and age discrimination.

GEOG 350 Urban and Regional Analysis (3) Krumme
Societal 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) Zandt
Principles and practices in effective utilization of resources; public policies relating to conservation.

GEOG 399 Future Patterns of Settlement (3) Morrill, Schneider
Possible future patterns of human use of the environment from apocalyptic to glorious. Review of landscape evolution. Emphasis on the evolving settlement, land use, landscape, and regional planning. 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) Morrill
Organization of farms, their spatial variation, and the methods of analysis of agricultural systems and regions. The student is expected to devote approximately twelve hours of time to field work. Timing of field trips is arranged by the class. Prerequisite: 315 or permission of department adviser.

GEOG 416 Urban Economies (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 geographic thought. Emphasis on the analysis and to the projection of urban and regional population patterns, and to income distributions, interurban and interregional growth differentials, regional and interregional linkages and flows, as well as urban and regional impacts of government expenditures. Prerequisite: 207 or permission of department adviser.

GEOG 441 Geography and Industrial Change (5) Myers
Changes in the spatial and structural components of industrial activity patterns. Understanding the nature and influence of economic forces affecting industrial change. Examples drawn primarily from North America and Western Europe.

GEOG 442 Social Geography (5) Merrill, Velikonja
Spatial patterns of population distribution and settlement; of migration and the spread of ideas; of social characteristics and social relations; social regions.

GEOG 443 Location and Movement Models (3) Merrill
Application of models of optimum location and allocation; assignment, transportation, and spatial equilibrium; spatial interaction; geographic simulation; and spatial diffusion.

GEOG 444 Geography of Water Resources (3) Mours
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 physical, economic, political, and institutional determinants of routes and flows. 207 and 277 recommended; junior standing or above preferable.

GEOG 448 Geography of Transportation (5) Meyer
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 passenger 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) Krumme
Classical and neoclassical theories of location of agricultural, residential, industrial, and recreational activities, spatial equilibrium concepts for individuals, organizations, sets of activities, urban land-use and settlement patterns, and associated networks focusing on the effect of transportation and location factors. Course represents in part, the history of thought in theoretical geographic thought. Prerequisite: 207 or permission of department adviser.

GEOG 452 Location and Behavior (5) Krumme
Principles governing individual and organizational behavior 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. Regional 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 countries. 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 relationships. Geographical problems of regional, national, and international organization. Prerequisite: 375 or permission of department adviser.

GEOG 476 Urban Political Geography (3) Hodges
Spatial organization of cities as related to political processes. Topics include political and administrative districts; cores and peripheral functions; conflict and spatial variation in voting behavior. Considerable emphasis on case studies within the Seattle metropolitan area. Prerequisite: 207 or 277 or permission of department adviser.

GEOG 477 Urban Locations and Structure (3) Johnson
Urban and other agglomerated settlements: nature, economic base, site and situation, distribution, supporting functions and new trends in metropolitan form and arrangements.

GEOG 478 Urban Spatial Patterns (3) Moyer
Intraurban land-use patterns and structure; particular attention to theoretical thought, pertaining to population, land-use linkages, rents, gradients and normative spatial relationships.

GEOG 479 Urban Social Geography (3) Hodges
Relationship between urban spatial form and social processes. Topics include urban population distributions, social space, intraurban migration, neighborhood change, social interaction, and spatial symbolisms. 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) Morris
Selected advanced topics and current problems in location theory and analysis as well as urban and regional economic development, analysis and planning. A strong emphasis on conceptual frameworks and analytical tools. does not preclude a problem-oriented or field-oriented research subject. Seminar format. Prerequisite: permission of department adviser or instructor.

REGIONAL FIELDS

GEOG 302 The Pacific Northwest (3) Bowers
Economy of the Pacific Northwest in the light of factors of location, resources, resource-oriented facilities, 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 integration trends in their regional context.

GEOG 305 Eastern Europe (5) Velikonja
Physical, historical, and socioeconomic characteristics of Eastern Europe activities and resource policies. An introduction to regional studies on a local scale.

GEOG 308 Canada: A Geographic Interpretation (5) Jackson
Study of Canada; emergence of political-geographic and
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cultural entity and identity in North America that presents
significant contrasts to the United States. Components
that have helped shape Canadian earth-space and land-
scape.

GEOG 313 East Asia (5)
Kakuchi
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)
Jackson
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, Velikonja
Spatial pattern of economic and social life in America—
how it evolved, the role of the environment and re-
sources; 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-
tion. Their relationships and interdependence. Prerequi-
site: 305 or permission of instructor.

GEOG 433 Soviet Resource Use and Management (5)
Jackson, Zumbrodt
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)
Velikonja
Regional and political structures; resources, economic
activities, and problems of development; overseas and in-
ternal relationships.

GEOG 435 Problems in the Geography of China (5)
Chang
Origins and development of Chinese civilization in its ge-
ographic base and area spread; political China and the
Chinese sphere; physical base and resources; problems of
agriculture, population, industrialization, urbanization,
transportation, and contemporary development; commun
ist China.

GEOG 437 Problems in the Geography of Japan (5)
Kakuchi
Regional structure of Japanese urban, industrial, and ag-
cultural 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 reproduc-
tion. Laboratory experience in application of these prin-
ciples to map design and construction.

GEOG 361 Experimental Cartography (5)
Sherman
Application of, and experimentation with, cartographic
techniques and materials. Problems of relief representa-
tion, 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 ma-
terials in map compilation and other geographic purposes.
Prerequisite: 360.

GEOG 365 Introduction to Computer Cartography (5)
Youngmann
Origins, development, and methods of automated cartog-
raphy. Experiments with a user-oriented package of
computer mapping programs capable of performing most
themetic mapping operations. Requires normal use of the
Computer Center with special emphasis on the Colormap
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)
Sherman
Analysis and appraisal of United States and foreign maps
and atlases; mapping agencies, coverage, organization,
and indexing; symbolism, scales, projections, and mili-
tary grids; map library problems and operation.

GEOG 462 Problems in Map Compilation and Design (5)
Sherman
Application and analysis of map intelligence processes as
related to map compilation. Measurement and experi-
mental study of psychophysical factors in design of map
elements. Prerequisite: 360.

GEOG 464 Problems in Map Reproduction (3)
Sherman
Process and photographic techniques applicable to car-
tographic and geographic presentations. Prerequisite:
360.

GEOG 465 Computer Cartographs (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
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 Colormap 926 plotter and the Tek-
tronix 4010/4014 CRT terminal. Prerequisites: 365 or el-
ementary FORTRAN programming ability or permission
of instructor or department adviser.

GEOG 467 Geography in the Social Studies Curriculum (3)
Jackson
Concepts and content of geography essential to effective
social studies curricula. Offered jointly with EDG&1 467.

INTRODUCTORY RESEARCH TECHNIQUES

GEOG 426 Quantitative Analysis of Spatial Distributions (5)
Hodge, Morris
Application of statistics to spatially ordered data. De-
scriptive and inferential statistics of spatial (bivariate)
distributions. Theoretical spatial distribution. Problems
of spatial autocorrelation and pattern analysis. Trend sur-
fase, 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
a variety of research situations; (3) analysis and interpre-
tation of field data; and (4) presentation of results of field
investigations.

GEOG 499 Special Studies (*) (max. 15)
Supervised reading programs, undergraduate and gradu-
ate library and field research; special projects for under-
graduate honors students. Prerequisites: senior clas,
graduate standing, or permission of instructor or depart-
ment 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)
Chang

GEOG 506 Research Seminar: Southwest Asia (3, max. 6)

GEOG 509 Research Seminar: Japan (3, max. 6)
Kakuchi

GEOG 510 Research Seminar: Settlement and Urban Geography (3, max. 9)
Mayer

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

GEOG 528 Automated Mapping and Graphing (3)
Youngmann

GEOG 529 Information Systems Applications to Urban and Regional Analysis (3)
Horwood, Staff

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)
Martis

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)
Krause

Selected research-oriented topics in classical, neoclas-
ssical, and behavioral location theory. Theoretical problems
of locational analysis. Relationships between location
theory and regional development and planning concepts.
Location concepts for urban analysis.
GEOS 556 Seminar in Urban Economics (3) Use of economic theory to explain land-use trends, transportation, housing and renewal, the ghetto, and the public economy in urban areas. Offered jointly with ECON 556. Prerequisites: ECON 300, 301, or equivalent.

GEOS 556 Regional Planning Seminar (3) Thomas Regional planning and development theories and methodologies. Critical evaluation of regional plans in selected economically advanced and lesser-developed countries. Offered jointly with URP 556. Prerequisite: 466 or URB P 466.

GEOS 567 Research Seminar: Geography and Development (3, max. 6) Thomas Offered jointly with URP 567.

GEOS 570 Research Seminar: Natural Resources Analysis (3, max. 6) Zumbrunn

GEOS 575 Research Seminar: Geologic History of the Northwest (3, max. 6) Velikovsky

GEOS 577 Research Seminar: Internal Spatial Structure of Cities (3, max. 9)

GEOS 600 Independent Study or Research (*)

GEOS 600 Doctoral Dissertation (*)

GEOS 632 Glaciers and Volcanoes of the Pacific Northwest (3) Porter Character and origin of Pacific Northwest volcanoes, their eruptive history and potential hazards. Distribution and nature of present and former glaciers in Washington; evidence for reconstruction of the history of the glacial ages and the chronology of recent glacier fluctuations in the Cascades. Interpretations of glaciers and volcanoes. Two all-day Saturday field trips to Cascade volcanoes.

GEOS 633 Environmental Geology (4) W Dunne Analysis of geologic constraints upon human activity and the environmental consequences of such activity. Topics include fluvial processes, fluvial processes, earth and volcanic hazard, and environmental aspects of the development of water, energy, and mineral resources. Laboratory work counts for 15% of the final grade.

GEOS 630 Mineralogy (5) A W. P. Alch, Brown, Giese, McCullum Introduction to mineralogy, including elementary crystallography (lattic e types, external morphology, stereographic projection), elementary crystal physics (relationship 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.

GEOS 631 Principles of Petrology (5) WSp Evans, McCullum, Stites Description, classification, and origin of igneous, metamorphic, and sedimentary rocks, with laboratory hand specimen study of rock specimens. Two one-day field excursions. Prerequisite: 320 or equivalent.

GEOS 630 Structural Geology (5) A WSp Cowan, Stewart Interpretation or rock structures and their genesis. Prerequisite: 321 or equivalent.

GEOS 631 Surface Deposits and Fossils (5) WSp Principles of physical stratigraphy and biostatigraphy and the end and origin of the earth's history. Prerequisites: 320, 321, GEOG 263.

GEOS 417 Field Geology (5) S Dunne Off-campus field work in general geology, emphasizing field mapping and report writing. Prerequisites: 301, 320, 321, 340, 361, and permission of department.

GEOS 402 Field Geology and Mapping (15) Sp A full-quarter course recommended for students planning to continue graduate study as a career in geology. Emphasizes field mapping problems in different geologic terrains and at different scales. Preparation of geological maps, development of written reports, and interpretation of maps. Prerequisites: 205, 301, 311, 320, 321, 340, 361.

GEOS 405 The Earth's Interior (3) Sp Busk Geophysical evidence as to the earth's interior regionalization and working; development of the major surface features.

GEOS 412 Fluvial Geomorphology (5) Sp Dunne Hydraulic, sedimentologic, and morphological characteristics of streams and valleys. Landscape evolution by stream erosion and deposition. Interpretation of fluvial sedimentary environments. Five field exercises emphasize 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.)

GEOS 413 Hillslope Geomorphology (5) Sp Dunne Theoretical, laboratory, and field study of hillslope evolution by mass wasting and water erosion. Five field exercises emphasize the quantitative analysis of geomorphic processes and the acquisition of various skills, such as mapping, topographic surveying, and report writing. Prerequisites: 311, MATH 125, PHYS 121. (Offered even-numbered years.)

GEOS 414 Photoelecography (3) AW Hanson, Porter Geologic interpretations of aerial photographs with emphasis on solving field problems. Prerequisites: 311, 340, 361, or equivalent.

GEOS 415 Principles of Glaciology (4) A LaChapelle, Porter, Raymond, Stuiver Structure and properties of snow and ice; snow metamorphism, 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.

GEOS 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.

GEOS 417 The Late Cenozoic Glacial Ages (3) A Lepold, Porter Physical and biological evidence, both terrestrial and marine, for cyclical 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 records. Evaluation 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.

GEOS 418 Periglacial Processes and Environments (4) Environmental processes in glacier-free areas, with emphasis on frost action and its effects.

GEOS 420 Advanced Mineralogy (3) Giese Symmetry and crystal structure, chemical bonding, magnetic, electric, optical, and elastic properties of the common minerals. Detailed crystal chemistry of the rock-forming silicates with respect to phase equilibria and natural occurrence. Prerequisites: 320, 321, PHYS 121, 122, 123, CHEM 140 or 145.

GEOS 423 Optical Mineralogy (4) A Christensen, Vance Petrographic microscope and recognition of common minerals in thin section. Prerequisite: 320 or equivalent.

GEOS 424 Petrography and Petrology of Igneous Rocks (5) W McCullum, Vance Syntactic study of igneous rocks and their origin, using the petrographic microscope. Prerequisite: 423 or equivalent.

GEOS 425 Petrography and Petrology of Metamorphic Rocks (5) Sp Evans Syntactic study of metamorphic rocks and their origin, using the petrographic microscope. Prerequisite: 423 or equivalent.

GEOS 426 Sedimentary Petrology and Petrography (5) A WSp Stewart, Whetten Occurrence, characteristics, and origin of sedimentary rocks, with emphasis on chemical and physical processes of formation. Petrographic analysis in laboratory. Prerequisites: 320, 423, or equivalent.

GEOS 430 Macroscopic Invertebrate Fossils (5) A Mallory Systematic study of invertebrate fossils and the principles of paleontology. Prerequisite: 101 or 265, or equivalent. (Offered even-numbered years.)

GEOS 435 Marine Paleontology (4) A Survey of the organic-walled, calcareous, and siliceous phytoplankton, with emphasis on the dinoflagellates (organic-walled), their morphology, classification, stratigraphic distribution, and paleoecology. Laboratory: interpretation in sample processing, microscopy, photography by light microscopy and SEM, darkroom techniques for photography, and manuscript preparation. One weekend field trip to the Friday Harbor Biological Laboratory. Prerequisites: 205 and introductory biology or equivalent.
GEOL 436 Micropalentology (5) A
Mallory
Principles of palentology as applied to micropalentology; the systematic study of foraminifera. Prerequisite: 361, 430, or permission of department. (Offered odd-numbered years.)

GEOL 437 Evolution of the Vertebrates (5) W
Reuther
Introduction to the ontology and evolution of the major groups of vertebrates. Prerequisite: BIOL 101-102 or BIOL 210. (Offered even-numbered years.)

GEOL 438 Evolution and Classification of the Mammals (5) W
Reuther
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 439 Advanced Structural Geology (5) A
Misch
Analysis in space and time; genetic interpretation; principles of geococnetics. Prerequisite: 340 or equivalent.

GEOL 449 Stress and Deformation of Geological Materials (3) A
Botnstrom
Introduction to Cartesian tensor analysis with applications 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
Botnstrom
Introduction to geophysics of the solid earth, outlining instrumentation, 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 451 Stratigraphy (3) A
Botnstrom
Systematic study of spatial relations of surface-accumulated rocks and their space-time implications. Prerequisites: 351, 361, or equivalent.

GEOL 471 Rock and Mineral Analysis (5) Sp
Green
Survey of analytical methods employed in geochemistry, emphasizing the theoretical basis for various techniques and their applications. Laboratory 520, 521, CHEM 160, or equivalent. Recommended: GEOL 474.

GEOL 472 Elements of Geochemistry (4) A
Green
Introduction to the interpretation and understanding of geological processes from the chemical standpoint. Prerequisite: senior standing in geological sciences or permission of instructor.

GEOL 474 Introduction to X-Ray Crystallography (3) W
Chase
Point groups and space groups. Reciprocal lattice. Theory of X-ray diffraction from single crystals. Powder diffraction; identification of unknowns and determination of precise cell dimensions. Single crystal camera (precession and Weissenberg) techniques; determination of cell dimensions and space groups; study of extinction 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 structures. Prerequisites: 320 and PHYS 123.

GEOL 476 Isotope Geology (3) Sp
Stuiver
Discussion of methods involving the application of radio-active isotopes in age dating (radiocarbon, uranium, potassium-argon dating, etc.), and of stable isotope variations in nature in determining the temperature history of the earth and igneous rock formation. Applications 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
Cheney
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 MIN E 481. Prerequisite: 205 or MIN E 350 or permission of instructor.

GEOL 485 Principles of Economic Geology (5) A
Cheney
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
Cheney
Four-to-six-day trip to mining districts for field inspection of ore deposits. Two or three weekend trips to map and describe mineralized areas. Prerequisite: 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) A/WSp
Pre-requisite: permission of department.

GEOL 498 Undergraduate Thesis (5) A/WSp
The thesis must be submitted at least one month before graduation. Prerequisite: permission of department.

GEOL 499 Undergraduate Research (*, max. 5)
A/WSp
Pre-requisite: permission of department.

Courses for Graduates Only

GEOL 511 Seminar in Geomorphology and Hydrology (*) A/WSp
Dune, Porter
Prerequisite: permission of instructor.

GEOL 512 Seminar in Pleistocene Research (*) A/WSp
Porter
Prerequisite: permission of instructor.

GEOL 513 Quaternary Stratigraphy (*) Porter
Advanced studies of Quaternary stratigraphic and chronologic problems. Topic(s) to be determined. Prerequisite: 417 or 416.

GEOL 516 Advanced Problems in Glacial Geology (3) Sp
Porter
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 techniques. Emphasis on the application of satellite and aircraft measurements to terrestrial geologic problems. Prerequisite: CETC 565.

GEOL 521 Metamorphic Minerals (5) W
Misch
Nature and paragenesis of metamorphic minerals; physical, chemical, and geological interpretation of paragenesis. Prerequisite: 425 or equivalent. (Offered odd-numbered years.)

GEOL 522 Metamorphic Processes (5) W
Misch
Deformation and crystallography, mineralization, and mobilization. Prerequisite: 425 or equivalent. (Offered even-numbered years.)

GEOL 523 Advanced Optical Mineralogy (4) A
Christensen
Universal stage, petrofabrics, advanced optical theory, fieldmap determination.

GEOL 524 Petrography and Petrogenesis of Igneous Rocks (5) Sp
McCallum, Vance
Classification and nomenclature of igneous rocks. Igneous rock associations, magma types, and petrographic provinces. Origin and differentiation of magmas. With laboratory. Prerequisite: 424 or equivalent.

GEOL 525 Theoretical Metamorphic Petrology (4) A
Evans
Theoretical treatment of metamorphic mineral assemblages and metamorphic processes. Prerequisites: 425, CHEM 456, or equivalent.

GEOL 526 Theoretical Igneous Petrology (4) W
McCallum

GEOL 527 Rock-Forming Minerals (3) A
McCallum
Structure, chemistry, physical properties, and determinative mineralogy of common rock-forming minerals. With laboratory. Coverage varies from year to year. Prerequisites: 424, 425, 472.

GEOL 531 Stratiographic Paleontology (5) Sp
Mallory
Principles of stratigraphic paleontology and chronologic biostratigraphy. Prerequisites: 430, 461, or equivalent. (Offered odd-numbered years.)

GEOL 532 Paleocology of Invertebrates (5) Sp
Mallory
Properties of fossil populations and interpretation of habitat and habitat in the geologic past. Prerequisites: 321, 430, or permission. (Offered odd-numbered years.)

GEOL 533 Seminar in Vertebrate Paleontology (3, max. 9) A/WSp
Reuther
Advanced topics in vertebrate evolution, morphology, classification, function, ecology, and stratigraphy. Subject to change by class at beginning of quarter. Prerequisite: advanced standing in paleontology, vertebrate zoology, or physical anthropology.

GEOL 542 Seminar in Structural Geology and Tectonics (2) W
Cowen
Reading and discussion of important concepts in structural geology and tectonics; topic is one of current interest and varies from year to year. Prerequisite: 340 or equivalent.

GEOL 545 Structure of Europe (5) Sp
Mischenko
Structural evolution and geotectonics of Europe. (Offered odd-numbered years.)

GEOL 546 Structure of Asia and West Pacific Rim (5) Sp
Mischenko
Structural evolution from Central Asia to West Pacific: geotectonic principles. (Offered even-numbered years.)

GEOL 547 Literature on Structural Geology (3 or 5) W
Mischenko
Selected readings and seminars on Cordilleran structure.

GEOL 549 Structural Analysis of Tectonites (4) Sp
Mischenko
Fundamental of structural analysis of tectonites. Symmetry 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. Prerequisite: 449. (Offered odd-numbered years.)
Sedimentary Rocks

Sedimentary rocks are rocks derived from or through the actions of water, ice, wind, and organisms. They are formed from pre-existing materials that have been transported and deposited, and then cemented together. Sedimentary rocks are divided into three main types: clastic, chemical, and organic.

Clastic sediments are formed from the weathering and erosion of pre-existing rocks. Examples include sandstone, siltstone, and shale. These rocks are composed of grains of sediment that have been transported by water, wind, or ice and then deposited. The size of the grains, the way they are sorted, and their arrangement can provide information about the environment in which the rocks formed.

Chemical sediments are formed from the precipitation of minerals from solutions, or from the evaporation of sea water. Examples include limestone, dolomite, and evaporite rocks. These rocks are formed from the precipitation of calcium carbonate, magnesium carbonate, and sulfate minerals from water.

Organic sediments are formed from the remains of plants and animals. Examples include coal, peat, and oil shale. These rocks are formed from the accumulation of organic matter that has been buried and preserved under conditions that prevent decay.

GEOL 543 Seismology and Earthquake Engineering (3)

Evans, Harris, Merchant, Smith

Prerequisite: Offered on an average of 12 weeks, and requires the combination of seismic processes and details of the characteristics of destructive ground motion; illustrates the effects of such motion on engineering structures. Section of course in estimating earthquake hazards for important structures such as nuclear power plants. Offered jointly with CEMS 431. Prerequisite: MATH 238 or permission of instructor.

GEOL 549 Independent Study for Undergraduates (1-3, max. 10) AWP

Prerequisite: Offered jointly with GEOL 499.

GEOL 550 Geophysics of Solids (3) W

Merrill

Introduction to the applications of solid-state physics to geophysics. The origins and the properties of resonant magnetization in rocks. Equations of state and the composition of the mantle. Defects in solids and their roles in tectonophysics. Prerequisite: permission of instructor.

GEOL 551 Elements of Geology (3) W

S. Smith

Prerequisite: Offered jointly with GEOL 550.

See above for prerequisites.

GEOL 552 Geophysical Data Collection and Analysis (3) W

Croston

Theory and practical application of data collection and analysis applied to geophysical problems. Digital processing of signals; filtering and spectral analysis. Two-hour laboratory section is problem solving on computer-based processing systems. Prerequisite: permission of instructor.

GEOL 553 Geophysical Inverse Theory (3) W

Prerequisite: Offered jointly with GEOL 551.

GEOL 554 Physics of Ice (3) A

Hobbs

Structure of the water molecule. Crystallographic structures of ice. Electrical, optical, thermal, and mechanical properties of ice. Growth and surface of solid phases. Physical properties of snow. Offered jointly with ATM S 510. Prerequisite: permission of instructor.

GEOL 555 Glaciology I: Formation of Snow and Ice Masses (3) W

Raymond, Underwater

Snow climatology. Transport of snow by wind. Transfer of radiative, sensible, and latent heat at the surface of snow and ice. Freezing of fresh 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.

GEOL 556 Glaciology II: Dynamic Glaciology (3) W

Raymond, Underwater

Rheology of ice. Internal deformation and sliding of glaciers. Thermal regime of glaciers. Steady flow, dynamic response to changing boundary conditions. Fluid mechanics and drift of sea ice. Snow and avalanche dynamics. Offered jointly with ATM S 512. Prerequisites: 510, 511, or permission of instructor.

GEOL 557 Glaciology III: Structural Glaciology (3) W

Raymond, Underwater

Snow metamorphism and primary layering. Dynamic response to changing boundary conditions. Fluid mechanics, freeze-up, and drift of sea ice. Structure of river, lake, and sea ice. The role and behavior of foreign matter. Physical processes of structural change and relationship between structures and bulk deposits indigenous to regoliths, sediments, and sedimentary rocks. Prerequisite: 485 or equivalent or permission of instructor. (Offered every year.)
physical properties. Offered jointly with ATM S 513. Prerequisites: 510, 511, 512, or permission of instructor.

GPHYS 514 Field Glaciology (6) Sp
LaChapelle, Raymond, Understiner
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 instructor.

GPHYS 520 Seminar (1-2) AWSp
Review of current literature in geophysics and graduate student research with faculty participation.

GPHYS 531 Structure of the Upper Atmosphere (3) A
Levy
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 ionosphere. 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 instabilities. Prerequisite: 555 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 curvatures, eigenvalues of the earth. Prerequisite: A A 567.

GPHYS 554 Earth Rotation and Tidal Forces (2) W
Boastm
Causes and consequences of changes in the rotation of the earth.

GPHYS 555 Planetary Atmospheres (3) A
Levy
Problems of origin, evolution, and structure of planetary atmospheres, emphasizing elements common to all planetary atmospheres; roles of radiation, chemistry, and dynamical processes; recent 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
Comparisons of surface processes and conditions on Mercury, Venus, earth, Mars, other planets, 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 ASTR 556 and GEOL 556.

GPHYS 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 planets and satellites, 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 GEOL 557.

GPHYS 570 Geophysical Exploration for Petroleum (3) W
Bostrom
Introduction to the geological principles of hydrocarbon accumulation and the geophysical techniques of exploration. Term project includes work-up of exploration program for a specific geophysical region. Prerequisites: GEOL 340, MATH 303, or equivalent.

GPHYS 571 Gravity and Geomagnetic Interpretation (3) W
Lewis
Fundamental concepts; the earth's magnetic field; instrumentation and reduction of magnetic measurements, interpretation of magnetic gravity measurements, reduction of gravity observations, interpretation of gravity anomalies. Offered jointly with OCEAN 571. Prerequisite: PHYS 523 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 in 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
Lander
The physics of rock deformation, theory of brittle and ductile behavior, techniques of experimental rock deformation at high temperature, high pressure with applications to flow processes in the mantle and crust. Prerequisite: 502 or permission of instructor.

GPHYS 575 Structure and Constitution of the Oceanic Crust (4) Sp
Christiansen
Seismic structure of oceanic crust. Composition and physical properties of oceanic rocks. Upper mantle seismic anisotropy. Ophidiolites and their relationship to crustal structure. Current models for creation of oceanic lithosphere. Crustal subduction and orogeny-type volcanism. Prerequisite: permission of instructor. (Offered even-numbered years.)

GPHYS 576 Structure and Constitution of the Continental Crust (4) Sp
Christiansen
Seismic structure of continental crust. Seismic properties, elastic 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 the Mohorovicic discontinuity. Prerequisite: permission of instructor. (Offered odd-numbered years.)

GPHYS 580 Special Topics in Geophysics (2-6, max. 12) AWSp
Intensive study of a selected topic in geophysics presented by lectures or seminars for students in geophysics and related special fields. Subject is selected from all areas in geophysics and varies from year to year. Prerequisite: permission of instructor.

GPHYS 594 Waves in Geophysics and Engineering (3) Sp
Crosson, Evans, Fye
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 aerodynamics, acoustics, seismology, and earthquake engineering. Offered jointly with CSEM 594 and A A 594.

GPHYS 600 Independent Study or Research (*) AWSp

GPHYS 700 Master's Thesis (*) AWSp

GPHYS 800 Doctoral Dissertation (*)

GERMANY

List 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) AWSp, AWSpS, AWSpSp
The methods and objectives are primarily audiovisual, with emphasis on speaking and listening. Secondary objectives are reading and writing.

GERM 104 Individualized First-Year German (1-15) AWSpSp
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 3 credits and must pay for 5 credits regardless of number of credits earned.

GERM 111, 112, 113 First-Year German (5,5,5) AWSp, AWSpS
Primary emphasis is placed on an accelerated acquisition of the reading skill. A foundation for proficiency in writing, 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 credits: 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) A,W Sp
Special beginning course devoted exclusively to the reading objective; 122 continuation of 121. For graduate students only.

GERM 150 Conversational German Through Films (2, max. 6) AWSp
Conversational practice in small groups based on films. Because series progresses through the year, beginners may enroll only Autumn Quarter: May be taken concurrently with any 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) AWSpSp, AWSp
Readings and oral practice in German, plus grammar review. The student may not receive credit for both 201 and 211. Prerequisite: 103 or equivalent.

GERM 202 Intermediate Second-Year German (5) AWSpSp
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
Special emphasis on 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 active reproduction of German is de-emphasized. The student may not receive credit for both 201 and 211. Prerequisite: 113 or equivalent.

GERM 212 Intermediate Second-Year Reading (5) AWSpSp
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 German House. Prerequisite: 103 or equivalent 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 equivalent 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 developments in literature and the arts, Middle Ages through the twentieth century. In English.

GERM 299 Supervised Study (1-5, max. 10) AWSp
Prerequisite: permission of department advisor.

GERM 300 Studies in Germanics (3 or 5)
Topics in various areas of German language, literature, and culture. Prerequisite: 15 credits in second-year German or equivalent.

GERM 301, 302, 303 Grammar and Conversation (3,3,3) A,W,Sp,WS
Material is presented merely at an increase in ability to speak, write, and understand German, but also at broadening the student's understanding of the culture of German-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 Literature (3) A,
Critical analysis and interpretation of various periods of German literature. Prerequisite: 15 credits in second-year German or equivalent 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 development of the German novella in the nineteenth century. Prerequisite: 15 credits in second-year German or equivalent 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 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 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 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 teaching. Prerequisite: third-year German or permission of instructor.

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
140 German Romanticism: literature from 1800 to 1830 with particular emphasis on the development of works by Novalis, Brentano, Eichendorff, Heinze, Klein, Böchner, E. T. A. Hoffmann, Grillparzer, and others. 411: Nine­teenth Century Realism: literature from 1830 to 1890, with aesthetic and historical consideration of works by Keller, Hebbel, Meyer, Stifter, Fontane, and others. 412: The Nineteenth Century: literature from 1890 to 1945, with aesthetic and historical consideration of works by Hauptmann, Kaiser, Brecht, Kafka, Mann, Rilke, Trakl, Stadler, Stumm, von Hooland, 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 emphasis on the historical considerations of works from the Carolingian and Cluniac Periods, the Court Epic, the Heroic Epic, the Sprengliammler, the Min­nesang, the poetry of the epigones who followed the Age of High Chivalry, and the German Mystics. 414: Litera­ture of the Sixteenth, Seventeenth, and Eighteenth Centuries, emphasizing the historical consideration of works by the Ackermann aus Böhmen, Erasmus, Luther, Hans Sachs, the Historia von Dr. Faustus, Baroque poetry and the literary influences of the Enlightenment. 415: Literature of the Eighteenth Century: aesthetic and historical consider­ation 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 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 437 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, with emphasis on foreign-lang­uage teaching methodology. Prerequisite: foreign-lan­guage teaching experience or participation in a previous foreign-language methods course.

GERM 490 Contemporary German Literature (3)
Introduction 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 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 overview 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 literary materials, and articles devoted to aspects of GDR culture and everyday life are used.

GERM 354 Great German Humanists of Renaissance and Baroque (3)
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 1490-1700. Renaissance and Reformation authors include: Erasmus von Rotterdam, Martin Luther, Martin Luther, Kten, Kanten, and the Meistersinger. School for the Baroque, discussion focuses on selected texts from Grimmeins, 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 modern 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 connected 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 aesthetic 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 concepts. Some previous exposure to the German literature and civilization after 1945 is expected.

GERM 510 Medieval Literature and Civilization (5)
A German literature and civilization from 750 to 1400, with extensive historical consideration of works from the Carolingian and Cluniac periods, the Court Epic, the Heroic Epic, the Spielmannslied, the Minnesang, the poetry of the emperors who followed the Age of High Chivalry, and the German Mystics. Prerequisite: permission of department 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 instruction in this period. Discussion of works by Teirl, Brahme, Mommsen, Schedel, Grimmeins, Opitz, Grynphaus, and other poets of German Renaissance, humanism, and baroque. Prerequisite: permission of department or departmental adviser.

GERM 512 Literature and Civilization of the Eighteenth Century (A)
Survey of German literature of the eighteenth century, presented within the context of European civilization during that period. Prerequisite: permission of department or departmental adviser.

GERM 513 Proseminar in German Literature of the Eighteenth Century (A)
Discussion and critical evaluation of representative topics selected from the German literature of the eighteenth century. Prerequisite: permission of department or departmental adviser.

GERM 514 Literature and Civilization of the Nineteenth Century (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 (W)
Discussion and critical evaluation of representative topics selected from the German literature of the nineteenth century. Prerequisite: permission of department or departmental adviser.

GERM 516 Literature and Civilization of the Twentieth Century (Sp)
Survey of modern German literature from the turn of the century to our own times. 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 (Sp)
Discussion and critical evaluation of representative topics selected from the German literature of the twentieth century. Prerequisite: permission of department or departmental 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 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: Enlightenment, sentimentalism, sentimentality, romanticism, realism, classicism, early romanticism, and works by principal authors such as Gotter, Bodmer, Goethe, Lessing, Wieland, Klopstock, Herder, Less, Goethe, Schiller, Jean Paul.

GERM 534 Storm and Stress (3)
Extensive investigation of poctological and esthetic concepts advanced by initiators and exponents of German storm and stress. Analyses of narrative and dramatic works of storm and stress reveal reflections and implementations of the new theoretical concepts.

GERM 535 Classicism: Goethe, Schiller (3)

GERM 540 Twentieth-Century Poetry (3)
Development of German poetry from Rilke, Hofmannsthal, and George through Trakl, Bens, the Expressionists, and the Dadaists, to such contemporaries as Eich, Heinsenblatt, 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 individual 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 (3)
Study of the evolution of the late Middle High German novelistic narrative.

GERM 567 Minneensang (3)
In-depth study of medieval German lyric in the context of German and European literary and intellectual development. Poems of the period from Kurenberger through Wolther are analyzed with stress on grammatical, formal, stylistic, and ideological interpretation. Prerequisite: adequate 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 Nibelengenlied and the Dietrichmph.

GERM 575 Teaching of German Literature and Civilization (3)
Teaching of German language and literature on the advanced level in secondary schools and colleges.

GERM 576 Modern Methods and Materials in Teaching German (3)
The audiolingual method and its application; current developments in foreign-language teaching, evolution 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 demonstrated. 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 (1-3)

GERM 591 German Idealism and Materialism (3)

GERM 592 German Existentialism and Neoplatonism (3)

GERM 600 Independent Study or Research (*)
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 education 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 behavior 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 health-related behavior change through the school environment, health instruction, and health services in elementary 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 problems, with emphasis on the role of health education in community health improvement. Prerequisite: 20 credits in health education core courses or permission of instructor.

H ED 473 Patient Education in Health Care (3) Examines patterns of patient education in health-care systems, patient and health professional roles, and health education needs of patients and health-care consumers. Prerequisite: 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 underlying 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 modern health education in the world, including contemporary 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.

H ED 505 Program Development and Evaluation (3) Conceptual models, program determinants, organizational variability and reciprocal effects of evaluative techniques 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, 503.

H ED 600 Independent Study or Research (*)

H ED 700 Master's Thesis (*)

HISTORY

Upper-division courses (300 and 400 level) in the Department of History must require prerequisites. Most 400-level courses deal with a single nation during a limited period. The 300-level courses deal with broader subjects at a relatively advanced level. Both are primarily for junior and senior students, 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) Bachrach, Bobe, 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 533.

HST 113 The Modern World (5) Sp. Bridgeman, Pinkey, Sugar Survey of the political, economic, social, and intellectual history of modern Europe. Not open to students who have taken 502 or 503.

HST 207 Introduction to Intellectual History (5) Survey of the history of the idea of eras in the context of Western intellectual history from Plato to the twentieth century. Includes Plato's Symposium, the Bible, Ovid, St. Augustine, Dante, Didascal, Marquis de Sade, Goethe, D. H. Lawrence, Freud, and contemporary movies and music. Equal attention is paid to the idea of era and to fundamental changes in the assumptions of Western thought. Required for all majors in the comparative history of ideas.

HST 215 The History of the Atomic Bomb (3) Hankins History of the atomic bomb from the beginning of nuclear physics to the security hearing of J. Robert Oppenheimer. The course includes a study of the scientific achievements that made the bomb possible, the organization 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 scientists involved, and the problem of espionage and security, ending with the security hearing of Oppenheimer. In addition to readings in the voluminous literature on the subject, the course includes documentary films, and discussions with faculty members who were actively engaged in the research of the Manhattan Project.

HST 216 The United States in Eastern Asia, 1784-1948 (5) Burow 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 Eastern 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) Bachrach Survey of the history of the Near East (the Arab countries, 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 perspectives of the human past have altered over time. 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 evidence and studies the difference between myth and legend and the nature of history.

HST 301 Early Modern European History: 1450-1648 (5) Bridgman, Emerson, Griffths, 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, Hantels, 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, Pinkey, 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 (England, Holland, France) of the seventeenth and eighteenth centuries; British naval and economic pre-eminence in the early nineteenth century; height of European expansion and conflict overseas from 1870 to 1920; imperial 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) Trendgold Introduction to the history of the Christian religion, including doctrine, practice, church organization, and culture, from the time of Jesus Christ to the present. No attempt is made to deal with the controversial aspects of the topic in detail, but the necessity of founding argument on knowledge is stressed.

HST 310 Science and Religion in Historical Perspective (5) Hantels Scientific and religious ideas have been two of the major forces shaping our modern view of the world. Often regarded as being in conflict, they can equally well be seen as complementary and interdependent. Study of the relationship between scientific and religious ideas with focus on particular episodes of history from ancient to modern times.

HST 311 Science in Civilization: Antiquity to 1600 (5) Hantels From preclassical antiquity to the end of the Middle Ages, using the great ideas and 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) Hantels Growth of modern science since the Renaissance, emphasizing the scientific revolution of the seventeenth century, the development of methodology, and the emergence of new fields of interest and new modes of thought.
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; status of societies; 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 movements; European expansion and African resistance; colonial rule and the rise of modern nationalism; crosscurrents of social, economic, and religious change; independent Africa and the guerrilla struggle.

HST 361 Slavery in History: A Comparative Study (5)
Bachrach
Slavery as a universal historical phenomenon lending itself to a comparative analysis is studied in terms of its philosophical justifications, economic importance, and local peculiarities. The following historical periods are surveyed: 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)
Perry
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 in various parts of the world. Historical and comparative perspectives are employed in examining the circumstances and the manner in which slavery was abolished; and the conditions and situations of the former slaves and their descendants in the various regions.

HST 363 Wars in the Modern Near East (3)
Bachrach
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 supplement the historical approach by analyzing the battles and wars on these terms.

HST 391-392 Honors Colloquium in the History of Ideas (6-6)
Dissertation 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 historians and to the new techniques that have evolved for the solution of these problems. Open with a brief historiographical introduction, reaching back to the "scientific" historians of the mid-nineteenth century, then continues by examining the impact on historians of new disciplines such as psychology, sociology, and economics, and of new techniques such as archival and prosopography. Readings are in the theorists and in those who followed their lead. Admission by departmental permission 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 Enlightenmment (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)
Bell
Britain in the Caribbean, Africa, India, Southeast Asia, and the Pacific; and the settlement, economic development, and political evolution of Canada, Australia, New Zealand, and South Africa.

HST 443 The United States and Japan: From Perry to MacArthur (5)
Busow
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 488 Franklin D. Roosevelt and His World, 1933-1945 (3) Sp
Busow
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 HIS 488.

HST 490 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 jihad; the coastal peoples and European penetration; colonial rule and the West African nationalist response; political independence and economic dependency in the contemporary period.

HST 491 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 migrations and the growth of state systems; the Swahili coast, its Arab and Portuguese invaders; European conquest and the African response; modern nationalism and developments to the present.

HST 492 Southern Africa From 1500 to the Present (5)
Griffeth
Development of political, social, and economic institutions in Africa south of the Zambezi River from the Portuguese arrival to the present; the Cape Colony, Zanzibar, and British interactions with African peoples from 1652 to 1870; political, social, and economic developments in the white settler states of southern Africa from 1870 to the present.

HST 491 History of the Near East: 622-1300 (5)
Bachrach
The Arab countries from the emergence of Islam.

HST 492 History of the Near East: 1300-1789 (5)
Bachrach
The Arab countries to the accession of Sultan Selim III.

HST 493 History of the Near East Since 1789 (5)
Bachrach
The Arab countries from the westernizing reform movements to the present.

HST 494 History of North Africa (5)
North Africa (Libya, Tunisia, Algeria, and Morocco) from the time of the Muslim conquest to the establishment of independence from European colonial rule. Economic, 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 495 Numismatics Seminar (3)
Bachrach
Introduction to the use of numismatic evidence for political, economic, and cultural history. Prerequisite: permission of instructor.

HST 496 Nations and States in the Modern World (5)
Treadgold
Development of national consciousness in the "old nations" of Europe before the French Revolution. Replacement by new nationalism, spreading into East Central Europe, Russia, Borte-America, Asia, and Africa.

HST 496 Introduction to Modern Jewish History (3 or 5)
Bachrach
Solutions to problems in modern Jewish history, 1789-1948.

HST 470 Medieval Jewish History (5)
Bachrach
Social and intellectual history of the Jews in Western Europe to the fifteenth century. Jews under Islam and Christianity; the church and the Jews; the Crusades and their legacy; intellectual achievements; conflict and cooperation.

HST 471 History of the Jews in Eastern Europe (5)
Bachrach
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. Recommended: 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 Seminar 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) A,W,Sp

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

HST 524 British Empire History (3-6)
Bachrach

HST 543 American Diplomacy and the World Crisis, 1931-41 (3-6)
Busow
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 Crisis, 1931-41 (3-6, max. 15)-(3-6, max. 15) A,W,Sp
Busow
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 interpretations; anniversaries; involvement in African history, with special attention to the growth of multidisciplinary approaches to historical reconstruction and the evaluation and use of oral and written evidence. Prerequisites: reading knowledge of one of the following: French, German, Portuguese, Arabic, or other African languages.

HST 561 Islamic History (3-6)
Bachrach
Field course. Introduction to advanced study in the major periods and problems of Islam. Bibliographical guidance is stressed.

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HST 562  Ottonian History (3-6)
Sger
Field course. Introduction to the major periods and problems of Ottonian 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 Ottonian materials. A minor problem is investigated in detail by each student. Prerequisite: knowledge of at least one major language besides English (French, German, Russian, or other).

HST 563  Modern Near East (3-6)
Buchanan
Field course introducing the student to the major periods and problems of Near Eastern history, 1798 to the present. 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 Europea (3) A

HST 592  Historiography: Early Modern European (3) W

HST 593  Historiography: Early Modern European and American (3) Sp

HST 596  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 documentation. Field trips to various archival establishments supplement the lectures and written exercises.

HST 600  Independent Study or Research (*)
AWSp

HST 700  Master's Thesis (*) A WSp S

HST 800  Doctoral Dissertation (*) A WSp S

HISTORY OF THE AMERICAS

Courses for Undergraduates

HSTAA 125  The American People and Their Culture in the Modern Era: A History of the United States Since 1940 (5)
Field course. 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, written materials, through written reports on historical problems, and through group tutorials, lectures, and audiovisual presentations, students are encouraged to examine evidence and to think "historically" about persons, events, and movements within the memory and era of their own generation and that immediately preceding theirs. Primarily for first-year students.

HSTAA 135  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-Hispanic 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 between the United States and Mexico. Recommended: 180.

HSTAA 201  Survey of the History of the United States (5) A WSp
Supplies the knowledge of American history that any intelligent and educated American citizen should have. Objective is to make the student aware of his heritage of the past and of intelligently conscious of the present.

HSTAA 202  Makers of American Foreign Policy, 1776 to the Present (5)
Fowler
Survey of the history of American foreign relations. Focuses on the individual responsible for initiating new foreign policies or for realizing old ones.

HSTAA 281  Introduction to Latin American History: From Columbus to Castro (5)
Selberg
Survey of political, economic, and social history of Latin America from the Iberian conquest to the present. Lectures, discussions, and films focus on developing understanding of Latin America's current problems through a study of their historical roots. Designed for the beginning student and the non-specialist.

HSTAA 301  Foundations of American Civilization (5)
Johnson
Founding of Anglo-Saxon society in the western hemisphere, with attention to the earliest colonial establishments, the growth of a new civilization, 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 expansion; 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 attention to the questions of race relations, civil rights, and social distinctiveness. Recommended: 201.

HSTAA 351  Formation of the American Constitution to 1840 (3)
English constitutionalism and its meaning for the colonies; the American Revolution; constitution making in the states; the Articles of Confederation and the Constitution 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)
Selberg
General survey and analysis of political, economic, social, and cultural aspects of Canadian history from the foundation of New France to present; Canadian-American relations, the rise of Quebec nationalism, and the development of the Canadian West.

HSTAA 381  Latin America: The Early Colonial Period (5)
Alden, Selberg
Discovery and founding of Spanish and Portuguese empires in New World and development until the eighteenth-century reorganizations.

HSTAA 382  Latin America: Late Colonial and Early National Periods (5)
Alden, Selberg
Imperial reforms, the struggle for independence; the founding of new nations.

HSTAA 383  Modern Latin America (5)
Selberg
Analysis of economic problems, political and social changes, and intellectual trends in major Latin American republics since the late nineteenth century.

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 organizations. Recommended: 381, 382, 383.

HSTAA 401  American Revolution and Constitution (5)
Johnson
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)
Johnson
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 reformers 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 colonial era through the Civil War, with special attention to reform: immigration, education, law enforcement and the city.

HSTAA 410  American Social History: The Modern Era (5)
Rorabaugh
Survey of American society and institutions from Reconstruction to the present with special attention to reform, poverty, social mobility, immigrant and ethnic groups, the city and law enforcement.

HSTAA 411  The United States During the Era of Civil War and Reconstruction (5)
Fowler
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. Railways, early New France and New Spain in colonial period; role of federal government in westward expansion; land policy and land distribution; migration, settlement, and the pioneering experience; federal Indian policies and implementation; political evolution, urbanization, and economic development of trans-Mississippi West; shaping of national character and institutions.

HSTAA 413  History of the Trans-Mississippi West (5)
Anglo-American exploration, conquest, occupation, and expansion of the trans-Mississippi West, with emphasis on economic development into the twentieth century. Consider 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)
Indi-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 perceptions of, and approaches to, natives; effects of colonial wars and American Revolution; evolution and implementation of federal Indian policies; impact of western frontierism; disintegration of Indian societies in the nineteenth century; Indian resistance to acculturation; condition and changing role of native Americans in modern society.

HSTAA 430 The American Disintegrated (3) Survey of major groups that have not shared in the American dream, and the clash of that dream with reality. Special emphasis is placed on the alienation, discrimination, and other factors that produced the disintegrated. The course analyzes reactions, specific periods, and issues when the disintegrated 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 additional hours devoted to discussion and special research projects. For history majors and students with urban 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, examining problems of the metropolis, the impact of industrialization and technological change, immigration, migration, ethnicity, and class; relationship between the changing physical city and the factors that gave the city its subcultural flavor. Students taking this course for 3 credits attend three weekly lectures. Those receiving 5 credits attend the same three weekly lectures plus two additional 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 integration of the immigrant community into the general American community; the rise of antisemitism; the development 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 colonial 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 Constitution, the Bill of Rights, and the compromises involved, 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 developments 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 present.

HSTAA 455 History of American Liberalism Since 1789 (5) Burke, Pease, Prussia, 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; explores 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 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 American 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 other major episodes in diplomacy are emphasized. Prerequisite: 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, 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 American: A Comparative Approach (3) Solberg Examines and compares twentieth-century Latin America's three major social revolutions: Mexico (1910-20), Bolivia (1952-54), and Cuba (since 1959). Lectures, discussions, and readings examine the backgrounds and causes of these revolutions, as well as the political, social, economic, and cultural changes they produced. Relations 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 Political, social, and economic history of Mexico from its independence from Spain to the present. Recommended: 466.

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 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) Pease

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) 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 522 American History: Writings and Interpretations Since 1870 (4-6) A. Burke, Fowler, Pease

HSTAA 524 American Social History Before 1860 (3-6) 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)

HSTAA 532-533-534 Seminar in American History: Recent Period (3-6, max. 12)-(3-6, max. 12)-(3-6, max. 12) A. Burke, Pease

HSTAA 554 American History: Intellectual (3-6) Saum

HSTAA 555-556 Seminar in 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 557 History of American Foreign Policy (3-6) Foster
### History

<table>
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<tr>
<th>Course ID</th>
<th>Course Title</th>
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<tbody>
<tr>
<td>HSTAM 452</td>
<td>The Early Renaissance (1300-1450) (3) Griffiths Growth of a humanistic culture in the Italian city-state in contrast with the Gothic values of the waning Middle Ages.</td>
</tr>
<tr>
<td>HSTAM 453</td>
<td>The High Renaissance (1450-1560) (3) Griffiths Climax of the humanist tradition and the expansion of European culture.</td>
</tr>
<tr>
<td>HSTAM 470</td>
<td>Intellectual and Religious History of the Later Roman Empire and Early Middle Ages (5) A 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 <em>'ontological argument,'</em> 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.</td>
</tr>
<tr>
<td>HSTAM 472</td>
<td>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 <em>'ontological argument,'</em> 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.</td>
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<tr>
<td>HSTAM 472</td>
<td>Intellectual and Religious History of the Later Middle Ages (5) Sp Bynum 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 &quot;humanism&quot; and the history of scholarship. Topics include: early fourteenth-century religious movements; the Avignon papacy; mysticism in the fourteenth, fifteenth, and sixteenth centuries, with special attention to Eckhart, Cusanus, and Teresa of Avila; nominalist philosophy and theology; the devoto moderno; Wyclif and the Lollards; conciliarism; northern humanism with special attention to Erasmus; radical religious movements of the sixteenth century; Luther against his medieval background; Calvin; Catholic spirituality in the sixteenth century with special attention to Ignatius Loyola; winterson; magic; and popular religion in the sixteenth century. Most of the reading in original sources in translation. Prerequisite: appropriate background in medieval history or intellectual history.</td>
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<tr>
<td>Courses for Graduates Only</td>
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<tr>
<td>HSTAM 501</td>
<td>Greek History (3-6) Thomas Problems in the history of the Athenian constitution.</td>
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<tr>
<td>HSTAM 511</td>
<td>Roman History (3-6) Ferrill Roman history, 31 B.C.-A.D. 37.</td>
</tr>
<tr>
<td>HSTAM 512-513</td>
<td>Seminar In Ancient History (3-6) (3-6) Ferrill, Thomas Detailed study of special topics in ancient history. Prerequisite: permission of instructor or graduate program adviser.</td>
</tr>
<tr>
<td>HSTAM 521</td>
<td>Byzantine History (3-6) Boba</td>
</tr>
</tbody>
</table>
HSTAS 333, 334 Medieval European Seminar (3-6, 3-6, 3-6) AWSp
Prerequisites: a reading knowledge of French or German and Latin.

HSTAS 201 Ancient Indian Civilization (5) Conlon
Introductory course dealing with the religions, literature, philosophy, politics, arts, and history of India from earliest times to the Muslim invasion.

HSTAS 202 Modern Indian Civilization (5) Conlon
Introductory course dealing with the Islamic impact, British conquest, and contemporary India. Emphasis on the rise of nationalization, 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) Sohn
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) Beckmann, Butow
Introduction to Japanese civilization from prehistoric to modern times. Course explores traditions of Japanese 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 organizations 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. Prerequisite: 202 or permission of instructor.

HSTAS 403 History of Modern India to 1900 (5) Conlon
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 Maharashtria 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) Pyle
Feudal development prior to 1600; establishment of the Tokugawa political structure, and the social, economic, and cultural history of the period from 1600 to 1668.

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 Tibet 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, T'ang, 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 1855. 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) Treidler
Comparative analysis of stages of Western impact on Russia (1462-1917) and China (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 communist 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. Prerequisite: 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) Beckmann
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) Dull
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
Dull
Prerequisite: reading knowledge of Chinese.

HSTAS 561 Field Course in Chinese History: Sung to Modern (3-6) Chan
Introduces Western language materials on Chinese history from the Sung period to the present 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 1850. A portion of 572 is devoted to preparation of seminar papers 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 reading and mastery of research, and preparation of extended research papers. Prerequisites: 571-572 or permission 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 research 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 360  The Destruction of European Jewry, 1933-45 (3 or 5) W
Examines the history of anti-Semitism; the dimensions of the holocaust; the holocaust organization and the victims' responses. Surveys the history of the events in Europe, Allied policies, refugee policy, and American actions. The numerous legal, historical, and sociological questions raised by these events are examined.

HSTEU 370  The Vikings (5) 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) Lyv
Relates the changes in political theory, philosophy, science, and literature to the historical events of the period 1500 to the present.

HSTEU 378  The Making of Contemporary France (3) Notstand, Pinckney
Study of the historical origins and subsequent development of nine contemporary problems and characteristics of French government and politics, economy, and society. Prerequisite: FREN 203 or 222 or equivalent.

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) Griffins
Origins of the disunity of Europe in the crisis of the sixteenth century with special emphasis on the relations between religion and politics.

HSTEU 402  History of the French Renaissance (5) Griffins
Sixteenth-century French history: the political and religious conflicts of the Renaissance and Reformation seen through the eyes of contemporary writers and statesmen.

HSTEU 403  European Intellectual History: Eighteenth Century (5) Toews
Development of the social sciences, moral theory, political thought, 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 404  European Intellectual History: Nineteenth Century (5) 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 Christianity, socialism, and utilitarianism; laissez-faire, liberalism as philosophy, the early Marx. Prerequisite: at least one course in the history of modern Europe.

HSTEU 407  European Intellectual History: Twentieth Century (5) Toews
Selected topics in the intellectual history of the last nineteenth and early twentieth centuries. The aftermath of Darwinism, the problems of methodology in modern social science, historicism, and relativism, irrationalism in philosophy and social theory, revisionism in secular and orthodox religions. Prerequisite: at least one course in the history of modern Europe.

HSTEU 411  Europe: 1814-70 (5) Bridgeham, Emerson, Lytle, Pinckney, 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) Bridgeham, 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) Bridgeham, 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 (1793-95) (5)
Emerson
Inquiry to discover what the war of 1793-95 was about and what it did to the more than five hundred million people involved.

HSTEU 421  France: 1429-1789 (5) Lytle, Pinckney
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, Pinckney
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) Lytle, Pinckney
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) Bridgeham, 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) Bridgeham, Emerson
Politics and society from the collapse of the Bismarckian empire to the collapse of Hitler's empire.

HSTEU 435  World War I (5) Bridgeham, Emerson
Historical, nationalistic, 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 Revolution of 1917.

HSTEU 439  Soviet Union Since World War II (5) Ellison
Covers both domestic and foreign policy and includes political, economic, social, and cultural developments.

HSTEU 440  History of Communism (5) Ellison
Communism in 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 European 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 historical sources, with emphasis on the latter. Prerequisites: reading knowledge of Russian and permission. Recommended: 443.

HSTEU 442  Russian Culture to the Era of Peter the Great (5) Waugh
Emphasis on the development of Klezmer and Muscovite "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  Klezmer and Muscovite Russia: 850-1700 (5) Waugh
Development of Russia from earliest times to the reign of Peter the Great. Prerequisite: HST 111 and 112, or permission 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 permission of instructor.

HSTEU 447  Russian and East European Bibliography (5) Boba
Analysis of bibliographical problems in the social sciences and the humanities. For seniors and graduate students. Prerequisite: one East European language or German.

HSTEU 450  Ethnole 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, Yugoslavia, 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 nineteenth 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)
Ullman
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 elevenths to the seventeenth centuries.

HSTEU 464 The Jews In Spanish History (5 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, 1580-1659 (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 wilderness. Classes on poetry, drama, music, architecture, painting, interior decoration, and some of the minor arts, as well as on demography and some of the traditional historical subjects. Not open for credit to students who have taken 471 or 472.

HSTEU 471 England in the Sixteenth Century (5)
Levy
Political, administrative, and social history from Henry VII to Elizabeth I, with emphasis on the Reformation and its effects and on conditions of life in Elizabethan England. Not open to students who have taken 470.

HSTEU 472 England in the Seventeenth Century (5)
Levy
Political, administrative, and social history from the accession of James I to the Glorious Revolution. Not open to students who have taken 470.

HSTEU 473 England in the Eighteenth Century (5)
Behrman
Study of political, social, economic, and cultural developments. Parliamentary government; rise of the British Empire; aristocratic culture.

HSTEU 474 England in the Nineteenth Century (5)
Behrman
Political, social, and cultural development; the agrarian, industrial, and French revolutions; the rise of parliamentary democracy; the Victorian age; political thought from Utilitarianism to Fabianism; Irish home rule.

HSTEU 475 England in the Twentieth Century (5)
Behrman
From the Boer War to the present; conservatism, liberalism, and socialism; England in two world wars; the decline of British imperialism.

HSTEU 476 Modern Irish History (5)
Behrman
Political and social history from 1800 to the present; the Irish Question after the Act of Union; development of Irish nationalism in the Home Rule and Sinn Fein periods; the Irish Free State and Northern Ireland since 1921; current problems in Northern Ireland.

HSTEU 521-523-524 Seminar In French History (3-6)(3-6)(3-6) A,W,Sp
Lytle, Pickney

HSTEU 524 Modern Russian History (3-6)
Waugh
Prerequisite: reading knowledge of Russian.

HSTEU 544 Seminar In Medieval Russian History (3-6, max. 12)
Waugh
Prerequisite: reading knowledge of Russian.

HSTEU 548 Field Course In Soviet History (3-6)
Ellison
Seminar in modern Russian history. Prerequisite: reading knowledge of Russian and either French or German.

HSTEU 551 History of Eastern Europe: 1772-1939 (5)
Sugr
Study of the East-central European region: Poland, Czechoslovakia, Hungary, Romania, and the Balkan countries, from their rebirth to World War II. Prerequisite: reading knowledge of German, French, Russian, or one Eastern European language.

HSTEU 552 History of Eastern Europe: 1939 to the Present (5)
Sugr
Prerequisite: reading knowledge of one major European or one Eastern European language.

HSTEU 553-554-555 Seminar In Modern East European History (3-6)(3-6)(3-6) A,W,Sp
Sugr
Study and research involving special methods dealing with the histories of the East European countries in the modern period.

HSTEU 555 Early Spanish History (3-6)
Ullman
Problems in the history of Spain, antiquity through the Middle Ages.

HSTEU 556 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 humanistic 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 methods 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, medicine, public affairs, etc.). For honors students. Prerequisites: 200-201 or 202-203.

H A&S 350 Honors Seminar (1, max. 20)
Selection of topics in a variety of subject-matter 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 Renaissance 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 present. Content and readings vary; emphasis on fundamental preoccupations of modern writers as a response to the times and societies in which they live.

HUM 214 Ideas in the Modern English Tradition: Modern (5) AWSp
Introduction to cultural issues and ways of thinking in the modern English 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)
Introduction 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 Coulon, Wolfe
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 understand-
ing 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
Chiot
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

Relationship of energy, the economy, and the political process. Focus on comparing policy response to energy crisis 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 445 Franklin D. Roosevelt and His World, 1882-1945 (3) Sp
Bawor
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)
A
Introductory survey of African societies and cultures, developed 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 skills and as 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. Prerequisites: 303 for 304; 304 for 305.

Eastman, Williams
Introduction to specific African languages with an emphasis on teaching skills that can be acquired in a language laboratory setting. One language is taught every time the course sequence is offered. Languages offered are among the 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, 303, 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)
Eastman
General survey of the development of Bantu linguistics with special emphasis on comparative Bantu phonology, 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 humanistic, 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 traditions 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 262.

SISAF 490 Special Topics (1-5, max. 15) AWSp
Course content varies. Prerequisites: three courses in the area.

SISAF 499 Undergraduate Research (0-5, max. 15) AWSp
Eastman, Spain, Williams
Prerequisite: permission of instructor.

CHINA REGIONAL STUDIES

Courses for Undergraduates

SISEA 101 Contemporary China (5)
Townsend, Staff

SISEA 210 The Far East in the Modern World (5)
Social, economic, and political problems of China, Japan, Korea, and Southeast Asia. Includes development of Russia as an Asian 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
Buono
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 Eastern 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 Marxism-Leninism in Asia from 1920 to the present. Readings, in translation, of Mao Tse-tung, Ho Chi Minh, Kim Il Sung, D. P. Aidit, M. N. Roy, and Sanan Nuska. 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 Marxist series or a course in modern Asian politics or history.

SISEA 424 Perspectives on East Asia for Teachers (3, max. 6)
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 444. Prerequisite: 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 doctrines, practices, and social consequences of the eclectic folk religions, the elite Confucian, Taoist, and Buddhist traditions, syncretistic sects, and imported Christianity. Offered jointly with ANTH 447. Prerequisites: 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 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 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 (5)

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 (5)

ART H 418 Buddhist Sculpture of China and Japan (3)

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 487 Chinese Reference Works and Bibliography (3)

C LIT 302 Comparative Literature: Themes (5)

C LIT 410 Literary Motifs (3-5, max. 10)
COMPARATIVE RELIGION

Courses for Undergraduates

RELIG 201 Introduction to World Religions: Western Traditions (5) AW
Webb, Williams
Introduction course in the history of religions, concentrating on religions that have developed in the West. Primary attention is given 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
Cotton
Introduction course in the history of religions, concentrating on religions that have developed in South Asia and East Asia. Primary attention to Hinduism and Buddhism; other important Asian religions are discussed in relation to them, with emphasis on basic conceptual and symbolic structures.

RELIG 210 Introduction to Judaism (5) W Stanislawski
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, Messiahship.

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 genre 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. History of the major themes: 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 Benca
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, rabbis, and philosophers. Emphasis on the evolution and consolidation of the Talmud along with examination of Hellenistic Judaism, Rabbinic Judaism, and Jewish thought in the Islamic world. Works studied are Philo, Hillel, Akiba, Gersonides, Rashi, and the rise of Hasidism. Recommended: 201 or 210.

RELIG 312 Jewish Mystical Traditions: Kabbalah and Its Influence (5) W Benca
Study of Jewish esoteric thought from Rabbi Moses Cordovero. 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 the modern movements—specifically the mystical messiah, Sabbatai Zevi, and the rise of Hasidism. Recommended: 201 or 210.

RELIG 314 Modern Judaism (5) Sp Stanislawski
Development of Jewish religious thought since the mid-eighteenth 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, philosophical, and religious environment. Covers the period from the Age of the Apostles to the Council of Nicaea (A.D. 325). Christian thinkers include Irenaeus, Polycarp, Clement of Alexandria, Origen, and Ireneaus. Recommended 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 Empire, 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) Williams
In-depth study of gospel material from early Christianity, including both canonical and noncanonical gospels. Attention to theme, form, and questions of historical reality. Recognition of gospels as analogical to the Hellenistic-Roman period. Recommended: 220 or ENGL 241.

RELIG 325 American Religious Thought (5) Sp Sloan
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 William
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 many other religions throughout that period. Readings are primarily from Gnostic apocalypses, gospels, treatises, and other forms of literature, dating from the first through the third centuries. 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 Buddhism (as practiced in Sri Lanka, Burma, Thailand, Laos, and Cambodia) and examination of the variations in ethical orientations developed through Theravada Buddhist ideas. Offered jointly with ANTH 352. Recommended background: 202 or knowledge of one Eastern religious tradition.

RELIG 352 Hinduism (3) Sp Rauy
Survey of the varieties of Hindu religious practice; emphasis on the diverse patterns of religious thought and action 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. Recommended preparation: 202 or other study of South Asian culture.

RELIG 354. Buddhists (3) A Rauy
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 Community [Sangha]). Course is organized into these three parts. Recommended preparation: 202 or other study of Asian culture.
RELIG 380 The Nature of Religion and Its Study (5) Sp Webber

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, anthropology, sociology, psychology, literary criticism, archaeology, philosophy, theology, etc.) illuminate different aspects of religion and help to shape our conceptions of its nature. Recommended: 201 or 202 or other course in the history of religious traditions.

RELIG 410 Religion and Personality (5) Sp Williford

Such fundamental religious concepts as "soul" and "spirit" describe aspects 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 important 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 attempts 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 its amalgamation with the teachings of Bon, the pre-Buddhist shamanism in Tibet. The resulting doctrines and phenomenology of Tibetan Buddhism are examined in depth. Prerequisites: 202 or equivalent. (Offered alternate years.)

RELIG 490 Special Topics (1-5, max. 15)

Special topics in which students and faculty have developed 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

Relates to the development of Christian religious thought during its classical formative period. Possible topics include Apocryphalism, Gnosticism, the figure of the "wise man" or "divine man," the relation between Christian thought and Hellenistic-Roman Philosophy. Recommended: at least one course in early Christian thought or literature.

RELIG 499 Undergraduate Research (1-5, max. 15) AWSp

Primary for comparative religion majors and minors 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 Nationality is open to graduate students. Credits 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 (3)

ANTH 600 Independent Study or Research (*)

AAS 205, 485 Asian American Culture (5,5)

AAS 490 Asian American Studies—Special Topics (3, max. 9)

GEOG 479 Urban Social Geography (5)

HIST 467 Nations and States in the Modern World (5)

HIST 469 Introduction to Modern Jewish History (3 or 5)

HIST 498 Senior Seminar (3-5, max. 15)

HSTAA 430 The American Disenfranchised (3)

HSTAA 436 African Urban History Since 1870 (3 or 5)

HSTAA 436 American Jewish History Since 1885 (5)

HISTE 450 Ethnic History of Russia and East Europe (5)

HISTE 464 The Jews in Spanish History (3 or 5)

LING 433 Language Policy and Cultural Identity (3)

LING 530 Dialectology (3)

LING 580 Problems in Linguistics (3, max. 12)

POL S 435 Ethnic Politics and Nationalism in Multi-Ethnic Societies (5)

POL S 493 Language and Politics (5)

POL S 623 Ethnic Politics and Nationality-Foreign Policy (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 (3)

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 (3)

SOC 630 Independent Study or Research (*)

JAPAN REGIONAL STUDIES

Courses for Undergraduates

SISSA 210 The Far East In the Modern World (5) Social, economic, political and cultural problems of China, Japan, Korea, and Southeast Asia. Includes development of Russia as an Asiatic power as well as the role of Western powers in the Far East.

SISSA 216 The United States in Eastern Asia, 1784-1945 (5) A Buuot 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 Eastern policy of the United States during the first four decades of the twentieth century. Offered jointly with HIST 216.

SISSA 417 Asian Marxist Thought (3) Introduction to the theory and, where appropriate, the practice of Marxism-Leninism in Asia from 1917 to the present. Readings, in translation, of Mao Tse-tung, Ho Chi Minh, Kim Il Song, D. P. Aidit, M. N. Roy, and Sanzo Nosaka. Emphasizes the role of Asian Marxist thought in 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.

SISSA 424 Perspectives on East Asia for Teachers (3, max. 4) W 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.

SISSA 440 The Emergence of Postwar Japan (5) A Hollmann, Pyle, Yamamura The making of modern Japan: World War II and surrender; Japanese occupation; postoccupation rebuilding; emergence as an industrial power.

SISSA 444 Economic and Social History of Japan to 1990 (5) A Hanley, Yamamura Lecturer-seminar on Japanese economic and social history 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 peasant/tenant system, and the early phases of industrialization. Political and cultural developments as related to economic and social change. (Taught with 541.)

SISSA 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.

SISSA 446 Political Development in East Asia (5) Sp Perry Comparative examination of political development in Japan 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 development, or permission of instructor.

SISSA 451 Undergraduate Colloquium on Japan (5) International study of Japan with emphasis on the modern period.

SISSA 490 Special Topics (1-5, max. 15) AWSp Course content varies. Prerequisite: three courses in the area.

SISSA 499 Undergraduate Research (3, max. 15) AWSp

COURSES ON JAPAN IN VARIOUS DISCIPLINES

ART H 316 Japanese Painting (5)

ART H 417 Buddhist Painting of China and Japan (5)

ART H 418 Buddhist Sculpture of China and Japan (3)

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)
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 Twentieth 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)
LAW 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 en 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, Japan, 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
Introduction to the theory and, where appropriate, the practice of Marxist-Leninist in Asia from 1920 to the present. Readings in translation, of Mao Tse-tung, Ho Chi Minh, Kim Il Sung, D. P. Aidit, M. N. Roy, and Sano 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: nineteenth- or twentieth-century Marxist series of courses in modern political science, or history.

SISEA 424 Perspectives on East Asia for Teachers (3, max. 6) W
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 446 Political Development in East Asia (5) Sp
Course content and examination of political development in Japan and China from the nineteenth century to the present. Emphasis on theoretical development and their applicability to the East Asian context. Prerequisite: an introductory course in Chinese or Japanese history or in political development, 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 IN JAPAN IN VARIOUS DISCIPLINES

SISEA 541 Economic and Social History of Japan to 1900 (5) A
Hanley, Yamamura
Japanese economic and social history from 700 to 1900. Analyzes the rise and disintegration of the above 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
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)

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 Sector 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) AWSp
Weaght
Russian material civilization, including fine arts, literature, religion, and history; political, social, and legal institutions and thought in relation to the general development 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 Multinational States in the Soviet Union and Eastern Europe (5) Sp
Volkov, Weaght
Nationality and multinational problems in the Soviet Union and East European states. Relevance and irrelevance of Marxist theory as applied to this problem.
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 Thornson, 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 supervised undergraduate research and discussions. Prerequisites: 243, two years of Russian language, and permission of Russian and East European undergraduate advisor.

SISRE 360 Communism, Literature, and the Movies (5) A
Paz
Film and literature as media of social and political commentary in Communist societies. The role of the cultural intelligentsia under conditions of political constraint. Emphasis on materials from Eastern Europe, although in some years attention is given to selected Soviet works. Feature films by such directors as Wajda, Schorm, Janco, Kadar, Eisenstein, and Pudovkin are shown and discussed. Readings may include works by Kundera, Andrezewski, Havel, and Solzhenitsyn. Offered jointly with POL S 349.

SISRE 378 Russia and Asia (5)
Wuath
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
Legters
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) WS 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 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
Cirnaut
The nomadic and sedentary cultures of the Turkic peoples in the past and in the present: their cultural life (language, literature, adherence to traditional modes of life) under Soviet Russia's dominance.

SISRE 457 Undergraduate Colloquium on Russia (5)
Interdisciplinary study of Russia, with emphasis through the historical period. Required of all undergraduate Russia 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 Changling 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)

HSTEU 452 Foreign Relations of the Soviet Union (5)

HSTEU 441 Government and Politics of the Soviet Union (5)

RuSS 242 Russian Folk Literature in English (3)

RUSS 341 Growing Up Russian: Childhood and Adolescence in Russian Literature (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 Dostoevsky (5)

RUSS 429 Chekhov (5)

RUSS 430 Solzhenitsyn: Artist and Social Critic (5)

ECON 495 Soviet Economics (3)

GEOG 533 Research Seminar: Soviet Union (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 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 (5)

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, Hungary, Poland, Romania, and Yugoslavia.

SISRE 248 Multilingual States in the Soviet Union and Eastern Europe (5) Sp Velickova, Waugh
Nationality and multilingual 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) Kapustec, Paul, Sugar
Designed as a bridge between the two basic requirements of the East European Regional Studies baccalaureate program. The initial topic is "Heretics and Conformists in Iron-Curtain Europe." Prerequisite: permission of Russian and East European undergraduate advisor.

SISRE 360 Communism, Literature, and the Movies (5) A
Paz
Film and literature as media of social and political commentary in communist societies. Role of the cultural intelligentsia under conditions of political constraint. Emphasis on materials from Eastern Europe and in some years on selected Soviet works. Feature films by such directors as Wajda, Schorm, Janco, Kadar, Eisenstein, and Pudovkin. Readings may include works by Kundera, Andrzejewski, Havel, and Solzhenitsyn. Offered jointly with POL S 349.

SISRE 419 Communist States of North-Central Europe (5) Legters
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 Bobek, 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. Prerequisite: three courses in the area.

SISRE 499 Undergraduate Research (3-5, max. 15) AWSp
COLLEGE OF ARTS AND SCIENCES

COURSES ON EASTERN EUROPE IN VARIOUS DISCIPLINES

CZECH 420 Modern Czech Literature in English (5)
* 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)
POLISH 420 Modern Polish Literature in English (5) 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 Faul
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 (3-4) Faul
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 (3-4)
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)(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 (3)
Emphasized are topics involving the interrelationship 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 Mogul India (5)
HSTAS 403 History of Modern India to 1900 (5)
HSTAS 404 History of Twentieth-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 Indo and Indo-European, (3,3,3)
MUSIC 438 Music of India (3)
PHIL 206 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 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 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 Research Seminar: Southeast Asia (5, max. 6)
LING 578 Seminar on Southeast Asian Linguistics (3, max. 9)
POL S 531 Problems of Southeast Asian Politics (3)

KINESIOLOGY

Courses for Undergraduates

KINESIOLOGY

KIN 200 Foundations of Physical Fitness (3)
KIN 301 Physical Activity and Sport: A Social Psychological Perspective (4)
KIN 302 Sport in American Society: Socialization Processes (4)
KIN 303 Sport in American Education: A Sociocultural Perspective (4)

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Kinesiology

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 Kinesenergetics (3, 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 Kinesenergetics (5,5)
Doolittle, Hutton, Miller, Sembowitch
Energetics and biomechanics of neuromuscular performance; factors underlying acute and chronic systemic adaptations to exercise; exercise prescription; nutritional environmental 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)
Kerr
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 social institution of sport (e.g., commercialization, administrative centralization, the influx of technical rationality). Prerequisite: 302 or permission of instructor.

KIN 413 Athletics In the Ancient World (3)
Hurd
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 life. Begins with eighteenth-century England, continues to the "Anglo-American Connection," and concludes with the period of American colonial growth through approximately the "Age of the Great Depression."

KIN 420 Field Analysis of Motor Development (4)
Smoll
Interrelationships among physical growth, motor development, and psychosocial development of children; includes laboratory experiences 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 demands 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 application in the education of the exceptional child. Prerequisites: 325 and 332, or permission of instructor.

KIN 470 Social Psychology of Sport (4)
Foster
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 performance 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)
Hardy
The mind-body dichotomy and selected philosophical positions 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. Prerequisites: appropriate background course work and permission of instructor.

KIN 497 Research Seminar in Sport Studies (3, max. 6)
Selected current research topics. Prerequisites: appropriate 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 tension 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. Prerequisites: 302, 306, and women's events. Fee charged. Prerequisite: 203 or appropriate background course work.

KINPE 216 SCUBA Diving (2)
Scientific principles and techniques of SCUBA (Self-Contained Underwater Breathing Apparatus) diving, based on marine biology, physiology, and medical requirements for a safe exposure in an underwater environment. Fee charged. Prerequisites: swim underwater (no fine) 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 special 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 combinations of sports according to season (soccer-field hockey; Lacrosse-tan hau ball; softball-baseball). Open to majors only.

KINPE 223 Performance Laboratory—Indoor Team Sports (2)
Development of personal skill in basketball and volleyball. Open to majors only.

KINPE 224 Performance Laboratory—Individual Sport (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; traditional dances and emergence of modified forms; performance, analysis, and interpretation.

KINPE 226 Performance Laboratory—Combatting 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 gymnastics events. Separates 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 springboard diving. Open to majors only.

KINPE 292 First Aid and Emergency Care (3)
Hughe s
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 (3)
(WSI certification) Designed to prepare students for employment as teachers or administrators in aquatic programs. Prerequisites: current Red Cross advanced life-saving certificate.

KINPE 304 Obitcrating (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 (2)
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 adolescence. 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 programs, considering elements of fitness, biomechanical principles of exercise, and specificity of movement performance requirements. Prerequisite: KIN 332.

KINPE 336 Athletic Training and Conditioning (4)
Athletic training techniques and procedures for the prevention and care of athletic injuries. Designed for the physical education major or student planning a coaching career. Prerequisites: KIN 331, KIN 332, and certification in first aid, or permission of instructor.
KINPE 359 Workshop in Athletics (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 physics of exercise, permission of instructor.

KINPE 437 Advanced Athletic Training (5)

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)
Harvey
Administrative and organizational procedures and problems surrounding sport and athletic programs, including ethical, legal, economic, social, and political issues. Prerequisites: 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, psychological, 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 maturation and ideologies. Specific attention is paid to the United States. Prerequisites: 302 or permission of instructor. Recommended: SOC 410 or 451. (Offered alternate years.)

KIN 514 Seminar in American Sport History (5)
Berrymen
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 delinquencies, and health. Prerequisite: 303 or permission of instructor.

KIN 515 Key Figures in American Sport and Physical Culture: A Sociohistorical Perspective (4)
Berrymen
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 where ideas, trends, dominant beliefs, customs, and general societal concerns emerge. Prerequisite: 303 or permission of instructor.

KIN 520 Advanced Growth and Motor Development (4)
Smith
Developmental kinesiology, focused on analysis of physical growth, motor development, and interrelationships among modifying variables. Prerequisite: 325 or permission of instructor.

KIN 522 Career Patterns and Career Contingencies in Sport (4)
Ingham
Lecture-seminar course. Role progression in sport. Historical, 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. Intrapersonal and interpersonal dynamics and place between spectators, athletes, and formal organization. Identity-work and impression management. Organizational changes and organizational ethics. Occupational character in relation to making respect, courage, compulsion. Failure. Prerequisite: 302 or permission of instructor. Recommended: SOC 419.

KIN 540 Physiological Bases of Physical Conditioning (5)
Doolittle
Principles of overload, specificity and progression, together with the underlying physiological mechanisms as they relate to that physical condition of the organism for movement stress. Prerequisite: 332 or permission of instructor.

KIN 541 Exercise and Metabolism (3)
Sembrowich
Carbohydrates, fats, 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
Neuromotorical and neuropsychological 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 Neuropsychological 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, proprioception, and feedback). Prerequisites: 332, 552, 2Z01. 118 or 208, or permission of instructor.

KIN 562 Advanced Learning and Movement Performance (3)
Purdy
Interrelationships among situational and conditional variables as related to learning and performance of movement skills, emphasis on practice factors. Prerequisite: 350 or permission of instructor.

KIN 570 Seminar in Sport Psychology (4)
Pauser
Psychology of sport and physical activity. In-depth analysis of two or three topics through reading, presentation, and discussion of research findings. 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 characteristics. Emphasis placed upon retrieval, reading, and discussion of relevant research as well as individual projects and term assignments in conjunction with the topic under consideration and adapted to the student's special interests. Prerequisite: 480 or permission of instructor.

KIN 589 Research in Human Movement (3)
Research procedures appropriate to the solution of human movement problems. Prerequisite: statistics or permission 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 kinesiology. Content variable: physical education programs, kinesioenergetics, 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 (5-6, max. 10)
Issues, problems, and trends in physical education and other movement-centered programs: relationship of changes in direction or focus to emerging 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 programs 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 conditions. 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 students in M.S. Physical Education Sport Administration option only. Prerequisites: concurrent registration in 503 and permission of instructor.

KINPE 596 Internship in Exercise Science (3-6, max. 12)
Supervised field-clinical experience. Nine hours minimum, eighteen hours maximum per week. Open to graduate 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 SPCII 111.
LING 200 Introduction to Linguistics (5) AWSp
Brane, Contreras, Emonds, Ioup, Kaiser, Newmeyer, Saporta, Williams
Introduction to the scientific study of language; language and writing; phonological and grammatical analysis; language change and 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 relationship of linguistic theory to societal problems. Ethical and political considerations involved in the application of linguistic theory also are discussed.

LING 400 Survey of Linguistic Method and Theory (3) AWSp
Brane, Contreras, Ioup, Kaiser, Newmeyer, Saporta
Background and scope of modern linguistics; syntax, phonology; languages of the world; language analysis; relations 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 various Chomskyan 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, nineteenth-century comparative and historical grammar, Prague School, and American structuralist grammar. Prerequisite: 400 or equivalent or permission of instructor.

LING 404, 405, 406 Indoe and Indo-European (3, 3, 3)
Voyle
Reading of simple Sanskrit texts with emphasis on structure of Sanskrit and its comparison with other Indoeuropean 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 linguistic minorities. In the United States, for example, the demand for non-English medium schools and other uses of non-English are compared with language policy in other societies (Europe, Africa, Asia). Attention is paid to attitudes, underlying second-language instruction, bi-lingualism, and language loyalty among Americans of non-English language background. The persistence of language minority societies is examined in terms of special cultural factors underlying language loyalty, 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 universals, and the poetic uses of language; linguistic description in the analysis of literature. Prerequisite: 400 or permission of instructor.

LING 443 Philosophy and Linguistics (3) A
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 philosophy. Offered jointly with PHIL 443. Prerequisite: permission of instructor.

LING 445 Theoretical Aspects of Teaching English as a Foreign Language (3) W
Voyle
Linguistic analysis as a basis for the teaching of English as a foreign language; language as rule-governed behavior. 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
Voyle
Survey of issues related to second-language learning; learning to read in a second language, learning the linguistic aspect, and learning the subject matter. Prerequisites: 200 or 400 and permission of instructor.

LING 451, 452, 453 Phonology (3, 3, 3) A, W, Sp
Brane, Contreras, Kaiser
Speech sounds, mechanisms 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
Voyle
Method and theory of comparative linguistics in relation to anthropological research. Prerequisite: 400 or permission.

LING 455 Areal Linguistics (3, max. 6) W
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
Brane, Contreras, Newmeyer
Study of the structural properties of language; introduction to generative transformational grammar. Offered jointly with ANTH 461, 462, 463. Prerequisite: 200 or 400, which may be taken concurrently.

LING 464 Articulatory Phonetics (34a) S
Function of speech mechanisms, and dimensions of speech sounds. Practice in the transcription and production of sounds from a wide variety of languages. Required.

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 background of constituent structure theory. To be taken concurrently.

LING 467 Grammatical Exercizes (24a) S
Practice in eliciting, recording, and analyzing grammatical data of a non-Indoeuropean 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-Indoeuropean language. Prerequisite: 472, which may be taken concurrently, or the equivalent.

LING 478 Introduction to Southeast Asian Linguistics (3) Sp
Cook
Survey of language families of Southeast Asia. Typology and relationships. Research needs and problems. Prerequisites: 452, 462.

LING 499 Undergraduate Research (1-5) AWSp
Courses for Graduates Only

LING 500 Seminar (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
Kaiser
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 years.)

LING 505 Indo-European Comparative Grammar (2) W
Svyntactic treatment, with extensive surveys of individual language groups. Prerequisite: 504.

LING 514, 515, 516 Seminar in Comparative Linguistics (3, 2, 1) A, W, Sp
Study of some mathematical models of language recognition, emphasizing context-free and context-sensitive grammars. Prerequisite: graduate standing in mathematics, linguistics, or psychology, or permission of instructor.

LING 519 Mathematical Models of Grammar (3) Sp
Study of some mathematical models of language recognition, emphasizing context-free and context-sensitive grammars. Prerequisite: graduate standing in mathematics, linguistics, or psychology, or permission of instructor.

LING 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 variation as related to linguistic stratification and usage. Prerequisite: 452 or permission of instructor.

LING 550, 551, 552 Advanced Phonology (3, 3, 3) A, W, Sp
Brane, Kaiser

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
Brane, Newmeyer
Intensive investigation of the historical background of, and recent developments in, transformational syntax. Offered: 461, 462, 463.

LING 565 Contrastive Linguistics (3) Sp
Voyle
The attempt to look at language systems for comparable and contrastive classes and subclasses. Problems of sublanguage and universal grammar. Three conceptually distinct models: structural, transfer, and generative. Prerequisites: 452, 463.

LING 567 Syntactic and Semantic Development (3) W
Dale
Advanced study of the patterns of child language, linguistic approaches to characterizing them, and psychological approaches to understanding the nature of development. Includes cross-linguistic comparisons, the relationship of comprehension to production, the cognitive basis of systems, early semantic systems, and others. Offered jointly with PSYCH 567. Prerequisites: one course in child language development and permission of instructor.

LING 578 Seminar in Southeast Asian Linguistics (3, max. 9) Sp
Cook
Advanced consideration of specialized problems in Southeast Asian linguistics. Reports on individual research.

LING 579 Comparative Altai Linguistics (3) W
Comparative phonology and morphology of Mongolian, Turkish, and other Altai languages. Offered jointly with ALTAL 579. Prerequisite: permission of instructor.

LING 580 Problems in Linguistics (3, max. 12) AWSp
Brane, Contreras, Ioup, Kaiser, Newmeyer, Saporta, Williams
Advanced problems of students of linguistics, dealing with signifi-
COLLEGE OF ARTS AND SCIENCES

cast movements, techniques, skills, and theories in the field. Prerequisite: permission of instructor.

LING 599 Linguistics Colloquium (1, max. 6) A,W
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 (*) A,W

LING 700 Master's Thesis (*) A,W

LING 800 Doctoral Dissertation (*) A,W

MATHMATICS

Courses for Undergraduates

MATHMATICS

MATH 100, 102 Algebra (5,5) A,W,Sp
Similar to the first three terms of high school algebra. Assumes no previous experience in algebra. Open only to specially admitted students (i.e., (1) Educational Opportunity Program students, or (2) students admitted with an entrance deficiency in mathematics). (Not open to regularly admissible students.)

MATH 103 Introduction to Elementary Functions (3) A,W
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 given as a major mathematics. Prerequisites: 1½ years of high school algebra, or X101 or equivalent.

MATH 124, 125, 126 Calculus With Analytic Geometry (5,5,5) A,W,Sp
Plane analytic geometry and elementary methods of integration, definite and indefinite integrals, techniques of integration, vectors, vector-valued functions, infinite series. Applications. Credit not allowed for both 124 and 134, or 125 and 135, or 126 and 136. Prerequisites: 105 or qualifying test, and trigonometry 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.

MATH 157 Elements of Calculus (5) A,W
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) A,W,Sp
Development of the systems of whole numbers, integers, and rational numbers; measurement; basic arithmetic concepts; functions; elementary probability and statistics. Ordinarily, credit may not apply toward a major in mathematics. Prerequisite: 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.

MATH 205 Elementary Linear Algebra (3) A,W,Sp
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
Prerequisite: 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) A,W
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) A,W
Continuation of 238. Laplace transforms, linear systems, stability theory. Prerequisites: 238 and either 205 or 303.

MATH 301 Elementary Number Theory (3) A,W
Brief introduction to some of the fundamental ideas of elementary number theory. Prerequisite: 126 or 136.

MATH 302, 303 Linear Algebra (4,3) A,W
Vector spaces, linear transformations; systems of linear equations; equivalence and similarity of matrices; quadratic forms. Prerequisites: 126 or 136 or 302; 302 for 303.

MATH 304 Linear Algebra (3) Sp

MATH 305 Introduction to Mathematical Logic (3) W
Propositional and predicate calculus. Techniques of mechanical symbolization and manipulation. (Elementary set theory may be required.)

MATH 327 Advanced Calculus (3) A,W
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) A,W
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) A,W
Infinite series, uniform convergence, power series, improper integrals. Prerequisite: 328.

MATH 400 Elementary Set Theory (3) Sp
Basic axioms of set theory, algebra of sets, Peano axioms, axiom of choice and Zorn'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
Algebraic systems; elementary theory of groups, rings, and fields; polynomials; topics in linear algebra; reductions of forms. Prerequisites: 236 or 302 for 402; 402 for 403; 403 for 404.

MATH 405 Introduction to Metamathematics (3) Sp
Formal systems; propositional calculus and predicate calculus of first order. The concepts of consistency, completeness, 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
Theory of linear and programs and its applications: systems of linear inequalities, duality, the simplex algorithm, matrix games, Nonlinear programs and Lagrange multipliers. Assignment problems and various combinatorial extremum problems involving directed graphs. Prerequisites: 302 for 407; 407 for 408.

MATH 411, 412 Introduction to Modern Algebra (3,3) A,W
Development of the algebraic systems of elementary algebra; groups, rings, integral domains and fields; polynomials. 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
Congruences, arithmetic of quadratic fields, binary quadratic forms. Dirichlet's theorem on primes in an arithmetic progression. Prerequisites: 301 or 414 for 415.

MATH 420 History of Mathematics (3) A,W
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
Sets, real numbers, topology of metric spaces, normed linear spaces, multivariate calculus from an advanced viewpoint. Introduction to Lebesgue measure and integration. Prerequisites: 329 or 236, and 303 or permission for 424; 424 for 425; 425 for 426.

MATH 427 Topics In Applied Analysis (3) A,W
Some elementary functions of a complex variable. Cauchy's integral formulas and applications, Taylor and Laurent series, conformal mapping. Prerequisite: 234 or 327.

MATH 428, 429 Topics In Applied Analysis (3,3) A,W,Sp
Fourier series, orthogonal functions and boundary value problems. Prerequisites: 234 or 327, and 238 or 428; 428 for 429.

MATH 438 Principles of Differential Equations (3) A,W
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, differential geometry, advanced analytic geometry, algebraic geometry, algebraic topology, and the geometry of convex bodies. Prerequisites: 327 or 234, and 302 or permission 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 geometry. Introduction to non-Euclidean geometry. Designed for teaching majors. Prerequisites: 126 or 136 and 444; 444 for 445.

MATH 464 Numerical Analysis I (3) A,W
Basic principles of numerical analysis, classical interpolation and approximation formulas, finite differences and difference equations. Prerequisites: 238, ENGR 141, and/or CSCI 241 or equivalent programming experience.

MATH 465 Numerical Analysis II (3) W

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) A,W
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, max. 15) A,W
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; combinatorial probability; conditional probability and independence; binomial, Poisson and normal distributions. Offered jointly with STAT 394. Prerequisite: 327 or 236.

MATH 395 Probability II (3) WS Prerequisite: MATH 394. Multivariate distributions, generating functions; recurrence relations and renewal theory; random walk. Offered jointly with STAT 395. Prerequisite: 394.

MATH 396 Probability III (3) Sp Characteristics functions and Fourier transforms; the Poisson process, Markov processes and Brownian motion. Offered jointly with STAT 396. Prerequisite: 395 or STAT 511.

MATH 491, 492 Introductions to Stochastic Processes (3,3) A,W Random walks, Markov chains, branching processes, Poisson process, point processes, birth and death processes, queueing theory, stationary processes. Offered jointly with STAT 491, 492. Prerequisite: 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 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. 3, 3, max. 9) A,W Sp Seminar-type classes designed to be taken concurrently. Under supervision of instructor, students read papers on calculus of variations, integral equations, functions of a complex variable, and applications to physical and social sciences. Material is developed and designed to help students organize courses in undergraduate mathematics. Intended for teachers of secondary- or college-level 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 number theory, classical groups, game theory, group extensions, group theory, Lie algebras, number theory, and structure of rings.

MATH 524, 525, 526 Real Variable (3,3,3) A,W,Sp Metric spaces; general measures and integration; differentiation of functions and partial functions on the line; Banach spaces. Prerequisites: 426 or equivalent for 524; 524 for 525; 525 for 526.

MATH 527 Elements of Real Variables for Scientists (3) A Concepts of sets, Lebesgue integration and limit theorems, Lebesgue integral, measure spaces; sequences of functions on the line; Banach spaces. Prerequisites: 426 or equivalent for 524; 524 for 525; 525 for 526.

MATH 529 Hilbert Space Operators (3,3,3) A,W Sp Spectral theorem for bounded Hermitian operators, state­ ment for unbounded operators, application to ordinary and partial differential operators with Fourier transforms, construction of Green's functions, contour integral representation. 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 Variables (3,3,3) A,W,Sp Complex numbers; analytic functions; contour integration; power series; analytic continuation; sequences of analytic functions; conformal mapping of simply connected regions. Prerequisites: 426 for 534; 534 for 535; 535 for 536.

MATH 537 Applications of Operator Theory (3) A Schroedinger equations; eigenvalue distributions; perturbation theory; special functions. Prerequisite: 529.

MATH 538, 539 Nonlinear Ordinary Differential Equations (3,3,3) A,W,Sp Phase plane analysis; critical points (nodes, saddle points, foci); theory of oscillations, limit cycles. Poincare-Bendixon theory: topological methods, fixed-point theorem. Prerequisite: 527 or 538; 538 for 539. (Offered alternately with 578, 579.)

MATH 541, 542, 543 Special Topics in Applied Mathematics (3, max. 3, 3, max. 3, 3, max. 3) A,W,Sp Such topics as mathematical quantum theory, fluid mechanics, optimization and operations research, and control theory are covered.


MATH 550 Seminar in Geometry (*, max. 5) AWSp Prerequisite: permission of graduate program adviser.

MATH 551, 552, 553 Special Topics in Geometry (3-3, max. 9; 2-3, max. 9; 2-3, max. 9) A,W,Sp Such topics as Lie groups, differential manifolds, complex manifolds, geometry of convex bodies.

MATH 557, 558, 559 Special Topics in Numerical Analysis (3, max. 3, 3, max. 3, max. 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 connectedness; complete metric 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 homology theory; applications. Fixed points, primary obstruction; products and Poincare duality; axiomatic approach, covering spaces. Prerequisites: 506 for 564; 564 for 565; 565 for 566.


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 578, 579 Special Functions (3,3) A,W,Sp Special functions arising from eigenvalue problems, asymptotic developments by contour integration, analytic continuation, complex variable aspects of Fourier integrals. Prerequisite: 427. (Offered alternately with 538, 539.)

MATH 585 Numerical Mathematics (3) A Numerical solution of linear algebraic systems, algebraic eigenvalue problems, ordinary and partial differential equations. Offered jointly with CSCI 585. Prerequisites: 239, 301, and programming with a procedure-oriented language.

MATH 586 Numerical Mathematics (3) A Contour integration of 585. Selected topics in numerical mathematics. Offered jointly with CSCI 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 590 Seminar in Probability (*, max. 5) AWSp Prerequisite: permission of instructor.

MATH 591, 592, 593 Special Topics in Probability (3, max. 3, 3, max. 3, max. 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, advanced 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
Lieberman
Genres and styles from earliest roots to the 1960s; Anglo-American ballads, dance music, French and other European immigrant groups.

MUSIC 302 Music of Greater Mexicos (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 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 music of other African-American cultures as well as to their African roots.

MUSIC 426 Music of Korea (3)
Classical instrumental and vocal genres of Korea. Examines 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 emphasis on traditional Indian music theory and present performance 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 ethnomusicological problems, theory, and methods. Prerequisite: permission of instructor.

MUSIC 430 Organology (3) W
Systematic study of musical instruments, including 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 Spanish-, 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 East Asian Area Studies with an interest in the area. Prerequisites: 316, 317, 318.

MUSIC 444 Music of the Near East (3) Sp
Sokol
Classical and folk musical traditions of Iran, Turkey, and the Arab world. Prerequisites: 316, 317, 318.

MUSIC 445 Selected Topics in Ethnomusicology (3) A
Deals with topics not covered by regular courses in ethnomusicology. 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. Prerequisites: 316, 317, 318.

MUSIC 495 Music of Japan After 1700 (3)
Shamisen, Biwa, Kud proper traditional music 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 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)
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 influence in Spain and the vestiges of early Spanish music in the folk and popular music of Spain and Latin America.

MUSIC 549 World Music (2-3, max. 18) AWSp
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 ethnomusicolog)—along with practical experience in recording and processing 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.

MUSIC 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
Kaplan

MUSIC 116, 117, 118 Elementary Music Theory (2,2,2) A,W,Sp
Prerequisites: 116 for 117; 117 for 118.

MUSIC 120 Survey of Music (5) A
Sp
Troy
Studies in listening with emphasis on the changing compositional styles 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) AWSp
Sokol

MUSIC 124 Symphonic Music: Contemporary (2) A
Sokol

MUSIC 128 The Concerto (3) A
Sokol

MUSIC 130, 131, 132 Basic Music Analysis (3,3,3) A,W,Sp
Langdiet
Examination of the processes of music from cross-cul­
tural vantage point, primarily African, Latin American, and Afro-American. Development of improvisatory techniques, performance, use of musical notation, development of analytical and score-writing techniques, development of aural perception ability. Prerequisite: permission of instructor.

MUSIC 161 American Musical Theater (5) W

MUSIC 162 American Popular Song (5)
Sp
Historical, social, and stylistic study of popular idioms from the late nineteenth century to the present. Most at­tention is given to contemporary idioms (country-western, soul, disco). Influences of music industry on taste and style. Does not include jazz, blues, or folk music. Rec­ommended: 160, 161.

MUSIC 176 Congress of Strings (5) Sp
Berganza
Sampling of different musical events on campus, which may include orchestras, chamber music, opera, non-West­ern music, mixed media, etc. Open to selected works; when possible, preview with performers. Attendance required at one evening concert weekly.

MUSIC 200 Music and the Child (3)
Introductory orientation to music designed to acquaint the student with the structural and aesthetic elements in music and those music-related processes of self-expression and communication as 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
Beals, Bensohof, Rahn, Thome
Basic techniques of baroque counterpoint, and writing in baroque forms, such as invention, fugue, and others. Pre­requisite: 212 and 215.

MUSIC 312 Twentieth Century Techniques (3) Sp
Beals, Bensohof, 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 virtuosic conductor in the nineteenth and twentieth centuries; prominent personalities from Berlioz to Osawa. Prerequisite: 122 or 123 or 124.

MUSIC 329 Chamber Music (2) W
Mclnese
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.
<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Instructor</th>
<th>Description</th>
<th>Prerequisites</th>
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<tr>
<td>MUSIC 100</td>
<td>University Singers (2, max. 24) A WSp</td>
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<tr>
<td>MUSIC 101</td>
<td>University Symphony Orchestra (2, max. 30) A WSp</td>
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<tr>
<td>MUSIC 102</td>
<td>University Band (2, max. 24) WSp</td>
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<tr>
<td>MUSIC 103</td>
<td>Chamber Music (1, max. 12) A WSp</td>
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<tr>
<td>MUSIC 104</td>
<td>Piano Ensemble (1, max. 12) A WSp</td>
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<td>MUSIC 105</td>
<td>Brass Ensemble (1, max. 12) WSp, Bissell</td>
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<tr>
<td>MUSIC 106</td>
<td>Woodwind Ensemble (1, max. 12) A WSp</td>
<td>Grossman, McColl, Skowronek, Storch</td>
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<tr>
<td>MUSIC 107</td>
<td>Opera Workshop (1, max. 12) A WSp, Reinhorn</td>
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<tr>
<td>MUSIC 108</td>
<td>Fundamentals of Electronic Music (2) A WSp</td>
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<tr>
<td>MUSIC 110</td>
<td>First-Year Theory (3,3,3) A, W,Sp</td>
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<tr>
<td>MUSIC 111</td>
<td>Ear Training (1,1,1) A, W,Sp</td>
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<tr>
<td>MUSIC 112</td>
<td>Music Fundamentals (2) A WSp</td>
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<td>For prospective students in elementary education.</td>
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<tr>
<td>MUSIC 136</td>
<td>Basic Keyboard (1, max. 6) A WSp</td>
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<td>For music majors only.</td>
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<tr>
<td>MUSIC 137</td>
<td>Class Instruction: Voice (1,1,1) A, W,Sp</td>
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<td>For music majors only.</td>
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<tr>
<td>MUSIC 140</td>
<td>Vocal Jazz Ensemble (2, max. 12) A WSp</td>
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<td>ätz</td>
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<tr>
<td>MUSIC 144</td>
<td>Dictation for Singers (2,2,2) A, W,Sp</td>
<td></td>
<td>Application of rules of diction,unciation, and articulation 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 accompanies. Drill of recitativo textural vocabulary. Recommended: additional study of grammar, vocabulary, and literature in the several language departments. Required for voice majors; elective for others if space available.</td>
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<tr>
<td>MUSIC 147</td>
<td>Opera Chorus (1, max. 12) A WSp</td>
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<tr>
<td>MUSIC 167</td>
<td>Oboe Reed-making Techniques (1, max. 3) A WSp</td>
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<tr>
<td>MUSIC 168</td>
<td>Clarinet Reed-making Techniques (1, max. 3) A WSp</td>
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<td>MUSIC 191</td>
<td>Composition (3, max. 9) A WSp, Beale, Benshoof, Bergsma, Kechley, Rahn, Smith, Thomson, Tafts</td>
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<td>MUSIC 201</td>
<td>Wind Sinfonietta (1, max. 12) A WSp, Bissell</td>
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<tr>
<td>MUSIC 202</td>
<td>Jazz Improvisation (1, max. 6) WSp, Smith</td>
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<td>Improvisational techniques in the jazz style for instrumentalists, with priority given to woodwind performers.</td>
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<tr>
<td>MUSIC 203</td>
<td>Marching Band (2, max. 10) A Bissell</td>
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<td>MUSIC 204</td>
<td>Percussion Ensemble (1, max. 12) A WSp, Dunbar</td>
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<td>MUSIC 206</td>
<td>Jazz Workshop (1, max. 12) A WSp, Stewart</td>
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<td>MUSIC 207</td>
<td>University Oratorio Chorus (2, max. 24) A WSp</td>
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<tr>
<td>MUSIC 208</td>
<td>Studio Jazz Ensemble (2, max. 24) A WSp, Cummings</td>
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<td>Large ensemble performance practices in the jazz idiom.</td>
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<tr>
<td>MUSIC 209</td>
<td>Recorder Ensemble (1) Sp, Beale, Benshoof, Rahn, Thomson</td>
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<tr>
<td>MUSIC 210</td>
<td>Second-Year Theory (3,3,3) A, W,Sp, Beale, Kechley, Rahn, Thomson, Tafts</td>
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<tr>
<td>MUSIC 213</td>
<td>Music After 1750 (3,3,3) A, W,Sp, Starr, Troy</td>
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<td>MUSIC 216</td>
<td>Introductory Composition (2,2,2) A, W,Sp</td>
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<td>MUSIC 220</td>
<td>String Techniques and Pedagogy (2,2,2) A, W,Sp</td>
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<td>MUSIC 223</td>
<td>Music Theatre Technique (1) A, W,Sp</td>
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<td>MUSIC 233</td>
<td>Guitar Techniques I (1) A WSp</td>
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<tr>
<td>MUSIC 240</td>
<td>Recorder Techniques I (1) W</td>
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<tr>
<td>MUSIC 291</td>
<td>Composition (3, max. 9) A WSp, Beale, Benshoof, Bergsma, Kechley, Rahn, Smith, Thomson, Tafts</td>
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<tr>
<td>MUSIC 307</td>
<td>Advanced Opera Workshop (1) A WSp, Desimone</td>
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<td>Preparation and public performance of one act chamber opera or scenes from the standard opera repertoire. Intended for the mature student with a secure vocal technique. Required: permission of instructor. Recommended: three quarters of 107.</td>
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<tr>
<td>MUSIC 309</td>
<td>Advanced Music Theatre Technique (1) W, Reinhorn</td>
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<td>Dramatic interpretation of musical style as represented by the major opera composers since Mozart. Required: permission of instructor.</td>
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<tr>
<td>MUSIC 310</td>
<td>Modal Counterpoint (3) A, Bergama, Rahn, Thomson</td>
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<td>MUSIC 311</td>
<td>Tonal Counterpoint (3) W, Beale, Benshoof, Rahn, Thomson</td>
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<td>Basic techniques of Baroque contrapuntal and introduction to the fugue. To be taken concurrently with 314. Required: permission of instructor.</td>
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<tr>
<td>MUSIC 312</td>
<td>Twentieth-Century Techniques (3) Sp, Beale, Bergsma, Thomson</td>
<td></td>
<td>Practical writing and analytical study of twentieth-century composition techniques from Debussy to the present.</td>
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</tbody>
</table>
MUSIC 332, 337, 328 Repertoire (2,2,2) A,W,Sp
Hokanson, Zeiglmund
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, Besnook, Bergama, Kechley, Rahn, Smith, Tharta
One-hour private lesson and one-hour laboratory sessions each week. Prerequisite: 291.
Courses 400 through 423: Prerequisite: 314.
MUSIC 400 Mediaval Music: To 1400 (3) A
Gregorian chant through Machaut and Landini.
MUSIC 401 Early Renaissance Music: 1400-1525 (3) W
Duustable through Josquin.
MUSIC 402 Late Renaissance Secular Music: 1525-1630 (3) A
The madrigal in Italy, England, and Germany. The Chanson through Lassus.
MUSIC 403 Late Renaissance Sacred and Instrumental Music: 1525-1630 (3) W
Surr
Latin church music. Willaert through G. Gabrieli; early Renaissance church music, Wilbye through Gombert; instrumental music, Cabezón, 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 (3)
Faure through Poulenc.
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) Sp
Selected choral masterpieces. Brahms through Britten.
MUSIC 420 Opera: 1600-1750 (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 Concepts of the History of Music to 1760 (5) W
Troy
Concentrated course in Renaissance, Baroque, and preclassical music. Intended primarily for seniors and graduates.
MUSIC 425 Concepts of the History of Music from 1760 (5) Sp
Troy
Concentrated course in classical, nineteenth- and twentieth-century music. Intended primarily for seniors and graduates.
MUSIC 431 The Curriculum In Music Education (3, max. 6) WSp
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
Lundqvist
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'Dea
Principles of effective studio teaching; survey and evaluation of teaching materials.
MUSIC 437 Harmony Analysis (3)
MUSIC 438 Psychology of Music (3) A or W
Carliner
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., Kodály, 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 consideration of various methods (e.g., Kodály, Orff) for later 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
Kaplan
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 Piano Repertoire (3, max. 9) AWSp
Hokanson
For piano majors. Examination in depth of more difficult works, by composers and by individual composers. Prerequisites: 326, 327, 328, and permission of instructor.
MUSIC 461 Advanced Piano Ensemble (1, max. 3) AWSp
O'Dea
In-depth study and performance of the greatest works for four hands at one or two pianos. Designed for upper-level piano majors or students with equivalent ability. Prerequisites: 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 perception of pitch and frequency; problems specific to choral or instrumental conductors; rehearsal efficiency. Participation in laboratory performing situations expected.
MUSIC 470 Contemporary Theories I: Tonal Music (3) W
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) W
Rahn
Continuation of 470. Includes both "free atonal" and "classical series" music. Systematic analysis of works of Schoenberg, Webern, Berg, and others, written both before 1923 (free atonal) and after (classical serial). Prerequisites: 215 and 312, or permission of instructor.
MUSIC 472 Contemporary Theories III: Music Since 1950 (3) W
Rahn
Continuation of 471. Emphasis on the many organizational systems aspiring to extend or replace tonality; late Stravinsky and other semiserial matrix systems; "total serialism," and "systematic serialism" developed by and from Milton Babbitt; recent developments in nonscalar "pitch-centric" and "set-centric" systems. Prerequisite: 471 or permission of instructor.
MUSIC 479 Senior Recital (1) AWSp
MUSIC 480 Sinfonialetta (1, max. 6) AWSp
MUSIC 481 Chamber Music (1, max. 6) AWSp
Prerequisite: graduate standing.
MUSIC 482 Opera Theatre (2, max. 6) AWSp
Desmonde, Rostomb
Preparation for participation in public performance of roles in opera.

COLLEGE OF ARTS AND SCIENCES
MUSIC 483 Colloquium Musicum (1, max. 6) A\WSp
MUSIC 484 Contemporary Group (2, max. 12) A\WSp
Bergman, Smith
Exploration of notation and performance problems in to­
day'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) A\WSp
Beale, Bennewitz, Bergman, Kechley, Rahn, Smith,
Thome, Tuffs
One-hour private lesson and one-hour laboratory session
each week. Prerequisite: 391.
MUSIC 492, 493 Opera Direction and Production
(4, 4) A, W
Residuum
Practical experience with problems of the theater. Prereq­
site: 492 for 493.
MUSIC 496 Special Topics in Music Education
(1-3, max. 10) S
Special studies designed to reflect contemporary em­
phases and concerns in the music education profession.
MUSIC 499 Undergraduate Research (*, max. 6)
A\WSp
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, Bergman, Kechley, Rahn
501: chant to middle Baroque. 502: high Baroque
through nineteenth century. 503: impressionists to pre­
sent.
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,
416, or 420.
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 Manusfer School.
MUSIC 516 Renaissance Notation: 1400-1600 (3)
Dufstahl 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 com­
posers 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 analysis 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. Prerequi­
site: 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 view­
points.
MUSIC 524 Seminar in Music Education (3)
Cooper
Special problems in the teaching and supervision of musi­
class in the elementary grades. Prerequisite: one year of
teaching experience.
MUSIC 525 Seminar in Music Education (3)
Justise
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: Rea­
sissance. 528: 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 musi­
cal learning. Prerequisite: 438.
MUSIC 532 Opera Direction and Production
(4 or 6, max. 12) A\WSp
Residuum
Practical experience with problems of the opera theatre.
MUSIC 537 Seminar on Opera (3, max. 6)
Troy
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
sion of instructor.
MUSIC 540 History of Music Education (3) A
Jazz
Chronological examination of contributions, events, phi­
osophies, and people that characterize the development
of music education in the schools of the United States.
MUSIC 541 Music and Society (3)
Landquist
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) A\WSp
Provides experienced teachers with an in-depth experi­
ce 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 theatrical studies. Prerequisites: teaching ex­
perience and permission of instructor.
MUSIC 555 Systematic Methods of Musical
Research (3) A
Carlsen
Introduction to problem identification and definition, hy­
pothesis construction, research design, use of controls,
data analysis, and interpretation.
MUSIC 559 Master's Recital (3, max. 4) A\WSp
Public performance for students in the Master of Music
program.
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 theo­
ries; 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 facul­
ty research in composition/analytical theory and
metathory.
MUSIC 580, 581, 582 Advanced Conducting
(3,3,3) A, W, Sp
MUSIC 583 Advanced Choral Conducting
(3, max. 27) A\WSp
Kaplan
MUSIC 590 Doctoral Recital (2, max. 18) A\WSp
Public performance for students in the Doctor of Music
Arts program.
MUSIC 591 Graduate Composition (*) A\WSp
Beale, Bennewitz, Bergman, Kechley, Rahn, Smith,
Thome, Tuffs
MUSIC 595, 596, 597 Practicum in Systematic
Musicology (3,3,3) 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
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
studied concurrently.
MUSIC 600 Independent Study or Research (*)
A\WSp
MUSIC 790 Master's Thesis (*) A\WSp
MUSIC 800 Doctoral Dissertation (*) A\WSp
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 550-578 series.

a77
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: Piano (3-4 each, max. 12 each for 160, 260, 360; max. 18 for 460; 3, max. 12 for 560) AWSpS Hokanson, Moore, O’Don, Rafols

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, Zigmund

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 Hokanson, Moore, O’Don, Rafols

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 Sokol

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 Grossman

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: Saxophone (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: Clarinet (3-4 each, max. 12 each for 170, 270, 370; max. 18 for 470) AWSpS Grossman

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 Cummins

MUSAP 172, 272, 372, 472, 572 Private Instruction: Trombone (3-4 each, max. 12 each for 172, 272, 372; max. 18 for 472; 3, max. 12 for 572) AWSpS Cummins

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 Demister

MUSAP 174, 274, 374, 474, 574 Private Instruction: Trumpet (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

MUSAP 179, 279, 379, 479, 579 Private Instruction: Clarinet (3-4 each, max. 12 each for 179, 279, 379; max. 18 for 479; 3, max. 12 for 579) AWSpS Terry

MUSAP 180, 280, 380, 480, 580 Private Instruction: Clarinet (3-4 each, max. 12 each for 180, 280, 380, 480, 580) AWSpS Terry

MUSAP 181, 281, 381, 481, 581 Private Instruction: Trombone (3-4 each, max. 12 each for 181, 281, 381, 481, 581) AWSpS Terry

MUSAP 182, 282, 382, 482, 582 Private Instruction: Trombone (3-4 each, max. 12 each for 182, 282, 382, 482, 582) AWSpS Terry

COURSES 580 THROUGH 598 ARE FOR GRADUATE PERFORMANCE MAJORS WHO HAVE BEEN FORMALLY ADMITTED BY JURY EXAMINATION TO THE M.A. DEGREE PROGRAM.

MUSAP 183, 283, 383, 483, 583 Private Instruction: Trumpet (3-4 each, max. 12 each for 183, 283, 383, 483, 583) AWSpS Terry

MUSAP 184, 284, 384, 484, 584 Private Instruction: Trombone (3-4 each, max. 12 each for 184, 284, 384, 484, 584) AWSpS Terry

MUSAP 185, 285, 385, 485, 585 Private Instruction: Oboe (3-4 each, max. 12 each for 185, 285, 385, 485, 585) AWSpS Terry

MUSAP 186, 286, 386, 486, 586 Private Instruction: Flute (3-4 each, max. 12 each for 186, 286, 386, 486, 586) AWSpS Terry


MEASURED TEXT LANGUAGE AND LITERATURE

Courses for Undergraduates

AKKADIAN

AKKADIAN 401, 402, 403 Elementary Akkadian (3,3,3) A,W,Sp Clear Introduction to the Akkadian language (Assyrian and
ARABIC

ARAB 101-102, 103 Elementary Arabic (5-5, 5) A, W, Sp
Heer, MacKay, 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
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
Heer, Jacobi, Ziadeh
Reading of selected texts in literary Arabic, with continuing emphasis on grammar and syntax. Prerequisites: 103 for 201; 201 for 202; 202 for 203.

ARAB 300 Arabic Composition and Syntax (5, max. 9) A W Sp
Designed to impart to the student an active knowledge of Arabic structure and syntax and to increase his or her vocabulary power through supervised composition, translation into Arabic, and proficiency in expository writings. Particular emphasis is placed on journalistic articles and editorials. Prerequisite: 203 or equivalent.

ARAB 401 Adab Prosse: Jahiz (3) A Heer, MacKay, Ziadeh
Reading in early Arabic prose, especially the writings of Jahiz. Prerequisite: 203 or equivalent. (Offered alternate years.)

ARAB 402 Macqamat (Assemblies): Hamadhanl, Harriri (3) W MacKay, Ziadeh
Reading of several macqamat (essays in rhymed prose) of al-Hamadhanl and al-Hariri. Examination of the macqamat genre as a whole. Prerequisite: 203 or equivalent. (Offered alternate years.)

ARAB 403 Historlamu Tabarz (3) Sp Heer, MacKay, Ziadeh
Readings in Arab historians with particular reference to al-Tabarz and his school of historical writing. Prerequisite: 203 or equivalent. (Offered alternate years.)

ARAB 404 Qur’ anxious and Tafsir (3) A Ziadeh
Reading of various sections from the Qur’an with the relevant exegetical writings on religious, philosophical, 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 Muhammad, 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 Ziadeh
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 Usayyad (3) A Heer, MacKay, Ziadeh
Reading and analysis of selected poems from pre-Islamic and Usayyad times. Prerequisite: 203 or equivalent. (Offered alternate years.)

Reading of the new poetry of the ’Abbasid period and studying of the social and political factors that gave rise to it; al-Mutani and al-Ma’ani. 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. Prerequisite: 203 or equivalent. (Offered alternate years.)

ARAB 414 Islamic Philosophical Literature (3) A Heer
Reading of selected texts by representative Islamic philosophers. Prerequisite: 203 or equivalent. (Offered alternate years.)

ARAB 415 Islamic Theological and Mystical Literature (3) W Heer
Reading of selected texts representative of Islamic theological 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) AW Sp
Special work in literature for graduates and undergraduates. Prerequisite: 203 or equivalent.

ARAB 499 Undergraduate Research (1-6, max. 18) AW Sp
Undergraduate research (1-6, max. 18) AW Sp

HEBREW

HEBR 101-102, 103 Elementary Hebrew (5-5,5) A, W, Sp
Jacobi
Introduction to Hebrew, emphasizing elements of grammar and reading of various styles found in the Hebrew Bible, post-Biblical and modern works, with some oral practice. Prerequisite: 203 or equivalent. (Offered alternate years.)

Colloquial language used in Israel, with emphasis on the everyday conversation of the educated city dweller. Combined oral-aural and media approach.

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, newspapers, reading, and modern poetry and prose. Prerequisites: 111-112, 113, or permission of instructor.

HEBR 401, 402, 403 Hebrew Prophetry (3,3,3) A, W, Sp
Jacobi
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) AW Sp
Clear
Readings of classical Hebrew prose selected from the historical books of the Bible: Joshua, Judges, Samuel, Kings, Chronicles. Prerequisite: 203 or permission of instructor.

HEBR 411, 412, 413 Classical Hebrew Poetry (3,3,3) A, W, Sp
Clear
Readings in classical Hebrew poetry: Psalms and Wisdom literature. Prerequisites: 203 or permission of instructor 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
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 secondary sources. Prerequisite: 203 or permission of instructor.

HEBR 426 Golden Age of Hebrew Poetry (3) W Jacobi
Reading and analysis of selected poems from the golden age of Spanish Jewish literature with particular reference to Ben Gabbai. Prerequisite: 203 or permission of instructor. (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 transformed from the original Aramaic 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 comparison with the Hebrew. Prerequisites: ability to read Greek and Hebrew for 441; 442 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 derived a corpus of Jewish philosophical and literary work principally in law, history, and ethics. 461 (Autumn Quarter): the Mishnah. 462 (Winter Quarter): the Talmud. Prerequisite for both courses: 203 or permission of instructor.

HEBR 490 Supervised Study (1-6, max. 18) AW Sp
Clear
Special work in literary texts for graduates and undergraduates. Prerequisite: 203 or equivalent.

HEBR 499 Undergraduate Research (1-6, max. 18) AW Sp
Clear

Near Eastern Languages and Literature
COLLEGE OF ARTS AND SCIENCES

PERSIAN

PERSAN 101-102, 103 Elementary Persian (5-5,5) A,WSp
Lorraine
Beginning course in pronunciation, conversation, grammar, and graded reading.

PERSAN 201, 202, 203 Intermediate Persian (5,5,5) A,WSp
Lorraine
Introduction to Persian literature, with continuing emphasis on grammar and syntax. Prerequisite: 101 for 201; 201 for 202; 202 for 203.

PERSAN 401 Sa’di (3) A
Lorraine
Selected readings from the Gulistan, Bustan, and Divan, 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. (Offered alternate years.)

PERSAN 402 Lyric Poetry (3) W
Lorraine
Selections from various authors, chiefly up to Hafiz. This course introduces examples of the ghazal, mainly as an impromptu literary type. It also gives an outline of the development of the type and introduces the chief writers of it in the context of literary history. Prerequisite: 203 or equivalent. (Offered alternate years.)

PERSAN 403 Ferdowsi (3) Sp
Lorraine
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.)

PERSAN 411 Slyasat-nama (3) A
Lorraine
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.)

PERSAN 412 Rumi (3) W
Lorraine
Selected readings from the Mathnavi and poems from the Divan. Selected readings from various authors, chiefly up to Hafiz. This course introduces examples of the ghazal, mainly as an impromptu literary type. It also gives an outline of the development of the type and introduces the chief writers of it in the context of literary history. Prerequisite: 203 or equivalent. (Offered alternate years.)

TURKISH

TURKISH 101-102, 103 Elementary Turkish (5,5,5) A,WSp
Andrews
Introduction to modern Turkish. Pronunciation and conversation, grammar and composition, graded reading. Latin characters used throughout.

TURKISH 201, 202, 203 Intermediate Turkish (5,5,5) A,WSp
Andrews
Introduction to modern Turkish literature. Prerequisites: 103 for 201; 201 for 202; 202 for 203.

TURKISH 400 Introduction to Ottoman Turkish (3) A
Andrews
Introduction to Turkish in Arabic characters to cover the peculiar grammatical and syntactical problems of Ottoman. Prerequisite: 203, ARAB 103, or PERSAN 103.

TURKISH 401 Taninmaz Poetry and Prose (3) A
Andrews
Readings from the poetry and prose of the Taninmaz pe-rod. Prerequisite: 400 or permission of instructor. (Offered alternate years.)

TURKISH 402 Early Ottoman Historians (3) W
Andrews
Readings in the early Tevfik-i Al-i Osman. Prerequisite: 400. (Offered alternate years.)

TURKISH 403 Ottoman Travelers and Geography (3) Sp
Mackay
Introduction to the geography of Ottoman Turkish: readings from traditional cartographies, travel journals, sailing instructions (portulans), ambassadorial and secret service reports, etc. Prerequisite: 400. (Offered alternate years.)

TURKISH 411 Classical Ottoman Historians (3) A
Andrews
Readings in the high classical narrative histories of Kemal Pasazade, Hoca Se’eeddin and other sixteenth-seventeenth century historians. Prerequisite: 400. (Offered alternate years.)

TURKISH 412 Ottoman Lyric Poetry (3) W
Andrews
Introduction to classical Ottoman poetry, including meters and themes in Ottoman lyric. Prerequisite: 400. (Offered alternate years.)

TURKISH 413 Ottoman Epic and Narrative Poetry (3) Sp
Andrews
Readings in major Ottoman epic and narrative poetry. Prerequisite: 400. (Offered alternate years.)

TURKISH 499 Supervised Study (1-6, max. 18) AWSp
Andrews
Special work in literary texts for graduates and undergraduates. Prerequisite: 203 or equivalent.

UZBEK

UGARIC

UGARIC 401, 402, 403 Ugaritic Language and Literature (3,3,3) A,WSp
Clear
Readings in the Ugaritic texts from Ras Shamra, Epic Mythological, and other texts. Prerequisite: intermediate knowledge of a cognate language (Akkadian, Arabic, Aramaic, 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.

Clear
Ancient Near Eastern Civilization as seen in the art and literature of Sumer, Babylon, Assyria, and the other cities and states of the northwestern Semitic area.

N E 230 Themes In Near Eastern Literature (5) Sp
Significant and interesting aspects of Near Eastern culture and society as represented by literary themes. Aspects of Near Eastern life and art such as women, minority groups, mysticism, and modern literature. Content varies 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, reading in particular on the meaning of the Biblical records in their own time and environment.

N E 320 Themes In Near Eastern Literature (5) Sp
Ziajed
Religious and cultural milieu of Arabia before Muhammad: the nature of the Qur'an's revelation to Muhammad: the Qur'an's content and style: the literary history of the text and its various "readings": the millennial theme emphasized by the Qur'an and the place of the Qur'an in the religious and intellectual life of Muslims. In English. Prerequisites: 210, HIST 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 Philological 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)
Sears
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 Iran 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
Ziajed
The origins of the sharf/shah, 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, Lorraine, Ziajed
Literary 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 architecture, 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

ARABIC 471, 472, 473 Arabic as a Second Near Eastern Language (3,3,3) A,WSp
Heer, Sadig, Ziajed
Designed for graduate students with some proficiency in a Near Eastern language who plan to embark upon a second Near Eastern language. Students are expected to participate fully in the elementary Arabic course; however, the student's work, whenever possible, is supervised by his or her major language instructor who, in consultation with the instructor of elementary Arabic, assigns supplementary work designed to accelerate 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 language instructor, and graduate standing.

ARABIC 474 Arabic as a Second Near Eastern Language (3,3,3) A,WSp
Heer, Sadig, Ziajed
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 Arabic course; however, their work, whenever possible, is supervised by their major language instructors who, in consultation with the instructor of Arabic, assign supplementary work designed to accelerate the students' ability to use Arabic in conjunction with their major language. The major language instructor also participates in assigning a grade for the course. Prerequisites: above elementary knowledge of one Near Eastern language (not Arabic), elementary knowledge of Arabic, and graduate standing.
NUTR 300 Nutrition for Today (3)
Importance of food to the maintenance of health; nutritive 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 nutritional needs of individuals at various age levels; environmental influences on nutrition; assessment of nutritional status; nutritional values of foods; dietary guidelines and their applications; principles of medical nutrition therapy.
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 environment on nutrition; dietary counseling of dental patients.
Prerequisites: CONJ 317-318 and organic chemistry.

NUTR 321 Nutrition (5)
Prerequisites: general and organic chemistry and human physiology.

NUTR 340 Foods I (5)
Composition, structure, and interactions of the constituents of foods, with emphasis on the principles underlying the preparation of foods of standard quality. Prerequisite: organic chemistry.

NUTR 341 Foods II (3)
Study of new food products, food additives, and convenience food items. Food laws, label information, food buyoutmanship, and characteristics of certain wines and spirits.
Prerequisite: 340.

NUTR 342 Demonstration Techniques (3)
Principles and techniques of food and equipment demonstration; television and radio programs of food photography; 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 patterns. Preferences of population of food supply. Meaning of food to different peoples. An ecological approach to malnutrition as a major world problem. Programs of national integration and international scope designed to combat malnutrition.
Prerequisites: 321 or 15 credits of social science and upper-division standing.

NUTR 405 Recent Developments in Nutrition (3)
Review of nutrition in the light of recent developments; 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 appropriate to the evaluation of foods and to the study of animal and human nutrition. Application of these methods.
Prerequisites: 321, 340, inorganic and organic chemistry.

NUTR 421 Advanced Nutrition (3)
In-depth consideration of metabolic pathways, with emphasis 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 adolescent. Development of the development of feeding behavior in children by use of videotapes and live subjects.
Prerequisite: 300 or 301.

NUTR 439 Special Problems in Nutrition (*)
Individual study and research in nutrition.

NUTR 440 Experimental Foods (3)
Illustrating scientific principles by subjective and objective testing of foods. Individual research problems. Prerequisite: 414.

NUTR 441 Food Safety and Quality in Food Processing and Handling (4)
Study of food science as it relates to food quality, food safety, and food laws; the microbiological aspects of foods; foodborne illnesses, and food processing effects of food handling on nutrient retention. Offered jointly with FD SC 441.
Prerequisite: senior standing in course work in the food science program.

NUTR 442 Laboratory 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 process and food processing plants. Offered jointly with FD SC 442.
Prerequisite: senior 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 disease and the maintenance of health. Students enrolled in the clinical dietetic program actively participate in the development 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 dietetic or 421, and BIOL 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 facility.
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 individual and group teaching situations. Taken concurrently with 360. Six hours of supervised clinical experience each week for ten weeks. Prerequisite: enrollment in clinical dietetic program.

NUTR 464 Clinical Dietetic Experience (2)
Opportunity for student in clinical dietetics to participate 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. Prerequisites: 463 and enrollment in clinical dietetic program.

NUTR 465 Clinical Dietetic Experience (6)
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 enrollment 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 experience each week for ten weeks. Prerequisites: 463 and enrollment in clinical dietetic program.

NUTR 468 Food Service Systems Management I (3)
Organization and management of food service systems. Organization of institutional meal service, and leadership 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 gain a background in food service systems management. The activities are a direct application of the didactic components of the professional dietetic experience. Students are employed in various management functions related to the food service organization. A total of sixteen hours supervised clinical experience in food service management. Prerequisites: 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 apply and extend clinical skills. Under the direction of a clinical instructor, student is responsible for planning, directing, implementing, and evaluating the delivery of nutritional care to individuals, and/or groups in a community health facility. The clinical facilities are selected to meet the interests of the individual student. Forty hours of supervised clinical experience each week 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 (1-3, 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 competitive requirements through the life cycle of mammals, protein quality and vegetarianism, mammalian proteins to protein deficiency and excess, 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 functions. Effect of diet and the normal development during the life span on these lipids. Changes of lipids with various 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 micronutrients whose essentiality is proposed or recently established, as well as the 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 medications; dietary implications drawn and clinical application made.

NUTR 523 Vitamina Nutrition (3)
Dietary components considered to be essential for humans and called vitamins. General topics are whether the vitamin is fat soluble or water soluble; reviewing basic dieting and 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 few independent factors influencing the growth, development, and behavior of experimental animals and humans. Specifically, the effects of nutritional and environmental deprivation and enrichment states are reviewed along with the mental, structural, and psychological alterations made by these parameters. Prerequisites: 414, BIOL 406 or equivalent, and PSY 403 or equivalent.

NUTR 525 Evaluation of Nutritional Status (3)
Dietary, clinical, and biochemical-biophysical components in the assessment of nutritional status. Interrelationships of nutrients and effects of varying levels of nutrient intake. Critical issues in acquiring data on the mentally retarded and physically handicapped children. Participation in clinics conducted by interdisciplinary teams, in lectures and seminar conferences in clinical and developmental feeding assessment. Under supervision each student is assigned responsibility for nutrition care of selected patients. Prerequisites: graduate standing in human nutrition, dietetics, and foods.

NUTR 531 Community Nutrition (3)
Survey of nutrition programs in communities, including program planning, nutrition education, health planning, surveillance, nutrition problems of all risk groups. Laboratory supervised. Prerequisites: 422, 525, or equivalent.

NUTR 532 Field Work In Public Health Nutrition (1-12, 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, sampling errors, color, form, flavor, and texture. Techniques in development of experimental design, application of multivariate statistical evaluation of data, and interpretation of results.

NUTR 560 Practicum In Dietetic Education (1-5)
AWSP3 Supervised instructional experiences for dietetic education 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 331 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 historic and contemporary textiles. Prerequisites: ART 109 or 129 or equivalent.

TSCS 332 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 335 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 336 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 339 Weaving: Structural Weaves (3)
Experimental problems in loom-controlled weaves and basic structural design; fundamentals of drafting,loom design and operation.

TSCS 344 Costume Design (5)
Design by hand and by machine. Problems involved in production of apparel using fabrics that require 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 affecting the growth, development, and structure of the textile industry in foreign countries. The effects of federal and state legislation on textile products and prices and on consumer satisfaction.

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 the instrumental analysis of compatibility between specific dyes and various natural and synthetic fibers. Laboratory experiences on application procedures for each proposed dyestuff. Prerequisites: 352 or 428. Recommended: organic chemistry.

TSCS 418 Advanced Textile Dyeing (4)

TSCS 425 Advanced Textile Science (3)
In-depth examination of the chemical and physical properties of natural and man-made fibers and the fabrics made from them. Emphasis on the improvement of intrinsic fiber properties through application of durable finishes. Prerequisite: 325.

TSCS 426 Analytical Methods for Textile Evaluation (3)
Qualitative and quantitative procedures specifically designed for analytical applications of the methods to fiber content, dyes, finishes, and performance characteristics of fabrics. Prerequisites: 325, 326, and inorganic 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 structured studies.

TSCS 433 History of Costume and Textiles (4)
Fabrics and costumes of ancient civilizations and medieval 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)
Greeting of basic patterns, adapting basic drafted patterns into garments. Design of specially designed clothing; some historical and traditional 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 rendering; drawing human figure; representing and differentiating fabric; understanding techniques and media of representation. Prerequisites: ART 105, 106.

TSCS 437 Socio-Psychological Aspects of Clothing (3)
Clothing as a reflection of culture and societal value concepts. Emphasis on theory, motivation, behavioral patterns.

TSCS 439 History of Textile Design (3)
History of clothing needs of persons with mental, physical, and emotional impairments, with solutions to some of the problems. Includes psychological aspects of textiles, and cultural understanding of design. Emphasis on supply and adaptation of ready-made garments; examination of recent research in the field; and a review of special organizations and community agencies concerned with the handicapped. Prerequisite: upper-division standing.
Oceanography
Courses for Undergraduates

OCEAN 101 Survey of Oceanography (5) AWSp
One course in physical marine science: 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 scientific and cultural influences created by man's activities' impinging on the oceanic environment. Topics include the problems of, and potential for, the extraction of food, fresh water, inorganics and minerals, seawater or the sea floor; the ocean as a sink for such wastes as heavy metals, pesticides, radioactive materials, gases, etc. Prerequisite: 101 or permission of instructor.

OCEAN 109 Survey of Oceanography—Honors (5)
Origin and expanse 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) AWSp
Lectures intended for oceanography majors. Students who might major in oceanography can learn more about the field. May be entered any quarter.

OCEAN 150 Lower-Division Tutorial—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. Required of students majoring in basic observational procedures are examined. Prerequisites: sophomore standing in an 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; physical, chemical, biological, and geological aspects of the sea; annual distribution and seasonal cycles of properties; currents; factors affecting populations. Intended for science majors. Prerequisite: sophomore standing in a science curriculum or permission of instructor.

OCEAN 250 Introduction to Oceanography—Honors (5)
Descriptive and regional oceanography covering physical, chemical, biological, and geological aspects of the sea. Intended for science majors. Prerequisites: sophomore 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
Water application of mathematical techniques and basic principles of physics, chemistry, geology, and biology to major oceanographic problem areas. 341: mathematical models of biological growth, processes in marine chemistry, wave phenomena. 342: applications of mechanics to marine geology and biogeography, and distribution 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 (3.5,5) A
Physical properties and processes; theories and methods involved in ocean currents, waves, and tides. Not open to physical oceanography majors. Prerequisite: one year of chemistry, one year of physics, MATH 126 for 401; 401 for 402.

OCEAN 405 General Geological Oceanography (6) Sp
Creager, McNamara, Merrill, Sternberg
Marine geophysics; shorelines and nearshore sedimentation; structure and morphology of the continental terrace and deep-sea types and distributions; 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 General Oceanography Laboratory (2)
Field methods in geological oceanography. Collect samples of data using such instruments as echo sounder, seismic reflection profilers, tide-sea son, grab samples, coring devices, and electronic navigation aids. Produce an integrated report on the sedimentology and stratigraphy 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)
Vibrating strings, bars, and membranes; plane and spherical 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 seawater, sound channels and bottom effects, ambient noise, scattering, passive and active tracking, acoustic telemetry. Prerequisite: 415.

OCEAN 417, 418 Physical Oceanography I, II (5,5) A,W
Geographic and hydrodynamic aspects of oceanography. Topics: physical properties of seawater; observed distributions of properties and currents; budgets; kinematics; hydrostatics; momentum dynamics of ocean circulation; vorticity dynamics; viscosity; Ekman's theory; eddy fluxes; eddies. Prerequisites: MATH 427, which may be taken concurrently, PHYS 223, CHEM 160, or permission of instructor; for 417 and MATH 428, which may be taken concurrently in 418.

OCEAN 419 Ocean Tides and Waves (5) Sp
Theory of surface waves; wave forecasting transformation of waves in shallow water, wave forces. Tide theory: analysis and prediction of tides and tidal currents. The course includes laboratory and computer simulation. Prerequisite: 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 solutions as related to seawater, kinetics, thermodynamics, and heterogeneous equilibria are included. Prerequisites: 421 and CHEM 350, 351, or permission of instructor.

OCEAN 423, 424 Chemical Oceanography Laboratory (2) AWSp
Laboratory problems in the analytical and physical chemical of seawater and marine materials. Prerequisites: 421, CHEM 321, for 423; 423, 424 for 424. 423 and 424 may be taken concurrently with 421 and 422, respectively.

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.
COLLEGE OF ARTS AND SCIENCES

OCEAN 434 Biological Oceanography: Phytoplankton (4) W Burton
Ecological physiology of phytoplankton. Quantitative distribution in time and space of primary producers including 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 Neptones (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 January
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 structure. Prerequisite: 15 credits in biological sciences or permission of instructor.

OCEAN 438 Marine Microbiology (3) Sp Ahmed
Taxonomy and symbiotic relationships of marine and estuarine micro-organisms; metabolic activities, including nutrient cycles and geological activities; effects of environmental and experimental manipulations; and considerations 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 microorganisms; heterotrophic activity measurements, anaerobic methods, and measuring dissolved oxygen; biochemical oxygen demand; effect of media and temperature 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
Introduction to the general principles of instrumentation design, including discussions of sensors, signal processing, telemetry, and recording from the point of view of the experimenter. Laboratory work, for variable credits, is offered in the form of projects, preferably practical ones resulting in the completion of a small hardware device.

OCEAN 443 Regional Oceanography (3) Sp Applications of modern methods to the comprehensive description of selected areas of the ocean.

OCEAN 444 Design and Analysis of Oceanographic Experiments (3) A
Planning of field and laboratory experiments in oceanography, 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. Particular emphasis is placed on geological interpretation of data. The ocean floor, tectonics, and geophysical processes are emphasized. Prerequisite: major in geophysical oceanography or geology, MATH 126, or permission of instructor.

OCEAN 451 Geochemistry of Marine Sediments (2) W Emerson
Study of chemical aspects of the more abundant minerals in marine sediments; their origin or mode of formation; their role in the sedimentation processes; their rate of deposition; their distribution and relative importance in the major sedimentary cycle; their influence on the chemical composition of seawater. Prerequisite: one year of general chemistry.

OCEAN 452 Physical Sedimentology (4) A Smith
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 of sediments by turbulent flows, mass movement of sediments, and application of sediment transport theory to problems of geological interest. Offered jointly with GEOl 452. Prerequisite: 402 or permission of instructor.

OCEAN 453 Sedimentary History of the Ocean Basins (2) Sp McMahan
Synthesis of introduction to chemical, physical, and biological processes of sedimentation and to major realms of geologic physics, in terms of the historical record of sediments and the geologic development of the ocean basins. Prerequisites: 450, 451, 452, or concurrent registration in same.

OCEAN 454 Benthonic 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 palaeomagnetically dated sediments. Prerequisites: either 101, 403 or GEOl 205 or 361, or permission of instructor.

OCEAN 455 Benthonic Sediments II (3) W Detailed survey of geologically important siliceous and radiolarian microfossils and their application in the solution of biostatigraphic problems in the history of marine sediments. Prerequisite: 454 or permission of instructor.

OCEAN 456 Acoustic and Seismic Techniques (2) Sp
Acoustic data-taking techniques: analysis and interpretation of acoustic bathymetry and seismic reflection and refraction 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 major sedimentary processes. Prerequisite: 402 or permission of instructor.

OCEAN 458 Chemical Aspects of Marine Sediments (3) W Carpenter
Lecture and laboratory exercises and lectures illustrating techniques and problems in marine geochemistry, especially the origin 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
Dunbar
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. Credit limits the data and an interpretation of the results for 5 credits. One or more cruises may be required. Prerequisite: permission of instructor.

OCEAN 475 Geochemistry (3) W A. Schoenner
Survey of modern and classical approaches to the problems of oceanic geographic distribution. Prerequisite: BIOL 210. Recommended: BIOL 472.

OCEAN 480 Undergraduate Research—Honors (6)
Independent research. Prerequisites: 180 or 300, and permission of instructor.

OCEAN 485 Topics in Oceanography (2)
Series of weekly lectures on oceanographic topics, including physical and chemical properties of water, motions, life in water, chemical and physical interactions, data collection and analysis, etc. For nonmajors. Prerequisite: upper-division 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: 350 or 480, and permission of instructor.

OCEAN 489 Undergraduate Thesis—Honors
(1-6, max. 6)
Theoretical or experimental contribution to oceanography. Prerequisites: 480 and permission of instructor.

OCEAN 499 Undergraduate Research (1-24, max. 24)
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.

Methods for solving problems in physical oceanography. Prerequisites: major standing in a physical science.

OCEAN 514 Seminar in Physical Oceanography (1, max. 9) A, W, Sp
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) W 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. Prerequisite: 512. (Offered odd-numbered years.)

OCEAN 518 Seminar on Dynamical Oceanography (1, max. 9) A, W, Sp
Selected problems of current importance concerning the dynamics of the ocean. Concentrates on topics that are considered fundamental, of central importance to most of the areas of applications.

OCEAN 519 Oceans and Climate Variation (3) Sp Interactions of heat, water, and energy: study of budgets and of mechanisms of exchange. Prerequisites: 418, ATM 542. (Offered even-numbered years.)

OCEAN 520 Seminar (1) A, W, Sp
Introduction to current research topics for beginning graduate students.

OCEAN 531 Seminar on Chemical Oceanography (*, max. 9) A, W, Sp
Lectures, discussions, and readings on selected problems of current interest. Prerequisite: permission of instructor.

OCEAN 532 Advanced Problems in Chemical Oceanography (1-4, max. 18) A, W, Sp
Field and laboratory work on selected problems of current interest. Prerequisites: 424 and permission of instructor.

OCEAN 534 Marine Chemical Thermodynamics (3) W
Application of classical thermodynamic principles to the study of chemical processes and chemical reactions in the oceans. Thermodynamics of seawater (pressure, temperature, and volume relationships); and thermodynamics of multi-component systems, general equilibrium theory, pressure and temperature effects on chemical equilibria, equilibrium models and calculation of complex equilibria. Prerequisites: CHEM 455, 456, 457, 460, or permission of instructor.

OCEAN 535 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
<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Prerequisites</th>
<th>Credits</th>
<th>Restrictions</th>
</tr>
</thead>
<tbody>
<tr>
<td>OCEAN 526</td>
<td>Marine Organic Geochemistry (2) W Hedge</td>
<td>General concepts of marine phytoplankton production; laboratory and field studies; critical examination of special problems. Not open to students who have taken 524.</td>
<td>2</td>
<td>Offered for 9 credits even-numbered years at Friday Harbor Laboratories with additional lectures and fieldwork.</td>
</tr>
<tr>
<td>OCEAN 531</td>
<td>Seminar in Biological Oceanography (5, max. 9) AWSp</td>
<td>Lectures, discussions, and work on selected problems of current interest. Prerequisite: permission of instructor.</td>
<td>5</td>
<td>Must be a junior or senior.</td>
</tr>
<tr>
<td>OCEAN 533</td>
<td>Zooplankton Ecology (3 or 6 or 9) S Base, Frost</td>
<td>Samples, methods, population dynamics and energetics, community structure, and other current topics. Three lectures per week. Three additional optional credits for laboratory projects. Prerequisite: permission of instructor. Offered for 9 credits even-numbered years at Friday Harbor Laboratories with additional lectures and fieldwork.</td>
<td>3 (6 or 9)</td>
<td>Offered for 9 credits even-numbered years at Friday Harbor Laboratories with additional lectures and fieldwork.</td>
</tr>
<tr>
<td>OCEAN 534</td>
<td>Phytoplankton Ecology (9) S</td>
<td>Contemporary problems in marine phytoplankton investigations. Emphasis on methods used in field and laboratory studies. Prerequisite: permission of instructor. Offered even-numbered years at Friday Harbor Laboratories.</td>
<td>9</td>
<td>Offered even-numbered years at Friday Harbor Laboratories.</td>
</tr>
<tr>
<td>OCEAN 538</td>
<td>Advanced plankton ecology (2-4) A Base</td>
<td>Methods of sampling and analysis of standing stock as affected by the ecology of plankton.</td>
<td>2-4</td>
<td>Offered for 2-4 credits.</td>
</tr>
<tr>
<td>OCEAN 557</td>
<td>Environmental Physiology of Marine Microalgae (2-4) W Perry</td>
<td>Physiology and biochemistry of microalgae, with emphasis on marine systems; physiological approach in understanding plankton processes in the ocean; laboratory includes culturing methodology and techniques for the study of physiological processes relevant to phytoplankton ecology. Prerequisite: permission of instructor.</td>
<td>2-4</td>
<td>Offered for 2-4 credits.</td>
</tr>
<tr>
<td>OCEAN 558</td>
<td>Identification and Structure of Marine Benthic Communities (2) Sp Jumars</td>
<td>Sampling gear and sampling techniques; qualitative and quantitative methods for identification and quantification of communities; structure of benthic communities; biota, productivity and benthos/fish relationships; historical review of benthos research. Prerequisite: permission of instructor.</td>
<td>2</td>
<td>Offered for 2 credits.</td>
</tr>
<tr>
<td>OCEAN 559</td>
<td>Seminar in Geostatistics (1-3) A WSp Jumars</td>
<td>Lectures and discussions on selected problems in the application of statistics in earth science. Prerequisite: Q SCI 383.</td>
<td>1-3</td>
<td>Offered for 1-3 credits.</td>
</tr>
<tr>
<td>OCEAN 564</td>
<td>Statistical Models in Oceanography (3) W</td>
<td>Multivariate analysis: regression, trend surface analysis, factor analysis, discriminant functions, and stochastic process models in oceanography. Prerequisite: Q SCI 383 or permission of instructor.</td>
<td>3</td>
<td>Offered for 3 credits.</td>
</tr>
<tr>
<td>OCEAN 568</td>
<td>Topics in Physical Oceanography (1-4, max. 9) AWSp</td>
<td>Lectures and discussions on major topics of physical oceanography.</td>
<td>1-4 (max. 9)</td>
<td>Offered for 1-4 credits (max. 9).</td>
</tr>
<tr>
<td>OCEAN 569</td>
<td>Seminar in Geophysical Oceanography (a, max. 9) AWSp</td>
<td>Lectures, discussions, and field and laboratory work on selected problems of current interest. Prerequisite: permission of instructor.</td>
<td>a (max. 9)</td>
<td>Offered for a credits (max. 9).</td>
</tr>
<tr>
<td>OCEAN 571</td>
<td>Marine Sediments (2) Sp</td>
<td>Topics in interpreting environmental significance of marine sediments. Prerequisite: permission of instructor.</td>
<td>2</td>
<td>Offered for 2 credits.</td>
</tr>
<tr>
<td>OCEAN 573</td>
<td>Research Techniques in Marine Geochemistry (2)</td>
<td>Analytical techniques and instruments applicable to problems of marine geochemistry. Prerequisite: CHEM 351.</td>
<td>2</td>
<td>Offered for 2 credits.</td>
</tr>
<tr>
<td>OCEAN 574</td>
<td>Research Techniques in Marine Geology (3) A</td>
<td>Planning field programs; selection of equipment and survey 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.</td>
<td>3</td>
<td>Offered for 3 credits.</td>
</tr>
<tr>
<td>OCEAN 575</td>
<td>Advanced Marine Geology (2)</td>
<td>Topics in geologic oceanography; environmental problems in the ocean; laboratory projects. Prerequisite: permission of instructor.</td>
<td>2</td>
<td>Offered for 2 credits.</td>
</tr>
<tr>
<td>OCEAN 576</td>
<td>Seminar in Geophysical Fluid Mechanics (3) Sp Smith</td>
<td>Reading and discussion of topics of current interest in geophysical fluid mechanics. Course work includes a report on a specialized topic. Offered jointly with GEOL 560. Prerequisites: 452, 511, and permission of instructor.</td>
<td>3</td>
<td>Offered for 3 credits.</td>
</tr>
<tr>
<td>OCEAN 578</td>
<td>Simulation Analysis of Marine Systems (3) Sp Winter</td>
<td>Introduction to the analytical methods of systems ecology. 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 ecosystems. Prerequisites: BIOL 472, FORTRAN 3, MATH 126, Q SCI 382, or permission of instructor.</td>
<td>3</td>
<td>Offered for 3 credits.</td>
</tr>
<tr>
<td>OCEAN 579</td>
<td>Gravity and Geomagnetism (3) Lw Merrill</td>
<td>Fundamentals concepts; the earth's magnetic field; instrumentation and reduction of magnetic measurements; interpretation of magnetic data; gravity measurements, reduction of gravity observations; interpretation of gravity anomalies. Offered jointly with GPHYS 571. Prerequisites: MATH 328, PHYS 323, or equivalents, or permission of instructor.</td>
<td>3</td>
<td>Offered for 3 credits.</td>
</tr>
<tr>
<td>OCEAN 580</td>
<td>Terrestrial Magnetism (3) Sp Merrill</td>
<td>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 GPHYS 573. Prerequisite: permission of instructor.</td>
<td>3</td>
<td>Offered for 3 credits.</td>
</tr>
<tr>
<td>OCEAN 581</td>
<td>Marine Science for Coastal Zone Management (3) W Duckburg, Jumars, Sternberg</td>
<td>Analysis and simulation of scientific knowledge for use in the decision-making process of coastal zone management. Lectures and discussion of the biological, chemical, and physical oceanography of the coastal zone. Techniques of generating data bases and using them to describe natural processes. Importance of considering natural processes in management schemes. Not open to oceanography students except by permission. Prerequisites: NES 303 or permission of instructor.</td>
<td>3</td>
<td>Offered for 3 credits.</td>
</tr>
<tr>
<td>OCEAN 582</td>
<td>Advanced Topics in Physical Oceanography (3) C Block</td>
<td>Advanced topics in physical oceanography.</td>
<td>3</td>
<td>Offered for 3 credits.</td>
</tr>
</tbody>
</table>
PHIL 160 A Historical Introduction to the Philosophy of Science (5)
Clart_contents
Study of the historical development of selected concepts from science and from the philosophy of science.

PHIL 200 Types of Philosophy (5)
Introduction to philosophy. The content of the course is entirely 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 Philosophical Issues in World Affairs (2)
Crock
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'ali, Richman
Critical study of some typical views of the basis and presuppositions of morality and of moral knowledge. Custom, theology, human nature, and happiness as standards of moral judgment. 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, definition, 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)
Clart_contents
Crock
Examination of formal languages, the nature of probability, the problem of induction, and determinism.

PHIL 267 Introduction to Philosophy of Religion (5)
Dietrich
Mish'ali
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 English writers as Nagarjuna, Sanakara, Gandh, Aurobindo.

PHIL 320 History of Ancient Philosophy (5) A
Clart_contents
Cohen, Key
Survey of the history of ancient Greek philosophy, emphasizing the origin and development of problems and theories in metaphysics and epistemology. Philosophers discussed are some or all of the following: the pre-Socratics; Socrates, Plato, and Aristotle; the Stoics, Epicureans, and Skeptics; Plotinus.

PHIL 321 History of Medieval Philosophy (5)
Boler
Development of main lines of philosophical thought in the Latin West from 400 to 1400, with emphasis on Augustine, Anselm, Abelard, Aquinas, and Occam. Prerequisite: 320 or permission of instructor.

PHIL 322 History of Modern Philosophy (5) W
Clart_contents
Crock
Examination of selected metaphysical and epistemological issues raised by philosophers in the modern classical period, eighteenth and nineteenth 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 Peterbach, 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 logical 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)
Key
Political philosophy of fourth- and fifth-century Greece, especially the Sophists, Plato, and Aristotle, stressing the connection between the political philosophy and the underlying philosophical system of each philosopher. Prerequisite: 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, Ockham), with special emphasis on the setting of their political thought in the context of their general philosophical positions. Prerequisite: at least one course in philosophy.

PHIL 332 History of Modern Political Philosophy (5)
Marks
Examination of major political philosophies from the sixteenth 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 tradition with attention to the philosophical method and foundation of Marxism.

PHIL 338 Philosophy of Human Rights (2)
Boler
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 Ethical (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 writings 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)
Crocker
Examination of moral problems that arise in connection with such topics as war and murder, famine relief, capital punishment, high-risk technologies, abortion, suicide, and the rights of future generations. Prerequisite: one course in philosophy or junior standing.

PHIL 347 Philosophy in Literature (3)
Mish'ali
Study of philosophical ideas expressed in works of literature.

PHIL 353 Introduction to the Philosophy of Language (5)
Boler
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 353 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, interpretation, and knowledge of other minds. Prerequisite: one course in philosophy.

PHIL 370 Intermediate Logic (5) A
Kirk

PHIL 372 Introduction to Set Theory (5)
Boh
Historical development and basic concepts of set theory. Set theoretical paradoxes and their proposed solutions.

PHIL 410 Social Philosophy (3)
Cohen
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, Saiva, and Vaishnavas. 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)
Cohen
Development of Chinese philosophy from the sixth century B.C. to modern times. Emphasis on Confucianism, Mohism, Taoism, Legalism, the Diacriticists, Buddhism, and Neo-Confucianism. Review of evaluation of 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-Chiu and the Idiocratic school of Lu-Wang. Prerequisite: 415 or permission of instructor.

PHIL 417 Indian Philosophy of Religion (3)
Arguments of Hindu, Jain, and Nietzschean 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 arguments found in Western philosophy. Readings in translation. At least one course in Indian philosophy or Hinduism or Buddhism recommended.

PHIL 418 Indian and Tibetan Buddhist Philosophy (3)
Rueg
Topics from Buddhist thought, both Sarvādānayan and Mīhayān, touching on the following areas: epistemology, theory of liberation, metaphysics and the theory of the Absolute, cosmology, and evolution. At least one course in Indian philosophy or Buddhist recommended.

PHIL 421 Studies in Medieval Philosophy (3, max. 9)
Boler
Survey of one individual problem or in medieval philosophy (of the Latin West) selected by the instructor. Prerequisite: 321.
PHIL 422 Studies in Continental Rationalism
(3, max. 9) Clouser, Rawls
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. Prerequisite: 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, metaphysics, and ethics. 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 attention 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, personal identity, 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 one or more of major works of Kant. Prerequisite: one course in philosophy (other than logic) beyond the introductory level.

PHIL 439 The Later Philosophy of Wittgenstein (3) Cohon, 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) Cohon, 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. Prerequisite: 320 or permission of instructor.

PHIL 443 Philosophy and Linguistics (3) Cohen, Marks
Study 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) Moore
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) Mohl alami

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; perception and knowledge of 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, Strawson, and Austin. Prerequisite: 120 or permission of instructor.

PHIL 456 Metaphysics (3) Bonjour, 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 emphasis 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) Clauerbacher, Crocker
Critical study of different theories about the nature of scientific theory. Topics include the relation of theory to observation, 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) Mohl alami
Treatment of philosophical questions and concepts pertaining to the collective production and appropriation of culture: exploration and interpretation in anthropology; structural analysis; the relation of history to culture; differences and interrelationships among the parts of culture (e.g., myth and ritual, science and magic); cultural variations (e.g., death, the person, obligation); the structuring 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 psychology and/or artificial intelligence. Topics vary. Recent topics include the philosophical implications of split brain research, the possibility of reducing psychology to physiology, natural versus empiricist explanations of language acquisition, the psychological reality of mental imagery, Shiffrin's behaviorism. Readings are drawn from both philosophy and the relevant scientific literature. Some philosophical sophistication is presupposed, but the course material should be accessible to nonphilosophers with suitable interests and backgrounds.

PHIL 465 Philosophy of History (3) Crocker, Mohl alami
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, functionalism, reductionism, and the status of idealized models. Prerequisite: 120 or 260 or 460, or course beyond introductory 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; idealism; 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
Consideration of major ideas in Kierkegaard's philosophy and in Sartre's and Heidegger's philosophy. Prerequisite: 322 or 325 or 326, or permission of instructor.

PHIL 470 Advanced Logic (5) Keyt, Kirk

PHIL 472 Axiomatic Set Theory (5) Clauerbacher, Crocker
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, intuitionism, and formalism, and the impact of Godel's incompleteness 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) Clauerbacher

PHIL 525 Seminar in Nineteenth-Century Philosophy
(5, max. 20) Burke

PHIL 526 Seminar in Recent Philosophy
(5, max. 20) Keys, Marks

PHIL 540 Seminar in Ethics (5, max. 20) Cohon, Keyt, Richman

PHIL 545 Seminar in the Philosophy of Art (5, max. 20) Moore

PHIL 550 Seminar in the Philosophy of Art
(5, max. 20) Cohen

PHIL 556 Seminar in Metaphysics (5, max. 20) Cohon, Cohen

PHIL 560 Seminar in the Philosophy of Science
(5, max. 20) Clauerbacher, 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, Mohl alami
PHYS 584 Reading in Philosophy (1-4, max. 12) AWSp Intensive reading in philosophical literature. The name of 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 Analytical Philosophy (5, max. 20) Richman

PHIL 600 Independent Study or Research (*) AWSp Prerequisite: permission of graduate adviser.

PHIL 790 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 setting. 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) AWSp,AWSp,AWSp Basic principles of physics presented without use of college-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 trigonometry, one year of high school physics or one quarter of college-level physical science; for 114: 115 for 116. The courses 121, 122, 123, 221, 222 plus appropriate laboratory together make up the general physics sequence for science and engineering students.

PHYS 121 Mechanics (4) AWSp 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) AWSp Basic principles of electromagnetism, the mechanics of oscillatory motion. Concurrent registration in 118 or 132 strongly recommended. Prerequisites: 121, concurrent or previous MATH 125 or 135.

PHYS 123 Waves (4) AWSp 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 engineering students. For physicists as background in high school laboratory work or other laboratory experience. Prerequisites: concurrent or prior enrollment in 121 for 131; 122 for 132; 133 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 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) A,W,Sp Introduction to the basic concepts of atoms, molecules, and nuclei; elementary quantum physics. Prerequisites: 123, concurrent or previous MATH 126 or 136.

PHYS 222 Thermal Physics (3) AWSp 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 scientific concepts to help students develop their understanding of scientific viewpoints and techniques. Objects treated include pigments, filters, prisms, lenses, rainbow, eyes, lamps, etc. Emphasis on development of concepts used to understand these and other basic elements in light and color. With the help of lecturers from the physics laboratories, color properties of these objects are explored. Prerequisite: students must have accumulated a substantial number of credits in their own major.

PHYS 321, 322, 323 Electromagnetism (3,3,3) A,W,Sp Charges at rest and in motion; dielectric and magnetic effects; electromagnetic waves; relativity and electromagnetism; physical optics. Prerequisites: 123, MATH 328, which may be taken concurrently, for 321; 321 and basic computer programming ability for 322; 322 for 323.

PHYS 324, 325 Quantum Mechanics (3,3,3) A,W Introduction to nonrelativistic quantum mechanics. Prerequisites: 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 completed 422. Prerequisite: 221 or permission of instructor.

PHYS 328 Statistical Physics (3) Sp Elements of statistical mechanics and their applications. Prerequisites: 221, 222 for 328 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; electronic devices; electrical measurements. Prerequisites: 123, MATH 126 or 136; 334 for 335.

PHYS 401, 402, 403 Special Problems (*, *, *) Supervised individual study. Honors section offered.

PHYS 405-406 Physical Science for Teachers (2, max. 6-6, max. 6) AWSp,AWSp Basic concepts of physical sciences providing background for teaching modern elementary school curricula. Also useful in lieu of physics at secondary school and introductory college levels. Prerequisite: permission of instructor.

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 development of skills essential to the scientific process. Background for teaching physics at secondary school and introductory college levels. Prerequisite: permission of instructor. Strongly recommended: 407 to be taken prior 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 selected by a school or school district. Prerequisite: in-service teacher in cooperating school district.

PHYS 411, 412, 413 Physical Science for Lead Teachers (1-4, 4-1, 4-4, max. 4) For preservice and in-service teachers. Extends the physical science content covered in previous courses and helps prepare 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: 110-102 or 405-406.

PHYS 422 Atomic and Molecular Physics (3) Survey of the principal phenomena of atomic and molecular physics. Prerequisites: 323 and 325, or permission of instructor.

PHYS 425 Nuclear and Elementary Particle Physics (3) W Survey of the principal phenomena of nuclear and elementary 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 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)
Courses for Graduates Only

PHYS 505, 506 Analytical Mechanics (3.3) A, W
Topics from mechanics and applications of mathematics to physics.

PHYS 513, 514, 515 Electromagnetism and Relativity (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 formulation of electromagnetism and particle dynamics.

PHYS 517, 518, 519 Quantum Mechanics (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; nuclear 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
Statistical mechanical basis for the fundamental thermodynamic laws and concepts; applications of thermodynamic reasoning to selected physical problems; classical statistical distribution functions; quantum statistical mechanics; introduction to equilibrium many-body problems. Prerequisite: 517, which may be taken concurrently.

PHYS 527, 528 Current Problems in Physics (1,1) Introductory 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
Development of mathematical descriptions of physical 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)
Coordinated lecture and laboratory treatment of topics in contemporary optics. Subjects include Fourier optics, lens systems, interferometry, laser-optics, holography, laser-light sources, laser amplifiers, lenses, bifringence, laser and conventional light sources, optical detectors. Prerequisite: 543 or equivalent.

PHYS 546 Condensed Matter Physics (4)
Experimental techniques for investigating surface geometrical 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) Trainer
Electronic techniques as applied in physics research. Topics include noise, control-system analysis, operational amplifiers, lock-in amplifiers, precision power supplies, and metering, microprocessors. 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 processes; atomic and molecular 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 interstellar 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; phenomenology of high-energy 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 particles, current-field models, 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 equations, experimental tests and their significance, and applications of general relativity, particularly in the areas of astrophysics and cosmology. Prerequisite: 515.

PHYS 567, 568, 569 Theory of Solids (3,3,3)
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, 577 Selected Topics in Theoretical Physics (*)

PHYS 578 Selected Topics in Experimental Physics (*)

PHYS 600 Independent Study or Research (*)
Study or research under the supervision of individual faculty 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 prerequisites. However, because these courses generally offer more advanced subject matter, they are recommended for juniors and seniors. Interested freshmen or sophomores who wish to enroll in upper-division courses may do so, but they should consult with the instructor or the departmental advisor 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 nonmajors, 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. Provides an introduction to the study of politics by the reading of a few books in political philosophy. Organized around several key political concepts, such as liberty, equality, justice, authority, rights, and citizenship.

POL S 202 Introduction to American Politics (5) AWSpS
Introduction to people, institutions, and politics in the American political system. Emphasis will be placed on 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 framework. Traditional and contemporary approaches to the study of governments and societies in different countries.

POL S 205 Introduction to Quantitative Political Analysis (5) Skills of analytical reasoning and scientific methods applied to social problems. Reading graphs and tables, discovering fallacies in arguments, evaluating the evidence for an assertion, and determining which of several conclusions 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 friction; historical and contemporary theories of minorities in 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, separation, affirmative action, and assimilation; and the role of minority groups in American politics.

POL S 212 Seminar in Policy Theory (5, max. 10) Horowitz, Mosher, Teather
Selected contemporary political issues. Political principles and policies in concrete political problems. Selected topics might include: war and peace, international organizations, 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 legislature, the executive, and the bureaucracy. The study of policy 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 interests. Topics include public opinion, public 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 particular reference to their significance for democracy and liberal values. Intended especially for nonmajors. Prerequisite: 201 of equivalent.
POL 312 Radicalism in American Politics (5)
Exploration of the varieties of radical dissent in American 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 impetus for American society of the radical challenge. Prerequisite: an introductory course in political science.

POL 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 "apathetic" woman, and on the process of political socialization in various cultural contexts. Field research on women's participation in political decision making.

POL 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 324 Contemporary International Relations in Europe (5)
European diplomacy and international relations between the two world wars; problems of European integration; contemporary developments.

POL 325 The Arab-Israeli Conflict (5)
Sheikholelami
The politics of conflicting ideologies: Zionism and Arab nationalism; formation of the state of Israel; development of Palestinian nationalism; Arab-Israeli wars. Re-emergence of Palestinian activism; domestic sources of foreign policy; the role of the super-powers.

POL 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 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 341 Government and Politics of Canada (5)
Crucial analysis of parliamentary institutions, political parties, and the federal system in Canada. Prerequisite: 101.

POL 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 development, and social change. Prerequisite: upper-division standing or permission of instructor.

POL 343 Government and Politics of Southeast Asia (5)
Levi
Analysis of the organization and functioning of government and politics in the countries of Southeast Asia, with attention given to the interaction of the social and political environments that condition them. Recommended: 101.

POL 346 Governments of Western Europe (5)
Modern government and politics of Great Britain, France, and Germany.

POL 347 Governments of Eastern Europe (5)
Paul
Survey of the communist regimes of Poland, Hungary, Czechoslovakia, East Germany, and the Balkans.

POL 348 The European Community (5)
Roberts
The movement toward a political union of European states; national, international, and supranational elements in the law and politics of the community.

POL 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 intellectuals under conditions of political constraint. Emphasis is on materials from Eastern Europe, although in some years attention will be given to selected Soviet films. Feature films by such directors as Wajda, Schorm, Jancso, Kadar, Eisenstein, and Pudovkin are shown and discussed. Readings may include works by Kundera, Andrasjewski, Havel, and Solzhenitsyn. Offered jointly with SISRE 360.

POL 350 Government and Interest Groups (5)
Agranoff, labor, professional, business, and ethnic interest in politics; impact on representative institutions and governmental processes. Prerequisite: 101 or permission of instructor.

POL 351 The American Democracy (5)
College of Arts and Sciences
Democratic theory; concepts of political economy; the Presidency; Congress; the Supreme Court; civil rights and civil liberties. Designed for nonmajors. Prerequisite: 202 or equivalent.

POL 353 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 362 The Supreme Court in American Politics (5)
Scheingold
Introductory public law course that examines the interplay of an independent judiciary with particular attention to the role of the Supreme Court in the formulation and implementation of public policy in such matters as crime, labor law, civil rights, political expression, and economic regulation.

POL 370 Government and the American Economy (5)
Government regulation, promotion, and services affecting such principal interest groups as business, labor, agriculture, and consumers; the independent regulatory agencies, public ownership, government corporations, and the cooperative movement.

POL 398 Honors Seminar (5, max. 15) A WSp
Intensive and advanced studies in various aspects of political science. Open only to participants in the departmental honors program.

POL 405 Seminar in Politics (5, max. 10)
Intensive reading and research in selected problems or fields of political analysis. Prerequisite: permission of instructor.

POL 406 Marxist Political Economy (5) W
Levi
Exploration of the relationship between social classes, the state, and politics in advanced capitalist societies. Investigates this relationship primarily by means of the tools of Marxist political economy and, in the process, evaluates these tools. Emphasis on theoretical perspectives, although the reading list has a few empirical applications as well. Requirements include reading, participating in class sessions, and completing a short midterm paper and a longer paper at the end of the quarter. Prerequisite: 201.

POL 409 Undergraduate Seminar in Political Economy (5) W
Levi, North
Undergraduate seminar in political economy with focus on Marxist and public choice approaches to political economy. Explores the questions raised by each approach, the assumptions A) and testability of hypotheses, and applies these approaches to a number of problems in political economy. Offered jointly with ECON 409. Prerequisites: 201. ECON 201, or permission of instructor.

POL 411 The Western Tradition of Political Thought: Ancien and Medieval (5) A
Origin and evolution of major political concepts from ancient Greece to the eighteenth century that underlie much contemporary thinking. A background in history is desirable. Prerequisite: 101 or permission of instructor.

POL 412 The Western Tradition of Political Thought: Modern (5) W
Continuation of 411, treating materials from the seventeenth century through the early nineteenth century. Hobbes through Hegel. Prerequisite: 411 or permission of instructor.

POL 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.

POL 414 Chinese Political Thought (5)
Theories of the Oriental state as exhibited in the writings of statesmen and philosophers.

POL 416 Economic Approaches to Political Analysis (5) W
Application of economic theory and methodology to political phenomenon. Emphasis on theory construction, with relevance in the American context. Offered jointly with ECON 452. Prerequisite: ECON 201 or 400, or equivalent.

POL 417 Asian Marxist Thought (3)
Introduction 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 Sung, D. P. Aidit, M. N. Roy, and Sanoo Nosaka. Offered jointly with SISRE 417. Prerequisite: one course from either the nineteenth- or twentieth-century Marxism series or a course in modern Asian politics or history.

POL 418 American Political Thought (5)
Major thinkers and movements from the colonial period to the present.

POL 420 Foreign Relations of the Soviet Union (3)
Rethsat
Ideological, historical, and strategic components of Soviet foreign policy; Comintern, Cominform, and international communist movement; Soviet policy in foreign trade, in international law and organization, and in specific geographic areas.

POL 423 International Law (5) A
Robins
History and present status of international law. Feedback between law and politics in international relations. Current trends in treaties and court cases. Prerequisite: 203 or equivalent suggested.

POL 424 International and European Regional Courts (5) A
Robins
Survey and comparison of formal dispute settlement procedures among sovereign states (i.e., various ad hoc arbitration tribunals, the Permanent Court of Arbitration, 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), problems for other international courts (African, Latin American, Commonwealth), and the role of courts in early federal systems (United States, Switzerland, Canada). Recommended: 423 or equivalent.

POL 426 World Politics (5) A
Modelski
The national-state system and its alternatives; world distributions of preferences and power; structure of international authority; historical world societies and their politics.

POL 427 International Government and Administration (5) A
Modelski
Comparative study of regional and general government international organizations.

POL 430 Government and Politics in the Middle East and North Africa (5)
Byres
Breakdown of traditional society and the problems of building modern political systems.

POL 431 International Relations in the Middle East (5)
Sheikholelami
Study of domestic sources of foreign policy in the Middle East; politics of oil; the East-West rivalry in the area 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.

POL S 436 Ethnic Politics and Nationalism in Multi-Ethnic Societies (5)
Brass, Chandler
Brass provides a broad theoretical base, both descriptive and analytical, for the comparative study of ethnicity and nationalism. Examples drawn from ethnic movements in different societies. Some previous exposure either to introductory courses in political science or to courses in ethnicity in other departments is desirable. Prerequisite: junior standing.

POL S 440 Government and Politics of South Asia (5)
Brass
Comparison of problems of national integration and political processes in India, Pakistan, and Ceylon.

POL S 441 Government and Politics of the Soviet Union (5) A
Rescher
Ideological and historical bases of Soviet politics; Leninism-Stalinism; Communist Party structure and functions; economic and political economy; police and military; law and the judiciary; Soviet federalism and nationality policy.

POL S 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
Cassinelli: Analysis of modern and premodern types of stable political systems; special attention to contemporary representative democracy.

POL S 444 Revolutionary Regimes (5) Cassinelli
Cassinelli: Analysis of the several types of political regimes concerned 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.

POL S 446 Peasants in Politics (5)
Political interaction of peasants and governments, with emphasis on the ways that peasants negotiate their political organization. Questions the utility of theories of modernization or political development in understanding this relationship and political interaction, suggesting instead a view of politics focused on power and participation.

POL S 447 Comparative Politics in Selected Systems (5)
Comparative study of nationally inherent and globally derived aspects of national political systems. Emphasis is on the extranational influences on national political cultures, governmental and political organization, and political processes in two or three national political systems.

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.

POL S 450 Political Parties and Elections (5)
Theories of American parties, campaigns and voting behavior; party leadership; political socialization and participation. Prerequisite: 101 or 202.

POL S 451 The Legislative Process (5)
Organization and procedure of Congress; state legislative politics; lobbying; legislative roles; the theory and practice of representative government. Prerequisite: 101 or 202.

POL S 452 Political Processes and Public Opinion (5)
Bennett
The foundations and environment of opinion; organization 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.

POL S 453 The State Legislature (5)
Intensive study of American state legislatures, with special reference to the Washington State Legislature. Student's schedule includes permit spending several Fridays in Olympia when the legislature is in session. Those desiring a more extensive involvement with the legislature should enroll in the political internship or general studies special topics offerings: upper-division standing and permission of instructor.

POL S 460 Introduction to Constitutional Law (5)
Scheingold
Growth and development of the United States Constitution 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 constitutionally guaranteed private rights, with particular reference to the period since 1957.

POL S 464 The Politics of Criminal Justice (5)
Cassinelli,
Investigation of the political forces and value choices associated with the enforcement of criminal law. Distribution of resources among particular 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
Investigation of the relationship between law and public policy, with particular attention to problems of social, economic, and political change. The course considers legal and constitutional processes as they relate to such problems of public policy as race relations, the environment, and the economy. Prerequisite: junior or senior 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 institutions, and the public.

POL S 480 Introduction to Urban, Suburban, and Metropolitan Political Systems (5)
Cass
Causes and consequences of variations in urban form and political structure. Social, economic, and cultural characteristics of different urban forms, and processes by which they have developed; emphasis on suburbanization and the metropolization (and joint) with the urban area. Prerequisite: POL 480.

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 political 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)
Examination of the relationships between technological and environmental change and policy formation in urban political systems. The estimation of the impact of technology and social change upon environment. Consideration of political behavior related to these phenomena and the capacity of public urban policy to predict changes and to formulate policies that reach for the future. 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. Opportunity for more independent study and analysis of particular 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 between federal, state, and local governments—emphasis upon patterns in these relationships that reflect program structures.

POL S 488-489 Honors Senior Thesis (5-12 A,W
Students individually arrange for independent study of selected topics under the direction of a faculty member. 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 planning a survey, using government documents, or analyzing 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 political behavior. Experimental design, analysis of voter turnout, public opinion research, relationship of the voter to the political elite, dominance of groups, and public opinion research. The various uses of these cultural elements establish the place of the individual in society, influence the perception of political events, and create opportunities for individual and mass political responses. Analyzing the processes through which political reality is created and changed helps us understand some of the most fundamental problems of politics: 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.

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 language, symbols, myths, and rituals. The various uses of these cultural elements establish the place of the individual in society, influence the perception of political events, and create opportunities for individual and mass political responses. Analyzing the processes through which political reality is created and changed helps us understand some of the most fundamental problems of politics: 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.

POL S 493 Language and Politics (5)
Foot
Language as a political phenomenon, a tool of political power, and a source of political problems. Includes the effects of social and economic forces on language, the role of language in racism and sexism, and the search for ways to overcome national and international language barriers in several political contexts. Prerequisite: for students in political science, languages, and area studies. Prerequisite: permission of instructor.

POL S 495 Psychiatry, Psychology, and Politics (5)
Survey of the contributions of psychiatry, psychoanalysis, and psychology to the understanding and analysis of politics. Background for further work in political psychology and social psychodynamic studies of politics.

POL S 496 Undergraduate Internship (5, max. 15)
Restricted to students entering approved internship. Only 5 credits may count toward the minimum 30 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 entering approved internship programs with state government agencies. Only 5 credits may count toward the minimum 30 credits required for the political science major. Prerequisites: junior or higher standing and permission of undergraduate adviser.

POL S 499 Individual Conference and Research (2-5, max. 20) A, W
No more than one registration in 499 under the same instructor is permitted. Only 10 credits may count toward the minimum 30 credits required for the political science major. Prerequisites: junior or higher standing and permission of undergraduate adviser.
COURSES FOR GRADUATES ONLY

POL S 505 Comparative Politics (5)
Brass, L. Townsend
Examination of modern theories, approaches, and methods in the study of comparative politics.

POL S 506 Contemporary Problems, Domestic and Foreign (3, max. 6)

POL S 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, regional, and universal. Prerequisite: permission of instructor.

POL S 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 operation of decisional functions associated with each strategy.

POL S 520 Seminar on the Foreign Policy of the Soviet Union (3)
Reuther
Selected topics in the development, methods, and objectives of the foreign policy of the Soviet Union. Prerequisite: 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)
Monvoisin
Part two of the core course in the field of international relations. Reviews basic literature on diplomacy and world organization, history of world politics, and selected special fields including foreign policies of major powers, international political economy, and global problems.

POL S 525 International Law I: Policy (3)
Rohn
Introduction to 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: 425 or permission of instructor.

POL S 529 Problems of American Foreign Policy (3)
Critical analysis of the historical foundations and contemporary problems of foreign-policy making, with attention given to selected foreign-policy decisions. Prerequisite: 521 or permission of instructor.

POL S 532 The Chinese Political System (3)
Townsend
Examination of key approaches, interpretations, and secondary literature in the study of contemporary Chinese politics. Prerequisite: permission of instructor.

POL S 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)
Analysis of foreign policy viewed whole, including defense policy, the relationships of foreign policy to domestic policies and priorities, and the full range of historical institutions, international, political, and theoretical questions related to the formation and execution of foreign policy in this broad sense. Offered jointly with PB PL 554.

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 Ethical Politics and Nationality Formation (3)
Brass
Seminar concerned with the analysis and theoretical understanding of the following processes: non-white group persistence and change over time; and the transformation of ethnic groups into politically self-conscious and influential nationalities. The readings and discussions deal with these two processes in the contexts both of developing 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 countries of East-Central and Southeastern Europe. Offered jointly with SISRE 504. Prerequisite: permission of instructor. (Offered alternate years.)

POL S 540 Problems in South Asian Politics (3)
Brass
Research problems in contemporary Indian politics.

POL S 541 The Soviet Political System (4)
Reuther
Critical appraisal of the principal research methods, theories, 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)
Hedemann

POL S 546 Seminar on Problems of Soviet Politics (3)
Reuther
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 development in both historical 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 leadership, state and national. Prerequisite: 451 or equivalent.

PSYCH 101 Psychology as a Social Science (5)
A. W. Arne
Keating, B. Smith
Survey of the scientific study of human behavior, covering experiments, observations, and theories relating to individual differences, personality, development, motivation, social behavior, deviant behavior, genetics, and physiology of behavior, learning and cognitive processes, sensory and perceptual processes. Discussion of social problems and the research psychologists' efforts to help change and solve these problems. Not open for credit to students who have taken 100.

PSYCH 102 Psychology as a Natural Science (5)
A. W. Arne
Bernard, E. Sacket, S. Simons, W. Woods
Survey of the behavior of behavior from a natural science viewpoint. Discussion of theories of the processes and mechanisms of behavior. Topics include evolution, genetics, and physiology of behavior, learning processes, motivation, individual differences, development, social behavior, and sensory, perceptual, and cognitive processes. Not open for credit to students who have taken 100.

PSYCH 103 Psychology as a Natural Science (5)
A. W. Arne
Bernard, E. Sacket, S. Simons, W. Woods
Survey of the behavior of behavior from a natural science viewpoint. Discussion of theories of the processes and mechanisms of behavior. Topics include evolution, genetics, and physiology of behavior, learning processes, motivation, individual differences, development, social behavior, and sensory, perceptual, and cognitive processes. Not open for credit to students who have taken 100.

PSYCH 202 Psychology as a Natural Science (5)
A. W. Arne
Bernard, E. Sacket, S. Simons, W. Woods
Survey of the behavior of behavior from a natural science viewpoint. Discussion of theories of the processes and mechanisms of behavior. Topics include evolution, genetics, and physiology of behavior, learning processes, motivation, individual differences, development, social behavior, and sensory, perceptual, and cognitive processes. Not open for credit to students who have taken 100.
PSYCH 200 Comparative Animal Behavior (3) AWSpS
Barash, Sleicher
Introduction to the methods and findings of comparative animal behavior. Emphasis on the reasons for studying the behavior of animals and similarities and differences 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 our understanding of human behavior. Recommended: 102 or BIOL 210.

PSYCH 205 Introduction to Personality and Individual Differences (4) AWSpS
Marlan, E. Robinson, R. Smith
Basic concepts, research background for more intensive study in the field of personality. Prerequisite: 101 or 102, or equivalent.

PSYCH 209 Fundamentals of Psychological Research (3) AWSpS
E. Loftus, Lambasted, Nelson, Rose
Introduction to psychological research methodology and techniques. Topics include hypothesis testing, influence of paradigms, experimental design, techniques of scientific writing, research techniques, ethical issues in psychological 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

PSYCH 213 Elementary Psychological Statistics (6) AWSpS
Pagano, Sackett
How data are described and reported. Introduction to probability theory. How psychological hypotheses are stated, tested, and evaluated in terms of numerical outcomes 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 1 1/2 years of high school algebra or permission of instructor.

PSYCH 217 Introduction to Probability and Statistics for Psychology (4) AWSpS
E. Loftus, G. Loftus, M. H. Smith
Introduction to probability and statistics as a model for scientific inference. Probabilistic variables and experimental outcomes, conditional probability, binomial and related distributions, expectation, sampling and sampling distributions, 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 statistical inference commonly employed in psychological research: t-test, analysis of variance, correlation and regression, and nonparametric statistics. Nature and control of experimental and inferential error in research. Required for majors in the psychology Bachelor of Science degree program or in the psychology honors or distinction 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 examination of learning, memory, sleep, the senses, and the emotions. Intended primarily for students who do not intend to specialize in physiological psychology. Prerequisite: 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 animal learning, perception, and performance. Prerequisites: 209 and 213 or 217.

PSYCH 232 Laboratory in Animal Learning (3) AWSpS
Barash
Laboratory on selected aspects of animal learning. Operant techniques with the rat are stressed. Prerequisite: 209.

PSYCH 233 Laboratory in Animal Behavior (5) AWSpS
Barash
Experience with a variety of animal species and a variety of experimental procedures and instrumentation. Prerequisites: 101 or 102, 209, and 200 or BIOL 212, or equivalents.

PSYCH 250 Racism and Minority Groups (4) AWSpS
Suer
Survey of the problems of racism and their effects upon minority groups, with particular emphasis on the conditions related to the development of mental health. Emphasis is placed on the situation of the Black, Chicano, American Indian, and Asian groups.

PSYCH 257 Psychology of Sex Differences (5) AS Kenney
Major psychological theories of sex-role development in young children and a study of the biological and environmental factors that determine and maintain sex differences in behavior. Topics include the genetic and endocrinological bases of sex, the development of sex roles in other animal species, the role of physical and psychological factors in promoting mental health in developing nations. Recommended: 101 or 345.

PSYCH 260 Psychological Aspects of Poverty and Affluence (3) A or Sp Lambasted
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
Topics include community mental health, epidemiology, program evaluation, and social ecology. Emphasis on research, theory, and practice in community settings and the influence of community-environmental factors in individual functioning and the utilization of these factors in promoting mental health. Prerequisite: 10 credits in psychology.

PSYCH 305 Deviant Personality (5) AWSpS
Jacobson, Kohnlein, Sue
Introduction to the field of psychopathology; analysis of forms, nature, and causes of disorders of behavior and personality. Prerequisite: 10 credits in psychology, including 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 relation to biological, physical, and sociological antecedent conditions from infancy to adolescence. Prerequisite: 101 or 102, or equivalent.

PSYCH 345 Social Psychology (5) AWSpS
Davidson, Feldman-Summers, Stierle
Study of the interaction of the individual and the group with emphasis upon interpersonal processes, social motivation, attitude formation and change, leadership, and the relation between personality and social behavior. Prerequisite: 101 or 102, or equivalent.

PSYCH 355 Survey of Cognitive Psychology (5) AW L. Beach, E. Loftus
Survey of the major theories and research in such areas as perception, attention, memory and learning, attitudes, thinking and decision making, and language. For both the student who wishes to have a broad understanding of psychology and the student who is interested in advanced work in clinical psychology or special education. Prerequisites: 305 and 306, or equivalents.

PSYCH 357 Psychology of Women (5) W Kenney
Physiological and psychological aspects of significant segments of women's lives. Topics include physiological determinants of sex differences, psychological and sociological changes at puberty and during adolescence; psychological events related to the menstrual cycle and menopause; the 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 physiological events. Offered jointly with WOMEN 357. Not open for credit to students who have taken GIS 357. Prerequisite: 237 or WOMEN 257 or permission of instructor.

PSYCH 361 Laboratory in Social Psychology (5) Feldman-Summers, Keating
Practice and discussion of methods of systematic observation, content analysis, laboratory and field experimental methods, and individual research projects. Prerequisites: 209, 213 or 217, 345, and major standing.

PSYCH 400 Learning (5) A or W Sp Bolles, M. H. Smith
Behavioral 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, frustration, preference, instinctual mechanisms, and other factors controlling animal behavior. Prerequisite: 101 or 102.

PSYCH 405 Advanced Personality: Theory and Research (5) WS W. S. Smith
Intensive survey of theoretical concepts and detailed review of experimental methods and experiments in the field of personality. Prerequisite: 305 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 in current use by behavioral scientists. Emphasis on psychophysiological recording and biofeedback (skin resistance, finger temperature, EMG, heart rate, etc.) employing research-caliber, high-speed, complex electronic instrumentation. Covers basic electronics, test instruments (oscilloscope and digital multimeter), 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 doctrines as behaviorism, determinism, and associationism, and the men who developed them. Prerequisite: 400 or equivalent.

PSYCH 409 Sociobiology (4) W Barash
Biological bases of social behavior, emphasizing evolution as a paradigm. Topics include: 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) AWSpS
Barash
Introduction to developmental deviations, including sensor-motor handicaps, mental retardation, brain injury and effects of drugs on intellectual development. Offered jointly with ZOOL 410. Registration limited to twelve students. Prerequisites: senior standing, high school biology, and permission of instructor.
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 nonhuman behavioral and psychological performance, sex differences, prenatal diagnosis and genetic counseling, and ethical considerations in behavior genetic research. Prerequisite: GENET 351 or 451 or equivalent.

PSYCH 413 Developmental Psychology (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 development 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 recent advances in cognition development, 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
Socialization: theory and research; infant social relationships; 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 protozoa 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 point. 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) AWSp
Beecher
Observational studies of social and reproductive behavior, infant development, activity cycles, and enclosure utilization of zoo animals, many of which are endangered or not. Designed to expand basic knowledge of animal behavior, and at the same time, facilitate research, 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 memory. Prerequisites: 101 or 102, or equivalent.

PSYCH 423 Sensory Basis of Behavior (5) W or Sp
Matsum
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 Bases (5) A
Teller
Phenomena of human vision, including spectral sensitivity, color vision, retinal and neural structure and function, visual accommodation, visual distance, distance perception, and binocular interaction. Techniques for the study of vision in human subjects; emphasis on 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 is recommended.

PSYCH 425 Surgical and Histological Techniques (5) Sp
Wood
Practical 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
Wood
Comprehensive survey of the endocrine system and how its secretions influence and are influenced by behavior. 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 is recommended.

PSYCH 430 Problems of Measurement in Psychology (5) Sp
C. Labov
Selection or development of instruments for the appraisal of individual or group differences in ability, achievement, interest, or opinion. Students gain experience in the construction and validation of psychological tests and survey questionnaires. Prerequisites: 213 or 217.

PSYCH 434-435 Laboratory in Vision (2-3)
Introduction to techniques of research in visual psychophysics; emphasis on alignment and calibration of basic optical systems; replication of some classical vision experiments or designs and completion of original vision experiments. Limited to 30 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 environmental issues. Prerequisites: 101 or 102, and 345, or equivalent.

PSYCH 441 Perceptual Processes (5) ASp
Culbert
Consideration of the ways in which experience is organized. Emphasis on experimental and theoretical treatments in the aspect of sensory modalities, relations between physical and psychological dimensions, nonstimulus determiners of the perceived world, and medial and focal feedback. Prerequisite: 101 or 102, or equivalent.

PSYCH 442 Measurement and Design in Attitude Research (5) A or W
Davidson
Major problems in the measurement and design of experimental studies of attitude formation and change, design of procedures for laboratory and field experiments employing both traditional and more recent approaches to measurement of attitudes, beliefs, etc. Students are required to undertake an attitude-measurement or attitude-change project. Prerequisites: 213 or 218, and 345, or equivalents.

PSYCH 443 Evaluation of Social Programs: Psychological Perspectives (3) W
Davidson
Major issues involved in the evaluation of social programs from the standpoint of mental health, education, law and justice, and family planning. Topics include formulating program goals, selecting research designs, measuring outcomes, and interpreting and utilizing findings. Prerequisites: 213 or 217; upper-division and graduate students only.

PSYCH 444 Attitude Change and Persuasive Communication (3) A or W, Sp
Lumsdale
Factors influencing attitude change, with emphasis on message variables in persuasive communications, and experiments 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 their outcomes. 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 group. Prerequisites: 345 and senior or graduate major standing.

PSYCH 446 Objective Assessment of Personality (3) A
Edwards
Methods and techniques of observing and measuring personal 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
Calbert
Psychological principles applied to linguistic development and organization; language in both stimulus and response aspects. Prerequisites: 101 or 102, or equivalent.

PSYCH 448 Seminar in Psychology (1-15) AWSp
Selected research topics of contemporary interest. May be repeated for credit. Quarterly list of specific offerings is available at administrative office. Prerequisite: one course in elementary statistics or equivalent.

PSYCH 449 Organizational and Industrial Psychology (3) W
Fiedler
Survey of research and methods in industrial-social psychology; exploration 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 (2-6) AWSp
Carter-Saltzman
Presentations by professors and advanced Honors students 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. Jointly offered with BIO 424. Prerequisites: 251 and 232 or 233, or equivalents, and permission of departmental honors advisor.

PSYCH 455 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-dimensionality. Data from both infant and adult populations. Written papers and oral presentations required. Prerequisites: 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 BIO 475. Prerequisites: 306 or LING 400, and junior or senior standing.

PSYCH 461 Human Learning (5)
G. Loftus, Nelson
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 465 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 impairments 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 psychometrics; 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 described by formal models. Current theories and exper-
imental studies of mental information processing and their implications for understanding processes such as perception, learning, and memory. Prerequisite: one undergraduate psychology course.

PSYCH 475 Computing in Behavioral Sciences (5) Sp
Hunt, G. Lofus
Application of computers to research problems in the behavioral sciences; functions and performance characteristics of batch processing, interactive and control computing systems; computing languages; computer methods of data processing, control of experiments, and automated instruction. Prerequisites: upper-division courses in behavioral and social sciences; functional and applied computer programming.

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 knowledge, sexual differences in male and female sexual patterns, sex in relationships, sexual malfunctioning, etc. Term paper and research proposal are required. Offered jointly with SOC 490. Prerequisites: 210 or SOC 110 or permission of instructor, and statistics.

PSYCH 489 Clinical Psychology (3) A/WSp
Aimee, R. Smith
Introduction to basic issues, methods, 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) A/WSp
P. Laxer
Individual consultation with faculty member and supervised practicum experience in a broad range of commu-
nity settings where issues may include individual factors and psychological problems. Prerequisite: 18 credits in 400 level and permission of instructor. Offered annually.

PSYCH 498 Readings in Psychology (1-3, max. 18) A/WSp
Readings in special interest areas under supervision of department faculty. Discussion of reading in confer-
ence with the instructor. Prerequisite: 18 credits in 400 level and permission of instructor. Offered annually.

PSYCH 499 Undergraduate Research (1-3, max. 18) A/WSp
Design and completion of individual research projects. Prerequisite: 12 credits in upper division research. 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 610) is determined by the scheduled quarter to quarter. A list of offerings is published each quarter and can be obtained from the Department of Psy-

ology. Students registering for independent study or research courses must receive permission of the depart-
mental instructor.

PSYCH 503 Advanced Social Psychology (4) A
Fischer
Problems in person perception; attitude; socialization; and group processes. For graduate and advanced undergraduate students only. Prerequisite: one undergraduate social psychology course.

PSYCH 504 Biological Basis of Development (4) A
Bernstein
Embryological, genetic, physiological, and evolutionary perspectives on human development; biological develop-
ment in infancy; sensory development and its influence on the development of perception; primate models for human development. First quarter of a three-quarter pre-


PSYCH 505 Cognitive and Linguistic Development (4) W
Carter-Salzman, Dale
Biological, Piagetian, and information-processing per-
cpectives on cognitive and language development through infancy. Prerequisite: 400 level courses in intelligence and educational implications for normal and exceptional children. Second quarter of a three-quarter sequence required for graduate majors in developmental psychology. Prerequisite: graduate standing or permis-
sion of instructor.

PSYCH 506 Personality and Social Development (4) Sp
M. T. Greenberg, H. Robinson
Survey of theoretical and empirical literature in the area of personality and social development throughout infancy, childhood, and adulthood. Third quarter of a three-quar-
ter sequence required for graduate majors in develop-
mental 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. Prerequi-
site: 504.

PSYCH 508 Research Methods in Social Psychology (3) Sp
Steel
Examination and evaluation of research problems most typically encountered by social psychologists. Examin-
ation of various types of research settings; discussion of factors relevant to the validity of experiments. Prerequisite: 514 or equivalent.

PSYCH 509 Leadership (3) Sp
Fiedman
Critical review of leadership literature and research with emphasis on empirical studies on leadership selection, training, and prediction of group and organizational effec-
tiveness. Prerequisites: 345 and 514, or equivalents.

PSYCH 510 Advanced Attitude Change Theory (3) Sp
Lumadue
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-
abilities and sampling distributions in 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 psychology; 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
Ebenhack
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) Sr
Xar
Theory of measurement; an examination of assumptions involved in test theory; errors of measurement, factors affecting reliability and validity, and problems of weight-
ing. Taught with EDP53 592. Prerequisites: 213 or 217, and permission of instructor.

PSYCH 517 Mathematical Psychology (3) Sp
Ross
Application of mathematics (drawn from set theory, finite mathematics, and probability theory) in the areas of measure-
ment, psychophysics, and learning. Open to un-
dergraduates with permission of instructor. Prerequisite: 514 or equivalent.

PSYCH 518 Single Subject Design and Research (3)
Comprehensive examination of single subject designs (reversal, multiple baseline, changing criterion), research employ-
ing these designs, and application of such designs to clinical cases. Prerequisites: 514 or equivalent, and graduate standing.

PSYCH 520 Cognitive Perception (3) A
M. T. Greenberg, Sacket
Presentation of those aspects of statistics and experiment-
design unique to, or heavily used in, developmental research, including: behavioral observation methods, data analysis, and experimental design. Prerequisites: 514 or equivalent, and graduate standing.

PSYCH 522 Cognitive Perception (3) A
G. Lofus
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) W
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. Ex-
amination of theories and behavioral data base of the fol-
lowing 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 of tests. Training in administration, scoring, and interpre-
tation of individual intelligence tests. Prerequisite: gradu-
ate standing in clinical or child-clinical psychol-
ogy, 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 interview methods, and traditional assessment. Training in administration of selected techniques. Prerequisites: 525 and permission of instructor.
PSYCH 527 Psychological Assessment of Adults (3) Sp
Brodrick
Training in the psychological assessment of adults, including development of skills in administration, scoring, and interpretation of the Rorschach, TAT, and Draw-a-Person tests. Prerequisites: 525 and permission of instructor. (Offered alternate years; offered 1981-82.)

PSYCH 528 Decision Processes (3) A Beach
Literature on prescriptive 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) A Nelson
Interpretation of psychological research results, related issues from the philosophy of science, and nonstatistical pitfalls in psychological research. Prerequisites: psychology graduate major or permission of instructor and completion 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: junior 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 attention to the relationship between assessment and therapy. Procedures include interviewing, observational techniques, self-monitoring, simulated environments, and physiological, self-report, and imaginal procedures. Prerequisite: clinical psychology graduate standing and permission 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, theory, and application of a wide range of procedures, including desensitization, relaxation, biofeedback, induced effect, sex therapy, assertiveness skills, and cognitive behavior therapy procedures. Treatment planning for wide range of problem areas. Prerequisite: clinical psychology graduate standing and permission of instructor.

PSYCH 538 Systems of Psychotherapy (3) A Marlati
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 practice 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, Carroll
Sessions alternate between intake interviewing of a patient 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) A
Linehan, Marlati, Perry, E. Robinson, Sarason, R. Smith, Sue
May be repeated for credit. Prerequisite: permission of instructor.

PSYCH 541 Seminar in Cognitive Processes (2) E. Lofus, G. Lofus, Nelson
May be repeated for credit. Prerequisite: permission of instructor.

PSYCH 542 Seminar in Animal Behavior (2) Barash, Brecher, 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. Lurie, H. Robinson
May be repeated for credit. Prerequisite: permission of instructor.

PSYCH 544 Seminar in Experimental Psychology (2)
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) Bolles
May be repeated for credit. Prerequisite: permission of instructor.

PSYCH 548 Seminar in Perceptual Processes (2) Burt
May be repeated for credit. Prerequisites: 441 and permission of instructor.

PSYCH 549 Seminar in Physiological Psychology (2) Diaz, Douglas, Kennedy, Simpson, M. H. Smith, Teller, Westman
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 permission 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. Lunenburg, Rose
May be repeated for credit. Prerequisite: permission of instructor.

PSYCH 553 Seminar in Social Psychology (3) Davidson, Feldman-Summers, Felder, Keating, Lumsdaile, 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) AWSp
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 Syntax and Semantic Development (3) W Dale
Advanced study of the patterns of child language, linguistic approaches to characterizing them, and psychological approaches to understanding the nature of development. Includes cross-linguistic comparisons, the relationship of comprehension to production, the cognitive 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 limits of psychology in the law-making process on appeal and the fact-finding process at trial. Analytical, process-oriented approach. Prerequisite: permission of instructor for law students; permission of department for upper-division undergraduates.

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, prerequisites: graduate major or minor standing in child clinical psychology.

PSYCH 571 Child Psychopathology and Behavior Change (3) W Major theoretical views of childhood disorders and research findings in the area. Prerequisites: permission of instructor for graduate major or minor standing in child clinical psychology.

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. Prerequisite: 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 more generations in synchrony. Prerequisites: second-year graduate 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 and issues relevant to professional student standing or processes by the clinician. Prerequisites: 592 and 593 or equivalent and permission of instructor. (Offered alternate years; offered 1981-82.)

PSYCH 578 Affective Disorders: Theory and Research (3) 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 FBSCI 578. Prerequisites: graduate or professional student standing or permission of instructor; graduate course in psychopathology and personality desirable.

PSYCH 579 Depression: Diagnosis and Psychological Treatment (2) Becker
Differential diagnosis of depression and depressive subtypes. Discussion on psychodynamic, cognitive-behavioral, and combined forms of psychological treatment of less severely incapacitated patients. Some discussion of biological approaches (i.e., antidepressant drugs, electroconvulsive therapy, etc.) as alternative or adjunctive treatments in severe, psychotic, and endogenous-like depressions. Offered jointly with FBSCI 579. Prerequisites: FBSCI 578 and permission of instructor.

PSYCH 580 Etiology and Epidemiology of Alcoholism and Drug Abuse (3) A Hoffman
Intensive survey of the historical evolution of etiological concepts pertaining to alcoholism and drug abuse; review and critique of current research on testing biological hypotheses; emphasis on the unique problems of applying epidemiological research methodologies to the study of alcoholism and drug abuse; offered jointly with SOC W 544 and PBSCI 544. Prerequisites: graduate or postdoctoral standing in social, behavioral, or biological sciences and permission of instructor.

PSYCH 585 Research in Psychotherapy (5) A or W Marlati
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.)
ROMANCE LANGUAGES AND LITERATURE

ROMANCE LANGUAGES AND LITERATURE

Courses for Undergraduates

ROM 401 Introduction to Romance Linguistics (5) A WSp
Contrasera, Hansell, Klausenburger, Saporita

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) A Sp
Klausenburger

Comparative historical survey of the development of the principal Romance tongues. Prerequisite: 401 or permission of instructor.

ROM 490 Senior Essay (3) A WSp

Contrasera, Hansell, Klausenburger

In consultation with the appropriate faculty, the undergraduate 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. Descriptive, 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) Contrasera, Hansell, Klausenburger

Specific problems in Romance linguistic analysis of the Romance languages. Prerequisites: 401, 402.

ROM 531 Problems in Romance Linguistics (2-5, max. 15) Contrasera, Hansell, 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 Hansell, 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 twentieth centuries as it relates to Romance studies; lectures, discussions, and readings in comparative and descriptive methods used in contemporary scholarship; student library projects (periodical literature, reference works, preparation of specialized bibliographies).

ROM 584 Seminar in Roman Culture (5) Nastroud

Individual and collective research in the evolution of concepts common to Romance literature 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

FRANCE

FREN 101, 102, 103 Elementary (5, 5, 5) A WSp, A WSpS, A WSp

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.


Beginning courses devoted to reading. Introduction to the grammar and syntax of written French, with representative texts of literary 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) Advanced Placement

Admission to 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 101, 102, 103, 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) A WSp, A WSpS

Systematic review of French grammar. Intensive practice in writing and conversation. Readings in literature, culture, and the sciences. Prerequisites: 103 or college equivalent or placement test for 201; 202 or college equivalent or placement test for 202; 202 or college equivalent or placement test for 203.

FREN 222 Introduction to French Literature (5) A WSp

Transition between reading for content on the intermediate level and the critical reading ability required for more advanced courses in French literature, and introduction to problems of style, genre, and aesthetics. Prerequisite: 202 or equivalent or placement test.

FREN 237 Conversational French (2-4, max. 8)

For participants in the Foreign Study Program. Prerequisites: 103 or college equivalent and permission of Foreign Study Office.

FREN 297 French Civilization (3 or 6) Sp

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. Substantial paper (written in English), and higher degree of participation, required for 6 credits. Course conducted in English. Prerequisite: two years of 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 Ellis

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 emphasis on the literary movement of the time, 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 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 major literary movements and characteristic texts. Includes Romanticism, Realism, Symbolism, Surrealism, Existentialism, Theater of the Absurd, the New Novel, and Structuralism. Major writers outside movements also are considered, but the emphasis is on a definition 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. Compositions on various subjects of intermediate difficulty relating to the civilization of the French-speaking countries of Europe. Grammar review, as needed. Prerequisites: 222 or college equivalent and permission of Foreign Study Office.

FREN 309 French Phonetics (5) A WSp

Creole Training in dictation and oral expression; interpretation of literary texts; phonetics as a teaching device. Prerequisite: 203 or equivalent.

FREN 350 French Civilization (5) A WSp

Survey of French civilization from the Roman period to the present day, with emphasis on the political, sociological, and cultural aspects of French culture. Credit will not be given for both 350 and 351.
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 (5)
Generic study of French drama. Prerequisite: 203 or 222 or college equivalent or placement test.

FREN 351 Poetry (5)
Generic study of French poetry. Prerequisite: 203 or 222 or college equivalent.

FREN 352 Fiction (5)
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 characteristics of French government and politics, economy, and society. Prerequisite: 203 or 222 or equivalent.

FREN 390 Supervised Study (2-6, max. 20) AWSp
Prerequisite: permission of the instructor and the undergraduate 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. Prerequisite: two years of college French and permission of Foreign Study Office.

FREN 400 The Synoptic Structure of French (5) AWSp
Hanzeli
Scientific study of the syntax of French: phrase structures and transformations (emphasis on passives, relativization, pronominalization, reflexive structures). Prerequisites: 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 sociocultural and geographic variations. Prerequisites: ROM 401 or LING 200 or 400, and two years of college-level French.

FREN 403 Background of Modern French (5) Klaussburger
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) Creagh
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) AWSp
Leiner
Study of the whole phenomena of Baroque literature, including 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. Prerequisite: 416 or permission of instructor.

FREN 418 French Literature of the Early Twentieth Century: Modernism (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 permission of instructor.

FREN 421 Fiction: 1560-1800 (5) Ellrich
Prerequisite: 305.

FREN 422 Fiction: 1800-1850 (5) Dale
Prerequisite: 305 or 306.

FREN 425 Fiction: 1850-1900 (5) Dale
Prerequisite: 306.

FREN 427 Fiction: Twentieth Century (5) J. Leiner
Prerequisite: 306.

FREN 437 Advanced Conversational French (2-8, max. 8)
Not open to students whose native language is French. Prerequisite: 227 or equivalent.

FREN 444 Poetry: Romantic (5)
Prerequisite: 305.

FREN 445 Poetry: Parnaslian and Symbolist (5) J. Leiner
Prerequisite: 306.

FREN 446 Poetry: Twentieth Century (5) Prerequisite: 306.

FREN 451 History and Literature of the French Religious Wars (5) Sp
Griffin, 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 458 Nonfiction of the Classic Period (5) Christofides, Keller, Wortley
Prerequisite: 304.

FREN 459 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: background 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) Wortley
Prerequisite: 304.

FREN 463 Nineteenth-Century Drama (5) Prerequisites: 306, 350.

FREN 465 Twentieth-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. Readings, discussions, and reports on representative works in poetry, prose, and drama by Festival (West Indies), Senghor (Senegal), Damas (Guiana), Camara Laye (French Guiana), R. Dada (Ivory Coast), Osoloegem and Komiouma (Mali), Oyono and Berti (Cameroon).

FREN 480 Social and Cultural Background (5) H. Nostrand
Common values, presuppositions, social behavior patterns 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 written in French.

FREN 490 Honors Seminar (5, max. 10) AWSp

FREN 496 Poetry and Song as Elements in French Civilization (5) W
Creeds
Relationship of poetry and music as expressed in the chansons in several periods of French culture. Emphasis on twelfth-century poet-composer-performers such as Tresen, Brames, Brel, Moustaki. Attention given to the medieval troubadours and to post-musician collaboration in the Renaissance and later periods. Prerequisite: 203 or equivalent.

FREN 498 The French-Speaking Countries and Their Culture (5) 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) AWSp
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 examination 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: permission of the department.

FREN 507 Stylestics (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 interfaces. 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) W
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) Eilrich

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) Creave, Keller

FREN 532 Studies in Sixteenth-Century Poetry (5, max. 10) Eilrich

FREN 534 Studies in Twentieth-Century Poetry (5, max. 10)

FREN 541, 542 History of the French Language (8,5)
Field, Klaussnburger
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) Eilrich

FREN 561 Studies in Seventeenth-Century Drama (5, max. 10) * Wordley

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

ITAL 101, 102, 103 Elementary (5,5,5) A,W,Sp
Methods and objectives are primarily oral-sural. Oral practice in the language laboratory is required. Prerequisites: 101 or college equivalent or placement test for 102; 103 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 communication. 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 Correspondence. 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 examination, 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 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.

ITAL 211, 212, 213 Intermediate (5,5,5) A,W,Sp
Administered by Independent Study Through Correspondence. Intensive practice in reading and writing. Functional review in grammar. Three courses correspond to 201, 202, 203 but students wishing to transfer to day school courses must satisfactorily complete placement examinations, including oral proficiency test. Prerequisites: 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 grammatic review; creative written and oral composition and reading, with special attention to problems of style. Prerequisite: 302.

ITAL 327 Advanced Conversation (2, max. 8) AWSp
Mastery of spoken words native to 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 undergraduate Italian adviser.

ITAL 401 The Development of the Italian Language (3)
Historical survey of Italian phonology, morphology, and 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
Prerequisites: 203 or college equivalent or placement test.

ITAL 413 Literature of the Renaissance: Quattrocento (5)

ITAL 414 Literature of the Renaissance: Cinquecento (5)
The high Renaissance. Bembo and the Petrarchans, Machiavelli, Guicciardini, Castiglione, Ariosto, Guarini, Tasso. Prerequisites: 404, 405, 406.

ITAL 423, 424 Eighteenth-Century Italian Literature (5,5)

ITAL 450 Manzoni and the Romantic Movement (5) A
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 Cani with extensive collateral readings from the Zibaldone, the Operette morali, the Pensieri, and other pertinent writings. Prerequisites: 404, 405, 406.

ITAL 469 Verismo (5) Friedrich
The development of Verismo with extensive readings from its main exponents—Capuana, Verga, Sera, 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 Italian majors; others by permission of instructor.

ITAL 499 Special Topics (1-5, max. 10) AWSp
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) Dale
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: Seventeenth Century (5, max. 10)

ITAL 595 Literary Problems: Nineteenth Century (5, max. 10)

ITAL 596 Literary Problems: Twentieth Century (5, max. 10)

ITAL 600 Independent Study or Research (*) AWSp

PORTUGUESE

PORT 101, 102, 103 Elementary (5,5,5) A,W,Sp
Methods and objectives are primarily oral-sural. Oral practice in the language laboratory is required. Prerequi-
<table>
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<tr>
<th>Course Title</th>
<th>Code</th>
<th>Credits</th>
<th>Prerequisites</th>
<th>Description</th>
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<tr>
<td><strong>Courses for Graduates Only</strong></td>
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<tr>
<td><strong>PORT 541, 542</strong> History of the Portuguese Language</td>
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<td>3</td>
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<tr>
<td><strong>PORT 590</strong> Special Seminar and Conference</td>
<td>1-9,</td>
<td>max. 30</td>
<td>AWSp</td>
<td>Group seminars or individual conferences are scheduled under this number to meet special needs. Prerequisite: permission of graduate program adviser.</td>
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<td><strong>PROVENCAL</strong></td>
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<td><strong>PROV 534</strong> Provençal Language and Literature</td>
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<td><strong>ROMANIAN</strong></td>
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<tr>
<td><strong>RMN 401, 402, 403</strong> Elementary Romanian</td>
<td>5,5,5,</td>
<td>A, W, Sp</td>
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<td>Offered jointly with ROMN 401, 402, 403.</td>
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<tr>
<td><strong>RMN 404, 405, 406</strong> Advanced Romanian</td>
<td>5,5,5,</td>
<td>A, W, Sp</td>
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<td>Offered jointly with ROMN 401, 402, 403.</td>
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<tr>
<td><strong>SPANISH</strong></td>
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<tr>
<td><strong>SPAN 101, 102, 103</strong> Elementary (5,5,5) AW, AWSp, AWSp</td>
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<td>Offered jointly with ROMN 401, 402, 403.</td>
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<tr>
<td><strong>SPAN 111, 112, 113</strong> Elementary (5,5,5)</td>
<td>2, max.</td>
<td>5</td>
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<td>Offered jointly with ROMN 401, 402, 403.</td>
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<tr>
<td><strong>SPAN 114</strong> Chileno-Spanish (5)</td>
<td>5</td>
<td>W</td>
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<td>Offered jointly with ROMN 401, 402, 403.</td>
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<tr>
<td><strong>SPAN 115</strong> Chileno-Spanish (5)</td>
<td>5</td>
<td>W</td>
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<td>Offered jointly with ROMN 401, 402, 403.</td>
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<tr>
<td><strong>SPAN 116</strong> Chileno-Spanish (5)</td>
<td>5</td>
<td>W</td>
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<td>Offered jointly with ROMN 401, 402, 403.</td>
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<tr>
<td><strong>SPAN 122</strong> Basic Grammar Review (5)</td>
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<td>Offered jointly with ROMN 401, 402, 403.</td>
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<tr>
<td><strong>SPAN 210, 202, 203</strong> Intermediate (5,5,5)</td>
<td>2, max.</td>
<td>5</td>
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<td>Offered jointly with ROMN 401, 402, 403.</td>
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<tr>
<td><strong>SPAN 211, 212, 213</strong> Intermediate (5,5,5)</td>
<td>2, max.</td>
<td>5</td>
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<td>Offered jointly with ROMN 401, 402, 403.</td>
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<tr>
<td><strong>SPAN 231</strong> Chileno Culture (3) Sp</td>
<td>2</td>
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<td>Offered jointly with ROMN 401, 402, 403.</td>
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<tr>
<td><strong>SPAN 237</strong> Conversational Spanish (2 or 4 or 6) Sp</td>
<td>2, max.</td>
<td>5</td>
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<td>Offered jointly with ROMN 401, 402, 403.</td>
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<tr>
<td><strong>SPAN 301, 302</strong> Advanced Syntax and Composition (3, A) WSp</td>
<td>2, max.</td>
<td>5</td>
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<td>Offered jointly with ROMN 401, 402, 403.</td>
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<tr>
<td><strong>SPAN 303</strong> Spanish Stylistics (4) A Sp</td>
<td>2</td>
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<td>Offered jointly with ROMN 401, 402, 403.</td>
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<tr>
<td><strong>SPAN 304</strong> Survey of Spanish Literature</td>
<td>2</td>
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<td>Offered jointly with ROMN 401, 402, 403.</td>
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<tr>
<td><strong>SPAN 305</strong> Survey of Spanish Literature</td>
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<td>Offered jointly with ROMN 401, 402, 403.</td>
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<td><strong>SPAN 311</strong> Black Literature of the Caribbean (3) A</td>
<td>2</td>
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<td>Offered jointly with ROMN 401, 402, 403.</td>
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<tr>
<td><strong>SPAN 327</strong> Advanced Conversation (2, max. 8) A</td>
<td>2</td>
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<td>Offered jointly with ROMN 401, 402, 403.</td>
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<tr>
<td><strong>SPAN 331</strong> Themes In Mexican-American Studies (5)</td>
<td>2</td>
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<td>Offered jointly with ROMN 401, 402, 403.</td>
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<tr>
<td><strong>SPAN 350</strong> Drama (3) A</td>
<td>2</td>
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<td>Offered jointly with ROMN 401, 402, 403.</td>
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<tr>
<td><strong>SPAN 351</strong> Poetry (3) A</td>
<td>2</td>
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<td>Offered jointly with ROMN 401, 402, 403.</td>
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<tr>
<td><strong>SPAN 352</strong> Fiction (3) W</td>
<td>2</td>
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<td>Offered jointly with ROMN 401, 402, 403.</td>
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<tr>
<td><strong>SPAN 359</strong> Introduction to Mexican Literature (3)</td>
<td>2</td>
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<td>Offered jointly with ROMN 401, 402, 403.</td>
</tr>
</tbody>
</table>
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, Friedman
Reviews perennial problems of Spanish grammar and explores elements 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 their implications 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) AWSp Contreras, Salinero
Analysis of sounds: training in pronunciation, intonation, and close transcription of Spanish language in its modalities.

SPAN 410 Spanish Medieval Literature: Teeth Through Fourteenth Centuries (5) A or W Peterson
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, including the Spanish national epic, the development of lyric and narrative poetry, and the evolution of romance verse through the reading of principal works (Arcas, Poema de los Cid, and Conde Lucanor and the Libro de buen amor) in the original texts, with supplementary reading of secondary materials. Taught in Spanish. Prerequisites: 304, 305, 306.

SPAN 411 Spanish Medieval Literature: Fifteenth Century (5) W or Sp Peterson
Principles literary forms of the fifteenth century: narrative poetry (Romancero viejo); lyric poetry (Sanllana, Manrique, and the Concionero poets); political and social satire (prose and verse); historiography (Perez de Guzman and Fernando del Pulgar); early prose fiction (novelas de caballerias and novels sentimental) and the Celestina. Taught in Spanish. For advanced undergraduate majors and graduate students in Spanish and comparative literature. Prerequisites: 304, 305, 306.

SPAN 412 Spanish Literature: Sixteenth Century (5) Shipy Golden Age and Age of Conflicts. 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) Shipy 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 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 447 Spanish Literature From 1940 to the Present (5) Penuelas
Prerequisites: 304, 305, 306. 416 and 350, 351, or 352 recommended.

SPAN 448 Spanish Poetry: Origin Through the Twentieth Century (5) Prerequisites: 304, 305, 306.

SPAN 449 Spanish Poetry: The Golden Age, Sixteenth Through Seventeenth Centuries (5) Shipy
Prerequisites: 304, 305, 306. Recommended: 351.

SPAN 454 The Modern Theatre in Spain, 1700-1900 (5) Anderson Survey of the literature and historical context of Spain's theatre in the eighteenth and nineteenth centuries. Readings include fifteen plays, plus supporting documents. Audiotapes and videotapes used when available. Plays studied primarily with regard to the evolution of dramatic form and its relationship to the historical framework. Major playwrights considered include Lope de Vega, Calderon, and Realism. The Genro chico also is considered. Prerequisites: 304, 305, 306. Recommended: 350, 440.

SPAN 466 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 reaction against realism. Developments in the theatre are related to political developments, principally the creation and short duration of the Second Spanish Republic (1931-36). Playwrights studied include Benavente, Vicente Blasco Ibáñez, Unamuno, Lorca, Millet, and Jardiel Poncela. Prerequisites: 304, 305, 306. Recommended: 350.

SPAN 471 Spanish Theatre Since the Civil War (5) Anderson
Readings include works of Spain's major dramatists of the post-war period: Sastre, Bueso Balaje, Pico, Jardiel Poncione, etc., as well as appropriate critical and theoretical readings. Special attention given to social and political developments of the post-Civil War regime. Prerequisites: 304, 305, 306. Recommended: 350.

SPAN 472 Contemporary Latin American Literature (5) Anderson
Prerequisite: permission of instructor.

SPAN 473 Cervantes and His Times (5) W Soliseno
Study of Cervantes and his moment in Spanish history, with special attention to his cultural and artistic environment. Recommended: 350, 351, or 352.

SPAN 476 Cultural Background of Latin American Literature (5) Survey of ideas and art forms and their relationship 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 477 Spanish Civilizatión (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 478 Contemporary Chicano Literature (5) Saxon
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 contemporary works, are examined in attempts to trace the development of Chicano fiction in the proper historical trajectory. Recommended: 350, 351, or 352.

SPAN 479 Latin American Literature: 1810-1916 (5) W Concha
Prerequisites: any three of the following: 304, 305, 306, 312, 331, 359. Recommended: 350, 351, or 352.

SPAN 480 Latin American Literature: 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 481 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 482 Latin American Fiction: Nineteenth Century, 1810-1896 (5) Sp Concha
Prerequisites: any three of the following: 304, 305, 306, 312, 331, 359. Recommended: 350, 351, 352, 470.

SPAN 483 Contemporary Latin American Literature (5) Sp Concha
Prerequisites: any three of the following: 304, 305, 306, 312, 331, 359. Recommended: 350, 351, 352.

SPAN 484 Latin American Fiction: Twentieth Century (5) Sp Concha
Prerequisites: any three of the following: 304, 305, 306, 350, 351, 352, or permission of instructor.
COLLEGE OF ARTS AND SCIENCES

SPAN 475 Latin American Poetry: Colonial 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 following—304, 305, 306, 500, 351, 352—or permission of instructor.

SPAN 476 Contemporary Latin American Poetry (5) Concha

Evolution of Latin American poetry, from post-Modernism and Vanguardism to the most recent poetic expression: Vicente Huidobro, Pablo Neruda, Cesar Vallejo, 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, Mario Vargas Llosa, Reyes, etc. Prerequisites: three of the following—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 complemented with monographic considerations. Plays studied include: Sanchez, Cuzzani, Nino, and other major 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 problem in Spanish literature. Prerequisites: 304, 305, 306.

SPAN 495 Study in Spain (12) Sp 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) AWSp

Takes up special needs. Prerequisite: permission of the instructor and the undergraduate or graduate program adviser.

Courses for Graduates Only

SPAN 105 Elementary (5)

Prepares graduate students to pass the reading examination required for advanced degrees. Credit is granted only to students who have received no previous credit in Spanish. Students receiving credit in 105 may not later register for credit in 101. Credits in 105 may not be applied toward an advanced degree. Prerequisite: graduate 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 105. 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

Courses in the phonological and grammatical analysis of modern Spanish. Prerequisite: 400.

SPAN 501 Graduate Study of Hispanic Literature (3)

Close study of literary texts exemplifying a variety of practical critical methods.

SPAN 531, 532 The Renaissance in Spain (5,5) Shipley

Literary creation and the cultural, social, historical context of the period from the fall of Constantinople 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

Salinas

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)

Premore

SPAN 573 Twentieth-Century Spanish-American Poetry (5, max. 10)

Concha

SPAN 575 Literary Criticism (5)

Penelas

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 (*) AWSp

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 supporting studies for students majoring in other departments. Courses in English translation are not applicable toward undergraduate or graduate major programs in the Department of Romance Languages and Literature. Majors 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 literature to illustrate major concerns of a particular period as expressed in these two media. Prerequisite: background 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 Present 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 Renaissance 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

ITALIAN

ITAL 318 Italian Literature in English (5)

ITAL 319 The Italian Short Story in English (5)

J. Leiner

The short story from the Novellino and Boccaccio to modern masters of the form. The translations are studied both as examples of narrative technique and as reflections of particular moments in Italian cultural history. Prerequisite: 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 Decamerone in English (5)

Friedrich

An integral reading of the Decamerone, with some consideration of its place in world literature and as an expression of the culture of its time. Prerequisite: upper-division 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
Special emphasis on expanding the speaking, reading, and writing skills obtained in 101-102, 103. Fictional texts, of varying degrees of difficulty, chosen from different genres and periods in Danish literary history. Prerequisites: 101-102, 103 for 300; 301 for 302.

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 literature from the beginnings to the present.

DAN 490 · Supervised Reading (*, max. 10) A, W, Sp
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) A, W, Sp
Fundamentals of written and oral Finnish. Offered by Independent Study Through Correspondence.

ICELANDIC

ICEL 101, 102, 103 · Elementary Modern Icelandic (3,3,3) A, W, Sp
Fundamentals of oral and written modern Icelandic. (Offered upon demand.)

NORWEGIAN

NOR 101-102, 103 · Elementary Norwegian (5-5,5) A, W, Sp
Fundamentals of oral and written Norwegian.

NOR 220 · The Norwegian Short Story (3) A Sehmsdorf, Sjdvik
Selected stories by twentieth-century Norwegian writers. Prerequisite: 103 or equivalent.

NOR 221 · Ibzen (3) W Sehmsdorf, Sjdvik
Study of two plays by Ibzen. Prerequisite: 220 or equivalent.

NOR 222 · Hamsun (3) Sp Sehmsdorf, Sjdvik
Study of two novels by Hamsun. Prerequisite: 221 or equivalent.

NOR 223, 224, 225 · Norwegian Conversation and Composition (2,2,2) A, W, Sp
Leiren, Sehmsdorf, Sjdvik
Prerequisites: 103 for 223; 222 for 224; 224 for 225.

NOR 300 · The Norwegian Contemporary Novel (3) A Sehmsdorf, Sjdvik
Prerequisite: 222 or equivalent.

NOR 301 · Norwegian Lyric Poetry (3) W Sehmsdorf, Sjdvik
Prerequisite: 222 or equivalent.

NOR 302 · Drama After Ibzen (3) Sp Sehmsdorf, Sjdvik
Prerequisite: 222 or equivalent.

NOR 303, 304, 305 · Advanced Norwegian Conversation and Composition (2, max. 4; 2, max. 4; 2, max. 4) A, W, Sp
Leiren, Sehmsdorf, Sjdvik
Prerequisite: 225 or equivalent.

NOR 350 · The Norwegian Short Story (3) Sehmsdorf, Sjdvik
General study of the Norwegian short story. Prerequisite: 220 or permission of adviser.

NOR 351 · Norwegian Romanticism (3) Sehmsdorf, Sjdvik
Historical study of Norway's cultural and, specifically, literary renewal from 1814 to approximately 1865. Prerequisite: 220 or permission of adviser.

NOR 352 · New Norwegian Writers (3) Sehmsdorf, Sjdvik
Study of fiction and poetry in Nynorsk by Dunn, Veesa, Garborg, and others. Prerequisites: two Norwegian courses on the 300 level and permission of adviser.

NOR 450 · History of Norwegian Literature (3) Sp Sehmsdorf, Sjdvik
A one-volume history serves as text. Representative literary works from the earliest times to the present supplement the literary historical account and show the evolution of the thought and form of the various genres. Prerequisite: 222 or equivalent.

NOR 490 · Supervised Reading (*, max. 10) A, W, Sp
Leiren, Sehmsdorf, Sjdvik
Students with an adequate reading knowledge of Norwegian pursue in this course a program of study in a selected area of Norwegian language, literature, or related fields. Conferences with the instructor; reports. Prerequisite: 302 or permission of instructor.

SWEDISH

SWED 101-102, 103 · Elementary Swedish (5-5,5) A, W, Sp
Fundamentals of oral and written Swedish.

SWED 220 · Modern Swedish Poetry (3) A W 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) A Sp Warme
Selected works of Per 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
Bontebrake, Warme
Prerequisites: 103 for 223; 222 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 Vemneg, Erik Lindgren, Werner Aspenstrum, 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. Prerequisites: 301 or equivalent.

SWED 303, 304, 305 · Advanced Swedish Conversations and Composition (2, max. 4; 2, max. 4; 2, max. 4) A, W, Sp
Bontebrake, Warme
Third-year conversation and composition, based on readings in Swedish newspapers and journals. Prerequisite: 225 or equivalent.

SWED 350 · Selected Swedish Prose and Fiction (3) A Stene, 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 Stene, Warme
Selected works by S. Lagerl6f, Hj. Soderberg, Hj. Bergman, and others. Reading in the original. Prerequisite: 350.

SWED 352 · Strandberg 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 literary 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) A, W, Sp
Bontebrake, 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. Conferences with the instructor; reports. Prerequisite: 302 or permission of instructor.

SCANDINAVIAN COURSES IN ENGLISH

SCAND 100 · Introduction to Scandinavian Culture (2 or 5) AWSp Bontebrake, Conroy, Leiren
Broad survey of the Scandinavian experience from the Viking age to the present day; the background for contemporary Scandinavian democracy, with major emphasis on the cultural, political, and religious development of the Scandinavian countries. 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) Vesaas, Warme
Study of major Scandinavian films and film directors from the 1920s to present. Courses may be taken consecutively or independently.

SCAND 309 · The Icelandic Saga in Translation (2 or 5) Sp Conroy
Icelandic family sagas in the context of thirteenth-century society. 2½ credits available Summer Quarter only.

SCAND 310 · The Scandinavian Emigrant Novel (3 or 5) Leiren, Sp, Sjdvik, 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 5) WS Rossel, Sjdvik, Warme
Representative novels and short stories of Jacobsen, Hamsun, Dinesen, Undset, and Lagerkvist. 2½ credits available Summer Quarter only.

SCAND 330 · Scandinavian Mythology (2½ 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. 2½ credits available Summer Quarter only.
SCAND 331 The Hero in Scandinavian Tradition (3) W
Schmidorf
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 Edsars and the Völfing cycle and its derivatives. For comparative purposes, 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 advisor.

SCAND 332 The Scandinavian Folktales (3) A
Schmidorf
Study of the Scandinavian folktales as oral literature and as expressions 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. Offered jointly with HSTEU 370.

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 Year 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 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)
Rosset
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 syntactic structure 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, Norwegian, Icelandic, and Swedish. Prerequisite: two years of a Scandinavian language or permission of instructor.

SCAND 480 Ibsen and His Major Plays in English (2 or 3) AS
Syvret, Steene
2h credits available Summer Quarter only.

SCAND 481 Strindberg and His Major Plays in English (2 or 3) WS
Steene
2h 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, non-majors. 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) A
Bonebrake, Conroy, Leiren, Rosset, Schmidorf, Sjoholm, Steene, Warme
Special topics in Scandinavian art, literature, culture, and history. Course offerings are based on instructor's specialty and student demand.

Courses for Graduates Only

SCAND 500, 501, 502 Old Icelandic (3,3,3) A,W,Sp
Conroy

SCAND 503 Scandinavian Literature: Methodology (3)
Bonebrake, Conroy
Bibliographical resources for Scandinavian literature; concrete 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 plays in the original. Prerequisite: baccalaureate degree in Scandinavian or equivalent.

SCAND 508 The Nineteenth-Century Scandinavian Novel (3) A
Rosset, Warme

SCAND 509 The Twentieth-Century Scandinavian Novel (3) W
Rosset, 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 Greig, Geoy, Munck, and Kjeld Abol.

SCAND 520 Modern Scandinavian Poetry (3)
Rosset, Warme
Seminar on the poetry from 1880 to 1930.

SCAND 521 Recent Scandinavian Poetry: Novel (3) Sp
Rosset, Steene, Warme
Seminar on recent and contemporary poetry from 1930 to the present.

SCAND 522 Scandinavian Romanticism (3)
Rosset, Schmidorf
Backgrounds: German idealism; organism concept of history and aesthetics; the poet as visionary genius; revolutionary tendencies and political conservatism; folklore and mythology; Genres: lyrical poetry, national epic, the 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 Coventry and Nils Bohrgren's Gertrud; Alf Sjoberg's version of Strindberg's Miss Julie. Recommended: 260 or 261.

SCAND 524 Scandinavian Emigration: History and Literature (3,5) A,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 Scandinavian Folklore (3,3) Sp
Conroy, Rossel
The study of the main genres in the vernacular, with primary emphasis on the ballads.

SCAND 541 Scandinavian Mythology (3) Sp
Schmidorf
Seminar on the historical development and special problems in Scandinavian mythology.

SCAND 542 Scandinavian Folklore I: Folk Beliefs (3) A
Schmidorf
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 Folklore II: Folk Literature (3) W
Schmidorf
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) A
Bonebrake, Conroy, Rosset, Schmidorf, Warme

SCAND 600 Independent Study or Research (*) A

SCAND 700 Master's Thesis (*) A

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 grammar in terms of the modern spoken language. Writing conventions of literary Bulgarian. 403: reading of modern texts to increase student's command of grammar and 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 selected 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 providing 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 twentieth centuries. The courses also reinforce and extend the student's basic knowledge of Czech grammar and vocabulary through daily discussions in the language. Prerequisites: 403 for 404; 404 for 405; 405 for 406 or permission of instructor.

POLISH

POLISH 401, 402, 403 Elementary Polish (5,5,5) A,Sp
401, 402: acquaints the student with the principal morphological 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.
POLISH 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. Prerequisites: 403 for 404; 404 for 405; 405 for 406, or permission of instructor.

ROMANIAN
ROMN 401, 402, 403 Elementary Romanian (5,5,5) A,W,Sp
Continuation of 401, 402, 403 to provide an introduction to Romanian literature, history, and culture through selected readings. Reinforces and extends basic knowledge of Romanian grammar and vocabulary through daily discussions in the language. 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 to Romanian literature, history, and culture through selected readings. Reinforces and extends basic knowledge of Romanian grammar and vocabulary through daily discussions in the language. Offered jointly with RMN 401, 402, 403.

RUSSIAN
RUS 101, 102 First-Year Russian (5,5) A,W Intro to Russian. Emphasis on oral communication with introduced vocabulary and grammar. Conversations and some reading. Conducted entirely in Russian except for periodic lectures on pronunciation, grammar, and writing (see also 110). For continuation, see 103.

RUS 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.

RUS 110 Accelerated Russian (10) A Equivalent to 101, 102. Meets two hours daily. Recommended for students who wish to study Russian at a more intensive pace and to progress rapidly.

RUS 115 Accelerated Russian (10) W Continuation of 110. Equivalent to 103 and 201. Meets two hours daily. Prerequisite: 102, 110, or permission of instructor.

RUS 150 Intensive First-Year Russian (15) S Covers prerequities: 403 for 404, 404 for 405; 405 for 406, or permission of instructor.

RUS 201 Second-Year Russian (5) A Sequel to 103. Complete review of Russian grammar with continuing oral practice and elementary composition. For continuation, see 202, 203. Prerequisite: 150 or 103, or permission of instructor.

RUS 202, 203 Second-Year Russian (5,5) W,Sp Continuation of 201. Reading and composition with careful attention to word derivation and vocabulary development. Prerequisite: 201 or 115, or permission of instructor.

RUS 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.

RUS 221, 222, 223 Russian for Reading and Research (5,5,5) W,Sp
Provides students who have no previous knowledge of Russian with all the essentials of grammar that they need to read, compose, and review, giving one quarter students general readings on the basis of their particular interests. Aural-oral and writing skills, while not emphasized, are given some attention.

RUS 250 Intensive Second-Year Russian (15) S Continuation of 150. For Superior Quads students who wish to complete 15 credits of Russian. Prerequisite: 150, 103, or permission of instructor.

RUS 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 supplementation of structural grammatical concepts. One hour of grammar per week conducted in Russian and English. Prerequisite: 203, 210 or 250 or permission of instructor.

RUS 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 approval, individuals may substitute readings in their field for readings assigned. For students with varied backgrounds working at different levels of competence. Need not be taken prior to 202. Prerequisite: 203, 210, 223, 250, or permission of instructor.

RUS 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.

RUS 351 Intermediate Russian Phonetics (3) A Systematic analysis and exploration of the Russian sound system, including phonetic transcription. Conducted partly in Russian. Prerequisite: 203, 210, or 250.

RUS 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. Prerequisite: 203, 210, or 250.

RUS 381 Phonetics in Lenigrad (2-5) A,W,Sp
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 correcting individual pronunciation errors. (2 credits are offered for the six-week Summer Quarter Program. 5 credits for the fourteen-week semester program.) Prerequisite: 203 for Summer Quarter, 303 for semester.

RUS 382 Advanced Syntax and Composition in Lenigrad (2-8) A,W,Sp
Class lectures on Russian syntactic structures are supplemented by active oral drilling and written exercises and compositions. (2 credits are offered for the six-week Summer Quarter Program. 5 credits for the fourteen-week semester program.) Prerequisite: 203 for Summer Quarter, 303 for semester.

RUS 383 Conversation in Lenigrad (4-8) A,W,Sp
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, including excursions, lectures, and other parts of both the academic and cultural programs in Lenigrad. (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.

RUS 384 - Soviet Culture In Lenigrad (4-6) A,W,Sp
Monograph lectures on major Soviet literary figures: two lectures per week on the life and writings of the week's author. Followed by a weekly hour devoted to the analysis of texts for characteristic stylistic features and thematic concerns. Summer program has only lectures, no seminars. (5 credits for the fourteen-week program.) Prerequisite: 203 for Summer Quarter, 303 for semester.

RUS 401, 402, 403 Advanced Russian (5,5,5) A,W,Sp
Class conversation and composition based on readings. Prerequisites: 303 for 401; 401 for 402; 402 for 403.

RUS 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.

RUS 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 speech, examination of common roots and productive derivational elements in Russian words, elementary principles of syntax. Prerequisites: 401, 402; 451 for 452; or permission of instructor.

RUS 461, 463 Advanced Russian Reading Skills (5,5)
Advanced course for undergraduate or graduate students concentrating on reading and discussion in Russian of a variety of literary texts with the particular aim of expanding reading skills. Class discussions and frequent written essays further develop writing skills and offer vocabulary needed for discussing literary texts. A detailed 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, including journalism. Both courses are appropriate for students of Russian language, literature, or area studies.

RUS 499 Undergraduate Research (3-5, max. 15) A,W,Sp
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 literature Serbo-Croatian. 403: designed to increase the student's vocabulary and enhance his knowledge of grammar through the reading of short stories in the modern 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 languages from the earliest writings to the present, with an emphasis on the development of writing systems, external attempts at reform, and the development of vocabulary.

SLAV 499 Undergraduate Research (3-5, max. 15) A,W,Sp
For Slavic majors only.

UKRAINIAN
UKR 401, 402, 403 Elementary Ukrainian (5,5,5) S,W
Introduction to spoken and written Ukrainian.

LITERATURE COURSES IN ENGLISH
Courses in this section usually do not require prerequisites. The 300-level courses generally deal with particular themes running through a body of literature or involve a comprehensive study of cultural history. The 400-level courses deal with major individual authors or periods in Russian literature. 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. To be offered in the context of earlier Czech and/or general European literary trends. Emphasis on prose and drama of major writers, including Hrabal, Cepk, Vansar, Skvorccky, Kundera, Vavilik, and Havl.

POLISH 420 Modern Polish Literature in English (5) W
Major trends in modern Polish literature through an examination 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 theo-

RUS 224 Russian Folk Literature in English (3) W
Introduction to representative works of various genres of Russian oral literature, including the epic, fairy tale, his-
torical and lyrical songs and the spiritual verses.

RUS 321, Russian Literature and Culture to 1800 (5) A

RUS 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, philosophy, and popular culture are treated as well. Periods covered include Monumental Simplicity, Romanticism, Renaissance, Reformation, Baroque, Sentimentalism, and Classicism.

RUS 324 Growing Up Russian: Childhood and Adolescence in Russian Fiction (3) 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, including Tolstoy, Akhmatova, Turgenev, Dostoevsky, Gorky, Bely. For nonmajors only.

RUS 324 Holy Fools and Madmen: The Theme of Madness in Russian Literature (3) 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.

RUS 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-
y, and others.

RUS 423 Russian Film and Fiction (5) Sp

RUS 426 Pushkin, Gogol, Turgenev in English (5) A
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, A Student of Literature by Turgenev, and works of one or two of their contemporaries.

RUS 427 Tolstoy in English (5) W Kram
Reading and discussion of major works by Leo Tolstoy, War and Peace and Anna Karenina particularly.

RUS 428 Dostoevsky in English (5) Sp
Reading and discussion of major works of Dostoevsky. The Possessed and The Brothers Karamazov are among the selections.

RUS 429 Chekhov in English (5) A
Kram
Introduction to the writings of Chekhov, including both short stories and plays, as well as works of one or two of his contemporaries.

RUS 430 Solzhenitsyn: Artist and Social Critic (5) W
Introduction to fiction and nonfiction of Solzhenitsyn; his development, not only as literary artist, but also as social critic and political thinker.

RUS 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 Kaptanov
Examination of the chief works of Yugoslav literature, in English translation. Particular attention is paid to Yugo-
lav modifications of Renaissance genres as the comedy and pastoral dramas; Yugoslav folk poetry and its impact on Romantic movement in Europe; Yugoslav participation in general European movements of nineteenth and twentith 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 on various aspects of Slavic literatures including: Russian, Polish, Czech, Serbian, Croatian, and Bulgar-
ian. Themes vary.

Courses for Graduates Only

RUSS 501 Russian Language for Graduate Students (2, max. 10) A
HSP
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 understand-
ing and maximum retention of vocabulary, and on ability to discuss in Russian the more theoretical and abstract kinds of material. Prerequisites: 403 or equiva-

RUSS 502 Russian Translation (3) A
HSP
Introduction 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 accuracy 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 select-
ed 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)
Representative works, including poetry, prose, and li-
terary criticism, by Alexander Pushkin, his contemporaries, and his immediate predecessors. Illustrates the crucial lit-

RUSS 524 Russian Literature, 1840-90 (5)

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 writings.

RUSS 527 Seminar in Nineteenth-Century Russian Poetry (5)
Selected topics in nineteenth-century Russian poetry to be treated in depth and with some critical sophisti-
cation. For Ph.D. and advanced M.A. students.

RUSS 538 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 Rus-
sian the literary works involved and become familiar with the social, historical, and philosophical backgrounds that inspire them.

RUSS 539 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 dimen-
sions. 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 Plinsky to contemporary Soviet and Russian emigre 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 philo-

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 as well as discussion and evalu-

RUSS 551 Advanced Russian Syntax (3)
Presentation and structural analysis of various simple and complex sentence types in the Russian literary lan-
guage and an evaluation of ways in which these structures may be economically described in formal grammars. Prerequi-
site: 550.

RUSS 554 History of the Russian Literary Language (5)
Russian literary language from the eleventh through the twentieth centuries, with special attention to syntax and lexi-
on and to the development of notions of literary styles. Offered in Russian. Four years of Russian lan-
guage or equivalent recommended.

RUSS 555 History of the Russian Language (4)
Brief review of the development of Russian from Indo-

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 beginning 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 byline, zaklady, historical and lyrical songs and the spiritual stikhii.

RUSS 578 Studies in Kievan 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 bibliographic materials, major critical problems, terms, schools, and genres.

RUSS 600 Independent Study or Research (*)
AWSp

SLAVIC
SLAV 520 Slavic Literary Theory (3)
Main works of the Russian, Czechoslavonic, and Polish theorists of the twentieth century, with special emphasis on Formalistik, Structuralistik, and Semiotičeskis.

SLAV 550 Historical Survey of Common Slavik (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 Byelorussian 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 Sorbian 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 languages. Prerequisite: 550.

SLAV 555 Old Church Slavonic (4)
Rise and development of earliest Slavic literary language and a descriptive study of its development, 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 577 Seminar on Slavic Linguistics (3)
Seminar designed to permit the investigation and discussion of special topics in Slavic linguistics. May be repeated for credit.

SLAVIC LANGUAGES AND LITERATURE
SLAVC 600 Independent Study or Research (*)
AWSp

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) AWSp

Individual research, under supervision, on some aspects of society and justice. Prerequisite: major standing.

SO JU 320- Field Experience in Society and Justice (2-3) AWSp

Stotland

Participation in some public or private agency relevant to the system of justice. Prerequisite: major standing.

SO JU 321-332 Case Study in the System of Justice (2-3) AWSp

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) AWSp

Stotland

Seminar in various aspects of the administration of justice. Prerequisite: major standing.

SO JU 485 Seminar in Institutionalized Crime (3, 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, processing, and reporting of financial information with emphasis on accounting systems, fund accounting, auditing, and criminal investigation of accounting records. Recommended: ACCT 210 and junior or senior standing.

SO JU 418 Basic Investigative Methods to Institutionalized Crime (3) W Ethier, Rucker

Investigative research by persons involved in law enforcement; consumer protection; regulatory, private security, and investigative work; journalism; paralegal work; public interest research. Existence, nature, and location of information; problems of access and dissemination; practical techniques for gathering, documenting, recording, 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 individual offender acting alone. Examined from the perspectives of: the degree of formal or informal organization present and the permanency of such; bases for development 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 emphasis on due process in adult and juvenile courts; case analysis 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 concerning the criminal justice system in our society.

SO JU 470 Evaluation Research in Criminal Justice (3) A Newcomb

Acquaints students with research techniques applicable to the criminal justice system. Topics include an examination of available data sources; measures and measurement techniques; the planning, design, and implementation of evaluation methodologies; and the use of research findings. Emphasis on consideration of research ethics. Prerequisite: major standing or permission of department.

SO JU 499 Readings in Society and Justice (1-5, max. 10) AWSp

Individual readings in society and justice. Prerequisite: major standing.

SOCILOGY

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 processes, 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. Prerequisite: 110.

SOC 240 Introduction to Social Psychology (5) AWSp
Blumstein, Hill, Schmeltz

Socialization of the individual; social processes; and interactions 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)
Rainbird, 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.
SOC 301 War (5) Sp
Chriot
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. Course work includes a term paper and a major paper. Offered jointly with STH 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 presented. Although relative emphasis may vary across sections, major problems in research design such as hypothesis testing, inferential statistics, and subject populations are examined. 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

SOC 340 Symbolic Interaction (5) W
Blumer
Role of language and culture in changing the human organism into a socialized human being; interpersonal process as they are shaped by the symbolic environment. Prerequisite: introductory course in social psychology.

SOC 345 Collective Behavior (5)
Larson
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 advisor.

SOC 346 Group Processes (5)
Cock, Schutt
Systematic analysis of social processes in small groups, including conformity, deviance, cooperation, competition, coalition formation, status and role differentiation, inequity, communication, and authority and power. A variety of methods of research are considered: field studies, laboratory experiments, and the simulation of social processes. Prerequisite: 240 or equivalent.

SOC 347 Socialization (5)
Hill
How social systems control the behavior of their constituent units. Social control, through the socialization process, sanctions, power, allocation of status and rewards. 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; desegregation and reorganization. Prerequisite: 110.

SOC 354 The Comparative Study of Societies (3)
van den Bergh
Entire societies at various levels of technological complexity are compared to explore problems of their development and structural organization. Both historical and contemporary Western and non-Western societies are examined. Offered jointly with ANTH 354. Prerequisite: 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 sex 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, religion, 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 organizing societies: causes of bureaucracy, innovations and work groups; ideologies; authority and the division of labor; social change in bureaucracies; the "faceless" bureaucrat in relationship to client needs; comparative organizations; complex organizations as settings for research. Prerequisite: 110.

SOC 367 Community Power and Urban Life (5)
Background on forces influencing the growth of contemporary cities. Major focus on who controls the city and particularly on the policy outcomes of this control as they influence the 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)
Schrags, Weis
Survey of legal definitions, types of criminal behavior, trends and patterns, recidivism, characteristics of offenders, environmental influences, diagnostic methods, predictions of behavioral and criminal forms, innovation, social policy. Prerequisite: 110. Recommended: 271.

SOC 372 Introduction to Criminal Justice (5)
Coster, Schrag, Weis
Examines roles of police, courts, and corrections in criminal justice. Traces cases from reporting of offenses through investigation, detention, charging, prosecution and defense, adjudication, sentencing, and punitive sanctions or correctional treatment. Treatment of community factors and diversity in the justice system. Prerequisite: 110. Recommended: 271.

SOC 373 Social Factors in White Collar Crime (5)
W
Schrags, Weis
Concept and etiology of white collar crime, its forms, roots, costs, victims, and innovative developments. Prerequisite: for theoretical explorations and social control. Prerequisite: 110, or POL S 101, 201, or permission of instructor or advisor.

SOC 410 History of Sociological Thought (5)
Campbell, Roth
Contributions 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 relationship 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 development of the concept of order in sociological thought; conflict theories; the development of action theory in sociology; German sociology; Marx, Weber, and Simmel.

SOC 414 Theory Construction (5)
Coster, Schrag
Logical structure of sociological theories; the role of concepts of order in sociological thought; model building; the development of action theory in sociology. Prerequisite: 20 credits in social sciences.
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 instruction 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 woman in history, (2) assumptions made about how social change occurs, (3) women's current status and tactics used to achieve change, (4) comparative studies of the outcomes (successes/failures) of various movement tactics used, examining specific situations 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 laws in American life; frames of reference for analysis of social change; forces causing social change. Prerequisite: 13 credits in social sciences.

SOC 452 Health and Social Behavior (5)
Sharp
Theoretical and methodological aspects of health, disease, and illness as deviant behavior in relation to social (organizational and occupational), ecological, demographic, 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 family and marriage. Prerequisites: 223 and 352.

SOC 454 Social Change in Pre-Industrial Societies (5)
Chiroi, Hechter
Theories and evidence concerning social change in pre-industrial societies. Topics include: the Neolithic Revolution, 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 contemporary developing societies.

SOC 455 Social Change in Industrial Societies (5)
Chiroi, 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: development of class consciousness, national development, and imperialism. 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, authoritarianism, 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 social structure: in particular, the political, economic, and social impact of religious beliefs and organizations, as well as the social determination of these beliefs and organizations: the rise of secularism, the rationalization of modern life, and the emergence of political quasi-religions.

SOC 458 Institutional Forms and Processes (5)
Process of institutionalization and the general nature of institutions; relationship of institution to persons; institutions and social control; social change and institutional disorganization. Prerequisite: 110.

SOC 460 Social Differentiation (5)
Barth, Roberts
Analysis of societal organization based on sex, age, residence, occupation, community, class, caste, and race. Prerequisite: 110.

SOC 462 Comparative Race and Ethnic Relations (3)
van den Bergh
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. Prerequisites: 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, armies, and similar formally institutional organizations. The major focus is on empirical research, with some attention to methodological problems in studying such organizations. Prerequisite: 15 credits in sociology.

SOC 466 Industrial Sociology (5)
Wager
Changing focus of field; cultural variation, work, and the worker; technology, society, and the evolution of industrial forms; types and forms of industrial organizations; industrial organizations as social and technical systems; aspects of control, process, and change; the individual in social and technical systems. Prerequisite: 110.

SOC 468 Sociology of Occupations and Professions (3)
Frameworks for study of occupations and professions; occupational structure and mobility in American society and relation to adult socialization and career development; occupational and professional associations and society. Prerequisites: 240 and 15 credits in social sciences.

SOC 469 Balkan Societies (3)
Chiroi
Examination of the roots of Balkan social problems (economic, political, social, etc.); the problem of the post-1945 attempts to achieve the economic, political, and social goals of the pre-1945 communist attempt at solution. Partial emphasis placed more on Bulgaria and Albania. Prerequisite: at least one introductory social science course.

SOC 472 Juvenile Delinquency (5)
Conner, Weis
Factors in delinquency, juvenile courts. Programs of treatment and prevention. Prerequisite: 371 or equivalent.

SOC 473 Corrections (5)
Schrag, Weis
Analyzing research on diversionary methods and treatment of convicts. Emphasis on program evaluation. Community treatment, fines, restitution, probation; parole, halfway house, and other alternatives to incarceration; 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 contents of the course vary according to recent developments in sociology and according to the interests 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 Bergh
Survey of the biological bases for human mating and reproduction, and an examination of the range of cross-cultural variability in human systems of kinship and marriage: comparisons 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 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 psychological and sociological theories of sexual identity and lifestyle, 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 dysfunction, etc. Prerequisites: 457, 458, 459, 463; 15 credits with PSYC 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 emphasis 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) AW,Sp
Open only to qualified undergraduate students by permission of instructor.

Courses for Graduates Only
SOC 510 Seminar on Sociological Theory (3)
Roth
Macroecological theories; functionalism and neo-evolutionism; 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 begin instilling the analytic skills required to advance knowledge in the area.

SOC 514 Current Theories in Social Psychology (3)
Blumstein, Schmit
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 research on complex organizations.

SOC 517 Deviance and Social Control (3)
Schrag, Weis
Survey of current research on deviant behavior and social control; definitions and forms of deviant behavior, causal analysis, and legal or other methods of social control.
Theoretical, and

SOL S33 Research Methods in Demography (3)

Measures of population composition, fertility, and mortality. Life table analysis, standardization procedures, population projections, and estimates. Prerequisite: 331.

SOL S39 Selected Topics in Demography and Ecology (3, max. 9)

Pulim Specialized problems in demography or ecology are covered; for example, migration, fertility, mortality, language, race and ethnic relations, metropolitan community. See quarterly announcement for specific problem to be covered.

SOL S42 Selected Topics in Group Processes (3)

Cook Theories, methodology, and studies in the area of small-group research. Prerequisite: permission of instructor for nonmajors.

SOL S43 Communications Seminar (3)

Larson Sociological research in mass communication. Emphasis on the role of mass media in providing norms and networks in the flow of information and influence from the mass media. Prerequisite: 443 or equivalent.

SOL S44 Seminar on Social Power (3)

Emerson Examination of basic principles concerning power, influence, and authority in small groups, organizations, and communities. Prerequisites: 240, 415, and 460.

SOL S45 Methods of Experimental Analysis in Social Research (3)

Schmitt Application of the method of experimental analysis to problems in sociology and social psychology.

SOL S46 Seminar on Symbolic Interaction (3)

Blumstein Examination of basic concepts concerning power, influence, and authority in small groups, organizations, and communities. Prerequisite: 240 or equivalent.

SOL S47 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 theoretical approaches to attraction and research ranging from initial attraction among strangers to the development of ongoing social relationships. Prerequisite: previous course in social psychology.

SOL S50, 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.

SOL S55 Methods in Maacro, Comparative, and Historical Sociology (3)

Chrot

SOL S56 Sociology of Health and Illness: An Organizational and Managerial Perspective (3)

Rones 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 implications for decision making from the sociological perspective. Offered jointly with HSERV 554. Prerequisite: HSERV 511 or undergraduate major in sociology, or permission of instructor.

SOL S56 Seminar in Comparative Race Relations (3)

van der Bergh Cross-cultural approach to race and ethnic relations, including case studies from Africa and Latin America. Prerequisite: graduate standing in social sciences.

SOL S56, 567 Seminar in Complex Organizations (3, 3)

Cook, Shortell Development and testing of theories related to illness behavior, health occupations and professions, and the organization of health-care delivery systems. 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 sciences doctoral opportunities program or graduate status in sociology, or permission of instructor.

SOL S56, 567 Seminar in Complex Organizations (3, 3)

Cross, Wager Research training in industrial sociology. Readings and field projects. Prerequisite: 465 or equivalent.

SOL S58 Women and Technology (3)

Interdisciplinary seminar for those interested in an investigation of the interaction between technology and women. Topics include comparing technological rationality with feminist modes of thought (focusing on values that are/should 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 labor force; technologies that have a particular impact on women (such as obstetric and gynecologic care); and investigating how the needs of women can be met through technological means. Offered jointly with SMT 559.

SOL S57 Seminar on Methods of Criminological Research (3)

Schrager Provides training in the technical analysis of published research in criminology; designs and processes studies in parole prediction, prediction of prison adjustment, and prediction of treatment effect.

SOL S58, 583 Special Topics in Sociology (3, 3) A, W, SP

Examination of current substantive topics in sociology. Contingent varies according to recent developments in sociology and the interests of the instructor. May be repeated for credit with permission of instructor.

SOL S58 Sociological Aspects of Human Sexuality (3)

Blumstein, Schwartz Research-oriented seminar taking a sociological approach to issues of human sexuality. Reading assignments aimed at achieving a broad mastery of the sociological writings on the subject. Students develop individual research projects based on readings and seminar discussions of sociological 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.

SOL S60 Independent Study or Research (3)

AWSP

SOL S65 Seminar in Educational Psychology (3)

AWSP

SOL S65 Seminar in Educational Psychology (3)

AWSP

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

The nature 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) WSWS

Survey of man's most clearly human endeavor: his capacity for speech production and perception. Speech and hearing mechanisms considered from the point of view of their development, structure, and function, with special emphasis on current and significant problems and issues, such as the nature of speech learning, and the significance of diversity in patterns of speech production and perception. Not open to speech and hearing sciences majors.

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 psychological characteristics. Study of standard and nonstandard American speech patterns is supplemented by readings in phonetics, phonology, sociolinguistics, and psychology.
Speech and Hearing Sciences

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) W
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 301 General Phonetics (4) AWSpS
Tiffany
Applied phonetic analysis and transcription. Applications to the problems of speech improvement, speech disorders, and standard and nonstandard English.

SPHSC 302 Applied Analysis of Language Behavior (3) AW
Application of linguistic analysis techniques to the language behavior of speech-disordered persons.

SPHSC 307 Speech and Language Development (3) W
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
Palmer, Wilson
Introduction to acoustic properties of the auditory system and function of the hearing mechanism.

SPHSC 311 Speech Science: Speech Production (5) W
SpS
Cooke, Minifie, Reich
Concentrated study of the physiological, acoustical, and perceptual aspects of speech production. Examples and laboratory work directed toward students with interests in speech pathology and audiology. For majors only. Prerequisites: 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

SPHSC 332 Introduction to Evaluation and Interviewing (4) ASp
Glueck
Study of materials and procedures used in the evaluation of speech disorders. Prerequisites: 307 and 330.

SPHSC 350 Methods of Clinical Management (4) AWSpS
Glueck
Principles and procedures for planning effective management 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, 335, and permission of undergraduate adviser.

SPHSC 370 Basic Audiology (5) W
Introduction to theory and practice of the assessment of hearing function, including standard pure-tone audiometry, speech audiometry, and basic impedance audiometry. 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 permission of undergraduate adviser.

SPHSC 391 Practicum in Audiology (3, max. 10) W
AWSpS
Supervised practicum in audiological assessment (section A) and aural rehabilitation (section B) of children and adults. Prerequisites: 300 for section A; and 300, 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 processes. Laboratory. Prerequisite: 201 or permission of instructor.

SPHSC 402 Advanced Phonetic Analysis (3) W
Tiffany
Advanced transcriptional and descriptive analysis of abnormal 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 laboratory 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. Laboratory 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 research 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 (3) W
Prins
Intensive study of selected special problems in speech pathology and audiology. Prerequisite: permission of instructor.

SPHSC 450 Treatment of Stuttering (3) WS
Prins
Description and evaluation of therapy systems for children and adults who stutter. Two hours of weekly 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) AWSpS
Special projects in clinical practice, offered only in the school setting. Provides an opportunity for students to extend practicum experiences in this special environment; 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
Buckman
Orientation information for speech pathology and audiology students on rehabilitation principles and techniques. Lecture and clinical practice 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: 250, 300, and 311.

SPHSC 470 Survey of Audiological Assessment (3) Thompson, Yantis
General review of methods, techniques, and instruments used in the measurement of auditory function designed for majors in speech pathology, speech science, and special 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 electroencephalographic 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) Sp
Wilson
Planning and execution of identification and educational programs related to hearing-impaired infants and children of preschool and school ages. Prerequisite: 300 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) AWSpS
Palmer
Directed individual dissection and study of selected anatomic structures of the speech or hearing mechanisms. Prerequisites: 201 and permission of instructor.

SPHSC 503 Current Issues in Speech Science (3, max. 5)
Application of experimental methods to research in speech science.

SPHSC 504 Research Methods in Speech and Hearing Science (3) W
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 abnormal 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 attributes of auditory sensation. Prerequisites: 410 or permission of instructor, familiarity with intermediate mathematics (115 or equivalent). (Offered alternate years.)

SPHSC 514 Speech Physiology (4) A
Cooker
Study of the physiological parameters of speech production. Prerequisites: 310, 311, or permission of instructor.

SPHSC 515 Speech Acoustics (4) W
Minifie
Study of the acoustical correlates of the distinctive parameters of speech. Prerequisites: 310, 311, or permission 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)
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 laboratory 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 craniofacial malformations. Through grounding in vocal tract anatomy and physiology as well as speech acoustics. Recommended: 201 or permission of instructor.

SPHSC 531 Neurogenic Disorders of Speech and Language (3) AW
Flowers
Includes aphasia, apraxia of speech, and dysarthria. Prerequisite: 401 or permission of instructor.

SPHSC 532 Evaluation and Treatment of Neurogenic Speech and Language Disorders (3) WSpS
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) WSpS
TIU
Approaches and experience in differential diagnosis of speech and language disorders in children. Two hours of laboratory required each week. Class size limited. Prerequisites: 332 and permission of instructor.

SPHSC 551 Advanced Practicum in Speech Pathology (1-9, max. 10) WSpS
Laboratory experience. Prerequisites: 351 and permission of instructor.

SPHSC 552 Clinical Management of Stuttering (4) WSpS
Cefi, Pris
Study and application of clinical procedures for the diagnosis and treatment of persons who stutter. Theoretical 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) WSpS
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 senior's level program. Prerequisites: 150 hours of supervised practicum and permission of instructor.

SPHSC 561 Language of Normal Children (3)
Advanced study of language acquisition and use by normal children, with emphasis on behavioral, semantic, grammatical, and syntactic aspects. Tools employed in study of early language development are presented. Two hours of laboratory required each week. Class size limited. 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 interviewing techniques and professional reporting methods. Three hours of practicum each week in an interdisciplinary 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) WSpS
Laboratory experience. Prerequisites: 431, 562, and permission of instructor.

SPHSC 564 Clinical Evaluation of Language Disorders of Children (3-4, max. 10) WSpS
Laboratory experience. Prerequisites: 536, 562, and permission of instructor.

SPHSC 565 Classroom Management of Language Behaviors (1-9, max. 10) WSpS
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. Concurrent registration in 591 required. Prerequisite: 370 or equivalent.

SPHSC 572 Impedance Audiology (3) A
Wilson, Yantis
Instrumentation and approaches to evaluation of auditory function through determination of impedance characteristics, 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
Fahs
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 Audiology (2) W
Thompson, Yantis
Use of speech stimuli in predicting general communicative functioning and in making differential diagnosis of the auditory system. Prerequisite: 370. (Offered alternate years.)

SPHSC 575 Medical Background for Audiology (2)
Snyder
Diseases and injuries of the ear resulting in reduced audition. 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 conservation for the hearing 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 modification 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) WSpS
Prerequisite: forty hours of practicum.

SPHSC 596 Experimental Design In Speech and Hearing Sciences (3) Sp
Applications of basic statistical procedures to investigation of specific problems in the communication sciences. Prerequisites: 504, course in statistics, or permission of instructor. (Offered alternate years.)

SPHSC 599 Research Practicum (2, max. 12)
WSpS
Supervised laboratory experience in experimental approach to problems in speech and hearing sciences. Prerequisite: permission of instructor.

SPHSC 600 Independent Study or Research (*)
WSpS
Prerequisite: permission of instructor.

SPHSC 700 Master's Thesis (*) WSpS

SPHSC 800 Doctoral Dissertation (*) WSpS

SPEECH COMMUNICATION

Courses for Undergraduates

SPCH 102 Speech, the Individual, and Society (5) WSpS
Park
Provides a basic understanding of human speech communication. Covers three major areas: (1) the nature of human communication, including models, principles, and settings; (2) elements of verbal and nonverbal communication; and (3) appearance and functions of human communication including persuasion, interpersonal communication, argument, propaganda, free speech.

SPCH 103 Principles of Oral Communication (5) WSpS
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) WSpS
Past
Introduction to the analysis and critical study of imaginative literature through the medium of oral performance. Analysis and interpretation of verse, prose, and drama.

SPCH 203 Communication In the Classroom (5) WSpS
Stout-Spicer
Theory and practice of interpersonal communication in instructional settings. Designed to prepare prospective teachers to employ communication effectively as a medium 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) WSpS
Campbell
Beginning course in public speaking emphasizing choice and organization of material, sound reasoning, audience analysis, and delivery. Overview of history of rhetoric. Classroom speeches followed by conferences with instructor.

SPCH 222 Speech Communication In a Free Society (3) W
Bumajian
Examination of problems and arguments related to freedom of speech; early English writers on freedom of expression; background of freedom of speech in the United States; contemporary freedom of speech issues.

SPCH 225 Parliamentary Procedure (3) A
Bumajian
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 science; survey of substantive research findings. Recommended: any 100- or 200-level speech communication course.

SPCH 305 Perspectives on Language In Speech Communication (5)
Philipson, Stewart
Introduction to the study of language and meaning, and survey of several influential modern approaches, including the semantic, general-semantic, behavioral, and analytic philosophical. Relates theories of language and meaning to the study of speech communication.
SPCH 308 Humanistic Approaches to Interpersonal Communication (5)

Sweer
Exploration of several humanistic approaches to interpersonal 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 background 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. Recommended: 220.

SPCH 329 Rhetoric of Social and Political Movements (5) Sp

Bosmajian
Introduction into the rhetoric of social and political movements; 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; analysis of argumentation, 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 oral and written form. No more than 3 credits may be earned in one year, and these should normally be distributed through at least two consecutive quarters.

SPCH 341 Oral Interpretation of Children’s Literature (2H) S

Post
Study and performance of children’s literature, emphasizing oral interpretation as a method of teaching literature 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 instructor.

SPCH 368 Small Group Facilitation (3) AWSp

Nyquist
Study of methods for facilitating discussion in small groups formed for purposes of instruction. Examines theoretical principles of group communication and group thought-line development. Considers both the cognitive goals and processes and the interpersonal communication 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 349. Recommended: 102.

SPCH 369 Small-Group Facilitation Practicum (2) AWSp

Nyquist
Practicum experience in the implementation of the theoretical techniques taught in SPCH 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: concurrent registration in 368.

SPCH 373 Principles of Group Discussion (5) AWSp

Bell, Phillipsen, Scheidel
Discussion as an everyday community activity, with emphasis on the informal cooperative decision-making methods of committee, conference, and round-table groups.

SPCH 400 Theoretical Backgrounds in Speech Communication (3) Nilson

Speech viewed as a form of individual and social behavior, 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 rhetorical dimension in the progress of ideas through analysis of revolutionary documents as persuasive 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

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; debates on ratification of the federal Constitution, the slavery question, Reconstruction, woman suffrage, populism, 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; polemies of the New Deal era; internationalism 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

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, Stutro-Sippe
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, Stutro-Sippe
Study of the communication process in youth environments with a primary focus on formal and informal learning. Includes critical analysis of communication in contemporary instructional approaches 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 (3)

Examination of major theoretical 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 speech-communication behavior in common interpersonal situations. Recommended: junior standing.

SPCH 473 Problems of Discussion Leadership (3) Bell

Critical analysis of leadership in committee and conference, 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, the types of problems 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)

Examination 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) AWSp

Prerequisite: permission of instructor.

Courses for Graduates Only

SPCH 501 Introduction to Graduate Research in Speech Communication (3) A

Scheidel
Development of the Greek tradition in rhetorical theory, criticism, and pedagogy from Homer to Augustine; analysis of the contributions of major figures and works to that tradition.

SPCH 522 Studies in Medieval and Renaissance 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

Nilson
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, Delbrueck, 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) A

Application of philosophical criticism, participant observation, and ethnomethodology primarily in interpersonal and small-group communication.
SPCH 576 Research Methods in Speech Communication (5) A
Prerequisites: SPCH 202, 203. Application of behavioral research principles to problems in quantification, design, and analysis of data in speech-communication research.

SPCH 577-578 Research Problems in Speech Communication (3, max. 6) W, Sp
Application of methodology and design principles to research 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 (3, max. 6)
SPCH 593 Seminar in Rhetorical Theory (4, max. 6)
SPCH 595 Seminar in Speech Communication Education (4, max. 6) Sp

SPCH 597 Seminar in Interpersonal Communication (2, max. 6) W
Examination of experimental literature on selected topics. Subject to change from year to year; topics include conflict resolution, information processing, communication 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 methodological 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 (*) A,W,Sp
SPCH 700 Master's Theses (*) A,W,Sp

STATISTICS

Courses for Undergraduates

STAT 220 Basic Statistics (5) A,W
Structure of data sets and description and summary of these structures; statistical tests; objectives of hypothesis testing, application to data sets, and interpretation. Prerequisite: 2 years of high school algebra.

STAT 311 Elements of Statistical Method (5) A,W
Elementary concepts of probability, binomial and normal distribution; statistical concepts of hypothesis testing and estimation; application to binomial and normal distributions; chi-square tests; linear regression theory. For nonmajors only. Prerequisite: MATH 105. (Formerly MATH 281.)

STAT 321 Statistical Analysis of Variance (4) A,W
Linear analysis of variance and covariance; multiple and curvilinear regression; sampling theory; discrete distributions; experimental design and power of tests. Applications to biological problems. Use of computer programs in standard statistical problems. Offered jointly with Q SCI 382, 383. Prerequisites: MATH 124 or SCI 101 or SCI 381, or permission of instructor for 382 or 383.

STAT 394 Probability I (3) A,W
Sample spaces; basic axioms of probability; combinatorial probability; conditional probability and independence; binomial, Poisson, and normal distributions. Offered jointly with MATH 394. Prerequisite: MATH 327 or 236.

STAT 395 Probability II (3) W,Sp
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 Analysis for the Social Sciences (5) A
Survey of multivariate techniques commonly used in the social and behavioral sciences. Development of linear models for interdependence (factor and canonical analyses) and dependence (MANOVA, discriminant function, and classification) study. Illustrations of the techniques 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
Inference and estimation; hypothesis testing; multivariate and correlation. Prerequisite: 395 or 511 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, systematic sampling, cluster sampling, sample size determination, applications in fisheries and forestry. Other topics include sampling plans, estimation, finite population sampling distributions, estimation of parameters and statistical treatment of data. Offered jointly with Q SCI 480. Prerequisites: 382, 383, or permission of instructor.

STAT 484 Distribution-Free Inference (3) Sp
Distribution-free methods in statistical tests; 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 effects. Prerequisite: 473 or 512. (Formerly MATH 485.)

STAT 486 Experimental Design (3) Sp
Topics in analysis of variance and experimental design; choice of design comparison of efficiency, power, sample size, use of complex designs for nonparametric problems; sampling 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
Random walks, Markov chains, branching processes, Poisson processes, birth and death processes, 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 functions; characteristic functions; central limit theorem. No more than 6 credits from among 394, 395, and 511 can be counted toward any degree. Prerequisite: MATH 327 or MATH 236 and senior or graduate standing, 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
Measure theory and integration, independence, laws of large numbers. Fourier analysis of distributions, central limit problem and infinitely divisible laws, conditional distribution, martingales. Offered jointly with MATH 521, 522, 523. Prerequisite: MATH 426.

STAT 534 Design of Medical Studies (3) A Fisher, Pearson
Design of medical studies, with emphasis on randomized controlled clinical trials. Bias elimination, controls, treatment assignment and randomization, precision, replication, power and sample size calculations, stratification, and ethics. Suitable for graduate students in biostatistics and related medical sciences. 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; sample surveys. Emphasis on the sampling of human populations, although principles apply to other sampling problems. Simple, stratified, and cluster sampling; multistage and two-phase procedures; optimal allocation of resources; estimation theory; replicated designs; variance estimation; national samples and census materials. Course content comparable to Q SCI 472. Offered jointly with BIOST 529. Prerequisites: 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; discriminant 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) A,W
Data analysis, spectral analysis, robust estimation. Prerequisite: 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 departures from the assumptions for nonstandard problems are presented; computers are used for homework assignments. Analysis of residuals, use of transformations, polynomial models, models 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) A Brecklo
Exact and asymptotic methods of analysis for 2x2 contingency tables. Maximum likelihood estimation, logistic regression models for binary response variables, and selected 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. Selected special topics. Offered jointly with BIOST 573. Prerequisites: 473, 581, and BIOST 513, or permission of instructor.

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STAT 574 Statistical Computing (3) W Kenne, Martin.  Statistics.  Computer.  Evaluation of statistical algorithms; matrix methods and least squares; computation of probabilities, data structures, and data base management. Offered jointly with BIOST 574. Prerequisites: 473 and programming, or permission of instructor.

STAT 575 Population Models (3) Poliastro Models in demography, using real and simulated data. Evaluation of demographic rates, the life table; stationarity, stable, and quasi-stable populations; determinants of the age-structure of a population; age-specific models of mortality, fertility, and natality. Offered jointly with BIOST 575. Prerequisite: 473 or permission of instructor.

STAT 576 Statistical Methods of Survival Data (3) A. 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 model, competing risks. Offered 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 Inference (3, 3, 3) A, W, Sp Limit theorems, asymptotic efficiency, maximum likelihood statistics; sufficient ancillary statistics; elements of decision theory; Neyman-Pearson theory, uniform, and ancillary statistics; and a study of statistical tests; classical analysis; distribution-free statistics; linear hypotheses. Prerequisites: 473 or 512 for 581; 582 for 583; 584 for 583. (Formerly MATH 581, 582, 583.)

STAT 590 Statistics Seminar (*, max. 15) A W, Sp Prerequisite: permission of graduate program advisor.

STAT 591, 592, 593 Special Topics in Statistics (C, J, A, W, Sp) Distribution-free inference, game and decision theory, advanced theory of estimation (including sequential estimation), robustness, advanced probability theory, stochastic processes. Prerequisite: permission of instructor.

STAT 599 Statistical Consulting (3) A W Sp Prerequisite: permission of graduate advisor.

STAT 600 Independent Study or Research (3) A W, Sp Prerequisite: permission of graduate program advisor.

STAT 700 Master's Thesis (3) A W, Sp Prerequisite: permission of graduate program advisor.

STAT 800 Doctoral Dissertation (3) A W, Sp Prerequisite: permission of graduate program advisor.

WOMEN 206 Philosophy of Feminism (3) WS Griffiths Philosophical analysis of the concept of equality and sex roles central to feminism. Theoretical positions within the feminist movement; views of the ideal society, goals and strategies of the movement, its relation to sexual 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 Kenney Major psychological theories of sex-role development in young children and a study of the biological and environmental influences that determine and maintain sex differences in behavior. Topics include the genetic and environmental bases 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) A WSpS Focus on the status of women and the law; the legal status of women and the development of protective legislation, and the effect of the legal changes such as the Civil Rights Act of 1964 and Equal Rights Amendment on women. 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 women's cultural experiences, statuses, and roles in cultural context and basis of sex, the theories used to account for them. Topics include: biology destiny? studies of primates, women the gatherer, work in pre-industrial India and folk infant care; music, matriarchy and maternal kinship, childbirth, and women's roles in economic development. Offered jointly with ANTH 353. Prerequisites: 200 and ANTH 202, or permission of instructor.

WOMEN 354 Lesbianism (3) W SpS Familiarizes students with lesbianism, the biological, cross-cultural, and psychosocial evidence, and the position and concern of lesbians in our society. Broadly conceived and interdisciplinary, course content provides historical and current information and discussion on the nature of lesbianism. Prerequisites: 200 or 353; 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 Psychology of Women (5) W S Kennedy Psychological and sociological aspects of significant segments of women's lives. Topics include: physiological determinants of biological sex; physiological and psychological changes at puberty and during adolescence; psychological events related to the menopausal 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 physiological events. Offered jointly with PSYCH 357. Not open for credit to students who have taken GEC 357. Prerequisite: 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 knowledge and experience with their peers, under faculty supervision. The topic is selected by the student of the course. Must be taken concurrently with G ST 493. Prerequisites: senior standing, General Studies major, or permission of Women Studies and permission of advisor.

WOMEN 404 Women and the Closeknit Imaginat (5, max. 15) A WSpS Murphy Extends 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 Foreign Films, Women of the Early Years, Women in Children's Stories, and 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) Offered occasionally by visitors or resident faculty. Prerequisite: permission of instructor and advisor.

WOMEN 490 Undergraduate Research (1-5, max. 10) WSpS Prerequisite: permission of instructor and advisor.

ZOLOGY

Courses for Undergraduates

ZOOL 118 Survey of Physiology (3) A WSpS 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, WSpS Griffiths, Martin, or 208. Prerequisite: one quarter of college chemistry or equivalent. For nonmajors. Credit is not given for 119 if credit has previously been given for 209.

ZOOL 208 Elementary Human Physiology (5) Sp Griffiths Each organ system is described and its function illustrated in the laboratory. Credit is not given for 208 if credit has previously been given for 118. Prerequisite: two quarters of college chemistry and one year of college physics. Credit is not given for 208 if credit has previously been given for 118.

ZOOL 220 Diversity in Animals (5) W, SpS Morphological, functional, and ecological diversity within the major phyla of animals. Prerequisite: BIOL 212.

ZOOL 301 Introductory Physiology (4) Dyrgr-Olsen, Riddiford, Truman, Kohn, Paine Fundamentals of physiology: biochemistry of cell constituents, environment of the cell, bioenergetics, intermediary metabolism, membranes, control mechanisms. Laboratory 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 Johnson, Scyphers Natural history of marine invertebrates. Field and laboratory course emphasizing the habits, habitats, associations, and interrelationships of marine animals. Students may be required to share a portion of the transportation costs of ZOOL 362. Natural History of Vertebrates (3) SpS

ZOOL 362 Natural History of Vertebrate (5) SpS Johnson, Scyphers Field and laboratory course on the classification, ecology, adaptations, and natural history of fishes, amphibians, reptiles, birds, and mammals. Students may be required to share a portion of the transportation costs of field trips. Prerequisite: permission of instructor.

ZOOL 403 Comparative Vertebrate Histology (5) A Chattery, Simon Microscopic and submicroscopic anatomy of the tissues and organs of vertebrates. Prerequisite: BIOL 212.
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ZOOL 409 Sociobiology (4) W Rohwer Biological bases of social behavior, emphasizing evolution as a paradigm. Topics are: individual versus group selection, kin selection, altruism, group versus individual living systems, parental care of offspring, and competitive strategies. Offered jointly with PSYC 409. Prerequisites: BIOL 211 and 212 or PSYC 200, or equivalent.

ZOOL 410 Ethology and Ecology Laboratory (1-4) Sp Orlans, Paill 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 Laboratory (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. Recommended: 433, 434.

ZOOL 419 Invertebrate Physiology Laboratory (2) Sp Fields, Martin, Truman Experimenter on invertebrate materials to illustrate the principles developed in 418. Prerequisite: prior or concurrent registration in 418. Recommended: 433, 434.

ZOOL 423 Protozoology (4) W Rohwer Introduction to protozoa exclusive of parasites, with emphasis on structure (including the structural and functional), 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) Willow Simple and complex ionic equilibria, electrical properties of membranes; active and passive membrane responses; impulse conduction and chemical and synaptic structures; structure of muscle, and mechanical, thermal, chemical, and electrical aspects of contraction. Prerequisite: 301.

ZOOL 429 General Physiology of Excitable Tissues Laboratory (2) Willow 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 sensory systems. 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 Kasloff, Strathmann Survey of groups of invertebrate animals represented in marine environments; natural history, ecology, distribution, habits, adaptation, and trophic interrelationships. Offered at Friday Harbor Laboratories. Concurrent registration in BOT 445 required at Friday Harbor. Prerequisites: 20 credits in biological sciences and permission of Director of Friday Harbor Laboratories. (Not offered Autumn Quarter 1980.)

ZOOL 432 Marine Invertebrate Zoology (9) S Kasloff, Strathmann 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, observed, and discussed in some detail. Offered at Friday Harbor Laboratories. Not open for credit to students who have taken 433 or 434. Prerequisites: BIOL 212 and concurrent or permission of Director of Friday Harbor Laboratories.

ZOOL 433, 434 Invertebrate Zoology (5, 5) A,W Ilg, Kohn, Kasloff Morphology and phylogeny of invertebrates exclusive of terrestrial arthropods. Required for those who have had 432. Prerequisites: BIOL 212; 433 for 434.

ZOOL 435 Parasitology (5) General course covering the principles of parasitism and the major groups of animal parasites. Prerequisite: 20 credits in biological sciences or permission of instructor.

ZOOL 438 Comparative Endocrinology (3) W Garman Hormonal integration of living processes at all levels in animals: cells, organs, organisms, populations. Prerequisite: one year of biology. Recommended: histology and organic chemistry.

ZOOL 439 Comparative Endocrinology Laboratory (3) Sp Garman 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 insects. Structure, classifications, 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 will share a portion of the transportation costs of field trips. Prerequisites: concurrent 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. Prerequisite: BIOL 212.


ZOOL 457 Methods and Problems in Development (3) Lecture course in experimental embryology focusing on modern approaches to developmental problems and emphasizing their analysis at a biochemical level. Selected topics are covered in two lectures 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 instructor.

ZOOL 458 Vertebrate Physiology (3) Dryer-Blazos, Kenagy, Martin, Riddleford Emphasis on the physiology of vertebrates' major functions and organ systems viewed extensively from an ecological 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) Dryer-Blazos, Kenagy, Martin, Riddleford Experiments on vertebrate materials to illustrate the principles developed in 458. Prerequisite: prior or concurrent registration in 458.

ZOOL 464 Natural History of Birds (5) Sp Rohwer Field, lecture, and laboratory study of birds framed in biological theory rather than taxonomy. Breeding systems, brood parasitism, appearance, molt, migration, orientation, social behavior, song, and flight are emphasized. Includes Saturday and weekend field trips for which students are required to share a portion of transportation costs. Prerequisites: BIOL 210, 211, 212 or equivalent, and permission of instructor.

ZOOL 465 Natural History of Mammals (5) Sp Kenagy Field, lecture, and laboratory course introducing mammalian general and central natural history of biology, behavior, morphology, and adaptation to the environment. Fieldwork focuses on rodent populations and their habitats in Washington State. Includes Saturday and 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. Recommended: 453-454 and BIOL 472.

ZOOL 469 Reproductive Endocrinology (3) Sp Garman Endocrine regulation of the processes of mammalian reproduction. Integration of reproduction with environmental features through behavioral and metabolic adjustment. 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 species and groups, determined ecologically. 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. Adaptation 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 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. Prerequisites: 478, and a course in vertebrate or invertebrate zoology, and permission of instructor. Recommended: 400-level physiology course.

ZOOL 490 Undergraduate Seminar (1-3, max. 6) Prerequisite: concurrent, selection of topics in behavioral ecology. 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. Includes discussions and laboratory demonstrations of aims, techniques, and results of zoological research. Prerequisites: upper-division standing and permission of instructor.

ZOOL 498 Special Problems in Zoology (1-5, max. 15) AWSp Prerequisites: 30 credits in zoology and permission of instructor.

Courses for Graduates Only

ZOOL 506 Topics in Experimental Embryology (2, max. 6) Seminar 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 Orlans, Rohwer Detailed consideration of topics in behavioral integration, communication, and social organization. Prerequisite: 409 or PSYC 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 biosynthesis, permeability, metabolic changes, acquisition of specific biochemical properties and physical mechanisms of developmental processes. The laboratory deals comparatively with a variety of marine invertbrates. 9 credits available at Friday Harbor Laboratories only. Prerequisite: permission of instructor.

ZOOL 520, 521, 522 Seminar (11,11) A.W.Sp

ZOO L 528 Advanced Topics In Physiology (1-3. max. 15) Bakken, Edwards, Laird, Riddiford, Schubiger Advanced considerations in morphology 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 Friday Harbor Laboratories. Prerequisite: 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, Kastoff Advanced considerations in morphology, ecology, phylogeny and systematics of selected current developments. 9 credits available at Friday Harbor Laboratories only. Prerequisite: permission of instructor.

ZOOL 536 Comparative Invertebrate Embryology (9) Sp Morphological and experimental studies of development of selected types of marine invertebrates. Offered at Friday 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 control of behavior, neuronal interactions, and other advanced topics determined by visiting faculties. Extensive laboratory 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 Characterization of developmental processes and their adaptations in diverse insect groups. Emphasizes hormonal control mechanisms in metamorphosis, polymorphism and diapause. Includes experimental preparation and analysis of development. Prerequisites: 456 or equivalent, BIOL 212 or equivalent, or permission of instructor.

ZOOL 568 Chemical Integration (2, max. 6) AW Gorbman Graduate seminar dealing with current problems in endocrinology and neuroendocrinology. Offered on credit/no credit basis only. Prerequisite: permission of instructor.

ZOOL 572 Topics In Ecology (2 or 3) W Edgerton, Kohn, Orians, Painé Graduate seminar on modern problems in ecology. Prerequisite: BIOL 472 or equivalent, and permission of instructor.

ZOOL 574 Ecology of Marine Communities (3) Painé Lecture course emphasizing the ecological structure and functioning of marine communities. Topics include population interactions and dynamics, distributional patterns, bioenergetics, stability, and species diversity. Prerequisites: BIOL 472 or equivalent, and permission of instructor.

ZOOL 575 Principles of Ecology as Applied to Fisheries (3) A Zaret Theoretical ecology as applied to fishes. Includes fish vision, color pattern determinants, adaptive radiation, competition and predation, fish behavior, reproductive patterns, 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 physiology to physical and environmental factors. Instructor: in principles and applications of modern instrumentation for quantitative study of animal-environment interactions. Offered at Friday Harbor Laboratories. Prerequisites: invertebrate and/or vertebrate zoology, one year of college physics, organic chemistry. Recommended: physiology.

ZOOL 578 Advanced Ecology (5) Orten Strategies of reproduction, habitat selection, foraging and spacing; theory of competition and predator-prey interactions; niche theory and community structure. Prerequisites: BIOL 472 or equivalent, and permission of instructor.

ZOOL 579 Population and Community Ecology (3) A Schoener Population dynamics, resource partitioning, niche, and 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) W Cloney Theory and use of light and electron microscopes, modern techniques of experimental and pathological studies, photomicrography. Methodologies are applied to analyses of special problems selected by students. Prerequisite: permission of instructor.

ZOOL 600 Independent Study or Research (*) A. W. Sp

ZOO L 700 Master's Thesis (*) A.W.Sp

ZOO L 800 Doctoral Dissertation (*) A.W.Sp

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 accounting information; introduction to basic accounting concepts, and some accounting techniques. Prerequisite: sophomores standing or above.


ACCTG 230 Fundamentals of Managerial Accounting (3) Analysis and utilization of accounting information as part of the managerial processes of planning, decision making, and control. Concentrates on types of economic decision making in enterprises and on accounting information 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 311 Cost Accounting (3) Introduction to the theory of cost accounting; job order, product, and standard cost systems; overhead accounting problems in allocation 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 firm, 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 principles. Prerequisite: 230; not open to accounting majors.

ACCTG 401 Federal Income Tax Factors in Business Decision (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 corporate income tax. Includes concepts of income, deductions, nontaxable exchanges, tax bases, 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 designing systems, with an emphasis on those using computer facilities. Includes sufficient study of computer systems to understand their present and future impact on information systems and to evaluate proposals for computerization of existing systems. Prerequisites: 230 and QMETH 200.

ACCTG 440 Accounting Systems (3) Concepts and methodology of computerized information systems analysis and design, and a study of the management of the information function. Introduction to CO-BOL. Advanced study of computer equipment and its impact 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 procedure. Prerequisite: 421.

ACCTG 460 Advanced Cost Accounting (3) Advance analysis of cost and management accounting problems; special applications of cost accounting techniques for management planning and control; current developments 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 issues. Prerequisite: 411.

ACCTG 480 Fund Accounting (3) Fund and budgetary accounting as applied to public sector organizations, such as governments, foundations, hospitals, and colleges. Prerequisite: 303.

ACCTG 485 Consolidated Financial Statements (3) Accounting for parent-subsidiary and branch relationships; 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.
ACCTG 495 Advanced Accounting Theory (3)
Theory of accounting related to income measurement, as-
set and enterprise. 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 procedures underlying de-
termination and presentation of information for financial
decisions by investors and other decision makers outside
the business entity. Study of problems of valuation,
income determination, and financial reporting.

ACCTG 501 Managerial Accounting (3)
Study of the generation and use of accounting infor-
mation within the firm for purposes of planning and con-
trolling operations. Topics covered include cost conceps,
responsibility accounting, costs, cost control, 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 statements, measurement of income, the valu-
ation of assets, and accounting for corporate stock
equities. Emphasis is placed on the uses and limitations
of accounting data, including methods of auditing and
the meaning of financial statements. Prerequisite: 500, 501, or
permission.

ACCTG 511 Concepts in Accounting Measurements (3)
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 the-
ory. 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. Emphasis is placed on research and writing skills
along with analytic abilities. Prerequisite: 520 or
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
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 those changes on auditing phi-
losophy, objectives, and methodology. The seminar fo-
cuses on the auditing of information systems, man-
gagement and its role in the audit, the expansion of the
reporting 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 evalua-
tion of business analysis and research methods. Ef-

ACCTG 585 Seminar in Financial Control Systems (3)
Design and administration of formal information systems
aimed at the planning and control process in large organiza-
tions. Requires knowledge of current job control and
cost control: measurement of divisional performance and
problems of goal congruence; administration of new
investment programs. Prerequisite: 501 A ORG 550 or
permission of graduate office.

ACCTG 589 Introduction to Accounting Research (3)
A Examination of research problems and techniques in ac-
counting. Interdisciplinary nature of accounting research
emphasized. Work in finance, economics, and psychol-
ogy may be used to develop current trends in accounting
research. Prerequisite: admission to doctoral program.

ACCTG 596 Seminar in Financial Accounting Research
(3, max. 6) Sp.
Critic: an analysis of research strategies and
methods applied to problems in financial reporting prac-
tice and financial aid accounting standard setting. May be
re-

ACCTG 597 Seminar in Managerial Accounting Research (3, max. 6)
Critical analysis of current managerial accounting res-

ACCTG 599 Doctoral Seminar in Accounting (3)
Study and research in advanced topics of accounting. The
seminar is generally concerned with unexplored areas of
research as well as research methodology and philo-

ADMINISTRATION
Approval of graduate business program office and entry
card required.

COURSEs for Graduates Only
ADMIN 510 Integrative Administration (15) S
Johnson
Includes materials basic to the study and analysis of
administration in organizations: organization theory and
administrative behavior; resource allocation, accounting,
and financial control; systems operation and analysis;
marketing; and governmental-societal framework. Facul-
ty-team-teaching approach. Not open to business ad-
ministration majors without consent or 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 selected
to aid the understanding of 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

A ORG 440 Organization Theory (3)
COURSES for Undergraduates
A ORG 441 Advanced Organization Theory (3)
Deals with current research, measuring organizational ef-
fectiveness, planning, leadership patterns, current
problems, developments in related disciplines. Prerequi-
t: 440.

A ORG 461 Two-Person Behavior in Organizational Contexts (4)
COURSES for Undergraduates
A ORG 462 Administrative Behavior (4)
Studies practice and theory in formal organizations
through selected readings and actual cases. Emphasizes
the superordinate-subordinate relationship at all levels.
Considers administrative elements of the three: communica-
tion 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 Radcl, Ethnic, and Cultural Factors in Administration (4)
Understanding difference based upon racial, ethnic, and
cultural factors and the consequences of difference on ad-
ministration of organizations. Emphasizes on the compre-

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)
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
graduate office.

A ORG 550 Organization and Management (3)
Studies concepts of objectives and goals, decision mak-
ing and planning, control and analysis, and the effects
of decision on organizational performance. Emphasizes
on the comprehension of difference on management and
administration of organizations. Emphasizes on the compre-

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 processes from which they may choose. Each is in-
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 exists. The seminar examines
these alternative patterns, asking which structure is likely to
be most productive. Prerequisite: permission of gradu-
te office.
A ORG 556 Seminar in Comparative Administrative Theory (3)
Identifies and evaluates the variations that occur among significant factors within organizations, across organizations, institutional groups (business, education, health services, etc.), 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 processes 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. Critically evaluates administrative theory in relation to administrative practice. Prerequisite: permission of graduate office.

A ORG 576 Human Aspects of Administration (3)
Develops in depth some of the basic contributions to administrative theory and practice made by past and current research, thought, and experience. Typically examines several major research studies, drawings on findings from psychology, sociology, political science, 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 techniques of human relations training, for learning about personal and interpersonal phenomena. The seminar presents the opportunity for an in-depth examination of cases and for the development of the effectiveness of an individual's behavior and on the consequences of that behavior. The vehicle for behavior training is the laboratory training method. Prerequisite: permission of graduate office.

A ORG 580 Planning and Decision Theory (3)
Usually focuses on the development of a theory of decision making, with emphasis on behavioral aspects. Consideration of information-decision systems and the role of model building. Occasionally emphasizes the development 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 office.

A ORG 581 Seminar in Advanced Organizational Behavior (3)
Analysis and examination in depth of human behavior in the context of business. Focuses on research, theory, and practice and their impact on individual or group behavior. 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 organization development, conditions for successful application, organization diagnosis, client-consultant relationships, the action research model, team building, intergroup conflict resolution, and implication 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 subcultures on structures, processes, goal determination, problem solving, innovation, and change. Appraises the development of the theory of organizational behavior such as the sociological, normative, descriptive, analytical, and systems approach. Studies in detail the most important conceptual and analytical models of organization behavior. Emphasis on the historical development and impact of each model, and implicative research directions. 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 generally concerned with unpublished 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.

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 (*) AWRp
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: QME 111 or equivalent.

BA RM 501 Statistical Methods II (4)
Continuation of 500. Further coverage of statistical research methods. Topics include introduction to multiple regression, analysis of variance, analysis of covariance, design of experiments, and time series analysis. Prerequisite: 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 procedures. Introduction to the linear regression model, interpretation of summary statistics, bias and precision of regression estimates, analysis of the residuals. Prerequisites: 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 perspective of scientific investigation and the evaluation of research. The development of theory and its relationship to research. Various strategies and designs in behavioral research. Prerequisites: 500 and 501, or permission of graduate office.

BA RM 521 Behavioral Research Methods—Approaches in Behavioral Research Consider alternative research approaches, such as laboratory and field experimentation, simulation, and surveys, with data gathering techniques appropriate for each approach. It is primarily concerned with developing alternative approaches to research problems and with discussing specific applications. It builds upon a background of specific technical tools and techniques and an understanding of theory development and research design. Prerequisites: 500 and 501, and permission of 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, semantics, planning, and principles of effective business writing. Practical application through messages that inform and persuade, grant and refuse; plus short business reports and applications for positions. 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 alternative 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 office.

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 developments. Prerequisites: 301 and senior standing.

B ECN 427 International Finance (4)
Asset choice and institutional operations in international finance; foreign exchange problems; the impact of international financial problems and operations on business; short-term and long-term international financing. Prerequisite: 301.

B ECN 459 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 deflationary techniques. Prerequisites: 301 and QME 201.

B ECN 499 Undergraduate Research (3, max. 6)
Research in selected areas of business economics. Prerequisites: 300 and 301, and permission of undergraduate office.

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; the demand analysis with focus on application.

B ECN 501 Business Economics II (3)
Analysis of real and monetary factors affecting the national 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.
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 relationships. Emphasis on understanding macro forecasts and converting them to industry forecasts. Prerequisite: permission of graduate office.

BG&S 200 Introduction to Law (5)
Legal institutions and problems including specific functions of the legal system of social thought and behavior and a frame of order within which rival claims are resolved and compromised; legal reasoning; law as a process of protecting and facilitating voluntary arrangements among economic socieites. Prerequisite: sophomore standing or above.

BG&S 310 Legal Aspects of Business and Public Policy (5)
Legal questions involved in government and business institutions and the roles of government in business, labor, and environmental protection. Analysis of the relation of these developments to corporate social responsibility. Prerequisite: permission of graduate office.

BG&S 491 The Context of the Business System (5)
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 exists between the two. Prerequisite: permission of graduate office.

BG&S 523 Commercial Law (3, 5)
Graduate business law, including selected topics in the law of contracts, agency, partnership, corporations, commercial paper, sales, securities regulation, opportunies for guided, independent study of recent developments. Prerequisite: permission of graduate office.

BG&S 540 Cultural Change and Modernization (3)
Intensive analysis of specific cases of cultural change across the world. The cultural context of international business transactions, opportunities for guided, independent study of recent developments. Prerequisite: permission of graduate office.

BG&S 555 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 United Kingdom, Japan, Canada, and the United States, with particular reference to the impact of the policies upon the multinational corporation enterprise as a whole. Prerequisite: permission of graduate office.

BG&S 562 The Social Responsibilities of Business (3)
Focus on the more conventional issues of social responsibility: 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; and corporate social audits. Prerequisite: junior standing or above.

BG&S 445 Comparative Enterprise Systems (5)
Investigation of functions, modes of operation, and methods of coordinating business enterprises in various economic systems, ranging from the competitive to the highly centralized. Prerequisite: junior standing or above.

BG&S 462 Social Processes of Business (3)
Focus on the more conventional issues of social responsibility: 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; and corporate social audits. Prerequisite: junior standing or above.

BG&S 490 Special Topics and Issues in Business, Government, and Society (3, 5)
Emphasis is on contemporary topics and issues of business 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 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 developed during 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 centers on the business scholar's need for an integrative approach to the social environment of business. Prerequisite: permission of graduate office.

BG&S 599 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, government, and society. Generally concerned with unpublished 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 policy making. Emphasis is placed on the general framework and objectives of policies and objectives. This course integrates and builds upon the work of the core curriculum. Prerequisites: senior standing or above and FIN 520, MKTG 301, OPYS 301, and HRSYS 301 or A ORG 420, or permission of undergraduate office. Entry card required.

B POL 471 Small Business Management (4) Policy formulation and implementation in smaller firms from the top manager's point of view. Integration and builds upon work of the core curriculum. Includes analysis of cases and field projects related to small firms. Prerequisites: senior standing or above and FIN 350, MKTG 301, OPYS 301, and HRSYS 301, or permission of undergraduate 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 means of simulation (business gaming). Prerequisites: senior standing or above and FIN 350, MKTG 301, OPYS 301 and HRSYS 301, or permission 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 - Non-Business Institutions (3) Analysis of policy problems faced by managers in business, government, and nonprofit institutions. Determination of organizational product/service objectives, development 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 operating methods in selected areas of 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 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 of accounting, marketing, and finance is assumed. Prerequisites: permission of graduate office.

B POL 545 Field Projects and Experience Exercises in General Management (3) Provides experience under such as: (1) case writing in ongoing organizations, (2) analysis and recommendations on real policy problems in corporations or other institutions; and (3) simulation games designed specifically designed according to the business policy area of courses. Prerequisites: 509 or 510.

B POL 571-572 Research Reports (3-3) See ACCTG 571-572 for description.

B POL 596 Technological and Social Responsabilities in Management Decisions (3) The job of any manager, whether in a corporation, hospital, or government agency, includes: (1) awareness of the technical responsibility of the organization to provide efficient goods or services to society; (2) awareness of human responsibility of the organization to provide a good life for human beings inside and outside the organization; and (3) in ability to reconcile 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 selected reading. Prerequisites: second-year standing.

B POL 599 Doctoral Seminar in Business Policy (3) Study and research in advanced topics of business policy. The seminar is generally concerned with unpublished areas of research and 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 enterprises. Interest rate behavior of working capital and loanable funds; long-term debt; leverage; capital budgeting; financial growth and expansion of business enterprises; government regulation of the financial process. Prerequisites: B ECN 300 and admission to business administration or permission of undergraduate office.

FIN 423 Banking and the Financial System (4) Role of banks and bank holding companies in the financial system; asset choices of banks and nonbank financial institutions; problems in the management of financial institutions; and government regulation of the financial system. Prerequisites: 350 and B ECN 420.

FIN 450 Problems in Corporation Finance (4) Case problems in corporate financial management. Includes cases on management of current assets, obtaining short-term loans, raising long-term capital, capital budgeting, and dividend policy. The management point of view is stressed. Prerequisites: 350 and ACCTG 375, 430.

FIN 453 Financial Theory and Analysis (4) Determination of liquidity needs subject to firm constraints and longer term capital budgeting problems involving cost of capital and capital rationing considerations; analytical approach. Prerequisites: 350 and QMETH 201.

FIN 460 Investments (4) Introduction to the nature, problems, and process of evaluating particular securities and portfolio construction and administration. Special attention is directed to the risk and rate of return aspects of particular securities, portfolios, and total wealth. 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 placed on 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 permission 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. Prerequisites: 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 the cost of capital for such investments, investigates some problems in the application of an appropriate investment criterion to specific types of opportunities, and explores some aspects of the urban renewal problem. Offered jointly with J U 515 and URB P 553. Prerequisite: 502; U D 505, URB P 552, or permission of graduate office.

FIN 530 Financial Measurement of Banks (3) Analytic problems in the financial management of commercial banks and other financial institutions. Loan and investment policies, liability management, capital policies, and other selected issues are discussed. Prerequisite: B ECN 520 or permission of graduate office.


FIN 551 Problems in Business Finance (3) The application of financial principles and techniques to problems in financial management. Topics include cash management, credit management, problems in short-term and long-term financing, and capital budgeting. Prerequisite: 502.

FIN 552 Seminar in Business Finance (3) Study of the financing of the corporation, including recent theoretical and institutional developments. Extensive reading and discussion in designated areas covering problems relating to financial management and to the social and economic implications of the financial process. Prerequisites: 502, 550.

FIN 560 Investments (3) Investment problems and policies, and process of evaluating particular securities and portfolio construction and administration. Special attention is directed to the risk and rate-of-return aspects of particular securities, portfolios, and total wealth. Prerequisite: 502 or permission of graduate office.

FIN 561 Seminar in Investments (3) Discussion and analysis of concepts, processes, and problems of investment analysis, portfolio valuation, and portfolio construction, and administration for individuals and institutions. Prerequisite: 560.
SCHOOL OF BUSINESS ADMINISTRATION

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 departmental faculty. May be repeated for credit. For doctoral students or by permission. Prerequisites: for Autumn Quarter, 550; for Winter Quarter, 550 and 599; for Spring Quarter, 599 (taken Autumn Quarter and Winter Quarter) and BA RM 510, or equivalent.

FIN 650 Independent Study or Research (*)

HUMAN RESOURCE SYSTEMS

Courses for Undergraduates
HRSYS 301 Personal 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 research. Prerequisite: junior standing or above.

HRSYS 443 Staffing (4)
Includes manpower planning, recruitment, testing, selection, 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 (3)
Focuses on helping the student acquire knowledge and skills that will enable him to be effective in resolving labor-management disputes. This course is designed to develop, interactively 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: 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)
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 development of skills in managing employee relations effectively. Recommended for students without previous coursework in personnel resource systems. Prerequisite: permission of graduate office.

HRSYS 520 Job Design and Staffing (3)
A job design considerations as they affect employee performance, such as job enrichment and work simplification techniques. A study of systems related to manpower planning, recruitment, selection, placement, training, and development. Focus on advanced techniques with emphasis on various methods of performance appraisal. Topics include criterion development, psychological testing, validation procedures, and cost effectiveness of personnel research.

HRSYS 530 Compensation and Performance Appraisal (3)
Analyzes the strategies, problems, and procedures of assessing 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)
Focuses on current and emerging forms of management and employee relations systems. Primary emphasis is given to new forms of white-collar unionization, public and private sector labor relations, bargaining and quasi-bargaining situations between professionals, and management, and emerging forms of third-party participation in these relationships. Prerequisite: permission of graduate office.

HRSYS 560 Dispute Settlement in Labor Relations (3)
Examines, from an interdisciplinary perspective, techniques and strategies that are used to resolve disputes between labor and management: recent innovations such as last-offer arbitration and 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 on 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 departmental 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)
Focuses on the importance of understanding the international political economic context. Emphasis on the critical components of international business; the organization of each student in an international business environment; and the impact on international trade and investment. Topics include: the development of world trade; the role of the nation state in global economic relations; the nature of international economic systems; and the major impediments to trade.

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 relations and political environments and their impact on international business; foreign investment in the development process; case studies. Prerequisites: 300 or equivalent and junior standing or above.

I BUS 340 Business Environment In Industrial Countries (4)
Study of factors and conditions affecting business operations and behavior in developed countries; international integration; business relations among nation states and integrated 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, but especially relevant to small companies. Emphasis on the management of import-export operations 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 international objectives and strategies; developing multinational company structures and executives; adapting management techniques to international 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, foreign investment, international monetary relations and economic integration, and national policy response to international market forces. May be taken first year of M.B.A. program, preferably after student has had ECN 500 and 501, or equivalent.

I BUS 560 Multinational Business Management (3)
Managerial responses to problems of international business organizations and operations. Emphasis on: (1) strategy formulation in an international context; (2) design and control of multinational organizations; and (3) adaptation of management systems and policies to different economic, social-cultural, and political environments. Prerequisite: 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, social-cultural, and political environment in less-developed countries. Problems of international trade and investment, north-south relations, commodities, technology transfer, foreign aid, and social flows. Prerequisite: 300 or equivalent, or a course in international economics or trade or international finance, or permission of graduate office. Entry card required.

I BUS 580 International Business in Industrialized Countries (3)
Emphasis on understanding the economic, social-cultural, and political environment in developed, industrialized countries. Problems of international trade and payments 'relations, economic integration, national policies, and supranational organizations' impact on managerial environments. Prerequisite: 550 or equivalent, or course in international 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 firm is located. Limited to students who have the approval of their major adviser and the faculty member who has agreed to direct their work in accordance with a definite program of studies. Prerequisite: permission of graduate office.

I BUS 599 Doctoral Seminar in International Business (3)
Study and research in advanced topics of international business. The seminar is generally concerned with unpublished 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 factors, tools, and concepts used by management in planning, establishing policies and solving marketing problems. Topics cover marketing concepts, con-
MKTG 301 Marketing Concepts (4) Analysis and application of principles used by management in planning, establishing policies, and solving marketing problems. Topics covered: marketing concept, consumer buying behavior, market analysis, marketing functions, institutions, channels, pricing, and public policy. Not open to business administration students for credit, nor to those who have taken MKTG 301.

MKTG 302 Marketing Management (4) Emphasis on contemporary topics and issues in marketing. Special emphasis on consumer decision making processes, marketing functions, 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 standing or above.

MKTG 303 Advertising Management (4) Analysis and application of principles used in advertising budgeting, media selection, and pricing. Prerequisites: 201 or equivalent and junior standing or above.

MKTG 304 Special Topics and Issues in Marketing (4, max. 8) Emphasis on contemporary topics and issues in marketing planing: 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 standing or above.

MKTG 401 Cases in Marketing Management (4) Analytical and practical problems in marketing. Emphasis on contemporary topics and issues in marketing. Individual cases are used to illustrate generalities addressed in the course. Course content reflects contemporary developments and the current interests of instructors and students. Prerequisites: 301 and junior standing or above.

MKTG 402 Undergraduate Research (3, max. 9) Prerequisite: permission of undergraduate office.

Courses for Graduates Only

MKTG 500 Marketing Management (3) Analysis of markets and institutions and the role of marketing decisions in the economy. Considerations necessary for sound marketing decisions include pricing, demand creation, physical distribution, channel selection, and product development. Topics emphasis on contemporary topics in marketing and political problems under varying competitive relationships; public policy and legislative constraints. Prerequisites: approval of graduate office.

MKTG 510 Marketing Channels (3) Analysis of marketing channels for goods and services in profit and nonprofit organizations. Course content emphasizes individual channels, and is applied to marketing decisions of both profit and nonprofit organizations. Prerequisites: 301 and junior standing or above. Recommended: QMETH 201.

MKTG 511 Marketing Strategy (3) The marketing strategy process; preliminary steps and research design, questionnaires, secondary and primary data, sampling, processing and interpreting data, evaluation and effective presentation of findings. A class research project provides practical application of methods studied. Prerequisites: 301, QMETH 201, or equivalent, and junior standing or above.

MKTG 512 Multi-Variable Marketing Analysis (4) Application of analytical methods in marketing research. Emphasis is on the applied aspects of multivariate techniques (multiple regression, factor analysis, and multidimensional scaling) and their usefulness in such marketing problems as advertising budgeting, media planning, sales forecasting, sales-force allocation, and pricing. Applications include market segmentation and positioning. Prerequisites: 301, QMETH 201 or equivalent, and junior standing or above.

MKTG 513 Advanced Marketing Management (4) Introduction to advanced marketing management through the application of various decision-making models and selected computer routines to such marketing problems as advertising budgeting, media planning, sales forecasting, sales-force allocation, and pricing. Applications include market segmentation, market positioning, and linear programming. Prerequisites: 301, MATH 157, or equivalent, and junior standing or above.

MKTG 515 Product and Price Policies (3) Identification of marketing opportunities, choice of goods and services in which to compete, and prices at which to offer them. Course content emphasizes determinants of product-line management, product development, market definition, and price policy considerations. Prerequisites: 500. QMETH 500.

MKTG 521 Multi-Variable Marketing Analysis (4) Methods of analyzing multivariate data in such marketing research problems as advertising budgeting, media planning, brand switching, sales forecasting, sales-force allocation, and pricing. Applications include computer simulation, stochastic models, Bayesian approaches, and optimization techniques. Prerequisites: 301, QMETH 510 and OPSYS 500.

MKTG 522 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 Research Reports (3-3) See ACCGST 571-572 for description.

MKTG 590 Independent Study or Research (*) Operation and Systems Analysis

Courses for Undergraduates

OPSYS 301 Principles of Operations Analysis (3) Principles and techniques used in the analysis and control of operating systems. Topics include current decision making and system planning processes, selection of resources, scheduling and control of the flow of transactions in systems, maintenance of efficiency, and statistical analysis of system behavior. Use of computers and quantitative models in analysis and control of operations. Prerequisites: QMETH 200, 201, and permission of graduate office.

OPSYS 401 Administration of Operations (4) Case studies of decision situations confronting managers of operations. Cases focus upon a systems approach to decision making, system analysis, and application of analytical techniques in actual situations. Problems of implementation in design and planning of operating systems, and in control of systems. Includes problems of resource allocation, project planning, scheduling, inventory, quality control, cost control, distribution systems, facilities planning, and coordinating operations with other parts of the enterprise. Prerequisites: 201 and junior 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 simulation, stochastic models, and computer simulation models, systems analysis, and network analysis). Analysis of organization of complex systems, emphasizing the integration between management decisions and information feedback. Prerequisites: 301 and junior standing or above.

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 improved curve theory to systems planning and control. Prerequisites: 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, investment in inventory, administration systems, aggregate forecasting and scheduling, network planning methods, job shop scheduling, and sequencing decisions. Prerequisites: 201 and junior standing or above.

OPSYS 499 Undergraduate Research (3, max. 9) Prerequisite: permission of undergraduate office.

Courses for Graduates Only

OPSYS 500 Operations and Systems Analysis (3) Study of the management of operations in business and public enterprises. Basic concepts, philosophy, and tech-
Courses for Graduates Only

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. Prerequisite: 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, operations research, decision theory, and computer applications. Prerequisite: permission of undergraduate office.

Courses for Undergraduates

QMETH 200 Computer Programming (2)
Introduction to computer programming using the BASIC language and "canned" programs. Applications to business problems. Prerequisite: 200 and junior standing or above. Recommended: 350.

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. Prerequisites: MATH 157 and junior standing or above.

QMETH 404 Computer Programming for Business (4)

QMETH 424 Simulation Techniques (4)
Construction and operation of simulation models, including 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 primarily deterministic nature through use of operations research tools. Emphasis on techniques of mathematical programming, dynamic programming, network analysis, and reliability. Prerequisites: 350 or equivalent and junior standing or above.

QMETH 510 Quantitative Methods (3)
Survey of operations research techniques for business problems. Emphasis on linear programming and general mathematical programming techniques. Prerequisite: 350 or equivalent preparation in elementary calculus.

QMETH 551 Mathematical Programming (4)
Advanced topics in linear programming, and an introduction to nonlinear programming. The managerial significance of nonlinear models. Topics include the relaxed and dual simplex algorithms, decomposition of large linear programs, shortest route problems, unconstrained 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 horizon and unbounded horizon models, Markov chain models; inventory models, and waiting line models. Not open for credit to students who have taken 451. Prerequisite: 510 or 450 or MATH 407.

QMETH 560 Research Seminar in Operations Research (4, max. 8)
Intensive study into operations research techniques relevant to business analysis. Selected topics include: extensions of linear programming, solution of large systems, stochastic processes, dynamic programming, discrete programming, and network models. Prerequisites: 551 or 552.

QMETH 570 Computer Information Structures (4)
Concepts of data structure and file organization typical to administrative data processing and management information systems. List structures, list processing algorithms. Sorting and searching algorithms for internal and external storage. Sequential, indexed, direct, and hashed-file organizations and processing. Introduction to database concepts and database computer systems. Programming techniques utilizing the University's central computing facility. Prerequisites: 504 or equivalent, and knowledge of a computer programming language.

QMETH 571-572 Research Reports (3-3)
See ACCCTG 571-572 for description.

QMETH 574 System Analysis, Design, and Programming (4)
Introduction to system analysis, design, and programming. 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. Prerequisite: 504 or equivalent.


QMETH 599 Doctoral Seminar in Quantitative Methods (3) Study and research in advanced topics of quantitative methods. The seminar is generally concerned with unpublished 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 420 Analysis of Insurer Operations (4) Study of basic operations common to all types of insurance companies. Emphasis on analysis and decision making 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 industry. 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 location, 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 management, freight location, materials handling, distribution warehousing, inventory control, and production scheduling. Prerequisite: junior standing or above.

TRANS 471 Transportation Policy and Innovations (4) Appraisal from the public point of view. Content and effect on decision making by carrier and shipper firms. Procedures of administrative agencies regulating transportation firms. Prerequisite: junior standing or above.

TRANS 481 Transportation Carrier Management (4) Carrier problems, including financing, equipment purchase and utilization, labor relations, policy determination, 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 warehouse 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 transportation industry from the standpoint of the transportation firm, the users, and governments. The physical distribution systems. The economic impact of location on transportation industries. Theoretical and pragmatic considerations in pricing transportation services. Environmental aspects of domestic and international transportation and physical distribution systems. The social and economic 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 transportation 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 ACCGT 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. Concepts and logic of planning as a community process and a professional activity. Evolution of planning ideas in response to changing social, economic, and environmental conditions within the American political framework. Complementary nature of public and private responsibilities. Major procedures used by planners. Offered jointly with URB P 300. Prerequisite: junior standing 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 and investment. Valuation and investment theory; techniques of investment analysis and capital allocation. Offered jointly with URB P 351: Prerequisite: junior standing or above.

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 496 Research in Urban Development (3) Workshop in problems of multivariate prediction. Application and critical evaluation of multiple regression, factor analysis, and case analysis techniques. Prerequisite: permission of graduate 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 current and seminar in the area. Topics include urban economy and determinants of land use, capital investment in urban development, land tenure, urban forms and policies, urban development policy, and urban history. Prerequisites: 505, URB P 552, or permission 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 office.

U D 550 Benefit-Cost Analysis Applied to Urban Development (3) Practical application of benefit-cost methodology to the decision-making process in urban development. In a workshop format, benefit-cost analysis procedures are applied to urban development projects or programs, including urban renewal. Emphasis is on determining political economy and methodology is utilized as necessary to determine objectives to identify and to measure benefits and costs, and to specify decision criteria as defined by the public interest. Offered jointly with URB P 550.


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, agricultural development, the heritage, urban development rights, tax allocation financing. Resource use, distribution 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 ACCGT 571-572 for description.

U D 595 Urban Development Problems (3) For advanced graduate students concerned with contemporary problems of urban development, including problem identification and measurement, research methodology, and techniques; historical and cultural aspects of urban problems; 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

COMMUNITY DENTISTRY

COM D 201 Planning a Career in Dentistry for the Future (2) ASp
Future-oriented overview of important concepts in dental science, contemporary issues of patient treatment, and dental-care delivery systems. Provides firsthand exposure 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
Care course designed to provide instruction allowing students to gain knowledge and the skills basic to the motivations for, and clinical competence in, the treatment of the disabled dental patient. Includes the special health, social, and economic problems of the disabled population; 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 treatment and home care necessitated by specific disabilities. Offered on credit/no credit basis only. Prerequisite: third-year 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 Financing of Dentistry (1) Sp
Topics include: leadership; community analysis and planning; reimbursement; management; quality assurance; and outcome assessment. Prerequisite: permission of instructor.

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 dentists and the quality of care rendered. Offered on credit/no credit basis only.

COM D 449 Directed Studies in Community Dentistry (*) A WSpS
Students and faculty with common academic interests pursue the goals 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 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

Study of material that enables student to gain knowledge of techniques and materials while developing sensitivity to the oral health needs of patients. Prerequisites: 304 for 305; 305 for 306.

D HYG 354, 355, 356 Clinical Dental Hygiene Practice I (3,3,3) A Sp
Clinical application of diagnostic, preventive, and therapeutic procedures utilized in patient care by a dental hygienist. 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 transition to the role of a private practice hygienist. Emphasis on professional responsibilities, state practice acts, professional organizations, practice management, ethics, application of principles of human communication, interpersonal communication and conflict management, techniques for job interview, employer/employee negotiations and contracting. Offered on credit/no credit basis only.

D HYG 402 Community Dental Health (2) W
Field experience in community health, with emphasis on dental hygiene care in specific community health programs. Includes methods of identifying community health problems, use of dental epidemiological survey techniques, elements of community analysis and organization, and influence of legislation on patterns of dental-care delivery systems.

D HYG 403 Principles and Practices of Dental Health Education (3) W
Presentations 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 injured, 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 interaction between 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 practice management and interpersonal communication, adaptations of procedure for special-needs 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) A WSpS
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.

D HYG 456 Community Dental Hygiene Practice (1,4, max. 6) WSp
Application of dental health principles and practices in hospitals and other clinical settings for those who do 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 therapeutic procedures utilized in patient care by a dental hygienist, with special emphasis on patient management, adaptation of procedures for special-needs patients, office management and personal communication, proficiency achievements in all dental hygiene skills, and initial opportunity 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) S
Continuation of 409, 459. Prerequisites: 409, 459, and permission of instructor.

D HYG 465 Advanced Clinical Dental Hygiene Practice (3 or 4, max. 6) A WSp
Advanced instrumented clinical and procedures for certificate dental hygienists. Seminars and clinical experience. Permission to 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 procedures: filling of rubber dam, placement and removal of matrix and wedge; polishing of amalgam restorations; application of cavity liners, bases, and varnishes; placement of temporary crowns and restorations. Clinical experience with patients. Prerequisites: certificate 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 the education for a teaching position. Others selected after review of credentials and with permission of instructor.

D HYG 481 Restorative Dentistry for Dental Hygiene Educators (2) S
Course designed to develop dental auxiliary faculty persons skilled in performing and teaching the following procedures: condensing and carving of amalgam restorations; placement and finishing of tooth-colored restorative materials. Prerequisites: 480, certificate in dental hygiene; and a valid license to practice dental hygiene; experience 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 482 Local Anesthesia for Dental Hygiene Educators (3) S
Course designed to develop dental hygiene faculty persons skilled in performing and teaching techniques of field and nerve-block anesthesia. Topics include: local and block anesthesia, anesthetic pharmacology, pain physiology, prevention and management of anesthetic complications and emergencies as well as techniques and administration of local anesthesia with patients is required. Prerequisites: certificate in dental hygiene and a valid license to practice dental hygiene; experience 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) A WSpS
Study of professional education, accreditation, legislation, organization, and literature and responsibilities of the dental hygiene to the community. Prerequisite: permission of instructor.

D HYG 492 Readings in Current Literature in Dental Hygiene and Preventive Dentistry (2) A WSpS
Discussion of reported readings and survey of background material, with emphasis on dental research and its application to dental health education. Prerequisite: permission of instructor.

D HYG 493 Problems in Dental Hygiene (2-4) A WSpS
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) A WSpS
Application of principles of learning to teaching methods and techniques effective in dental hygiene, with opportunity for course planning, demonstration, and practice teaching. Prerequisite: permission of instructor.

D HYG 497 Directed Studies in Dental Hygiene (*) A WSpS
Elective course based on student interest in special areas of preventive dentistry or dental hygiene education. The course allows independent study and a tutorial-student-faculty relationship. Offered on credit/no credit basis only. Prerequisite: permission of instructor.

D HYG 499 Dental Hygiene Extended Learning (*) S
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) A WSp
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 501 Introduction to Dental Hygiene Procedures (1) A WSp
See 501 for course description.
DHYG 595 Internship in Dental Hygiene Education (3-10, max. 10) AWRSp
Clinical and/or didactic teaching experience or program administration, planning and administration responsibilities assigned according to student's previous experience, education needs, and interest. Seminar required. Prerequisites: 494, status as registered dental hygienist licensed in at least one state, and permission of instructor.

DENTISTRY


DENT 401 Normal and Abnormal Growth and Development (2) A Normal and abnormal developmental processes and characteristics 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 423 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 associated with aging; and problems with institutional 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 setting, the goal is to achieve acceptable levels of management of patient care. Tasks are delegated to group members to achieve this goal. Offered on credit/no credit basis only.

DENT 460 Orthodontic Diagnosis (2) W Principles of orthodontic diagnosis and treatment planning 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) AWRSp Series of courses offered by the various departments, from which students may elect study in areas of special interest to them. These courses include subject matter applicable to all phases of dentistry, and may be applied toward 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 saveable capabilities of SPSS, utilizing SPSS control cards, data transformations, and documentation.

DENT 497 Extramural (*) AWRSp Extramural courses are 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 practice. Offered on credit/no credit basis only.

DENT 520 Biostatistics and Research Design (3) Lectures and programmed instruction in basic biostatistics, emphasizing the integration of statistics with research design and including measures of central tendency, regression, correlation, Chi-square, and comparison 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 interpretation of nonparametric and parametric statistical tests in dental research. Statistical package for the social sciences is used to provide examples of statistical tests discussed. Prerequisite: permission of instructor.

DENT 540 Temporomandibular Joint Diagnosis and Treatment (2, max. 8) AWRSp Four-quarter seminar and clinic sequence for comprehensive examination, diagnosis, and treatment of patients with temporomandibular joint problems. Includes management of dysfunction and morphologic alterations in associated muscles and occlusion. Prerequisite: permission of instructor.

DENT 560 Dental Photography (2) Freche Designed to provide the student with sufficient knowledge and experience use current photographic equipment for photographing patients (facial and integral), 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 treatment of pulp pathology and associated periodontal 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 frequently 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 I, II, III, IV (1, max. 7) AWRSp The student is required to complete endodontic treatment of anterior, premolar, and molar teeth. In addition to conservation 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 Technique I (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 root canal therapy, in surgical procedures, and in bleaching. Available to selected students.

ENDO 497 Directed Studies in Endodontics (*) AWRSp Course permits students and faculty who have common academic interest and 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) W Diagnosis and treatment of acute symptoms of dental origin, surgical endodontic therapy, traumatic dental injuries, and the relationship between periodontal and pulp pathology, including differentiation of diagnostically and appropriate treatment planning are discussed.

ENDO 505 Radiographic Interpretation (2) Various aspects of radiographic interpretation of particular relevance to endodontics, including interpretation 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 particular relevance to endodontics, including interpretation of normal structures, acquired and developmental abnormalities, infection, cysts, benign tumors, and diseases other than tumors.

ENDO 525 Physiology of Dental Structures (3) Current concepts in areas of physiology related to dentistry, including pain, taste, speech, microcirculation, occlusion, and calcification. Review of basic physiologic mechanisms, survey of recent literature, and design of applied dental research in each area. Offered jointly with P B 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, regenerative phenomena, differential diagnosis of oral pain, evaluation of case success, and replantation are representative topics. Course includes critical evaluation of presently accepted concepts and the better known literature upon which they are based, followed by study of the applicability and validity of the biologic concepts involved and of the historical development of present dica.

ENDO 550 Calculatation of Oral Tissues (2) Present concepts of the formation of dentin, enamel, cementum, and bone; role of vitamins, PTH, Calcitonin, serum Ca* and P* levels, PO4~ and inhibitors, and the relationship of various phosphate in matrix and crystal deposition; calcification, dissolution, and repair. Prerequisite: permission of instructor. (Offered alternate years; offered 1980.)

ENDO 551 Restoration of Endodontically Treated Teeth (3) AWRSp 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 555 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. (Offer 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 endodontic and related literature and to discussion of research methods.
ENOR 582, 583, 584 Treatment Planning Seminar (2,2,2) Weekly seminar to discuss controversial treatment problems and difficult diagnostic cases.

ENOR 585, 586, 587 Treatment Planning Seminar (2,2,2) Continuation of the weekly seminar to discuss controversial treatment problems and difficult diagnostic cases. Prerequisites: 582, 583, 584.

ENOR 591, 592, 593 Clinical Practice Teaching (1,1,1) Close supervision of required experiences in treating clinical endodontics to the undergraduate dental student.

ENOR 597, 598 Endodontics Teaching Seminar (2,2,2) Weekly seminars devoted to an examination of general problems of teaching and learning and specific problems of endodontics teaching.

ENOR 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 advisor. For other graduate course offerings, see individual department listings.

ORAL BIOLOGY

ORAL 301 Dental Plaque and Caries (2,2,2) A Etiology, pathogenesis, histopathology, epidemiology, and principles of prevention of dental caries. Considerable time is devoted to the formation, composition, and pathogenic potential of the dental plaque and its relation to dental caries. Required for students in dental hygiene; others by permission of instructor.

ORAL 324 Oral Histology (3) Sp Development and microscopic anatomy of structures of the oral cavity. Required for dental hygiene students; others by permission of instructor. Prerequisites: B STR 301 or equivalent or more advanced course in histology.

ORAL 400 Oral Histology and Embryology (5) W Development and microscopic anatomy of enamel, dentin, dental pulp, cementum, periodontal membrane, alveolar 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.

ORAL 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. Prerequisites involved in the prevention of cross-contamination and in the diagnosis of clinical infections.

ORAL 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, cellular alterations. Correlation of the gross, functional, and biochemical alterations.

ORAL 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 parotid 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.

ORAL 448 Directed Studies in Oral Biology (3) AWSpS See COMP D 449 for course description and prerequisite. Offered on credit/no credit basis only.

ORAL 449 Undergraduate Research Topics in Oral Biology (3) AWSpS Individual research on topics selected in collaboration with a faculty member. Offered on credit/no credit basis only. Prerequisite: permission of instructor.

ORAL 497 Directed Studies in Oral Biology (3) AWSpS Selected readings and seminars on a topic chosen by individual arrangement 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.

ORAL 498 Undergraduate Research Topics in Oral Biology (3) 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.

ORAL 499 Oral Biology 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

ORAL 500 Dental Caries (2-3) Series of lectures outlining the morphological, biochemical, and microbiological aspects of dental plaque and caries 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: courses in general mammalian histology, or its equivalent, and permission of instructor.

ORAL 502 Supervised Teaching in Oral Biology (1-5, max. 10) AWSpS Directed and guided experience in selected topics in oral microbiology, histopathology, and course design of courses given by the Department of Oral Biology. Students are required to participate in lecture and laboratory teaching under supervision of the course director. Prerequisite: permission of instructor.

ORAL 510 Clinical Oral Pathology (1-3, max. 10) S 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 tissue. The relation of these oral lesions to systemic disease is stress. Primarily designed for students with D.D.S., M.D., or D.V.M. degrees. Prerequisite: permission of instructor.

ORAL 515 Surgical Oral Pathology (2-4, max. 16) Students are trained to interpret microscopic slides of lesions from the oral cavity and related areas, and to correlate these with the clinical findings. Each student is responsible for the grossing of specimens and the preparation of histologic sections. Primarily designed for students with D.D.S., M.D., or D.V.M. degrees. Prerequisite: permission of instructor.

ORAL 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.

ORAL 532 Clinical Stomatognat° (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 procedures deemed relevant and essential to establishing a 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 radiographic, surgical, or therapeutic diagnosis.

ORAL 540 Oral Biology Seminar (1-3, max. 10) AWSpS Presentation and discussion of current research problems by members of the staff, investigators from other departments in the University, visiting scientists, and trainees. Prerequisite: permission of instructor.

ORAL 550 Research Techniques in Oral Biology (2-4, max. 15) Sp Introduction to biochemical, analytical, or morphological techniques employed in biochemical 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 determinations. Morphological techniques include light microscopy, electron microscopy, autoradiography, histochemistry, and cytchemistry. The analytical techniques show how, even with quite limited training, a biologist can use simple mathematical methods to describe living systems and to advance biological theory. Prerequisite: permission of instructor.

ORAL 581-582-583 Secretory Process in Exocrine Glands (1-3)(1-3)-(1-3) A, W, Sp Biologic, structural, physiologic, and biochemical aspects of individual secretory systems as integrated units. Faculty members with appropriate expertise participate in discussions and presentations during each of the three quarters.

ORAL 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 department. Prerequisite: permission of instructor.

ORAL 700 Master's Thesis (*)

ORAL 800 Doctoral Dissertation (*)

ORAL DIAGNOSIS AND TREATMENT PLANNING

ODTP 400 Introduction to Clinical Procedures (3) A 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 diagnostic criteria for arriving at a treatment plan are covered and applied to actual clinical examples.

ODTP 411 Internal Medicine (4-3) 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 extroral techniques. The radiographic appearance of pathology as seen on extraoral films.

ODTP 415 Introduction to Laboratory Diagnostics (1) Sp Laboratory procedures useful to the practicing dentist, including: 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 in biochemical or molecular pathology.

ODTP 425 Hospital Dentistry (1-3) Sp Introduction to techniques used in hospital procedures and protocol and specific patient types.

ODTP 430 Oral Medicine Clinical Conference (1-3) 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 dysfunction. Participation in discussion required.

ODTP 432 Oral Medicine Clinical Conference (-1) Sp
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 (*) A
AWSp
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) A
Biophysical, clinical, and interpretive aspects of dental x-ray procedures, with practical application in the completion of acceptable full-mouth surveys on patients.

ODTP 470 Clinical Oral Diagnosis and Treatment Planning (3-3) A
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 (2-1-1) A
Advanced instruction in diagnosis and in the examination and handling of patients. Students will block schedule and perform radiographic surveys, oral diagnosis, and treatment plans for prospective patients.

ODTP 485 Hospital Dentistry (2) A
Clinical experience that puts into practice the material presented in 415. The student is involved in hospital procedures and protocols and in dental care of the hospital patient.

ODTP 497 Directed Studies in Oral Diagnosis (*) A
AWSp
Permits students and faculty who have common academic interests to pursue them together within the curriculum by means of independent study and a student-faculty relationship. Offered on credit/no credit basis only. Prerequisite: permission of instructor.

ODTP 499 Oral Diagnosis Extended Learning (*) S
Supplements work and treatment planning 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) A
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 evaluative techniques, and variations of various diseases. Includes discussion on management of dental disease. Offered on credit/no credit basis only.

ORALM 530, 531, 532, 533, 534, 535 Rotations In Medical Disciplines (*, max. 4 each)
Clinical experience in the hospital practice of oral medicine, clinics, or rotation with various medical specialists. Offered on credit/no credit basis only.

ORALM 546 Clinical Oral Medicine (3-3) A
Clinical involving the diagnostic evaluation of patients with difficult and unusual oral diseases. The student diagnoses and treats the patient. Types of therapy include medications and chemical agents, functional physical therapy, and counseling.

ORALM 548 Oral Medicine Clinical Conference (*, max. 16) A
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)
Laboratory course directed toward the presentation and discussion of oral diseases and oral manifestations of systemic disease. Primarily the clinical manifestations and management of the patient management with in-depth discussions of therapy.

ORALM 576 Oral Medicine Literature Review Seminar (2, max. 16) A
Seminar analyzes the recent literature concerning the area of oral medicine, diagnosis, and therapy for oral disease.

ORALM 580 Advanced Radiographic Techniques (2)
Seminar and clinic concerning radiographic procedures necessary for visualization of soft and hard tissue structures of the maxilla, sinuses, temporomandibular joint, and mandible and soft tissue structures approximating the oral cavity. Emphasis placed on extroral and special techniques.

ORALM 590, 591, 592 Clinical Oral Diagnosis Teaching (*, max. 16 each)
Clinic designed to give the student experience and instruction in the teaching of clinical oral diagnosis. Treatment of emergency dental problems as well as routine and specific diagnostic procedures is emphasized.

ORALM 600 Independent Study or Research (*) A
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 student's ability to diagnose and treat dental emergencies, especially those emergencies that could be considered life threatening. Some instruction is given in the clinical manners on the diagnosis of dental problems, emergency treatment of dental abscess, such as syncope, hysteria, anaphylactic shock, and cardio-pulmonary arrest. A portion of the material presented emphasizes treatment of dental emergencies and their prevention. A portion of the material presented is designed to give students the knowledge necessary to perform dental surgery. Offered on credit/no credit basis only.

O S 401 Introduction to Dental Emergencies and Techniques of Local Anesthesia (2) Sp
Development of the student's ability to diagnose and treat dental emergencies, especially those that could be considered life threatening. Portion of material presented is designed to give students the knowledge necessary to perform dental surgery. Offered on credit/no credit basis only.

O S 410 Dental Sedation and Pain Control (2) W
An approach to the patient presenting concerns regarding the comfort of the dental procedures. Every form of sedation, from oral sedation to intravenous sedation, is presented. Students practice giving these drugs in 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) A
Theoretical and practical knowledge of minor and major oral surgery, using a broad and thorough approach. This includes lecture on the surgical treatment of teeth, impactions surgery, preprosthetic surgery, maxillofacial surgery, and regional techniques. Prerequisite: oral surgery course.

O S 431 Oral Surgery (3-3-3) A
Clinical and surgical techniques related to oral surgery. Theoretical and practical knowledge of minor and major oral surgery, using a broad and thorough approach. This includes lecture on the surgical treatment of teeth, impactions surgery, preprosthetic surgery, maxillofacial surgery, and regional techniques. Prerequisite: oral surgery course.

O S 432 Oral Surgery (3-3-3) A
Clinical and surgical techniques related to oral surgery. Theoretical and practical knowledge of minor and major oral surgery, using a broad and thorough approach. This includes lecture on the surgical treatment of teeth, impactions surgery, preprosthetic surgery, maxillofacial surgery, and regional techniques. Prerequisite: oral surgery course.

O S 433 Oral Surgery (3-3-3) A
Clinical and surgical techniques related to oral surgery. Theoretical and practical knowledge of minor and major oral surgery, using a broad and thorough approach. This includes lecture on the surgical treatment of teeth, impactions surgery, preprosthetic surgery, maxillofacial surgery, and regional techniques. Prerequisite: oral surgery course.

O S 434 Oral Surgery (3-3-3) A
Clinical and surgical techniques related to oral surgery. Theoretical and practical knowledge of minor and major oral surgery, using a broad and thorough approach. This includes lecture on the surgical treatment of teeth, impactions surgery, preprosthetic surgery, maxillofacial surgery, and regional techniques. Prerequisite: oral surgery course.

O S 435 Oral Surgery (3-3-3) A
Clinical and surgical techniques related to oral surgery. Theoretical and practical knowledge of minor and major oral surgery, using a broad and thorough approach. This includes lecture on the surgical treatment of teeth, impactions surgery, preprosthetic surgery, maxillofacial surgery, and regional techniques. Prerequisite: oral surgery course.

O S 436 Oral Surgery (3-3-3) A
Clinical and surgical techniques related to oral surgery. Theoretical and practical knowledge of minor and major oral surgery, using a broad and thorough approach. This includes lecture on the surgical treatment of teeth, impactions surgery, preprosthetic surgery, maxillofacial surgery, and regional techniques. Prerequisite: oral surgery course.

O S 437 Oral Surgery (3-3-3) A
Clinical and surgical techniques related to oral surgery. Theoretical and practical knowledge of minor and major oral surgery, using a broad and thorough approach. This includes lecture on the surgical treatment of teeth, impactions surgery, preprosthetic surgery, maxillofacial surgery, and regional techniques. Prerequisite: oral surgery course.

O S 438 Oral Surgery (3-3-3) A
Clinical and surgical techniques related to oral surgery. Theoretical and practical knowledge of minor and major oral surgery, using a broad and thorough approach. This includes lecture on the surgical treatment of teeth, impactions surgery, preprosthetic surgery, maxillofacial surgery, and regional techniques. Prerequisite: oral surgery course.

O S 439 Oral Surgery (3-3-3) A
Clinical and surgical techniques related to oral surgery. Theoretical and practical knowledge of minor and major oral surgery, using a broad and thorough approach. This includes lecture on the surgical treatment of teeth, impactions surgery, preprosthetic surgery, maxillofacial surgery, and regional techniques. Prerequisite: oral surgery course.

O S 440 Oral Surgery (3-3-3) A
Clinical and surgical techniques related to oral surgery. Theoretical and practical knowledge of minor and major oral surgery, using a broad and thorough approach. This includes lecture on the surgical treatment of teeth, impactions surgery, preprosthetic surgery, maxillofacial surgery, and regional techniques. Prerequisite: oral surgery course.

O S 441 Oral Surgery (3-3-3) A
Clinical and surgical techniques related to oral surgery. Theoretical and practical knowledge of minor and major oral surgery, using a broad and thorough approach. This includes lecture on the surgical treatment of teeth, impactions surgery, preprosthetic surgery, maxillofacial surgery, and regional techniques. Prerequisite: oral surgery course.

O S 442 Oral Surgery (3-3-3) A
Clinical and surgical techniques related to oral surgery. Theoretical and practical knowledge of minor and major oral surgery, using a broad and thorough approach. This includes lecture on the surgical treatment of teeth, impactions surgery, preprosthetic surgery, maxillofacial surgery, and regional techniques. Prerequisite: oral surgery course.

O S 443 Oral Surgery (3-3-3) A
Clinical and surgical techniques related to oral surgery. Theoretical and practical knowledge of minor and major oral surgery, using a broad and thorough approach. This includes lecture on the surgical treatment of teeth, impactions surgery, preprosthetic surgery, maxillofacial surgery, and regional techniques. Prerequisite: oral surgery course.
Courses for Graduates Only

ORTH 501, 502, 503, 504 Orthodontics Seminar (2, A, W, Sp)
Methods of diagnosis, analysis, and treatment planning of malocclusion; analysis of methods and theoretical principles used in the treatment of malocclusion. The student presents a detailed case analysis and plan of treatment for each clinical patient supervised. Each course is prerequisite to the following course.

ORTH 511, 512, 513, 514 Orthodontic Theory (2, A, W, Sp)
A four-quarter lecture-sequence dealing with interpretation and application of orthodontic principles and concepts. Pertinent literature, research findings, and current orthodontic theory are analyzed in depth.

ORTH 518 Scientific Methodology in Dental Research (2)

ORTH 520 Roentgenographic Cephalometry (2) A Basic principles, history, and techniques of roentgenographic cephalometry.

ORTH 525 Post-Retention Seminar (1, max. 2) A,W,S
Each student is required to locate one or more orthodontic patient(s) with at least ten years postretention. Concepts used in the treatment are reviewed. The student learns and discusses in the seminar. The instructor critiques the presentation and offers similar or contrasting cases for comparison.

ORTH 540 Orofacial Biology (4, max. 12) A,W,S
Comprehensive evaluation seminar of the literature relative to the growth and development of the craniofacial complex. Anthropology, embryology, morphogenesis, genetics, and concept of craniofacial integrated to give the student an appreciation of facial development. Outside reading assignments by the student are discussed and critiqued during the seminar discussion.

ORTH 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.

ORTH 550 Surgical Orthodontic Diagnosis and Treatment Planning (3) A,W,S
Seminar and clinic for orthodontic graduate students and oral surgery residents in comprehensive, integrated diagnosis, treatment planning, and treatment of the dental problems of the adult patient.

ORTH 560 Local Anesthesia (1, max. 2) A,W,S
Ten-hour lecture series on basic principles of multidisciplinary treatment planning, orthodontic diagnosis, biomechanics, and appliance therapy.

ORTH 582 Orthodontic Diagnosis and Treatment Planning for the Adult Dental Patient (3) A,W,S
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.

ORTH 600 Independent Study or Research (*) Prerequisite: permission of instructor.

PEDONTOICSON

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 dentistry, radiography, diagnosis, and dental anomalies.

PEDO 415 Pedodontics (1) W
Introduces the second-year dental hygiene student to numerous technical procedures in pediatric dentistry, including 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)
Introduction to pedodontics, which includes behavior management, oral diagnosis, preventive dentistry, dental anomalies, radiography, anesthesia, restorative dental procedures, pulpal therapy, interproximal orthodontics, and traumatic dental injuries of the child patient.

PEDO 470 Clinical Pedodontics (1-1-1) A,W,S
Diagnosis and examination of the child patient. Restorative procedures in primary and mixed dentitions.

PEDO 480 Advanced Clinical Pedodontics (1-1-1) A,W,S
Diagnosis and treatment planning, with emphasis on preventive dentistry. Complete operative procedures, including pulpal 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) A,W,S
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 (*) A,W,S
Comprehensive treatment of the disabled child in the hospital environment; the role of the pediatric dental patient in general practice; and orthodontic diagnosis and treatment planning in the mixed-dentition patient. Offered on credit/no credit basis only.

PEDO 499 Pedodontics Extended Learning (*) 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 consideration of emotional factors in pedodontic practice.

PEDO 530 Pedodontic Hospital Training (*) A,W,S
Provides clinical experience in the comprehensive dental care of hospital inpatients and outpatients. Treatment is carried out at Children's Orthopedic Hospital and Medical Center. Prerequisite: admission to the postdoctoral program in pedodontics.

PEDO 546, 547, 548, 549, 550, 551, 552 Clinical Pedodontics (4, *, *, *, *, *, *)
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) A,W,S
Explores usual and extraordinary medical, mental, and emotional problems of normal and handicapped children who receive comprehensive pedodontic care.

PEDO 588-581 Dental Care for the Handicapped Child (**) W,S
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,S
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 (*) A,W,S
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,S
Clinical experience in examination, treatment planning, and performance of periodontal therapy.

PERIO 470, 471, 472 Periodontics (1,1,1) A,W,S
Treatment of mild to moderate periodontal diseases.

PERIO 480 General Practice Periodontics (1-1-1) A,W,S
Treatment of patients with more complex periodontal involvement. The development of skill in treatment planning and execution by the individual student. Concrete experiences in surgical periodontics.

PERIO 491-493 Periodontics Elective (2-2-2) A,W,S
Clinic-sessional experience for selected fourth-year dental students that allows for clinical independence and individual responsibility in periodontal treatment and case analysis. Substitutes for 480.

PERIO 497 Directed Studies in Periodontics (*) A,W,S
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 (*) Supplemental work in periodontics to correct an area of student deficiency. Offered on credit/no credit basis only.

Courses for Graduates Only

PERIO 520 Hospital Periodontics (1) A,W,S
Prepares graduate students in periodontics to practice in hospital situations. Experience in operating with nitrous oxide anesthesia, general anesthesia, and intravenous premedication is offered. Hospital procedures for treating outpatients and inpatients are offered.

PERIO 546, 547, 548, 550, 551, 552, 553 Clinical Periodontics (4, 2-2-2, 4-2-2, 2-2, 2-2, 2-2, 2-2)
Clinical experience in diagnosis and treatment of periodontal disease.

PERIO 561-563 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 published within the past three years and 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
Lecture course covering basic bacterial structure and pathogens, the general oral microbial flora, and the bacteria associated with periodontal diseases, caries, endodontic abscesses, and other dental diseases; management of the dental office and means of controlling dental bacterial plague 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 qualified undergraduate students with the basic concepts of oral diseases.
immunology and immunopathology. Topics include cellular immunology, antibody structure and function, complement system, immunopathologic mechanisms, tumor immunology and immunopathologic 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 characteristics of the periodontal lesion, immunopathologic and other pathogenic mechanisms involved in the progression 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 standing or permission of instructor.

PERIO 577 Review of Literature (2, max. 14)
Continuous weekly seminar devoted to review of periodontic and related literature and the discussion of teaching methods and philosophy of teaching and treatment.

PERIO 582 Periodontic Treatment Planning Seminars (1-1, max. 8)
Weekly seminar involved with the presentation, discussion, and tentative solution of problems to complex problems in diagnosis and treatment.

PERIO 585 Supervised Experience in Teaching Seminars (1-1, max. 8)
Weekly seminar utilizing the case review method and dealing with the treatment of moderate to advanced periodontal disease.

PERIO 586 Longitudinal Evaluation of Periodontal Therapy (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 Disease Research Seminar (1, max. 12)
Weekly seminar devoted to advanced in periodontal research. 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 Prosthodontic Study (1-1-1)
Clinical course in prosthodontic surgery in which specific surgical procedures are performed by graduate students on a prescription basis for patients undergoing therapy in the University 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. Prerequisite: permission of graduate program advisor.

PROS 420 Management of Immediate Denture Patients (1) A
Lecture course describing and illustrating the clinical management of immediate denture patients (typical and overfiture).

PROS 421 Special Topics in Prosthodontics (1) Sp
Lecture describing and illustrating the following topics: reline procedure, management of difficult patients, maxillofacial 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 complete 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 for 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 physiologically acceptable removable partial denture. The student gains experience via clinically simulated laboratory exercises 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 dentures are fabricated. Follow-up care provided for patients previously treated.

PROS 480 Clinical Prosthodontic Maintenance (1-1-1) AWSp
Clinical course 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 (*) Sp
Supplemental work course 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 transition from natural to artificial dentition. This course provides an opportunity 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 edentulous patient requiring fabrication of a removable partial denture. Also study of supporting tissues and patient PHYSIOLOGIC RESPONSE.

PROS 566 Obturators and Speech Appliances (3)
Seminar-laboratory course devoted to the diagnosis and treatment of the patient with congenital or acquired defects of the palate and contiguous tissue. Various types of appliances are described and constructed.

PROS 565 Definitive and Adjunctive Mandibulofacial Appliances (2) Seminar-laboratory course devoted to the theories and principles in the fabrication of somatoprostheses, appliances for ressected or traumatized mandible; vehicle and protective devices in irradiation therapy; stents, alloplastic prostheses, splints and other special prostheses. Various materials and types of appliances are utilized.

PROS 568 Periodontal Treatment (1-1, max. 4) AW
Supervised experience in teaching clinical prosthodontics to the undergraduate dental student.

PROS 569 Definitive and Adjunctive Mandibulofacial Appliances (1-1) WSp
Clinical application of 564. Patients requiring the fabrication of obturators and speech 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 (1-3) AS
Review of literature. Prerequisite: permission.

PROS 578 Prosthodontic Technique Practice Teaching (1) ASp
Designed to provide practical experience, under supervision, in the teaching of technical procedures in undergraduate 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) AWSp
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 advisor.

RESTORATIVE DENTISTRY

RES D 400, 401, 402 Oral Anatomy (1-1,1) A, W,Sp
Detailed study of the human oral and paranasal structures from the standpoint of function, with attention given to systematized nomenclature. Study of the determinants of occlusion and instruction in the examination 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 manipulation 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 morphology, and the influence of tooth anatomy on selected clinical procedures. For junior dental hygiene students; others by permission of associate dean.

RES D 411 Restorative Dentistry Technical (3) Sp
Lecture-laboratory course offering experience in instrumentation and manipulation of restorative materials.
Special emphasis on dental amalgam and composite resin restorations. For dental hygienists. Prerequisite: 410.

RES D 412 Restorative Dentistry Technic (3) A Lecture and laboratory with experience in instrumentation 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 (5) 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 pre-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 restoration of dentition with crowns and fixed bridges. Related to practice operated on a model. Offered 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 restorations. Includes concepts to fulfill the inlay restorations supplemental to that presented in 404.

RES D 417 Operative Dentistry Lecture (2) Sp Helps students make transition from preclinical to clinical activities. Clinical restorations of amalgam, composite, and gold foil. Restorative and clinical application of dental materials and information on clinical operation.

RES D 420, 421, 422 Restorative Dentistry (1,1,1) A,W,Sp Lecture series closely related to 470, providing a means of comparison with the class regarding clinic instruction and policy. Presentation of new material related to the operations and procedures with which they are involved clinically.

RES D 424-425 Applied Dental Practice (Personal Management) (1-1) W,Sp Lecture, seminar, and clinical activity related to communicating with staff, delegation, scheduling, body mechanics and work position, efficient work systems, and staff techniques. Involves in lecture/seminar sessions with applications in a clinical setting designed to simulate a dental practice.

RES D 430, 431-432 Advanced Restorative Dentistry (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 office, 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) A Sp Physical and chemical properties of dental materials.

RES D 451 Dental Anatomy (3) A Lecture and laboratory on the morphology and nomenclature of individual teeth of the adult human dentition. Introduction to tooth histology and function and the influence of tooth anatomy on clinical dental procedures. 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 examination and charting of a patient's occlusion, record-taking for analysis of occlusion on a dental articulator, and preclinical diagnostic correction of problems of occlusion on articulated clinical cases.

RES D 454, 455 Restorative Dentistry Laboratory (3,3) W,Sp Provides preclinical experience in basic restorative principles 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 dentistry clinic. Clinical activities limited to operative procedures. Scheduled to be limited 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 restoration 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 involved teeth and the replacement of teeth, particularly anteriorly, 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-faculty 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 restorative dentistry.

RES D 570 Review of Literature Seminar (2, max. 12) AWSpS Continuous weekly seminar devoted to a review of restorative 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 (2-, max. 4) WS The seminar is coordinated application of knowledge gained from both graduate and undergraduate courses to the diagnosis and treatment of comprehensive dental cases with special emphasis given to the relationship 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 physiology of occlusion. Pertinent literature reviewed and discussed from the multidisciplinary viewpoint. The clinical sessions include training in masticatory functional analysis and treatment of occlusally related diseases.

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 student. Use and application of several fully adjustable 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 (1) AWSpS Involves patients in one of the clinical sciences, under the direction of one of the departmental faculty. Prerequisite: permission of graduate program adviser.
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 instructor, and the form must be filed in the Office of Educational Administration in Education. Students conducting studies under this rubric should be advised as to the proper format for their investigations should be regarded as a basis 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 setting priorities and goals for educational formations, for providing procedures for allocation of human resources, and for evaluating educational programs. Topics include bases for educational programs, needs assessment, goal setting, administrative decision making, evaluation of school programs, 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, supervision and control processes, differences and conflicts, managerial 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 within and 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 socioeconomic context. Topics include schools as complex organisms, schools as open systems interacting with other open systems, power, and consensus mechanisms. Prerequisite: graduate standing.

EDADM 507 School Finance (3) AWSpS
Franson
Objective is to aid students to acquire knowledge and understanding of the technical aspects of educational administration. 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
Franson
First-hand experience in applying planning and evaluation techniques to school problems. Includes school scheduling, network planning, information systems, program planning and budgeting, and enrollment projections. Each student is expected to conceive of problem 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, Bolton, Franson, 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 experience. Supervision by staff members of the College of Education and appropriate administrators in the selected school district. Prerequisites: completion of all other requirements for administrator's credential and permission of instructor.

EDADM 537 Special Problems in Educational Administration and Supervision (3, max. 9) AWSpS
Anderson, Andrews, Bolton, Franson, Johnson, Ostrander
Readings, lectures, and discussions of topics of special and current interest to school administrators or supervisors. Reports on new developments in research. Topics vary each year. Prerequisite: master's degree or permission of instructor.

EDADM 551 Seminar in School Supervision (3) AWSpS
Anderson, Bolton
Theory of the process of supervising school personnel, including an analysis of the techniques of supervision, theory of leadership and group process, interpersonal relations, and evaluation of teacher effectiveness. Prerequisite: master's degree or permission of instructor.

EDADM 552 Seminar in School Personnel Administration (3) AWSpS
Bolton
Major emphasis on the analysis of factors to be considered in the selection and evaluation of teachers, including determination of relevant criteria, acquisition and analysis of data, planning and decision processes.Less emphasis is given to other 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 school-community relations and organizational influences. Offered on credit/no credit basis only. Prerequisite: master'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. Attention is given to the understanding of administrative due process requirements and to the growing body of administrative law affecting student and personnel management. Prerequisite: 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 procedures, complaint and hearing procedures. Prerequisite: master's degree or permission of instructor.

EDADM 557 Seminar in Administration: Finance (3) AWSpS
Johnson
Current problems in school finance, including costs, ability to support schools, and financial implications of educational principles. The economics of public education. Problems of federal, state, and local school support. Financing capital outlay, research, and public relations. Prerequisite: master's degree or permission of instructor.

EDADM 558 Seminar in Administration: School Buildings (3) AWSpS
Schneider
Survey of problems and issues faced by educational administrators that are impacting on educational facilities. Directed readings and informal discussion of the people, process, 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 (2-4) AWSpS
Workshop for teachers facing educational administration. Topics may include personnel management, supervision of personnel, professional relations, conflict and planning procedures, power relations, school-community relationships. Prerequisite: 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, perception, communication, and dynamics of groups are studied through use of cases and simulated situations. 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
Franson, Johnson
Application of principles utilized in planning and organizing schools. Formation of policy and procedures; formal and informal organizations; 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 decision, social and psychological constraints, and application in simulated situations. Prerequisite: master's degree or permission of instruction.

EDADM 579 Internship in Educational Administration: Superintendent (1-6, max. 6) AWSpS
Anderson, Andrews, Bolton, Franson, Johnson, Ostrander
Recommended for candidates preparing for superintendent positions other than those having sufficient experience in central offices of school districts. Half-time work in a school district or districts for one, two, or three quarters, depending upon the student's previous experience. Supervision by staff members of the College of Education and the superintendent of schools in the selected school district. Prerequisites: completion of all other requirements for superintendent's credential and 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 advisor 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 advisor for the work proposed. It must be filed prior to registration. Prerequisite: permission of Educational Administration in the College of Education. A report or paper setting forth the results of the investigation is required. Prerequisite: permission of instructor.

EDUCATIONAL CURRICULUM AND INSTRUCTION

EDCAI 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 elementary school Spanish. Offered jointly with SPAN 128.

EDCAI 314 Business Education Clinic (1-15, max. 15)
Brown, Freichs
Business education clinic designed to develop and refine those skills that will aid students in attaining the professional capabilities for beginning business education teachers. Instruction is largely on an individualized basis, with measurement largely by group and by student standards. Focus is on situational skills, accounting, office machines operation, and data processing. Prerequisite: basic skills in business education. First hour of a laboratory session open to all, second and later hours reserved for those students who have completed the basic skills course. Prerequisite: permission of instructor.
EDC&I 315 The Teaching of Business Education: Typewriting, Shorthand, Office Practice, and Typing
Prerequisite: EDPSY 304.

EDC&I 316 The Teaching of Business Education: Accounting, Office Machines, Business Arithmetic, and General Business
Prerequisites: EDPSY 304 and 9 credits in accounting.

EDC&I 317 Art in Childhood Education (3)
AWPS
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)
AWPS
Provides the student with a theoretical and practical introductory background in the fundamentals of 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)
AWPS
Cooper
Provides the student with a theoretical and practical introductory 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 programs 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 languages in the secondary school.
Prerequisite: EDPSY 304.

EDC&I 330, 331, 332 The Teaching of French
Elementary, junior high, and senior high emphases. Prerequisites: 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
Prerequisite: EDPSY 304 and demonstration of language proficiency.

EDC&I 336 The Teaching of German in Secondary Schools (5)
Ruthar
Prerequisites: 329, EDPSY 304, GERM 303, or permission of instructor.

EDC&I 337 The Teaching of German in Elementary Schools (3)
Ruthar
Objectives 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) Auger
Special methods in the teaching of Russian to acquire prospective teachers with materials, methods, and problems.
Prerequisites: 329, EDPSY 304, and permission of instructor.

EDC&I 339 The Teaching of Scandinavian (Norwegian, Swedish) (2)
Special methods in the teaching of Norwegian and Swedish to acquire prospective teachers with materials, methods, 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 development of children, ages 8 to 12, with attention to musical activity and the general body of music content and skills.
Prerequisites: EDPSY 304 and MUSIC 119.

EDC&I 344 Materials and Methods of Teaching Chinese (3)
Text
Methods specifically pertaining to the teaching of Chinese language are discussed. Existing textbooks are reviewed. 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)
Krenning, Selters
Basic course in planning and teaching elementary language 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) McCrory, 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. Prerequisite: EDPSY 304.

EDC&I 357 The Teaching of Speech Communication (3) a Senior-Spicer
Special methods course in the teaching of speech communication at the secondary level. Prerequisites for majors 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) Krenning, 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) a Developmental readiness for reading; diagnostic teaching of reading in the classroom; reading instruction for bilingual learners; reading for special learners; developing the least restrictive environment; teaching functional reading and study skills; and materials and approaches for teaching reading.
Prerequisites: 360 and EDPSY 304.

EDC&I 365 Social Studies in the Elementary School (3) Banks, Hunkins, Jardinek, Kalousis
Basic course in planning and teaching of social studies in the elementary school. Prerequisites: EDPSY 304 and GEOG 100.

EDC&I 366 The Teaching of Social Studies in Secondary Schools (5) Galar
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) Olnstad, 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) Olnstad
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) Olnstad
Prerequisites: 371, EDPSY 304, and 25 credits in biology.

EDC&I 373 The Teaching of Chemistry (3) Ritter
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) Best, Kerth
Basic course in the teaching of mathematics in the secondary 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 content for industrial education; 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. Prerequisite: 400 or permission of instructor.

EDC&I 402 Instructional Analysis for Industrial Education Teachers (3) a Study of the techniques and procedures used in analyzing instructional areas into their basic elements, and an arrangement 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) Principles, problems, techniques, and methods of supervision; planning and organizing a supervisory program, equipment and instructional materials; relationship of supervisors 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 operating and supervising vocational schools and classes. Designed for supervisors, principals, vocational directors, supervisors, 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)
Study of the problems of industry such as employment practices, job requirements, materials handling and processing, plant organization and management that would exist in typical and vocational industrial practices. Prerequisites: teaching experience in industrial education and permission of instructor.

EDC&I 411 Principles and Problems in Distributive Education (3) a} With improvement of instruction, maintenance of high standards in work stations, and special techniques used by experienced coordinators in the solution of common problems. (Offered Summer Quarter only.)
EDC&I 413 Coordination of Cooperative Education Programs (3) Stresses elements, and reports on 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 for preparing and using typewriters.

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 matter; laboratory study of new inventions in office machines.

EDC&I 417 Materials and Methods of Teaching Shorthand and Transcription (3) Brown, Frerichs Recent research and experimentation in teaching shorthand and transcription are emphasized. Psychology of skill development and techniques for transcription systems: evaluation of teaching materials; considerations of standards, objectives, and teaching techniques. An advanced course for experienced teachers. (Offered Summer Quarter only.)

EDC&I 418 Principles and Problems of Business Education (3) Brown, Frerichs Objectives, history, trends, and issues of business education; federal participation in vocational education; economic, occupational, and population trends and their implications for educators; leaders in business education; research and problems.

EDC&I 419 Materials and Methods of Teaching Bookkeeping and General Business Subjects (3) Brown, Frerichs Techniques of teaching bookkeeping and general business subjects; relationship to the curriculum; standards to be achieved; content and organization of the subject matter; 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 interested in developing a school safety program in elementary, junior, and senior high schools. Special emphasis is given to the safe school environment and the role of the teacher in promoting safety.

EDC&I 424 Multidisciplinary Curriculum and Instruction (3) Banks Primarily for pre-service and in-service teachers who have little or no previous exposure to issues related to diversity and school policy. Designed to help teachers in better understanding the school's role in the ethic 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; textbooks; relation of Latin to other languages. Latin derivatives in English vocabulary. Offered jointly with LAT 475.

EDC&I 439 Caesar for High School Teachers (3) Grummel, Pascal Interpretation of Caesar's works in the light of their historical, political, literary, and geographical background, with special reference to the problems of high school teachers. Offered jointly with LAT 476. (Offered Summer 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) Development 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) Hirobayashi, Kreening Systematic treatment of the content, teaching processes, and learning and teaching environment in kindergarten and primary school with particular emphasis on current research and development. Prerequisite: EDPSY 304 or permission.

EDC&I 447 Teaching the Bilingual-Bicultural Child in the Elementary School (3) Wisp 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 migrant bilingual with emphasis on the educational difficulties the child experiences in all three settings. A major component of the course is bilingual-bicultural education—research findings and special programs, materials, and methodologies. Prerequisite: concurrent registration in EDC 302.

EDC&I 448 Teaching the Bilingual-Bicultural Student in the Secondary School (3) Wisp Gonzales, Juarez Provides prospective secondary school teachers with the knowledge and skill to integrate bilingual-bicultural studies into the curricular offerings of the secondary school. Focus on the cultural contributions of bilingual populations 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 subject bilinguals.

EDC&I 455 The Language Arts: Instructional Problems and Practices in the Elementary School (3) Sessions Study of important and recent research in elementary school language arts and consideration of its practical implications 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 477 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 auditory, cognitive, and creative construction of second language learning. Includes diagnostic-prescriptive strategies for classroom application.

EDC&I 460 The Teaching of Reading (3) Mossen, 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) Mossen Designed to provide assistance with materials used in the teaching of reading. basal readers, materials from content areas, and media for teaching reading. Prerequisite: one prior course in the teaching of reading.

EDC&I 462 Reading in the Secondary School (3) Foss, 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) Bill Assists students in understanding the Native American Indian child from cultural, socioeconomic, and psychological points of view. Provides opportunities for the student to apply knowledge and skills gained in other courses to prepare programs and learning aids relevant to the educational situation of the Indian child.


EDC&I 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 Curriculum (3) Discussion of the concepts and content of geography essential to effective social studies curricula. Offered jointly with GEOG 467.

EDC&I 468 Workshop in Instructional Improvement: Social Studies (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 literature, both theoretical and empirical, relevant to curriculum patterns and programs designed specifically for Black inner-city children. Special attention is given to the implications 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) Ouslim, Smith Designed for classroom teachers with reference to the teaching and learning of science from kindergarten through the junior grades. Emphasis on instructional methodologies, 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) Ouslim Survey of the status and potential role of science in education; trends and their implications for the teaching of both biological and physical sciences in the junior and senior high schools; representative curricula and related teaching procedures; the psychology of concept formation and problem solving; and organization of science programs. 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 Multicultural Studies: Methods, Content, and Materials (3) Banks Designed to help preservice and inservice teachers identify content and materials and devise methods for implementing ethnic studies programs and for incorporating ethnic content into regular K-12 social studies, language arts, and humanities curricula. Special attention is given to teaching about American Indians, Mexican Americans, Black Americans, Asian Americans, Puerto Ricans, and while ethnic groups. Prerequisite: admission to Teacher Education Program or teaching experience.
EDC&I 475 Improvement of Teaching: Elementary School Mathematics (2-6)  
Robel, 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: one and one-half years of high school algebra or MATH 100, 102.

EDC&I 476 Improvement of Teachings: Junior High School Mathematics (2-6)  
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 Teachings: Secondary School Mathematics (2-6)  
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 (3-5, 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, Torcikson  
Factors influencing the selection and use of learning resources, 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  
Theory and practice in producing still photographs and slides for teaching purposes; camera and darkroom techniques. Producing photographic materials to meet specific learning problems.

EDC&I 483 Basic Motion Picture Production (4)  
Driscoll  
Basic motion-picture techniques, emphasizing cinematography and editing.

EDC&I 484 Educational Film Production (3)  
Driscoll  
Advanced film techniques, including instructional film design, narration writing, sound editing, and re-recording. Prerequisite: 483.

EDC&I 485 Workshop in Instructional Improvement: Learning Resources (2-6)  
Driscoll, Hawk, Torcikson  
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 animation techniques in educational television and films. Relationships of frames, 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)  
Godfrey  
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 senior students; 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 television as instructors or as supervisors of school-oriented television, in cooperation with 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)  
Sponsors the planning of procedures for curriculum development, maintenance, and evaluation. Individuals taking this workshop have opportunities to develop and perfect strategies for program development and have occasions to utilize the strategies in master plan and materials preparation for simulated or real school situations. Students working with this program by arrangement with district. Prerequisite: permission of instructor.

EDC&I 495 Improvement of Teaching (3)  
To help teachers (1) understand the physical, psychological, emotional, and social needs of children; (2) adapt instruction to the needs of children; (3) select the approaches and instructional resources that will provide the soundest learning experiences; and (4) appraise themselves (offered only by special arrangement with school districts.)

EDC&I 496 Workshop in Instructional Improvement (3)  
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 by a study prospectus on a special form provided by the Office of Educational Curriculum and Instruction, endorsed 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 Instruction 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)  
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 technical education. Prerequisite: permission of instructor.

EDC&I 514 Coordination and Supervision of Cooperative Office Education Programs (3)  
Brown, Frerichs  
Practices and procedures in the initiation and sequential development of cooperative office education programs. Relevant techniques in coordinating, supervising, and evaluating cooperative office education programs; review of research studies, surveys, and reports; state requirements; preparation of proposals; analysis and evaluation of techniques of recruitment, selection, placement, training, and follow-up; assessment of skills and knowledge required for job performance; analysis of year of teaching experience in office occupations and valid state vocational certificate.

EDC&I 515 Seminar in Business Education (3)  
Brown, Frerichs  
Analysis of problems in business education; current research in business education; evaluation of work experience programs; developments in vocational business education. Prerequisites: 415, 418, 419.

EDC&I 520 Current Models in Early Childhood Education (3)  
Hirabayashi, Krenning  
In-depth analysis of current program models for the education of young children, with an emphasis on specification of objectives, evaluation of effectiveness, and development of model effectiveness. Models emphasized are those developed in this country, but the course also includes a study of models appropriate to other countries as they have influenced practice.

EDC&I 521 Problems and Issues in Early Childhood Education (3)  
Hirabayashi, Krenning  
Study of issues currently facing the field of early childhood education, emphasizing the rationale, impact, and management of child-care programs. Relationship of local 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, Krenning  
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 523 Seminar in Analysis of Approaches for Teaching Reading (3)  
AWS, Monson, Sebesta  
Designed to aid experienced teachers who possess background in the teaching of reading, this course presents a variety of approaches with implications for research on analysis of effectiveness and evaluation of reading, individually guided instruction, eclectic methodology, and others. Evaluation of pupil performance included. Prerequisites: teaching experience and a basic course in the teaching of reading.

EDC&I 531 Seminar: Analysis of Reading Materials (3)  
Monson, Sebesta  
Students formulate and apply criteria for assessing materials, with emphasis on linguistic, cultural, and psychological 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, Standaal  
Primary focus on those aspects of the reading process that are common to all reading contexts. Emphasis is on research dealing with factors influencing reading ability, problems in skill development, effectiveness 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. Prerequisites: permission of instructor.

EDC&I 533 Seminar: Conducting Research in Reading (3)  
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 research 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, language development, social values, and literary judgment of pupils and adolescents. Emphasis on analysis of research in these areas and on the development of action research designed to study response to literature. Prerequisite: one 400- or 500-level 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)  
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 literay 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) Fall
A Juarez
Study of the structure and organization of bilingual programs. Includes study of the developmental and organizational factors affecting bilingual education. Assists graduate students in reviewing the historical antecedents in bilingual education and in developing a personal philosophy about bilingual education.

EDC&I 542 Seminar in Bilingual Education: Instructional Foundations and Issues (4) W
Juarez
Study of the theoretical foundations and instructional implications of psychology and linguistics as they apply to bilingual education. Assists graduate students in exploring learning styles of bilingual children and in becoming familiar with the crucial issues in bilingual education.

EDC&I 543 Seminar in Bilingual Education: Instructional Strategies (4) Spring
A Juarez
Study of instructional factors affecting bilingual education. Particularly, theory, trends, instruction, and specific strategies they apply to bilingual education and in becoming familiar with the current issues in bilingual education.

EDC&I 555 Educational Futures (3) Spring
A Ellis
Concept of alternative futures, current social events affecting education, the current educational arena, and possible educational futures. Participants become acquainted with basic future studies methods and have opportunities to apply such methods in dealing with aspects of the educational arena. Prerequisite: prior graduate course work or experience in education.

EDC&I 556 Elementary School Curriculum (3) Fall
A Foster, Ellis, and Staton
Description and analysis of current curriculum practices, with particular emphasis on the interrelationships and dimensions of content, organization, methods, evaluation, trends, and issues. Prerequisite: teaching practice.

EDC&I 558 Secondary School Curriculum (3) Spring
A Johnson
Systematic description and analysis of the current curriculum practices, with particular emphasis on the factors and forces affecting secondary school curriculum.

EDC&I 559 Principles and Procedures of Curriculum Development (3) Spring
Guille, Foster
Intensive study of the basic principles and procedures utilized in the development of curricula. Prerequisite: teaching practice.

EDC&I 561 Seminar in Language Arts (3) Spring
Study of recent research in language structure with special attention to research pertaining to the teaching of language skills: auditory, 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) Fall
Foster, Staton
Study of recent research in listening, oral language, reading, and written language, emphasizing psychological and interrelated aspects. Prerequisite: permission of instructor.

EDC&I 563 Current Issues in Language Arts Education (1, max. 6)
Guille, Juarez, and Kalawitski
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) Spring
Guille, Juarez, Kalawitski
Intensive study of the social studies curriculum, with particular emphasis on current literature and research. Prerequisite: 465 or equivalent.

EDC&I 566 Seminar in Social Studies Education: Secondary Emphasis (3)
Guille, Juarez
Intensive study of the social studies curriculum, with particular emphasis on current literature and research. Prerequisite: 466 or equivalent.

EDC&I 567 Current Issues in Social Studies Education (1, max. 6)
Kalawitski
Discussion of problems and issues of current interest and importance in social studies education.

EDC&I 569 Educating Ethnic Minority Youth (4) Spring
Bank
Intensive analysis of research and review of the research and curricular programs related to the social, psychological, and political factors that influence the school experiences of ethnic minority youth. Special attention given to instructional 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 current literature and research. Prerequisite: 471 or equivalent.

EDC&I 572 Current Issues in Science Education (1, max. 6)
Kalawitski
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)
Kerch
Investigation of curriculum and instruction in mathematics 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)
Kerch
Investigation of curriculum and instruction in mathematics at the secondary school level; review of research and preparation of proposals. Prerequisite: 476 or 477, or equivalent.

EDC&I 577 Current Issues in Mathematics Education (1, max. 6)
Kerch
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, and factors affecting use 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)
Hawle
Study of factors affecting management of educational programs. Includes, media, use of visual and auditory materials and equipment. Prerequisite: 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 instructional practice in achieving traditional kinds of learning goals, cognitive, affective, and perceptual-psycho-motor.

EDC&I 585 Seminar: International and Cross-Cultural Education (3)
Driscoll
Treats selected instructional problems, innovation strategies, and the management of learning resources in various emerging countries.

EDC&I 587 Practicum in Learning Resources (3)
Driscoll, Hawle, 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, Hawle, 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, Staton
Exploration of the philosophy, history, purposes, curriculum, methods, school organization, and evaluation in elementary education, with emphasis on individual research. Prerequisites: elementary school teaching experience, 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: 559.

EDC&I 593 Seminar in Curriculum: Theory and Practice (3)
Guille, Ellis
Investigation of the area of curriculum theory and practice. Consideration is given to the development of models and relationships between various curriculum 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) Bruns
Emphasis, from a systems and futuristic view, on the current approaches to curriculum, curriculum innovation, and major educational issues as they affect curriculum activity. Prerequisites: 559 and teaching experience.

EDC&I 595 Seminar in Analysis of Teaching (3)
Guille
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 experience.

EDC&I 596 Strategies of Instruction (3)
Guille
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
Olstad
Offered each year as a two-quarter sequence. The first quarter focuses on the evaluator's roles, evaluation theories, and models, and selected curricular evaluations. Examples 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.
EDC&I 598 Internship in Curriculum (3-9, max. 9)
Recommended for all doctoral candidates preparing for positions in school districts in public school systems. 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 experience. Supervision by staff members of the College of Education and the appropriate school staff member in charge of curriculum in the selected school district. Registration must be accompanied by a study prospectus endorsed by the appropriate faculty advisor for the work proposed, and, with permission of the instructor, must be filed with the Office of Educational Curriculum and Instruction in the College of Education. Prerequisite: 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 prospectus endorsed by the appropriate faculty advisor for the work proposed and must be filed with the Office of Education 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.

EDC&I 600 Independent Study and Research (*)
Registration and equal financing of public schools. Open to law students and to nonlaw students enrolled as graduate students or as upper-division undergraduates. Offered jointly with History not satisfactory option available to nonlaw students only.

EDEPS 444 Constitutional Freedom and American Education (3-6, max. 6) S
Moritz
Emphasis on the principles, processes, and content of constitutional law in an effort to provide new insights and new tools with which school administrators and teachers may examine questions involving political and civil rights in the United States, especially as these affect the conduct of education. Specific topics on constitutional freedom include the obligation to go to school; legal controls over curriculum, teachers, and students; and racial integration and equal financing of public schools. Open to law students and to nonlaw students enrolled as graduate students or as upper-division undergraduates. Offered jointly with History not satisfactory option available to nonlaw students only.

EDEPS 458 History of American Education to 1865 (5)
Burgess

EDEPS 459 History of American Education Since 1865 (5)
Burgess

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. Prerequisites: 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)
Legers
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)
Kerr
Selected studies of education as a key to the good society.

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 advisor most appropriate for the project proposed and the instructor, and must be filed in the Office of Educational Policy Studies 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 investigation 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 educational policies and problems of research and evaluation of those policies. Includes survey of resources for description of particular types of policies.

EDEPS 502 Sociology of Education (3)
Examining 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 concepts, bases, and implications of educational theory and practice. Emphasis on relationships between enduring educational problems and fundamental philosophical issues; concepts that feature prominently in educational discourse; and conceptual analysis as a means for clarifying decisions regarding educational policy and practice.

EDEPS 510 Seminar in Educational Sociology (3)
Application of sociological principles to school problems; individual problems and investigations. For teachers, administrators, and those using educational sociology as a field for advanced degrees.

EDEPS 571, 572, 573 Public and Educational Policy Issues in the Development of Human Talent (3, 3, 3) A, W, Sp
Wolfle
Higher education and the nation's human resources; trends, future projections, policy issues, and national and personal goals in the relation between education and the utilization of professional and specialized personnel. Offered jointly with PSYL 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 criteria of historical scholarship and major trends analyzed 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)
Kerr
Study of the various ways in which philosophers of education 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 discourse of education. Prerequisites: 587 and permission of instructor.

EDEPS 589 Special Topics in History, Philosophy, and Sociology of Education (3, max. 18)
For credit by a study prospectus endorsed by the appropriate faculty advisor for the work proposed, and, with permission of the instructor, must be filed with the Office of Educational Policy Studies. Prerequisite: permission of instructor.

EDEPS 594 History of the Modern University (3)
Madsen
Growth of the modem university with attention to intellectual trends as well as organizational and curricular changes. Special attention is given to nine American universities in the twentieth century: Berkeley, Chicago, Columbia, Cornell, Harvard, Michigan, Stanford, Wisconsin, 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 advisor for the work proposed and must be filed with the Office of Educational Policy Studies. Prerequisite: permission of instructor.

EDEPS 600 Independent Study or Research (*)
Registration must be accompanied by a study prospectus endorsed by the appropriate faculty advisor for the work proposed and must be filed with the Office of Educational Policy Studies. Prerequisite: permission of instructor.

EDPSY 304 Educational Psychology (5)
W. Brown, Nolen
Basic undergraduate course in psychology concerned with the study of human learning in the educational setting. Learning motivation, technology, the cognitive process, human development and socialization, the affective processes and attitudes change, and classroom management. 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, Mitakawa, Peckham, Sax
Fundamentals of measurement, construction of achievement tests, selection and administration of standardized tests and scales, and evaluation and application of test results. Prerequisites: admission to a Teachers Education Program and permission of instructor.

EDPSY 400 Developmental Foundations of Early Learning (3)
Gray, McCartin, Mitakawa
Study of perceptual-motor, language, and overall cognitive development in children from birth through primary school age. Basic learning processes and guidelines for the assessment of developmental status. Field-based classroom projects are assigned when approved, and implications of early development for parenting and teacher behavior are stressed. Prerequisite: 304 or equivalent.
EDPSY 402 Childhood Socialization and School Practice (3) Evans, McCarron
Study of the development of personal-social behavior from the preschool through the preadolescent years. Basic concepts of socialization in United States culture and reviewed as is current research about American child-rearing practices. The role of the school in socialization is examined as part of the emphasis on social problems and the teacher as socialization agent. Prerequisite: 304 or equivalent.

EDPSY 403 Adolescence and Youth (3) Evans, Gray, McCarron
Overview of the adolescent period, especially for persons engaged in the helping professions—concerned with junior, 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) Freethill
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) Principles of mental health; normal personality development and functioning; relation of school environment to mental health of students, teachers, and administrators. Backdrop for mental health and psychological research 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, appropriate remedial instruction. Analysis and instructor that is considered both feasible and practical for the teacher working with individuals or a group.

EDPSY 422 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: EDCI 360 or equivalent.

EDPSY 447 Principles of Guidance (3) W. Brown, Lovelle, Williams
Study of guidance programs in elementary and secondary schools. Emphasis is given to the roles of specialists with emphasis on the role of the classroom teacher in school guidance programs. This course is designed for teachers, administrators, and guidance counselors. Prerequisite: 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 psychological services in schools and colleges. The course focuses on special topics that have either local or contemporary significance. (Not offered every year; check quarterly Time Schedule.)

EDPSY 490 Basic Educational Statistics (3)
Abbot, 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 by a study prospectus on a special form provided by the Office of Educational Psychology, endorsed by the faculty advisor most appropriate for the project proposed and that the study be appropriate for the requirements for the Office of Educational Psychology in the College of Education. Students activities and the field upon which the research is to take place is included in the form must be filed in the Office of Undergraduate Research in the College of Education. Studies developing activities 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.

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 (5, max. 15)
Fea, Gray
The psychology of children's thinking. Course emphasis is 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 emphasizes 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, Mitokawa, Nolen
Study of linguistics and the psychological implications of classroom and learning. Prerequisite: permission of instructor.

EDPSY 506 Instructional Theory (3) Brown, Fea
Examination of cognitive theories of learning related to instructional strategies. (Offered alternate years; check quarterly Time Schedule).

EDPSY 507 Reading Disability: Etiology and Diagnosis—Practicum (5) Nolen, Thalberg
Theory and basic concepts underlying appraisal techniques and causality. Lectures and clinical practice in administrative-scoring and evaluating each technique, and in interpreting and communicating results. Prerequisites: 425 and permission of instructor.

EDPSY 508 Clinical Supervision—Practicum (2-4, max. 12)
Practicum in supervising, counseling, group counseling, diagnostic activities, and remedial reading therapy. Prerequisites: advanced graduate standing and permission of instructor.

EDPSY 510 Seminar in Educational Psychology (3-5, max. 15)
Seminar on advanced topics in educational psychology. A critical appraisal of current research. Prerequisites: advanced 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 psychology. 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/label, cognitive style, locus of control, and motivational systems) that affect learning among minority students, and 2) teaching strategies appropriate for these cultural socioeconomic variables.

EDPSY 514 Seminar in Quantitative Methods (3, max. 15)
Abbot, Klockars, Peckham, Sax
Seminar on such topics as measurement techniques, research design, inferential statistics, and statistics. Prerequisites: permission of instructor.

EDPSY 515 Seminar in Development and Socialization (3, max. 15)
Evans, Gray
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 instructor.

EDPSY 516 Seminar in Learning and Thinking (3, max. 15)
Mitokawa, Nolen
Seminar in the psychology of learning language and language learning. Each seminar is oriented with predesign 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

EDPSY 520 Human Learning and Educational Practice (3)
Evans, McCarron, Mitokawa
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. Prerequisite: 304 or equivalent.

EDPSY 521 Educational Issues in Human Learning (3) Freethill, Gray
Study of contemporary problems in learning with emphasis 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 psychology and/or psychology.

EDPSY 522 Reading Disability Clinic (3-5) Freethill
Supervised practicum in diagnosing and teaching children 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 research. Psychological, social, and economic determinants of vocational development and choice are examined as a basis for vocational counseling. Prerequisite: graduate standing or permission of instructor.

EDPSY 543 Seminar in Vocational Psychology (3) Forster, Lawrence
Self-directed, shared learning experiences for persons in preparation for eventual work in certain helping professions 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, Williams
Emphasis on the theory and practice of student counseling.

EDPSY 545 Practicum in Counseling (3-6, max. 6) Brammer, R. Brown, Fenner, Forster, Lavelle, Lawrence, Thalberg, Williams
Supervised practice in counseling. Prerequisites: 541, 544, and permission of instructor.
EDPSY 546 Internship in Student Personnel Services (1-12, max. 12) Supervision and critical evaluation of student personnel activities for advanced students. Prerequisite: permission of instructor. 

EDPSY 547 Organization and Administration of Student Personnel Programs (3) Brammer 
Basics in planning, organizing, and operating school student personnel programs; analysis of issues and problems encountered in formulating policy; supervision and evaluating services. Prerequisite: permission of instructor. 

EDPSY 548 Educational Implications of Personality Theory (5) Bashey, Frethill, Olch 
Study of personality development and personality theory with continuous attention to the meaning of these in educational practice, testing, and counseling. Prerequisites: 15 credits of psychology and educational psychology. 

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 analysis. Prerequisite: 544 or permission of instructor. 

EDPSY 551 Student Development Services in Higher Education (3) Brammer 
Survey of historical study of the philosophy and practice of student personnel work in American colleges and universities. 

EDPSY 552 Seminar in Counseling Specialty (1-3, max. 6) A WSPs 
Bashey, at times, Brown, Forster, Lavelle, Williams 
Oriented 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 designated settings. 

EDPSY 561 Group Process Laboratory (3) Brammer, Bashey, R. Brown, Fenner, Forster, Lavelle, Lawrence, Williams 
Experience in small-group process. Collateral discussions of process and independent study. Prerequisite: permission 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 disabilities, and focusing on techniques acquired in 540, 542, and 544. Prerequisite: permission of instructor. 

EDPSY 565 Personality Appraisal (5) Brammer, R. Brown, Frethill, Gray, Meacham, Olch 
Study of personality evaluation with a supervised laboratory emphasizing work with children and their families. Prerequisites: 540, 542, 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 (1, max. 3) 
R. Brown, Gray, Frethill, McCartin, Meacham, Nolen, Olch, Zuckerman 
Seminar in current issues in professional psychology. Limited to master's degree students in school psychological services. Prerequisite: permission of instructor. 

EDPSY 590 Computer Utilization in Education (3) Peckham 
Introduction to programming languages, computer utilization in the solution of research problems, data reduction to forms amenable to computer processing, appropriate framing of problems for solution by computers, utilization of program packages. Prerequisite: 490. 

EDPSY 591 Methods of Educational Research (3) 
An introduction to educational research, primary focus on hypothesis development, experimental design, use of computer assisted data collection. Prerequisites: 308, 490, and permission of instructor. 

EDPSY 592 Advanced Educational Measurements (3) 
Kloock, 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, Kloockars 
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) 
Multivariate Review and critical examination of measurement strategies and evaluation procedures in contemporary settings for early childhood development and education. Emphasize a study of early childhood education evaluation research, established and experimental measurement techniques, and the problems of measurement and evaluation unique to young children. Skills in the interpretation of measurements and the design of evaluation studies in early education. Prerequisite: 308 or equivalent. Recommended: 490. 

EDPSY 596 Program Evaluation (3) 
Kloock, Peckham, Sax 
Advanced course in evaluation research emphasizing nontraditional designs, especially those that impose severe ecological constraints on the evaluators. Prerequisites: 593, 594, ED&L 597, or permission of instructor. 

EDPSY 597 Test Development (3) 
Kloock, Sax 
Principles of test construction, including criterion and norm-referenced tests, item writing and sampling, test administration, preparation, scoring, and item validation techniques. Problems of scaling and norming of collective 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 instructor, the form must be filed with the Office of Educational Psychology in the College of Education. A report or paper setting forth the results of the investigation is required. 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 investigation is required. Prerequisite: permission of instructor. 

EDPSY 700 Seminar in School and Community Psychology (1, max. 3) 
R. Brown, Gray, Frethill, McCartin, Meacham, Nolen, Olch, Zuckerman 
Seminar in current issues in professional psychology. Limited to master's degree students in school psychological services. Prerequisite: permission of instructor. 

EDPSY 790 Computer Utilization in Education (3) Peckham 
Introduction to programming languages, computer utilization in the solution of research problems, data reduction to forms amenable to computer processing, appropriate framing of problems for solution by computers, utilization of program packages. Prerequisite: 490. 

EDPSY 817 Principles and Practices of Adult and Continuing Education (3) 
A. Murray, Williams 
Historical and current development of adult and continuing education in the United States; component parts of the field; issues, theory, and research; program planning for adults; professionalization of the field. 

EDPHE 430 Higher Education and the Ethnic Minority (3) A Morishima 
Designed to provide the student with information on special problems in higher education (e.g., access, areas of study, financial ability, etc.) faced by the nonwhite ethnic minority student. Special emphasis is given to the comparison among the four race-ethnic groups. Additional emphasis placed on major differences. 

EDPHE 496 Higher Education Programs and Problems (1-6, max. 12) Brammer 
Individual and group study of significant topics such as planning, development, organization, operation, or evaluation of current or emerging programs or problems in higher education. Prerequisite: permission of instructor. 

EDPHE 499 Undergraduate Research (2-5, max. 15) Brantley 
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. 

EDPHE 501 Occupational Programs in Higher Education (3) Schill 
Analysis of occupational preparation programs in institutions of higher education, industry, business, and government agencies, with emphasis on methods of determining content, on processes for evaluation, and on research. 

EDPHE 502 College Instruction (3) Relin 
Analysis of various instructional modes, media, and instructional programs with emphasis on current research findings and methodology. 

EDPHE 503 The Community College (3) 
Brammer 
Study of the history and development, the roles, the objective, and the organizational structure of the community college and of the problems and the issues confronting the two-year college. 

EDPHE 504 Academic Freedom and Tenure (3) S P Williams 
Historical analysis of academic freedom and tenure issues, leading to the development and defense of individual rights on present and future status of these issues. Special attention to the impact of collective bargaining on academic freedom and tenure. 

EDPHE 505 The American College and University (3) Cope, Williams 
Introduction to contemporary United States higher education, with special emphasis on emerging trends, roles of the several kinds of institutions, the composition and character of student bodies and faculty, and the state coordination of colleges and universities. 

EDPHE 506 History of American Higher Education (3) Williams 
Examination of the historical development of the American higher education enterprise. 

EDPHE 507 Training Programs in Business and Industry (3) WS Schill 
Examinations 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 employees elsewhere for training. 

EDPHE 508 Academic Governance and Collective Bargaining in Higher Education (3) S Ortwang, Schill 
Explores the concept and operation of collective bargaining in higher education: its origin; the reasons for its growing popularity as a governance mechanism; the legal foundations within which it is practiced; the rights, powers, and duties subsumed under its operation; and its relationship to the traditional form of faculty governance mechanisms. 

HIGHED 

HIGHED 417 Priniciples and Practices of Adult and Continuing Education (3) A Murray, Williams 
Historical and current development of adult and continuing education in the United States: component parts of the field; issues, theory, and research; program planning for adults; professionalization of the field. 

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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, community colleges, and other institutions of higher education with the goals held for higher education by those in the environment. Development of personal statements of, and justifications for, goal priorities for higher education, 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 institutions 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 conceptualized in terms of personal development, the growth of knowledge, and impacts on the environment society. The content is organized in association with manual English.

EDHED 513 The University, a Critical Event, and Development of the Community College (3)
Cope
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) E
Cope
Intensive study of selected topics and proposals for research in higher education. Prerequisite: permission of instructor.

EDHED 592 Institutional Research Methods (3) A
Morishima
For students planning to engage in institutional research in higher education. Primary emphasis on survey research and data-gathering techniques. Analysis on theory, format, caveats, and the like. Students expected to develop forms for class critique. Prerequisite: permission of instructor.

EDHED 590 Independent Study or Research (3) E
Williams
Registration must be accompanied by a study prospectus endorsed by the appropriate faculty advisor for the work proposed and must be filed with the Office of Higher Education. No credit or report paper setting forth the results of the investigation is required. Prerequisite: permission of instructor.

EDHED 505 Special Education

EDHED 404 Exceptional Children (3)
Ryckman, Lawrence
Atypical children studied from the point of view of the classroom teacher.

EDHED 414 Integrating Handicapped With Non-Handicapped Preschool Children in the Inner City (3)
Upper-level course designed for teachers and aides planning to work in inner-city preschool classrooms where handicapped children are integrated with nonhandicapped children.

EDHED 418 Vocational Development of Handicapped Children and Youth (3)
Williams
Curricular aspects of vocational training relevant to each age level in the education of handicapped children. Application of programmed instructional techniques to breaking down the occupational task. Emphasis on familiarizing school personnel with interdisciplinary services and community resources available to assist them in facilitating the maximal vocational development of handicapped children and youth.

EDHED 419 Interventions for Families of Handicapped Children (3) WS
Edger
Upper-division course for professionals and paraprofessionals working with families of handicapped children enrolled in special education or integrated programs.

EDHED 435 Principles and Practice of Manual English (3)
Peterson
Nature of manual communication is introduced with an identification of its specific modes: sign language, signed English, simultaneous method, fingerspelling, and manual English. Discussions center on the linguistic structure of signs, the psycholinguistic effects of signs on young children, and a review of the pertinent literature. Laboratory sessions emphasize manual English.
of dependent and independent variables, research design, reliability, validity, and data analysis. Prerequisite: 510.

EDSPE 512 Evaluation of Instructional Materials for Exceptional Children (3)
Theory and practice of determining the quality of instructional materials in terms of (1) the systems of specific subject matter organization and (2) specified instructional outcomes.

EDSPE 513 Clinical Appraisal of Exceptional Children (3)
Ryczek
Diagnostic instruments used in the clinical appraisal of exceptional children. Theoretical considerations are used to heighten practical experiences in appraisal related to intervention.

EDSPE 514 Fundamentals of Reading for Handicapped Children (3)
Presented in 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 special education, such as legislation, interdisciplinary function, 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 instructional materials for exceptional children. The course involves a basic examination 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 evaluated in seminar discussion. Prerequisites: EDSPSY 490 and 591 or equivalent, or permission of instructor.

EDSPE 518 Seminar in Special Education Research (1, max. 3)
Affleck, Haring
Designed for doctoral students in special education during the second semester of the candidate selects a dissertation problem and submits a proposal. Topics such as the procurement of subjects, the reporting and communication of research findings, and the evaluation of research are stressed. The seminar leads to the evolution of a viable dissertation proposal.

EDSPE 520 Seminar in Applied Special Education (1-12, max. 12) A
Designed for graduate students in special education. Focus on demonstrating and applying the theoretical constructs to special education. Prerequisite: permission of instructor.

EDSPE 521 Classroom Strategies for Developing Communication in Exceptional Children (3)
Ryczek
Discusses centers on the theory and models of communication. Neurophysiological bases of communication are then explored with reference to different types of exceptional needs. Emphasis is on the underpinnings 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 instruction and education of the severely/profoundly handicapped infant, child, adolescent, or young adult. Prerequisite: permission of instructor.

EDSPE 525 Evaluating Speech and Language Disability (3) B
Neel
Introduction to the principles of speech and language disability. Prerequisite: permission of instructor.

EDSPE 526 Seminar in Teaching and Research in Learning Disabilities (3) B
Lowenbraun, Ryczek
Advanced seminar for participants in learning disabilities. Prerequisite: permission of instructor.

EDSPE 527 Seminar in the Education of Children With Learning Disabilities (3) B
Lovitt, Ryczek
Students will explore the learning disabilities of all students in the educational environment. Prerequisite: permission of instructor.

EDSPE 528 Seminar in the Education of Children With Learning Disabilities (3) B
Lovitt, Ryczek
In-depth study of learning disabilities in the educational environment. Prerequisite: permission of instructor.

EDSPE 529 Seminar in Counseling of Exceptional Children (3) B
Haring
Advanced seminar for participants in counseling exceptional children. Prerequisite: permission of instructor.

EDSPE 530 The Hearing Impaired (3) B
Lowenbraun, Ryczek
Consideration of the needs of the deaf from social, economic, and educational aspects. Prerequisite: permission of instructor.

EDSPE 531 Aural-Oral Communication for the Hearing Impaired: Part I (3) B
Lowenbraun
Methods for instructing hearing-impaired students in language acquisition problems. Prerequisite: permission of instructor.

EDSPE 532 Aural-Oral Communication for the Hearing Impaired: Part II (3) B
Lowenbraun
Methods for instructing hearing-impaired students in language acquisition problems. Prerequisite: 531.

EDSPE 533 Teaching Language to the Hearing Impaired: Part I (3) A
Ryczek
Methods for instructing hearing-impaired students in language acquisition problems. Prerequisite: permission of instructor.

EDSPE 534 Teaching the Hearing Impaired: Part II (3) A
Ryczek
Methods for instructing hearing-impaired students in language acquisition problems. Prerequisite: permission of instructor.

EDSPE 535 Teaching Language to the Hearing Impaired: Part III (3) A
Ryczek
Methods for instructing hearing-impaired students in language acquisition problems. Prerequisite: permission of instructor.

EDSPE 536 Mental Retardation (3)
Ryczek
An advanced course in mental retardation and the problems it presents to parents, the mentally retarded, the community, the schools, and society.

EDSPE 537 Learning Disabilities (3)
Ryczek
Analysis of major theoretical approaches to the study of learning disabilities. Prerequisite: permission of instructor.

EDSPE 538 Instructional Modifications for the Education of the Mildly Handicapped (3)
In-depth study of several instructional approaches for the education of the mildly handicapped.

EDSPE 539 Seminar in Teaching and Research in Learning Disabilities (3) B
Lowit, Ryczek
Advanced seminar for participants in learning disabilities. Prerequisite: permission of instructor.

EDSPE 540 Seminar in Counseling of Exceptional Children (3) B
Haring
Advanced seminar for participants in counseling exceptional children. Prerequisite: permission of instructor.

EDSPE 541 Seminar in Teaching and Research in Learning Disabilities (3) B
Lowit, Ryczek
Advanced seminar for participants in learning disabilities. Prerequisite: permission of instructor.

EDSPE 544 Seminar in the Education of Children With Learning Disabilities (3) B
Lovitt, Ryczek
Advanced seminar for participants in learning disabilities. Prerequisite: permission of instructor.

EDSPE 545 Seminar in Teaching and Research in Learning Disabilities (3) B
Lowit, Ryczek
Advanced seminar for participants in learning disabilities. Prerequisite: permission of instructor.

EDSPE 546 Seminar in Teaching and Research in Learning Disabilities (3) B
Lowit, Ryczek
Advanced seminar for participants in learning disabilities. Prerequisite: permission of instructor.

EDSPE 555 Seminar: Early Childhood Education for the Handicapped (3) W
Edgar
Advanced seminar on early childhood education for the handicapped. Prerequisite: permission of instructor.

EDSPE 599 Independent Study in Education (1-12, max. 12)
Briggs, Dimmitt
Independent study or readings of specialized aspects of education. Prerequisite: permission of instructor.

EDSPE 650 Independent Study or Research (1-12, max. 12)
Registration must be filed with the Office of Special Education 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 experiences in a specific community service organization, placement made according to participant interests and needs. Approximately sixty hours of participation on a prearranged schedule plus scheduled seminars are required. Prerequisites: application during quarter prior to participation and permission of instructor.

EDUC 302 Introductory Practicum in Classroom Teaching and Management (3-4, max. 9)
Briggs, Dimmitt
Opportunity is provided for initial participation experience in classroom teaching and management. Assignment is for twenty hours per credit in a specific school situation, level as requested. Scheduled seminars required. 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 experiences in a specific community service organization, placement made according to participant interests and needs. Approximately twenty hours of participation on a predetermined schedule plus scheduled seminars are required. Prerequisites: application during quarter prior to participation and permission of instructor.

EDUC 402 Practicum in Classroom Teaching and Management: Early Childhood, Kindergarten, Primary (Through Grade 3) (3-56)
Dimmitt
Teaching practicum is completed in an assigned school. Approximately twenty hours of participation on a predetermed schedule plus scheduled seminars are required for each credit earned. Placement is approved through the Office of Field Experiences. Prerequisites: EDSPSY 304, 308, and permission of instructor. (20 credits required for certification.)

EDUC 403 Practicum in Classroom Teaching and Management: Intermediate Grades, Middle School (3-36)
Dimmitt
Teaching practicum is completed in an assigned school. Approximately twenty hours of participation on a predetermed schedule plus scheduled seminars are required for each credit earned. Placement is approved through the Office of Field Experiences. Prerequisites: EDSPSY 304, 308, and permission of instructor. (20 credits required for certification.)
EDUC 404 Practicum In Classroom Teaching and Management: Secondary School (5-50) (Grades 7-12) Dimmitt
Teaching practicum is completed in an assigned school. Approximately twenty hours of participation on a predetermned schedule plus scheduled seminars are required for each student earned. Placement is approved through the Office of Field Experiences. Prerequisites: EDPSY 304, 308, and permission of instructor. (20 credits required for certifcation.)

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. Approximately twenty hours of participation plus scheduled seminars are required for each student credit. Participants wishing to fulfill an advanced community service existence to satisfy, in part, graduate program requirements should make such arrangements prior to enrollment with their advisor 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 certified teachers with selective, in-depth classroom participation experiences. Activities include: selected supervised reading instruction, assessment of learning disabilities, remedial or specialized teaching, experimental approaches to learning, etc. Participants wishing to fulfill an advanced classroom experience to satisfy, in part, graduate program requirements should make such arrangements prior to enrollment with their advisor 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 premasters graduate students (i.e., those who have not yet completed the master’s degree requirements in their major field at the University of Washington). Name of faculty member responsible for supervising the student should be indicated on the Program of Studies. Prerequisite: permission of supervisory committee chairperson or graduate program adviser.

EDUC 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 Completed satisfactory graduate work. Premasters students initiating doctoral dissertation research should register for 600. Name of faculty member responsible for supervising the student should be indicated on the Program of Studies. Prerequisite: permission of Supervisory Committee chairperson or graduate program adviser.

COLEGE OF ENGINEERING

COLLEGE COURSES

Courses for Undergraduates

FUNCTIONAL TECHNIQUES

ENGR 123 Graphical Analysis (1-8, max. 8) AWSpS Macamfrey
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. Approaches thirty units cover the following: techniques of freehand and instrument drawing; development of orthogonal view relationships; reading and interpreting engineering drawings; use of drafting instruments; and applied descriptive geometry and graphical statics; practical applications in graphical calculs, empirical equations, and nomography. Starting unit determined by previous experience. Subject matter covered determined by student's interests and major.

ENGR 120 Introduction to Technical Communication (5) AWSpS
Corequisites:
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) AWSpS
Corequisites:
Solution of problems in engineering measurements, statistics, probability, and unit systems. Design of experiments. Collection of data in several laboratories in the college. Recommended: MATH 124.

ENGR 141 Introductory FORTRAN Programming (4) AWSpS
Corequisites:
Computer programming using FORTRAN language. Includes use of one-, two-, and three-dimensional arrays and subroutines. 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) AWSpS Chakar
Design groups of three to five students attack problems assigned to give students as authentic an experience in engineering design as possible. Local industries and student organizations interested in the design of objects or systems related to their work are involved. Prerequisite: MATH 126, PHYS 121, Recommended: MATH 126.

ENGR 150 Special Projects (1-3, max. 3) AWSpS
Corequisites:
Students propose problems to solve to an engineering faculty member. The problems may be selected from the student's own experiences. Local industries and student organizations interested in the design of objects or systems related to their work are involved. Prerequisite: MATH 105 or permission of adviser.

ENGR 331 Scientific and Technical Reporting (3) AWSpS
Corey, Souther, Trimble, White
Principles of presenting technical material logically, concisely and effectively in written reports of various situations and audiences. For majors in engineering and similar professional programs, and for those in the natural, social, and health sciences. Emphasis on 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 utilized in the practice of engineering. The properties of inorganic and organic materials are related to atomic, molecular, and crystalline structure. Metals, ceramics, glasses, 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
Experiments in materials science designed to illustrate fundamentals related to the structure and the properties of engineering materials: optical microscopy, X-ray diffraction, mechanical properties, electrical conductivity, crystal growth, solid-state reactions. Prerequisite: 170, which may be taken concurrently.

ENGR 150 Introduction to Logical System Design (4) AWSpS Johnson
Introduction to concepts of logical design of specific classes of systems primarily observed in digital logic. Representation, conversion, and arithmetics of number systems related to digital systems. Boolean algebra fundamentals and operations. Topological representation of logical combinational functions, complexity reduction, optimization criteria. Time-dependent sequential logics using memory, repression, minimization, and implementation. Register transfer concepts. Three hours lecture weekly. Twelve hours self-paced laboratory.

ENGR 210 Engineering Statics (4) AWSpS
Sherer
Principles of statics, basic concepts, parallelagram law, Newton's law, moment, force, principle relationships, equilibrium diagrams, equilibrium analysis, three-dimensional 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
Hunts
Introduction to the concepts of stress, deformation, and strain in solid materials. Development of basic relationships that link 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 recommended for students who have taken 240. Prerequisites: 210, MATH 126, which may be taken concurrently.

ENGR 230 Kinematics and Dynamics (4) AWSpS
Merkel
Kinematics, dynamics, rectilinear motion, vector calculus, kinematics and kinetics of a particle, statics, friction, vibration, impulse, momentum, energy, and conservation laws, moving references, central force motion, systems of particles, rigid-body mechanics. Prerequisites: 210, MATH 126.

ENGR 240 Introduction to Continuum Mechanics (4) ASp Halegoue
Basic principles in the study of continuous media. Introduction 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 equations 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 applications in analog and digital circuits. Includes concepts of direct-current circuit analysis, circuit models for electronic devices, and solutions of first-order linear differential equations. Elementary circuit elements: diodes, transistors, and opamps, and their uses in analog and digital applications such as amplifiers, gates, and counters. Prerequisites: MATH 126, which may be taken concurrently, 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. Development of the basic laws of thermodynamics, together with an illustration of their application to engineering problems and state changes in engineering problems. Prerequisites: 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 introduction to the College of Engineering, curricular options, fields of engineering, interdisciplinary programs, and informations about general interest. Small sections provide an opportunity for students to become acquainted with an engineering faculty member and a time to ask questions and to obtain information on the major and educational 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, studia surveying, public land sys-
tem. Prerequisite: trigonometry.

ENGR 305 Environmental Radioactivity (3-4) Sp
Woodford
Study of the nature of the various sources of radioactivity
encountered today and to be expected in the future. Top-
tics 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
Albrecht, Garlid
Description and analysis of crucial questions; nontechni-
cal, political, economic, energy supplies and con-
sumption. Consideration is given to energy sources and
requirements on global, national, and regional scales;
foundations of energy generation, conversion, and dis-
distribution; resulting pollution and environmental effects;
controversies between environmentalists and growth pro-
ponents. All forms of energy are considered, but electric-
ity 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 (3-4) Sp
Bessono, Lurritten
Examines cases of engineering designs and identifies
ways in which social goals affect engineering designs in de-
,cisions. As part of this examination, social values and
public policy issues that generate design criteria are ex-
,amined. Equations, curve fitting, and algorithm, Taylor
series analysis, numerical integration, ordinary differenti-
al equations. Prerequisites: 141 or equivalent and
MATH 238, which may be taken concurrently.

ENGR 341 Computer Applications of Numerical
Methods (3) AWSp
Svarcz, Leventhal
Development and application of numerical methods and
algorithms to solve problems in engineering. Simultane-
ous equations, curve fitting, interpolating algorithms,
Taylor series analysis, numerical integration, ordinary differen-
tial equations. Prerequisites: 141 or equivalent and
MATH 238, which may be taken concurrently.

ENGR 345 Advanced Topics in Digital Computing
(3) AWSp
Redder
The concept of the higher level language. Advanced
FORTRAN techniques used to construct an interpreter,
including various FORTRAN IV statements, the
machine-dependent features of the CDC 6400, real and
integer pointer conversion subroutines and unstuffing,
object format, 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) AWSp
Redder
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. Prerequisites: 141 or equivalent.

ENGR 351 Inventions and Patents (1) Sp
Seel
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
C-gatek, Pfeiffer
Historical development of acoustics; the terminology and
units employed. Sound sources in engineering systems.
The physics of sound, traveling and standing waves. The
analysis of vibrating systems. Helmholtz resonators,
wave transmission, and reflection. Ultrasonics and In-
struments and their applications. Fluorescence and photo-
Prerequisite: 12 credits of engineering sciences or per-
mission of instructor.

ENGR 401 Analytical Methods in Engineering I (3)
Decher, Joppe, Rae
Acoustics applied to the problems of vibration and noise
in the atmosphere. Prerequisite: Junior standing or permis-
sion.

ENGR 402 Analytical Methods in Engineering II (3)
Joppe, Rae
Kinematics and dynamics of flow fields; incompressible
flow and steady state analysis. Prerequisite: COMP 322.

ENGR 498 Special Topics in Engineering (1-5, max.
6) AWSp
Kieling
Engineerling practice; the integration of classroom the-
oy with on-the-job training. Periods of work alternate
with periods of study. Open only to students who have
been recommended by their instructors. Prerequisite:
MATH 238.

ENGR 499 Special Projects in Engineering (1-5, max.
6) AWSp
Kieling
Engineering practice; the integration of classroom the-
oy with on-the-job training. Periods of work alternate
with periods of study. Open only to students who have
been recommended by their instructors. Prerequisite:
MATH 238.

AERONAUTICS AND
ASTRONAUTICS

Courses for Undergraduates

A A 300 Aerospace Dynamics I (4) A
Decher, Joppe, Rae
Aerodynamics as applied to the problems of flight of
vehicles in the atmosphere. Prerequisite: Junior
standing or permission.

A A 301, 302 Aerospace Dynamics II, III (4,4) W,Sp
Decher, Joppe, Rae
Kinematics and dynamics of flow fields; incompressible
flow and steady state analysis. Prerequisite: COMP 322.

A A 401 402 Spacecraft and Space Systems Design I, II (3)
Woodruff, Bollard
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 centered
from communications to solar power from space. Prerequisite:
Senior standing.

A A 424 Environmental Aspects of Energy
Conversion and Heat Engines (3) W
Dyer, Herrges
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.
Chemical, mechanical, and thermal aspects of engine
hybrid systems. Prerequisites: CHEM 140, ENGR 260, or
permission.
A A 430 Finite Element Structural Analysis (3) 
Holsapple
Introduction to the finite element method. Applications to stresses, strains, beams, plates, and structures. Prerequisite: 332.

A A 431 Plates and Shells (3) W 
Holsapple, Parmeter

A A 432 Structural Design (3) Sp 
Bollard, Holsapple, Parmeter
Design and evaluation of structural components. Methods of preliminary design. Arrangement of members. Selection of materials and member sizes. Practical design of selected components. Prerequisite: 331.

Bass, Joppa

Bass, Kevorkian, Vagner

A A 470 Analytical Problems in Aerospace Science (3) W

A A 475 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 computational analysis. Offered jointly with CER E 476, CESM 476, ME E 476, and MET E 476.

A A 480 Systems Dynamics (3) A 
Bollard, Fye
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 Aerelasticity (3) W 
Bollard
Discussion of aeroelastic problems in aircraft design; elementary development of static and dynamic aeroelastic problems. Prerequisite: 480.

A A 482 Aerodynamic Acoustics (3) Sp 
Fye

A A 499 Special Projects (2-5, max. 10) A WSp
Investigation on 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 
Christensen, Hirsberg, Street
Chemical thermodynamics; thermodynamics properties derived from quantum statistical mechanics, reacting gas mixtures. Introduction to nonequilibrium 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, molecular transport, and kinetic theory. Each topic alternates between Chapters 3, 4, and 5; Chapters 6, 7, and 8. 503 is a post-master's course with 502, or equivalent, as a prerequisite.

A A 504 Fluid Mechanics I (3) A 
Chorin, Derch, Oates, Russell, Street
Review of Newtonian fluids, vector and dyads. Derivation of the Navier-Stokes equations, stream functions and potential functions; integrals of the equations of motion. Boundary conditions and discontinuity surfaces. The ideal gas equation. Exact solutions. Dimensional analysis. Highly viscous flows. Prerequisite: 507, which may be taken concurrently, or permission of instructor.

A A 505, 506 Fluid Mechanics II, III (3,3,3) W, Sp, A 
Christensen, Derch, 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
Introduction to viscous flow; exact solutions of the laminar equations of motion; approximate equations. Exact solutions for laminar boundary layers. Approximate methods for flow in rotating layers. The phenomena of turbulence, transition prediction, Reynolds stresses, turbulent boundary layer equations. Free turbulent 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-numbered years.)

A A 511 Unsteady Aerodynamics (3) W
Oscillating airfoils; sonic 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 
Christensen, Hirsberg, Russell
Study of the physics and fluid mechanics of high-power lasers with emphasis directed to the performance of modern gas dynamic lasers, flowing chemical lasers, and gaseous electric lasers. Techniques of obtaining populations inversion, coupling problems, and the interaction of optical radiation with matter are part of the study topics. Due to the interaction 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 dynamic stability; the influence of aerodynamics on flying characteristics. Response of airplane to actuation of control; automatic stability and control. Prerequisites: 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 controls. Prerequisites: 516.

A A 523 Special Topics in Fluid Physics (3) A WSp
A A 524, 525 Aerothermodynamics of Aircraft Gas Turbine Engines I, II (3,3) W, Sp 
Decher, Oates
Aircraft gas turbine cycle analysis, off design performance. Component performances. Inlets, description of flow distortion, effects of moisture. Aerodynamic problems of fans and turbines. Throughflow theory, actuator 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, noise reduction techniques. Elementary duct acoustics, rotator-stator interaction, effect of design blade loading. Turbine noise, core noise, acoustic lining. Jet noise, Linearized 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-power commercial power generation. Gas-cooled nuclear reactors, very high temperature gas-cooled reactors. Flow properties in solids. Applications to structural design.

A A 535 Analysis of Shells (3) Sp 
Parmeter

A A 540, 541 Finite Element Analysis I, II (3,3) W, Sp 
Fye, Holapple
General theory of the finite element method and its application 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
Engineering background to the many flow regimes existing in the human body. Specific examples of flow problems such as cardiovascular, bronchial, microcapillary, urethra, etc. Offered jointly with BIOEN 547. Offered only when enrollment warrants; for permission of the instructor. (Offered odd-numbered years.)

A A 553 Vibrations of Aerospace Systems (3) W 
Bollard, Fye
Natural frequencies and modes of vibrations of linear systems; effect of forcing functions and initial conditions; 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) A WSp
A A 556 Aerelasticity (3) Sp 
Bollard
Course of functional diagrams and aeroservoelastic operators; quasi-static lifting-surface deformations and stability; control surface effectiveness; nonstationary lifting-surface deformation and stability; general dynamics of aerodynamic, structural, and control system interactions. Prerequisites: 481, 553.
A A 560 Optimization in Dynamic Systems (3) W Vagner
timization, problems of Mayer, Bolza, and Lagrange, necessary conditions of optimality, path constraints, corner conditions, Pontryagin’s minimum principle. Extreme fields, suffi­ciency conditions. Hamilton-Jacobi theory, dynamic pro­
gramming and systems. Elements of differential games. Emphasis on problem formulation and motivation of mathematical ideas rather than rigorous mathematical development. (Offered even-numbered years.)

A A 561 Techniques of Nonlinear Optimization (3) Sp Vagner
Selected computational techniques; advanced linear program­
ing, duality and Lagrange multipliers. Nonlinear and
nonlinear programming, search techniques, penalty tech­
niques, gradient techniques, dynamic programming, regular and singular. Differential equations. (Offered even-numbered years.)


A A 567 Analysis in Engineering I (3) A
Algebra and calculus of vector and tensor fields. Linear mappings, curvilinear coordinates. Complex variables. Tensor and vector analysis. Offered jointly with AMATH 567.


A A 569 Partial Differential Equations (3) Sp Kevorkian, Pearson, Vagner

A A 571 Principles of Dynamics (3) A
Pfeiffer, Kevorkian, Pearson, Vagner
Review of rigid-body dynamics; calculus of variations. Lagrangian mechanics. The canonical equations of Ham­
ilton; canonical transformations. Hamilton-Jacobi theo­
rem; 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 motion, 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
Basic concepts of asymptotic expansions with applica­
tions to differential and 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 AMATH 576, 577, 578. (Offered even-numbered years.)

A A 580 General Theory of Continuous Media (3) Sp Holsapple
General continuum theory of mechanics and thermody­

A A 583 Special Topics in Solid Mechanics (3) A
Approximation theory, curve-fitting. Numerical differen­tiation and integration. Linear and nonlinear algebraic equation systems. Ordinary differential equation meth­
tional 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.)


Pearson, Overt

A A 590 Special Topics in Applied Analysis (3) A
A A 594 Waves in Geophysics and Engineering (3) Sp

Pearson, Overt
Examination of the fundamental concepts and mathemati­cal descriptions of wave propagation; group and phase velocity, dispersion, effects of boundaries, normal modes, 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 CSEM 594 and GPHYS 594.

A A 599 Special Projects (1-5, max. 15) A
Sp
Investigation on a special project by the student under the supervision of a faculty member.

A A 600 Independent Study or Research (*) A
A A 700 Master’s Thesis (*) A
A A 800 Doctoral Dissertation (*)

BIOENGINEERING
See Interachool 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: concept, analysis, process and equipment design, operation; familiarization with the techniques of design. Prerequisites: CHEM 150, calculus, and sophomore standing or permission of in­
structor.

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, gas liquid, and multiphase extraction, and introductory thermochmistry. Prere­
qu Infinite 260, which may be taken concurrently, although inadvisable.

CH E 326 Chemical Engineering Thermodynamics (4) Phase equilibria and chemical equilibria in multicompo­
nen 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; one­dimensional flow with engineering applications. Prere­
quises: 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, convective, 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, and equipment design. Emphasis on the characteristics 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. Prere­
quises: 310, 326, 330, and 340.

CH E 436 Chemical Engineering Laboratory I (3) A
Sp
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) Sp
Continuation of 436. Laboratory investigation of chem­
ical engineering principles applied to equipment design with emphasis on heat transfer and mass transfer opera­
tions. Prerequisites: 340, 435, and 436.

CH E 461 Electrochemistry (3) F
Principles of electrochemistry with applications to batteries and industrial processes. Emphasis is on obtaining a basic working knowledge in the field. Offered jointly with E 461. Prerequisite: senior standing in en­
gineering 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 liquid and heterogeneous systems. Prerequisites: 310, 326, 330, and 340.

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 232 or permission.

CH E 471 Pulping and Bleaching Technology (3) W

Sarkanen
Conversion of wood to mechanical and chemical pulps. Kraft pulping; chlorine and chlorine dioxide pulping. Chemical recovery systems. Bleaching of mechanical and chemical pulps. Offered jointly with PFR P 476.

CH E 472 Papermaking Technology (3) Sp
Fiber sources and properties. Secondary fibers. Stock
Courses for Graduates Only

CH E 523 Seminar in Chemical Engineering (1, max. 20) AWSp
Topics of current interest in chemical engineering. Offered credit/no credit basis only.

CH E 525 Chemical Engineering Thermodynamics (4) A
Review of principles of thermodynamics. Applications to problems in multiphase and multisystem components; 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; membranes; chromatography. Theory and industrial applications, especially relating to pulp and paper industry. Prerequisite: 525 or permission of instructor.

CH E 530 Momentum, Heat, and Mass Transfer I (4) A
A derivation of the differential equations for mass, energy, and momentum transport. Principles of fluid mechanics; creeping flow, turbulence, boundary layer theory.

CH E 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; adsorption, continuous contact and stagewise operations; characteristics of contact equipment.

CH E 543, 544 Fluid Turbulence (3, 3) A,W
Gasier, Sleicher
Statistical and phenomenological theories of turbulence. Interactions between theories, turbulence in gaseous systems, turbulence in non-gaseous systems, turbulent boundary layer, turbulent free surface flow, recent literature. Offered jointly with M E 543, 544. Prerequisite: 6 credits in graduate fluid mechanics. (Offered Fall 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, adsorption, surfactant monolayers and micellar solutions; capillary hydrodynamics, interfacial turbulence and applications in distillation, absorption, and extraction. Prerequisites: 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 selected case studies pertinent to air and water pollution, biological and industrial processes. (Offered odd-numbered years.)

CH E 564 Fundamentals of Chemical Kinetics (3)
Krieger
Techniques for describing complex kinetic and thermodynamic systems as well as some experimental techniques for elucidating rate coefficients and mechanisms. Coupling of transport processes and reaction rates, intermolecular energy transfer, free radical rates, intermolecular energy transfer, free radical and chain reaction kinetics. Emphasis on engineering applications to combustion, pollution, atmospheric chemical systems, pyrolysis of solids and liquids.

CH E 565 Kinetics and Catalysis (3)
Findlayson, Hager, Johanson, Krieger
Homogeneous and heterogeneous systems with emphasis on chemical reactor design and scaling applied to industrial reactor design. Prerequisite: 525.

CH E 570 Chemistry of High Polymers (3, max. 6)
Alden
Fundamentals of high polymer chemistry, including kinetics of addition and substitution reactions. Determination of average molecular weights and chain length distributions, solution properties and the relationship between macromolecular structure and polymer properties. Introduction to rubber and fiber properties of various polymers. Prerequisite: undergraduate chemistry 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 physics with emphasis on the coupling of structure morphology. (Offered odd-numbered years.)

CH E 574 Cellulose and Lignins (3) W
Sarkanen
Chemistry and technology of cellulose, lignin, and related substances. Previews 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
Findley
Comparison of numerical techniques: similarity, perturbation, finite difference, Galerkin, orthogonal collocation methods as applied to nonlinear chemical engineering 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 effluents. Reduction of effluent volumes and quality of effluents. The history and development of the production of by-products and by-products. Novel pulp and bleaching techniques to reduce the formation of pollutants. Offered jointly with FOR 578. Available senior years. Prerequisite: 470, 471, or permission of instructor. (Offered alternate years; offered 1981-82.)

CH E 580 Topics in Chemical Engineering Design (3, max. 9)
Introductory and seminars on current design methods in chemical engineering, including technical and economic feasibility of processes, design and optimization of process equipment, and environmental and social constraints. Prerequisite: undergraduate chemical engineering design, admission to chemical engineering senior design student project, or permission of instructor.

CH E 589 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 (*) AWSp

CH E 700 Master's Thesis (*) AWSp

CH E 800 Doctoral Dissertation (*) AWSp

CIVIL ENGINEERING

CORE COURSES

Courses for Undergraduates

CIVE 206 Construction Engineering I (3) AWSp
Hoag, Terrel
Introduction to construction engineering, planning, scheduling, methods, contracts, and specifications. Production estimates; equipment selection; ownership and operation costs; role of the engineer in construction. Prerequisite: upper-division standing in civil engineering.

CIVE 316 Geomechanics (4) AWSp
Colcord, Veress
Introduction to geodetic and photogrammetric concepts and applications to engineering surveys. Errors, Measurement of position with modern techniques including use of tachometric, optical, and electronic instruments. Reduction to plane coordinates. Analysis and adjustment of measurements. Prerequisites: ENGR 141 or permission and 18 credits in mathematics.

CIVE 320 Transportation Engineering I (3) AWSp
Staff
Introduction to the historical development of transportation with present important legislation. Review of operating...
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characteristics of transportation modes, review of methods used to predict travel demand and capacity supply; study of basic geometric fundamentals and their relationship to design with emphasis on major components of administration and management of transportation systems. Prerequisite: upper-division standing in civil engineering.

CIVE 342 Fluid Mechanics (4) AWSpS
Neces, Nikan

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, turbulence. Prerequisite: 342.

CIVE 350 Environmental Engineering—Water and Air Quality (4) AWSpS
Ferguson, Seabloom,Sprydaits, 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 impact this has produced in these properties; significance of these properties to the engineer/scientist and to society. Laboratory sessions stress significant techniques and measurement, accuracy and precision, sampling, and design of surveillance systems. Prerequisite: CHEM 140. Recommended: CHEM 150, BIOL 210, or ENV S 204.

CIVE 351 Water Supply and Waste Management (3) AWSpS
Miller, Staff
General introduction to the physical and mechanical properties and engineering behavior of metallic and nonmetallic materials. Steel, aluminum, copper, wood. Laboratory testing, instrumentation, and investigation into macrobehavior, workability, brittleness of materials, and various aspects of materials science. Prerequisite: ENGR 220.

CIVE 366 Basic Soil Mechanics (4) AWSpS
Meese, Sheriff
Introduction to basic soil properties, soil classification, volumetric relationships, compaction, consolidation, soil rheology, shear strength, bearing capacity, and lateral stresses against retaining structures. Prerequisite: ENGR 220.

CIVE 379 Mechanics of Structural Elements (3) AWSpS
Bogdan, 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; inclusion of plastic behavior, beams in columns, volume design formula. Credit cannot be earned for 379 if 393 has been taken for credit. Prerequisite: ENGR 220.

CIVE 389 Analysis of Elastic Structures (3) AWSpS
Evans, Staff
Introduction to matrix structural analysis. Classification and idealization of structures. Matrix formulation of virtual work method of statics of mechanisms, of equations of equilibrium, geometry and force-deformation for structural members and for truss and frame structural systems, including eigenvalue problems. Computer solutions of matrix equations for statically determinate and indeterminate structural systems for deflections and member forces, using stiffness 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 structures. Criteria for structural adequacy and efficiency. Examination of the design process. Introduction to design of components. Prerequisites: 363, 379.

CIVE 390 Civil Engineering Systems (3) AWSpS
Brown, Nihal
Introduction to civil engineering system processes. Decision methods, economic considerations, linear graphs, optimization, and programming. Examples illustrating quantitative and subjective aspects of civil engineering practice. Prerequisite: Junior standing.

CIVE 423 Heritage of Civil Engineering (3 or 4) Sp
Brown, Colcord, Struesser
Contribution of civil engineering to civilization based on the lives and projects of prominent engineers and cultures. Incidents and individuals from prehistory to the nineteenth century give the student an understanding 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, Pile
Development of scientific methods for the tasks of problem 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, Nikan, Palmer
Introduction to probability distributions and statistics useful in systems analysis, conditional distributions, queueing 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 information 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 programming and analysis, internal and external financing, and regulations and environmental concerns. Students select topics in their areas of public works interest.

CIVE 505 Economic Analysis of Public Works (3) C
Horwood
Use of benefit-cost ratio, rate of return, and maximum of benefits as criteria in project justification, cost allocation, and selection among engineering alternatives in the design and construction of public works. Topics vary from year to year. Offered jointly with URB P 598.

CIVE 506 Theory of Design (3) Sp
Brown
Decision processes in design. Resolution of dichotomy between owner and society. Study of input data, analytical procedure, 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
Analysis of the interaction of technology and society through general principles and case studies of contem­porary technological issues. Study of the nature of the technologi­cal enterprise, its scientific base, ingredients of capital, specialized manpower, organizational structure and management, and the role 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 poli­cies; legal and economic considerations; process of pub­lic decision making. Offered jointly with SMT 540, 541, 542, and PB PL 540, 541, 542. Prerequisites: permission of instructor for 540; 540 for 541; 542 for 542.

CIVE 543 Marine Technology Affairs I (3) W
Week
Class studies in marine legislature, fishery conventions, coastal pollution, oil and gas extraction, environmental observations, planning for international exploration of the continental shelf, etc., to identify components in the marine technology enterprise, dynamics of interrelationships, externalities, policy planning and in­stitutional conflicts in setting goals, priorities, and pro­gram strategies. Offered jointly with O ENG 503. Prerequisite: 540.

CIVE 544 Marine Technology Affairs II (3) Sp
Week
Class-project group research on a contemporary marine issue in Washington, D.C. leading to specific pol­icy proposals. Offered jointly with O ENG 504. Prereq­uisite: 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 adjacent property. Not open to majors in civil engineering. Prerequisite: ARCH 321 or ENGR 220.

CESM 431 Sedimentology 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; reviews 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
Meese, Sheriff
Design considerations for foundations and retaining structures. Surface 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
Stability and elementary seepage theory. Foundation 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 slabs 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 solutions, interaction diagrams, and the effects of incremental loading and geometry changes. Prerequisite: CIVE 380.

CIVS 477 Structural Design Through Model Studies (3) W April, Mackey Theory of models, dimensional analysis, direct model analysis; studies employing specific materials, techniques of testing and measurement. Offered jointly with ARCH 521. Prerequisite: permission of instructor.

CIVS 481 Bridge Design (3) W Howerton Design of highway bridges. Design considerations; planning; characteristics of different types, economy, esthetics, location, 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.

CIVS 482 Prestressed Concrete Design (3) W Bridland, Howerton, Matlock Analysis, design, and construction of reinforced and prestressed concrete structures. Prerequisite: 484 or graduate standing.

CIVS 483 Design of Steel Structures (3) AWPs Roeder Design of steel structures, structural steels, manufactured products, and fabrication methods. The design of members and connections for various load conditions accepted in practice. Prerequisite: CIVE 381.

CIVS 484 Design of Reinforced Concrete Structures (3) AWP's Howerton, Matlock, Stanton Fundamentals of design of buildings in reinforced concrete in accordance with current codes and practices. Prerequisite: CIVE 381.


CIVS 486 Design of Timber Structures (3) AWP's Evans The design and construction of timber structures, using elements made of sawn wood, glued-laminated wood, and plywood. Prerequisite: CIVE 381.

CIVS 487 Structural Unit Masonry (3) Sp Lebert, Matlock Structural behavior and design of reinforced brick, tile, and unit masonry structures. Offered jointly with ARCH 426. Prerequisite: CIVE 381 or permission of instructor.

CIVS 498 Special Topics: Structures and Mechanics (1-5, max. 12) AWP's Special topics in civil engineering offered as course with lecture and laboratory. Maximum of 6 credits may be applied toward an undergraduate degree. Prerequisite: permission of department chairman.

CIVS 499 Special Projects: Structures and Mechanics (1-5, max. 12) AWP's Individual undergraduate research projects. Maximum of 6 credits may be applied toward an undergraduate degree. Prerequisite: permission of department chairman.

Courses for Graduates Only

CIVS 520 Seminar (1, max. 6) AWP's Required for doctoral students. Prerequisite: permission of thesis supervisor.

CIVS 561 Engineering Properties of Clay (3) A. A. Elsherief Soil strength, consolidation characteristics, structural concepts, rheological behavior, and related properties of clay. Prerequisite: CIVE 366.

CIVS 562 Stresses in Earth Masses (3) W Elsherief 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.

CIVS 563 Seepage and Slope Stability (3) W Meese Analysis of groundwater flow, using relaxation, matrix and finite-element methods, slope stability analysis, considering seepage forces and pore-water pressures. Prerequisite: 467.

CIVS 564 Applied Soil Mechanics (3) Sp Meese Passive pressure and bearing capacity theories. Foundation analysis, applications to soil and rock materials. Prerequisite: 467 or permission of instructor.

CIVS 565 Case Studies in Geotechnical Engineering I (3) A Case studies in geotechnical engineering, including stability of reservoir slopes and performance of dams, dykes, soil properties under dynamic and static loading, instrumentation. Prerequisite: graduate standing or permission of instructor.

CIVS 566 Case Studies in Geotechnical Engineering II (3) W Case studies in geotechnical engineering, including siting and design of nuclear reactor foundations, case studies, instrumentation and performance evaluation. Prerequisite: graduate standing or permission of instructor.

CIVS 571 Plates: Theory and Applications (3) W Zienkiewicz 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.)


CIVS 573 Matrix Structural Analysis (3) AS Zienkiewicz, Elsner, Hartz Matrix methods in structural mechanics. Review of basic matrix algebra. Theory of components of basic matrix force (flexibility) and displacement (stiffness) methods of structural analysis. Prerequisite: graduate standing or permission of instructor.

CIVS 574 Dynamic Structures (3) W Zienkiewicz, Elsner, Hartz Dynamics of structures using mode superposition and matrix methods. Laplacian and distributed parameter systems. Application to earthquake, moving and blast loads. Approximate and numerical methods. Prerequisite: 573 or permission of instructor.

CIVS 575 Variational Methods in Structural Mechanics (3) A Zienkiewicz, Elsner, Hartz Variational and energy methods in structural and solid mechanics. Application of calculus of variations and minimal principles of mechanics to nonlinear structural analysis. Stability. Theory of plasticity, plates and shells, and vibrations. Prerequisite: 574 or permission of instructor. (Offered alternate years.)

CIVS 576 Shell Theory and Applications (3) W Zienkiewicz General theory of thin shells. Membrane and bending behavior. Application to the design of dome, cylindrical, and translational roof shells. Prerequisite: 470 or permission of instructor. (Alternates every year with 571.)

CIVS 577 Finite Element Methods in Structural Mechanics (3) Sp Zienkiewicz, Elsner, 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 convergence and bounding and extension to investigation of stability and finite deformations. Prerequisite: 573 or permission of instructor.

CIVS 580 Statics Measurements and Instrumentation (3) W Hartz Experimental determination of strain under static and dynamic loads; strain gauges; transducers for displacement velocity and acceleration; photoelectric, bristle coating and other methods; problems of instrumentation, data collection, and analysis of data; use of modern IC and digital electronic components and computers or microprocessors for data collection and analysis. Offered jointly with O ENG 580. Prerequisite: graduate standing or permission of instructor.

CIVS 582 Advanced Structures II (3) W Vas, Varahiyal Analysis of stressed structures. Deflections and secondary stresses. Influence lines. Strain energy methods. Flexibility matrix, specialized or computer programs. Prerequisite: 573 or permission of instructor.

CIVS 584 Plastic Design of Steel Structures (3) A Roeder, Vasahiyal Plastic (inelastic) behavior of structural steels. Applications to the design of structural members and systems. Upper- and lower-bound theorems, minimum weight design, limitations and effects of the procedures. Prerequisite: graduate standing or permission of instructor.

CIVS 585 Advanced Design of Concrete Structures (3) Sp Hawkin, Matlock Advanced topics in the design of reinforced and prestressed concrete structures. Design of cast-in-place and precast statically indeterminate prestressed concrete structures. Design of prestressed concrete flat plate structures. Analysis and design of reinforced concrete structures (e.g., combined tension, bending, and shear, etc.). Prerequisites: 482, 484, or similar basic courses in design of prestressed and reinforced concrete.

CIVS 586 Structural Materials and Design (3) W Brown, Howerton 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.

CIVS 587 Advanced Design of Steel Structures (3) Sp Roeder, Vasahiyal Critical review and discussion of the factors influencing the function of a structure such as materials and fabrication methods. Welded, riveted, and bolted connections. Particular problems of welded structures. Design projects. Prerequisite: 586 or permission of instructor.

CIVS 588 Behavior of Concrete Members (3) A Matlock 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.

CIVS 589 Behavior of Concrete Structures (3) W Matlock 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.

CIVS 590 Wind, Wave, and Earthquake Response of Structures (3) Sp Hartz 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 loadings. Offered jointly with O ENG 590. Prerequisite: graduate standing in engineering.

COLLEGE OF ENGINEERING

CCESS 592 Theory of Elasticity II (3) A Brown, Evans
Rigorous formulations of classical theory making use of Continuum mechanics. Stress functions. Use of potential theory to obtain solutions in terms of Pappovitch functions. Prerequisite: 591, A A 530 or M E 551, or permission of instructor. (Offered alternate years.)

CCESS 594 Waves in Geophysics and Engineering (3) Sp Evans, Fyfe
Examination of the fundamental concepts and mathematical description of wave propagation, group and phase velocity, dispersion, effects of boundary, 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. Offered jointly with A A 594 and GPHYS 394.

CCESS 599 Special Topics: Structures and Mechanics (3-5, max. 15) AWSpS
Prerequisite: permission of instructor and department Chairperson.

CESS 600 Independent Study or Research: Structures and Mechanics (*) AWSpS

SPECIAL PROGRAM IN THE DESIGN OF BRITTLE CERAMIC MATERIALS

CESS 476 Introduction to Design With Brittle Materials (3) W Properties and behavior of ceramic materials are related to their use in advanced technology structure. 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.

CESS 496 Brittle Material Design Project (3) Sp Application of appropriate criteria and the interdisciplinary team approach in the design of structural components utilizing brittle (ceramic) materials. Offered jointly with CER E 496, MET E 496, and M E 496. Prerequisite: 476.

CESS 536 Brittle Material Design Problem (3, max. 9) AWSpS
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 GEOMETRONS 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 education, enforcement, courts, traffic engineering, insurance, and public support. Prerequisite: senior standing or permission of instructor.

CETC 405 Critical Path Methods of Project Scheduling (3) AWSpS
Dawe, 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, Terrell
Construction engineering, with emphasis on heavy construction. Includes selection of equipment, work analy- sis, methods, schedules, and labor cost. Prerequisite: CET C 306 or permission of instructor.

CETC 407 Contracts and Specifications (3) Sp Specification writing and the elements of contract law relat- ing to heavy construction and engineering services. Prerequisite: junior standing.

CETC 410 Traffic Engineering—Fundamentals (3) A Sawhill
General review of scope and functions of traffic engi- neering including its relation to urban planning, munici- pal engineering, motor vehicle registration, safety, and administration. Prerequisite: senior or graduate standing in engineering or permission of instructor.

CETC 413 Highway Capacity and Traffic Flow Theory (3) W Sawhill
Modern practices in the estimation of street and highway capacity; mathematical models; application of counting theory to traffic events. Prerequisites: CIV E 320 and se- nior or graduate standing in engineering.

CETC 415 Photogrammetry (3) A Veres
Geometrical characteristics of photographs. Planning and control considerations for mapping. Theory of stereoscopy, parallel measurements, interior and exterior orien- tation; Photogrammetric instruments and manufacture (production of maps, orthophotos, and cross sections). Evaluation of accuracies and error sources. Prerequisite: CIV E 316 or permission 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 cadastral systems; Subdivision design and site planning. Prerequisite: CIV E 316 or permission of instructor.

CETC 421 Urban Surveying and Mapping (3) Sp Colcord
Survey specifications. Urban projection systems and design of horizontal and vertical control for engineering, utility and city maps, and photogrammetric projects. Azi- muth design and map projection (production of maps, orthophotos, and cross sections). Ground and hydrographic map design project. Prerequisite: CIV E 316 or permission of instructor.

CETC 421 Transportation Engineering II (3) W Terrel, Staff Design, construction, and performance of the physical ele- ments of transportation facilities. Topics may include site location, drainage, roadway, airfield pavement, rail- ways, hydroways, pipelines, and other design compo- nents of transportation systems. Prerequisites: CET C 520 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. Performance evaluation of pavement design. Prerequisite: senior or graduate standing in civil engi- neering.

CETC 425 Introduction to Urban Transportation (3) A Hornwood, Staff
Identification of the framework, central concepts, con- straints, and issues of urban transportation planning. Offered jointly with URB P 425.

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: CET C 390 or permission of in- structor.

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 which the 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: CIV E 363 or equivalent and senior standing in engineering or architecture.

CETC 498 Special Topics: Transportation, Construction, and Geometrics (1-6, 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 Geometrics (1-5, max. 12) AWSpS
Individual undergraduate research projects. May be re- peated for credit. A maximum of 6 credits may be ap- plied toward an undergraduate degree. Prerequisite: permission of department Chairperson.

Courses for Graduates Only

CETC 507 Heavy Construction Estimating (3) W Hoag, Terrell
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 operations 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. Prereq- uisite: graduate standing or permission of instructor.

CETC 509 Traffic Engineering—Analysis (3) A Sawhill
Measurement and evaluation of characteristics of vehicu- lar volume, speed, and speed distribution. Parking studies and computer analysis of traffic engineering studies. Prerequisite: 410 or permission of instructor.

CETC 511 Traffic Engineering—Administration (3) 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 plan- ning and preliminary design for access facilities serving downtown areas and speculative degree, 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 facil- ities. Special design studies and reports. Prerequisite: se- nior or graduate standing in engineering.

CETC 515 Stereophotogrammetry (3) W Veres

CETC 516 Analytical Photogrammetry (3) W Veres
Basic principle of analytical photogrammetry. Stereocamera theory (2) the analytical plotter, distortion of plate coordinates. Perspective, Collinearity, coplanarity, space coordinate systems, translations. Space inter- sections, planes, and the geometric solutions using high-speed electronic computers. Prerequisites: 415, 530.

CETC 518 Aerial Triangulation (3) Sp Veres
Raster seroionigulation; instrumental aerial triangulation by independent pairs, serologon, surveileling and in- dependent geodetic control methods. Semianalytical
CETC 521 Methodology of Transportation Systems Analysis (3) W
Applications of the systems approach and historical approaches to transportation planning problems. Basic transportation system relations. Characteristics of supply-and-demand equilibrium problems for auto and transit. Transportation 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 service. Equipment, route selection. Running time. Station spacing. Prerequisite: graduate standing in engineering or permission of instructor.

CETC 525 Land Use Planning Models (3) A
Schneller
Review of theoretical basis of several existing models used to forecast urban growth patterns and their associated land use, transportation, and energy requirements. Model validation studies in relation to empirical studies of urban growth and change. Environmental implications of alternative urban growth patterns. Offered jointly with URB P 530.

CETC 526 Transportation Studies, Model Calibration, and Network Flow (3) Sp
Nilan
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 optimization 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 products. Urban geographic base file, and geographic data 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
Youngman
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 instructor.

CETC 530 Adjustment Computations (4) A
Veres
Two- and multi-dimensional distributions and concept of error, biases, covariances, weight and error propagation. Least square adjustment by variation of parameters and other methods. Adjustments of hybrid systems using matrix notation inversion by high-speed computers. Prerequisite: permission of instructor.

CETC 531 Geodesy (4) A
CETC 532 Mathematical Geodesy (1) A
Concepts of geometric, gravimetric, and astrogeodesy. Computation of geodetic position; gravity observation and reduction and reduction to gravity anomaly. Introductions 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 economic 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
Veres
Modern EDM instrumentation theory and applications; hydrographic and navigation systems; chart and map design, application of lasers in surveying; long line reduction and trilateration adjustment. Prerequisite: 530.

CETC 543 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 measuring 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 FISH 434. Prerequisite: senior or graduate standing in engineering.

CETC 544 Coastal Engineering I (3) AW
Richey
Laboratory survey of water waves, wave transformations due to boundary conditions, sediment motion, elementary tidal theory; applications illustrated by laboratory experiments. Offered jointly with O ENG 444. Prerequisite: CIVE 342.

CETC 445 Hydraulic Transients (3) A
Starr
Application of hydraulic principles to the design and function of hydraulic machinery, with emphasis on centrifugal pumps. Hydraulic transients in penstocks and force mains, including use of digital computer in analyzing such conditions. Prerequisite: CIVE 345.

CETC 446 Analysis Techniques for Groundwater Flow (3) W
Burge
Emphasis on developing appropriate equations to quantitatively describe saturated groundwater flow and analyzing the associated numerical problems. Application of numerical solution and computer programming instruction. Offered jointly with GEOG 480. Prerequisite: CIVE 342 or equivalent.

CETC 447 Physical Hydrology (3) A
Burge
Global water picture, data sources and data homogeneity, precipitation-transportation-flow to water resources; rivers, lakes, and groundwater flow problems. Participants required to obtain solutions to specific problems using numerical and experimental techniques. Offered during the course. Prerequisite: CIVE 342 or equivalent.

CETC 448 Open-Channel Engineering (3) W
Starr
The transportation of water by gravity flow. Analysis and design of channels, transitions, energy dissipaters, and similar structures. Analysis of surface profiles and effect of nonlinear alignment on flow. Design-oriented problems in open-channel hydraulics. Prerequisite: CIVE 345.

CETC 450 Man and the Pollution of His Environment (3) A
Burge, Nece, Pilat, Seabloom, Welch
Growing problems of air, water, and land pollution that the person must define the quality of man's environment is to be maintained. The quality and present production of water; their known environmental 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 aspects. Primarily for nonengineering students. Prerequisites: junior standing and a course in either biology, chemistry, physics, or oceanography from the "A" list.

CETC 451 Environmental Engineering Design (3) A
Bogan, Seabloom
Introduction to the theory and practice of planning and design of urban water supply, sewerage, solid wastes, and drainage collection systems. Evaluation of service areas and service requirements and the relationships to urban and regional planning activities. Engineering methods and computer programs for solving design for basic system elements. Prerequisite: CIVE 351.

CETC 453 Water and Waste-Water Treatment (3) Sp
Bogan
Objectives of water and waste-water treatment; associated physical, chemical, and biological phenomena; design of common treatment systems. Prerequisite: CIVE 351 or permission of instructor.

CETC 454 Sanitary Engineering Design Studies (3) W
Bogan
Individual and group design studies involving local community concerns. Application of the principles and methods presented in 451. Preparation of comprehensive plans and of

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preliminary design and cost studies for urban water supply, sewerage and drainage, and solid-waste collection systems. Presentation of engineering reports dealing with selected design problems. Prerequisite: 451, which may be taken concurrently.

CEWA 459 The Chemistry of Natural Water Systems (3) Sp
Benjamin, Ferguson, Spyridakis
Principles of chemical equilibrium relevant to natural wa­
ter systems; the nature and effect of chemical reactions of domestic and industrial waste effluents on natural wa­
ter systems; chemical principles involved in the treatment of waste and wastewater. Prerequisite: one year of gen­
eral chemistry or equivalent.

CEWA 457 Water Quality Analysis (3) W
Spryridakis
Laboratory evaluation of chemical quality of natural and waste waters. Theory and application of instrumentation used in water-quality measurement.

CEWA 458 Introduction to Air Chemistry (4) A
Charlton, Waggoner
The atmosphere as a chemical system; the analytical and physical chemistry of trace atmospheric constituents, with natural and man-made inputs. Offered jointly with ATM 5 458. Prerequisite: CHEM 160.

CEWA 461 Air Pollution Dynamics and Control (3) A
Rossano
Fundamental concepts of air pollution. Systems analysis approach to an analysis of the dynamic interaction between the essential factors of emission sources, metro­
tology, topography and adverse effects on sensitive re­
ceptors. Basic elements 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
Pilot
Overall approach for controlling air pollution. Definition of the problem, including the processes of air pollutants, atmospheric dilution capacity, emission sources, and detrimental effects. Factors involved in air resources en­
geering: legal aspects, air pollution control legislation and regulation, processes and equipment for controlling emissions of gases and particulate air pollutants. Case studies of specific air pollution problems. Priority for nonengineering students. Prerequisite: junior standing.

CEWA 467 Air Pollution Source Testing and Plant Equip­
ment Evaluation (3) Sp
Pilot
Engineering evaluation of air pollutant sources and air pollution control equipment, including 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
Pilot
Design of equipment to control emissions of air pollu­
tants from stationary sources. Procedures for calculating the design and operating parameters and sizes of air pol­
lation control equipment. Fundamental mechanisms and processes of gases and particulate control equipment. Control equipment for the abatement and destruction of gase­
ous pollutants and scrubbing electrostatic precipitation and filtration of particulate pollutants. Case studies of actual equipment on coal-fired power plants, pulp mills, aluminum reduction plants, metal smelters, and other industrial processes. Prerequisites: 461, 435, 740, senior standing in engineering, or equivalent or permission of instructor.

CEWA 470 Solid Waste Disposal (3) A
Scobee
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 collection and transportation aspects in solid-waste production and disposal are discussed, especially as re­
lated to community location and planning and to methods of family and controlling wastes concentration and utilization.

CEWA 485 Sampling Techniques for Water Quality (3) Sp
Perkins, Welch
Collection and analysis of water for selected biotic and bio­
logic 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
erequisite: 457 or permission of instructor.

CEWA 489 Special Topics—Water and Air Resources (1-5, max. 12) AWSpE
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) AWSpE
Individual undergraduate research projects. Maximum of 6 credits may be applied toward an undergraduate degree. Prerequisite: permission of department Chairperson.

Courses for Graduates Only

CEWA 520 Seminar (1, max. 6) AWSpE
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
Badger, Charlton, Harrison
Seminar for graduate atmospheric and atmospheric scientists in the atmospheric problems related to air pollution. A wide variety of topics is covered. Faculty lecturers and student participation. Offered jointly with ATM S 525. Prerequi­
tite: ATM S 301 or permission of instructor.

CEWA 541 Hydrodynamics I in Water Quality (3) W
Nece
Theoretical, field studies, and laboratory model ap­
proaches to diffusion in problems of concern to water re­
source engineers. Offered jointly with O EN 544. Prerequi­
tite: CIVE 342 or permission of instructor.

CEWA 542 Hydrodynamics I (3) A
Nece
Fundamentals of fluid potential motion. Two- and three­
dimensional flows, including surface flows. Conformal mapping, other solution techniques. Prerequi­
tite: CIVE 342 or equivalent.

CEWA 543 Hydrodynamics II (3) Sp
Pneumatikoflbosm of fiaaal flare, fiaaal, vesicous flows, the Navier-Stokes equations, and some exact solutions. Boundary layer theory. Introduction to turbulence. Some aspects of stratified and two-fluid flows. Prerequisites: 542 or permission of instructor.

CEWA 544 Coastal Hydraulics (3) Sp
Christensen, Richay
Nonlinear wave water waves and structural loadings analyzed for practical applications: random waves and structural responses analyzed by nonlinear techniques. Offered jointly with O EN 544. Prerequisite: familiarity with linear wave theory.

CEWA 547 Advanced Hydrology (3) W
Bessel
Detailed treatment of statistical methods used in hydro­
logic analysis. Stochastic hydrology, detailed examination and application of a deterministic watershed model (Stanford Watershed Model). Economic aspects of water use design. 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
sidations of waste-water treatment, including theory, purpose, evaluation, and design of secondary and tertiary processes. Prerequisite: CIVE 350 or equivalent or per­
mission of instructor.

CEWA 551 Sanitary Engineering Unit Operations (3) W
Brogan, Ferguson
Major unit operations employed in water and waste treat­
ment, including solids separations, filtration, chemical coagulation, treatment, and gas transfer and adsorp­
tion. Theory and basic principles. Development of math­
ematical models and evaluation of current design criteria and methods. Prerequisite: 456 or permission of instruc­
tor.

CEWA 552 Design of Water and Waste Treatment Processes (3) Sp
Bogan
Selection and functional design of water and waste treat­
ment processes to satisfy specific requirements. Comprehensive 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 or­
ganic materials encountered in waste and water-waste 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 biotechnological 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 wa­
ter resource development and management; water pol­
icy, programs, and administration; use relationships and conflicts; considerations for regional water resource sys­
tems.

CEWA 558 Water Quality Management (3) Sp
Mar
Water quality control objectives, methods and philoso­
phies; effect of various uses on water quality; receiving water characteristics; dispersion and behavior of pol­
lutants; treatment required for various water uses. Pre­
requisites: 434, 456, or permission of instructor.

CEWA 559 Water Resources System Management (3) A
Burgess, Mar, Palmer
Application of advanced quantitative methods to the analy­
sis of water resources. Includes quantity and quality issues in specific regions, emphasizing interbasins. Prerequisites: 557, 558, or permission of instructor.

CEWA 560 Topics in Environmental Health (3) A
Rossino
Introduction to human biology, including physiology, ep­
idemiology, and toxicology. Study of contemporary en­
vironmental health problems and practices as they relate to radiological health, solid-waste disposal, food- and wa­
ter-borne diseases, occupational health, biomecorol­
ogy, and biotechnology.

CEWA 563 Industrial Sources of Air Pollution (3) W
Rossino
Study in depth of the major sources of air pollution, in­
cluding analysis of flow diagrams, raw materials, off­
stream, pollution control facilities, and environmental impact. Field trips to representative plants; trip reports
E E 356 Linear Systems Analysis I (4) AWSp
Analysis of linear systems using Fourier series, the Fourier transform, Laplace transforms, and the convolution integral. Fourier series expansion of periodic signals. Response of linear systems to periodic nonperiodic inputs. The Fourier transform and convolution, the Laplace transform and system function transfer functions. Frequency response. Prerequisites: 333 or permission of department Chairperson.

E E 344 Electric Power Engineering (4) AWSp
Introduction to the theory and methods of analysis involved in the use of electrical 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 synchronous induction, and commutator machines. Prerequisites: 333 and 381.

E E 355 Linear Systems Analysis II (4) AWSp
Analysis of linear systems using Fourier series, the Fourier transform, Laplace transforms, and the convolution integral. Fourier series expansion of periodic signals. Response of linear systems to periodic nonperiodic inputs. The Fourier transform and convolution, the Laplace transform and system function transfer functions. Frequency response. Prerequisites: 333 or permission of department Chairperson.

E E 371 Fundamentals of Computer Organization and Operation (3) AWSp
Organization and operating principles of digital computers. Representation of information, processor components, computer organization, and levels of computer systems (microprogramming, machine, assembly, and system). Laboratory exercises demonstrate conceptual principles. Interfacing and the relation of computer design to program and computer applications. Prerequisites: 355, ENGR 190.

E E 372 Computer Engineering Laboratory I (2) AWSp
Digital computer laboratory exploring the computer at the assembly language level and illustrating concepts of central processor architecture, memory organization, input/output and interrupts. Assembly language programming. Projects assigned to the solution of various laboratory problems. Hands-on microprocessor stations are used. Prerequisites: 371, which may be taken concurrently.

E E 373 Data Structures and Algorithms (3) AWSp
Fundamental algorithms, and data structures for their implementation. Techniques for solving problems by programming, sorting, searching, linked lists, binary search trees, balanced trees, and other data structures. Use of computer systems. May include design and construction projects. Prerequisites: ENGR 245 or 445, or equivalent knowledge of Pascal.

E E 381 Electrophysics I (4) AWSp
Electromagnetic fields and polarization; Maxwell's equations, electromagnetic waves in line, and more effects of boundaries; transmission lines; radiation of a dipole antenna. Prerequisites: 335 taken concurrently, and permission of the Department Chairperson.

E E 383 Electrophysics II (4) AWSp
Waves in bounded regions; reflection, normal modes. The Fourier transform in three dimensions; uncertainty relations, particle density waves. Equilibrium energy distribution. Elementary electromagnetic properties of materials: conductivity in metals and semiconductors, dielctric and magnetic properties; polarizations. Prerequisite: 381.

E E 399 Special Topics In Electrical Engineering (1-3) AWSp
New and experimental approaches to current electrical engineering problems. May include design and construction projects. Prerequisites: permission of department Chairperson.

E E 401 Introduction to Assemblers and Compilers (3) W Fundamentals of assembler, compilers, and interpreters. Symbolic language, machine language processing, lexical analysis, syntax analysis, semantic analysis, and code generation for general-purpose programming languages. Offered jointly with CSCI 401. Prerequisites: E E 371 or CSCI 373 or 376.

E E 411 Introductory Network Synthesis (3) A Network representation, network function, principal domain, 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-Aided System Analysis (3) P Concepts, principles, and techniques concerned with the design, testing, and application of general-purpose problem-oriented computer programs for analyzing large-scale systems. Specific attention to implementation on computers. Prerequisites: ENGR 141 and senior standing.

E E 417, 418 Introduction to Communication Theory I, II (4, 4) W Sp Introduction to communication systems and general techniques of digital and analog communications. Elementary concepts of probability, random variables, and processes. Signals, spectra, random signals, and noise. Network communication by digital and analog methods. Modulation techniques including AM, FM, PM, PAM, PCM, and code synchronization. Channel capacity, noise, and control coding. Prerequisites: 335 or permission of department Chairperson.

E E 421 Electromagnetics I (4) A Fundamentals of acoustics and the electroacoustic aspect of signal processing. Electromechanical properties of transducers. Synthesis of systems. Includes laboratory to be arranged. Prerequisites: 383 or permission of department Chairperson.

and term paper. Prerequisite: 461 or permission of instructor.

C E W 563 Air Resources Management (3) Sp Focuses on the atmosphere as a vital natural resource, Clean-air strategies. Administrative and legal aspects of air conservation, air quality criteria and standards, controversial issues; design of area-wide surveys; long-range planning. Prerequisite: 461 or permission of instructor.

C E W 564 Aerosol Science and Technology I (3) W Charlson, Waggoner
Topics related to suspended particulate matter in a gaseous and particulate system. Statistics, mechanics, and physical chemistry of aerosols. Theoretical reference to particulate matter in the laboratory of experimental methods, Brownian motion, diffusion, coagulation, and light scattering. Prerequisite: permission of instructor.

C E W 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.

C E W 566 Control of Gaseous Air Pollutants (3) A Pilot
Principles and designs of processes used to control the emissions of air pollutants. Use of settling chambers, cyclones, filters, wet scrubbers, and electrostatic precipitators for controlling emissions of aerosol particles. Case studies of particulate air-pollutant control systems on emissions from Kraft pulp mills, sulfuric acid, pulp mills, hog fuel boilers, coal-fired boilers, aluminum refineries, etc. Discussion of particulate control pilot plant studies conducted by the University of Washington, EPA, etc. Prerequisite: MATH 238 or permission of instructor.

C E W 567 Control of Particulate Air Pollutants (4) W Pilot
Principles and designs of processes used to control the emissions of air pollutants. Use of settling chambers, cyclones, filters, wet scrubbers, and electrostatic precipitators for controlling emissions of aerosol particles. Case studies of particulate air-pollutant control systems on emissions from Kraft pulp mills, sulfuric acid, pulp mills, hog fuel boilers, coal-fired boilers, aluminum refineries, etc. Discussion of particulate control pilot plant studies conducted by the University of Washington, EPA, etc. Prerequisite: MATH 238 or permission of instructor.

C E W 590 Special Topics: Water and Air Resources (2-5, max. 15) AWSps
Prerequisites: permission of instructor and department Chairperson.

C E W 600 Independent Study or Research—Water and Air Resources (0-4) AWSps
E 433 Electronic Circuit Design (4) ASP
Electronic circuit design using modern electronic devices. Topics include application of integrated-circuit amplifiers and multipliers, design of solid-state amplifiers for low-level, high frequency, high power output, and the application of modulation theory to modern systems. The design aspect of solid-state electronic circuitry is emphasized. Prerequisite: 356.

E 436 Medical Instrumentation (4) SP
Spectral introductory course in the application of instrumentation to medicine. Topics include transducers, signal-conditioning, amplifiers and multipliers, feedback, basic electronic system problems. Dynamic performance, including methods for linear and non-linear systems, assignment of state variables, state equations, time domain solution of state equations, state transition matrix, impulse response matrix, frequency domain solution of state equations, methods of state variable analysis of the Fourier integral, multidimensional transforms. Prerequisite: 335 or permission of department chairperson.

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. Linear time invariant systems, convolution, assignment of state variables, state equations, time domain solution of state equations, state transition matrix, impulse response matrix, frequency domain solution of state equations, methods of state variable analysis of the Fourier integral, multidimensional transforms. Prerequisite: 335 or permission of department chairperson.

E 444 Linear Signals and Filtering (3) W

E 445 Nonlinear Systems Analysis (4)
A Dynamic analysis of nonlinear circuits and of other simple systems. Exact methods, graphical methods, approximate methods, including linearization and numerical and analog computer solutions. Stability. Forced vibrations. Prerequisite: 333 or permission of department chairperson.

E 446 Control System Analysis I (4) ASP
Linear systems in time and frequency domains. Pole-zero analysis, stability of feedback systems by root-locus and real frequency response methods. Design methods of root-locus and frequency response. Introduction to advanced topics in automatic control theory. Prerequisite: 335 or permission of department chairperson.

E 447 Control System Analysis II (3) SP

E 449 Electrical Machinery (5) A
Polyphase circuits and classical theory of rotating electrical machines and transformers for electrical utility and industrial applications. 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 450 Energy Transmission (4) A
High-energy lumped and distributed parameter evaluation; equivalent circuits, time and frequency domain analysis; wave propagation; loading; and high-frequency transmission lines. Prerequisite: 344.

E 454 Power System Analysis (4) W

System stability in steady-state and transient cases. Introduction to economic operation of power systems. Prerequisite: 344.

E 455 Power Systems Analysis II (4) SP
Steady-state power system analysis: Ybus and Zbus matrix description of large-scale power systems, load flow simulation, power system operation, and analysis of voltage and current control, governor and control systems, and automatic power equalization; short-circuit analysis, fault location, and fault protection; analysis of load flow characteristics of synchronizing power. Prerequisite: 454 or permission of department chairperson.

E 456 Numerical Methods in Power Systems (3) SP
Operation of a bulk power distribution network depends upon an accurate solution of the many complex computer problems. Dynamic computer programs and a thorough understanding of the dynamics and operation of large power networks. Prerequisite: 454 or permission of department chairperson.

E 460 Waves in Bioengineering (3) SP
Auth, Sigelmann
Ultrasonic, electromagnetic, and optical wave effects in biological tissues. Application of biomedical waves in diagnosis, therapy, and surgery. Offered jointly with BIOL 460. Prerequisite: 381 or other course in wave propagation as approved by instructor.

E 461 Electrochemistry (3) SP
Fundamental methods and applications with emphasis on batteries and industrial processes. Emphasis on obtaining a basic working knowledge in the field. Offered jointly with CHE 461. Prerequisite: senior status in engineering or permission of department chairperson.

E 467 Introduction to Radio Science (3) SP
Introduction to radio astronomy, including radio telescope antennas and interferometry, radio telescope receivers and radio sources. Remote sensing of the earth's surface in meteorology and ocean and land surface applications, including mapping of agricultural areas and natural resources. Selected propagation of the electromagnetic field by passive (ground) and active (scattering, acoustic sounding) techniques, ionosphere, and magnetosphere. Prerequisite: 383 or permission of department chairperson.

E 468 Applied Optics (4) W
Fundamentals of optical image formation, data processing, holography, interferometry, laser principles, optical detection, material interactions, scattering, and fiber optics. Prerequisite: 383.

E 469 Boundary Value Problems and Wave Fundamentals (3) SP
Wave propagation in varying types of material media of practical importance, including ionized, noisy, layered, anisotropic, and composite media. 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 standing.

E 473 Wave Shaping (4) WSP
Generation and transmission of special waveforms, including pulses, square waves, and linear ramps; clipping, clamping, and d-c restoration; stable, monostable, and bistable multivibrators; application to analog and digital systems. Includes one four-hour laboratory on alternate weeks. Prerequisite: 356.

E 474 Real-Time Computer Laboratory (4) AW Zick
Laboratory with major emphasis on real-time computer systems. Topics include: interrupts structure, context switching, software device handlers, system error detection and recovery. A structured approach to the solution of real-time systems problems in the area of data acquisition, analysis, control, and automation. Prerequisites: 371 and 373 or permission of department chairperson.

E 475 Digital Electronics and Microprocessors (4) A
WSP
Hardware-oriented course concerned with synthesis of digital systems, integrated circuit logic, digital code conversion, microprocessor hardware, MPU operation, address decoding, digital circuits, digital interfaces, and microprocessor software. Five laboratory periods. One four-hour laboratory on alternate weeks. Prerequisite: 371.

E 476 Logical Design of Digital Devices (3) WSP

E 477 Digital Computer Applications (4) ASP
Advanced topics in numerical analysis and their application to the solution of engineering problems using digital computers. Includes general numerical methods for solving 3rd order nonlinear differential equations; least squares approximation; Chebyshev approximation; fast Fourier transform and application to digital signal processing. Prerequisites: FORTRAN and ENGR 341, or permission of department chairperson.

E 479 Microcomputer System Design (5) WSP
Moritz
Intensive course covering microprocessor architecture and operation, assembly language instructions and programming, system design criteria and techniques for integrating hardware and software into actual systems. Prerequisites: 474 or 479. Weekly laboratory and a design project included. Prerequisites: 371; 475 recommended, which may be taken concurrently, and permission of department chairperson.

E 481 Fundamentals of Microwaves (4) W
Microwave circuit elements, resonators; microwave measurement techniques; beam-type and solid-state amplifiers. Microwave system concepts; microwave integrated circuit. Includes one three-hour laboratory per week. Prerequisites: 356, 383.

E 483 Semiconductor Devices (4) AW
Physics of p-n junctions and semiconductor surfaces; operating principles of various semiconductor devices. Development of small-signal circuit models for n-p-n and p-n-p transistors. Includes junction transistors, controlled rectifiers, field effect transistors, microwave and integrated circuit devices. Prerequisite: 383 or equivalent.

E 488 Laser Materials 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 489 Control System Components and Measurements (3) SP
Study of control system components and formulation of their mathematical models. Amplifiers, servomechanisms, servomechanism components, emphasis on experimental determination of dynamic parameters, and behavior of closed-loop systems. Two three-hour laboratories per week. Prerequisite: permission of department chairperson.

E 490 Special Projects (2-5, max. 10) ASP
Assigned construction or design projects carried out under the supervision of the instructor. Prerequisite: permission of department chairperson.

E 503 Real-Time Computer System Design (3) W
Zick
Engineering aspects of the development of real-time computer systems. Investigates the use and implementation of real-time computers in practical applications. Topics include system architecture, system software, internetwork and intersystem communications, man-machine interaction in real-time systems. Emphasis is on three areas: the structured approach to design of the overall system, defensive interfacing to ensure reliability and maintainability, and communication standards and protocols including IEEE-488, CAMAC, and SDL. Prerequisites: 371 and 474 or 479, or permission of department chairperson.

E 505 Introduction to Probability and Random Processes (4) W
Lyle, Martin
Probability theory; discrete and continuous random vari-
ables; stochastic process. Spectral analysis of random signals and noise. Prerequisite: graduate standing.

EE 506, 507 Communication Theory I, II (3,3) W, Sp

Lytle, Martin

Review of stochastic processes. Communication system models and channel capacity. Optimum detection, modulation and coding, convolutional codes and decoders. Typical channels, random and fading channels. Waveform communication, optimum filters. Prerequisite: 505 or equivalent.

EE 508 Stochastic Processes (3) W

Lytle, Martin


EE 509 Engineering Applications of Linear Graphs (3) W

Andersen

Elementary theory of linear graphs, incidence, cut-set and circuit matrices, matrix formulation of loop, node, and admittance techniques. Linear algebra and analysis of networks, signal flow graphs, applications to switching circuits, automata and communication nets. Prerequisite: graduate standing or permission of department Chairperson.

EE 510 Mathematical Foundations of Systems Theory (4) A

Damborg, Lytle, Martin

Mathematical foundations for system theory are presented 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.

EE 511 Principles of Network Synthesis (3) W

Network representation in the complex frequency domain. Realizable synthesis criteria, synthesis of driving point and transfer impedances and coupling networks for prescribed transfer characteristics, canonical forms, and network equivalents. Frequency and time domain aspects of approximating response functions. Prerequisite: 411.

EE 513 Active Circuit Theory (3) Sp

Andersen

Principles of analysis and synthesis of linear active circuits. Elementary feedback systems, the analysis and synthesis of linear active amplifiers, state variables, and stability. Prerequisite: 510 or permission of department Chairperson.

EE 517 Introduction to System Optimization (3) W

Hsu

Systems engineering and optimization; classical optimization techniques; equality constraints and inequality constraints; Kalman-Tucker conditions; linear inequalities and linear programming; nonlinear optimization and programming; Fibonacci, Golden-section, and minimax search; gradient search; method of Davidson; Fletcher, and Powell; method of conjugate gradients; elements of quadratic and geometric programming; applications to engineering systems. Prerequisite: 510 or permission of department Chairperson.

EE 518 Digital Signal Processing (4) Sp

Digital representation of analog signals. Frequency domain and Z-transforms of digital signals and systems. Design of digital systems; IIR and FIR filter design techniques, fast Fourier transform algorithms. Sources of error in digital systems. Analysis of noise in digital systems. Channel models and C-SIC 518. Prerequisites: knowledge of Fourier analysis techniques and graduate standing, or permission of department Chairperson.

EE 519 Data Analysis (3) A

Martin

Techniques of exploratory data analysis; plotting and display techniques. QQ and PP plots; parameter estimation and confidence intervals; data transformations, Box-Cox transformation. Estimation of correlations, high-dimensional plots, principal components; two-way tables; regression, regression residual analyses, data transformations, and data deletion; smoothing; clustering; introduction to robust-resistant techniques for parameter estimation, confidence interval estimation, and smoothing. Offered jointly with BIOST 519. Prerequisite: 505 or equivalent.

EE 520 Spectral Analysis (3) Sp

Martin


EE 525 Acoustics in Engineering I (3) W

Chalgup, Ishamur, Merchant, Silgmenu

Acoustic wave transmission, reflection, refraction, and diffraction in fluids, gases, and solids. Includes review of continuum mechanics and examples from electro-acoustical systems. Offered jointly with M 525. Prerequisite: graduate standing or permission of department Chairperson.

EE 526 Acoustics in Engineering II (3) Sp

Auth, Chalgup, Merchant, Silgmenu

Continuation of 525. Material differs each year, covering such subjects as ultrasonic imaging, acoustic holography, optoacoustics, transducer propagation in anisotropic medium, etc. Offered jointly with M 526. Prerequisite: 525 or permission of department Chairperson.

EE 529 Optical Electronics (4) A

Auth


EE 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. Semi-classical theory of the interaction between electromagnetic radiant fields, and matter. Quantum mechanics of electromagnetic fields, and their quantization. Optical properties of materials. Prerequisite: 383 or permission of department Chairperson.

EE 531 Topics in Engineering Optics (4) Sp

Content changes from year to year. Guest lectures or regular faculty present material in the general areas of optics, laser applications, optical processing, optical communications, and light interaction with materials. Emerging technology emphasized. May be repeated for credit. Prerequisites: 468, 488 or 529, or permission of department Chairperson.

EE 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 of electromagnetic radiation and matter. Quantum theory of the laser. Photon counting, correlation and noise. Parametric conversion; Raman and Brillouin scattering. Prerequisite: 530 or permission of department Chairperson.

EE 533 Advanced Semiconductor Devices (3) W

Analysis of selected devices with heavy emphasis on extreme operating conditions of bias, temperature, and frequency. Includes carrier lifetime, carrier generation-recombination, microwave devices; recent developments from the present literature. Prerequisite: 483 or permission of department Chairperson. (Offered odd-numbered years).

EE 534 Power Electronics (3) A

Lauritsen

Analysis and design of thyristors and power transistors to energy conversion and control circuits; including ac/dc converters, feedback amplifiers, current control, switching regulators, voltage multipliers. Includes integrated circuit technologies, semiconductor device protection circuits, and linear control circuits. Prerequisites: 344, 473, or permission of department Chairperson.

EE 535 Digital Integrated Circuits (3) Sp

Analysis and design of digital integrated circuits. Emphasis on MOS and bipolar LSI technology and devices including static and dynamic MOS and PL bipolar logic. Circuits include logic elements, shift registers, memories, microprocessors, and programmed logic arrays. Prerequisite: 483 or permission of department Chairperson.

EE 537 Electronic Amplification Devices and Applications (3) W

Helms, Reynolds

Present state-of-the-art linear amplification devices and circuits are reviewed and foreseeable future developments anticipated, with the objective of providing a timely introduction to analog circuit design at the graduate level. Focus is on both the internal design and operation of integrated devices to prompt understanding of limitations and the application of standardized modules to electronic systems design. Prerequisite: graduate standing or permission of department Chairperson.

EE 538 Topics in Electronic Circuit Design I-5

Gulford, 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 progress in these areas of faculty interest. May be repeated for credit by permission. Prerequisite: permission of department Chairperson.

EE 539 Advanced Topics in Solid-State Electronics (1-5, max. 5)

Prerequisites: 505, 508. W

Aud, Bjorkstam, Yee

Lectures or discussions of topics of current interest. The field of solid-state electronics for advanced graduate students having adequate preparation in solid-state theory. Subject matter may vary according to the interests of students and faculty. Permission: permission of department Chairperson.

EE 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 systems theory. Prerequisite: permission of department Chairperson. (Offered when adequate enrollment develops prior to close of advance registration).

EE 547 Neural Communication and Control in Biological Systems (3) W

Pinter

Conveys quantitative knowledge of the means by which electrochemical events generate, modulate, and demodulate neuronal signals and noise, and the manner in which these signals interact in the nervous system. The constraints placed on transmission of information in the nervous system are discussed, together with pertinent examples, such as the visual system. Prerequisite: advanced graduate standing or permission of department Chairperson.

EE 548 Optimal Control (3) A

Hsu

Variation calculus and optimal control, the Pontryagin minimum principle, Bellman's principle of optimality and dynamic programming, optimum control of distributed parameter systems, sensitivity in optimum control, quasi-linearization and computational methods for optimum control. Prerequisite: advanced graduate standing or permission of department Chairperson.

EE 551 Power System Control and Protection (3) Sp

Bergseth

Dynamics of power system behavior, including the effects of the governor loop and the voltage regulator loop. Symmetrical components and the computational methods for optimal control. Prerequisite: advanced graduate standing or permission of department Chairperson.

EE 555 Data-Communication Networks (3) Sp

Medich

Analysis and design of data-communication networks. Queuing theory and computer time-sharing systems.
HSS 420 Technology in Contemporary Western Culture (5) 
Bontje 
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 technological, human values, and the individual; examines implications of future technological development for man and his culture.

HSS 421 Socioeconomic Consequences of Technology (4) 
Douglas/Weite 
Overview of the role of technology in forming public policies and in determining personal alternatives. A non-mathematical exposition of engineering objectives, practices, 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) 
Douglas/Weite 
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, Sturesser 
Contributions of civilization as opposed to military, engineering to civilization based on the lives and projects of prominent engineers and cultures. Incidents and individuals from problem to project of 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 ENOL 423. Prerequisite: junior standing.

HSS 425 Technology in Developing Countries (5) 
Boiling 
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) 
Shippee 
Analysis of governmental actions (particularly antidiscrimination legislation) designed to reduce discrimination on account of race, color, religious creed, national origin, and, more recently, age and sex in various sectors of American life. The legal, economic, educational, political, administrative, and regulatory solutions to leading cases are examined. Prerequisite: upper-division standing.

HSS 435 Impact of Technology on Human Rights (4) 
Shippee 
The impact of technology on human rights, ranging from its safeguarding of these rights to its incursions on them and associated constitutional processes. Particular attention is given to secret surveillance technology, indiscernible data storage and retrieval, and other technologies ranging through those of the mass media to technological enculturation. The institutionalized and impersonal aspects of technology are examined, and possible remedies are explored. Recommended: upper-division standing.

HSS 450 The Human Image (5) AWS 
Leath 
Leath 
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) AWS 
Leath 
Introduction to the art of theatrical performance by reading, attending, and discussing plays offered currently in the theaters and by the community. Offered on credit/no credit basis only.

HSS 461 Experience in the Arts (1) W 
Forman 
Informal experiences with the arts through attendance at theaters, concerts, art exhibits, etc.; through discussions with creative artists; and through personal attempts at producing a work of art. Offered jointly with CER E 443.

HSS 465 Aesthetic Value and Technology (3) 
Conway 
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 Folktales Among African Peoples (3) 
Skeels 
Techniques of classification, geographic-historical distribution, theories of origin and interpretation, and roles and 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 cultivation 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) AWSpek 
Skeels, White 
Science fiction is compared with forecasts of the future by authorities in science and technology. Categories of prophecy and degrees of departure from the probable to the fantastic are determined. The fiction is analyzed in terms of depth of meaning and of the particular stylistic qualities and abilities of the author.

HSS 489 Special Topics (1-5, max. 10) 
Brown 
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) AWSpek 
Wright 
Work on a special project by a student under the supervision of an instructor. Prerequisite: upper-division standing 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 readers, and general public. Required of students taking an interdisciplinary degree in science and technical communication. Prerequisite: junior standing or permission of instructor. (Formerly HSS 401.)

STC 402 Scientific and Technical Editing (4) W 
White, Williams 
Editorial responsibilities and practice in the communication of scientific and technical information; the editor's role both as editor and as supervisor of publication groups. Required of students taking an interdisciplinary degree in science and technical communication. Prerequisite: 401 or permission of instructor. (Formerly HSS 402.)

STC 403 Managing Technical Publication (4) Sp 
White 
White 
Responsibilities and practice in managing publications units for the communication of scientific and technical information. Required of students taking an interdisciplinary degree in science and technical communication. Prerequisite: 402 or permission of instructor. (Formerly HSS 403.)

STC 406 Preparing Proposals and Environmental Impact Statements (3) W 
McFeron 
Preparing proposals and environmental impact statements for scientific, technical, and community projects; examination of legal guidelines, procedures, and steps. Prerequisites: 402 or permission of instructor. (Formerly STC 406.)

STC 409 Writing for Publication (3) Sp 
Souther 
Writing for professional and trade periodicals in science, engineering, and technology: examination of the publication process, including the roles of author, editor, and reviewer; selecting the appropriate periodical; organizing and writing the article. Prerequisite: upper-division standing or permission of instructor. (Formerly HSS 409.)

STC 415 Production Editing (4) Sp 
Williams 
The editorial role in the 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 professionals in the production phase of the publications field. Offered jointly with ENOL 415. Prerequisite: 402 or permission of the instructor.

STC 499 Professional Practice (3-5, max. 10) AWSpek 
Souther, White 
Supervised internship in a working publications organization approved by the faculty adviser. A minimum of one internship is required of students taking an interdisciplinary 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 advisor.

INDUSTRIAL ENGINEERING

See Mechanical Engineering Industrial Engineering under 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. Lecture and laboratory.

M E 304 Manufacturing Processes (3) AWSpek 
Ford 
Study of manufacturing processes, including interrelationships between the properties of the material, the manufacturing process, and the design of component parts. Prerequisite: 343.

M E 320 Thermodynamics (4) AWSpek 
Wallble 
Introduction to classical macroscopic thermodynamics, including development of the basic laws applicable to energy transformations, with reference to engineering applications. Prerequisites: MATH 126 and CHEM 140.

M E 323 Thermodynamics and Heat Transfer (4) AWSpek 
Depew 
Dewey 
Applications of thermodynamic principles: properties of pure substances from an advanced point of view, non-Newtonian fluids, processes of freezing and melt, analysis of reactive mixtures, chemical equilibrium, combustion, power, and refrigeration cycle analysis. Prerequisites: 320 or ENGR 260.

M E 331 Introduction to Heat Transfer (4) AWSpek 
Morgan 
Morgan 
Study of heat transfer by conduction, radiation, and convection: elementary heat-exchanger design. Prerequisites: 330 or ENGR 260, and 333 or ENOL 342.

M E 333 Introduction to Fluid Mechanics (4) AWSpek 
Gosser 
Gosser 
Introduction to the basic fluid laws and their application. Compressible flow, boundary layer concepts, effects of friction, compressible flow, fluid machinery, measurement techniques. Prerequisites: 330 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 industrial design or permission. (Offered odd-numbered years.)

M E 343 Behavior of Engineering Materials (3) AWSpS Taggart
Study of the nature, properties, and behavior of engineering materials, involving strength, deformation, fracture, impact, creep, fatigue, and corrosion. Lecture and laboratory. Prerequisite: 332 or permission of instructor. Recommended: ENGR 170.

M E 352 Introduction to Mechanics of Solids (4) AWSp Serber
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 subassemblies 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 domain response and stability of linear systems via analytical methods and computer applications. Prerequisites: MATH 238, ENGR 230.

M E 374 System Dynamics Analysis and Laboratory (3) AWSp Jorgensen
Extension of 373, frequency response analysis, generalized impedance concepts and applications, Fourier series analysis and Laplace transform techniques. Introduction to nonlinear modeling. Laboratory experiments and computer 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
Cutting and noncutting processes for material removal in the shaping of manufactured products. Study of forces and of power consumption in the various processes, and of the 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. Prerequisites: 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; estimate of working loads for wire drawing and extrusion. Introduction to slip-line and velocity fields with applications to indentation, extrusion, and drawing through asymmetric dies. Principles of tube making; rolling of flat slabs; friction and lubrication in metal working. Prerequisite: 343 or equivalent.


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. (Offered odd-numbered years.)


M E 428 Noise Control (3) W Chalupnik
Introduction to design for noise control. Includes summary 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) W Depew Fundamentals of thermodynamics, heat transfer, and fluid mechanics are reviewed and applied to practical engineering situations. Applications include: absorption refrigeration, cryogenics, solar energy, and effects of human thermal environment. Prerequisites: 323, 331.

M E 432 Gas Dynamics (3) Sp Chao-Ding Dynamic and thermodynamic relationships for the flow of a gas. Application of thermodynamic processes involving various changes, compressors, and turbines. Prerequisites: 320 or ENGR 260, and 333 or CIVE 342.

M E 433 Turbomachinery (4) W Weibler Basic principles of turbomachinery operation, design, and testing. Prerequisite: 333.

M E 434 Advanced Mechanical Engineering Laboratory (3) AWSp Kieling Introduction to engineering measurement problems and techniques, including interpretation of experimental data, based upon the theories of probability and statistics. Experiments in all areas of mechanical engineering using single-component and multicomponent systems. Prerequisites: 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, 335, or permission of instructor.

M E 440 Mechanical Behavior of Solids (3) W Wolak Mechanics of deformable bodies: transformation of stress and strain; yield and plastic properties; compatibility; elastic constants of crystalline and polycrystalline solids. Application 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. Prerequisite: 343 or permission of instructor.

M E 450 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 dimensional control in fusion welding. Prerequisite: senior standing in mechanical engineering or permission of instructor.

M E 469 Applications of Dynamics to Engineering (3) AWSp Serber Application of the principles of dynamics to selected engineering problems, such as suspension systems, gyroscopes, electromechanical devices. Includes introduction to energy methods and wave propagation in fluids and solids. Prerequisites: ENGR 250 and 373 or permission of instructor.

M E 470 Mechanical Vibrations (3) Sp Merchand Single-degree-of-freedom linear systems techniques. Matrix techniques for multi-degree-of-freedom linear systems. Applications in vibration isolation, transmission, and absorption problems and instrumentation. Prerequisite: 373 or permission of instructor.

M E 471 Automatic Control (3) A Gallen
Engineering analysis of automatic control systems. Dynamic modeling, computer simulation, and stability analysis by Root, Routh, and frequency response techniques; computer simulation. Lecture and laboratory. Prerequisite: 374 or permission of instructor.

M E 473 Instrumentation (3) W Gallen Principles and practice of industrial measurement. Dynamics of instrument response; theory of transducers fo temperature, pressure, flow, and other measurements. Lecture and laboratory. Prerequisite: 374 or permission of instructor.

M E 474 Systems Modeling and Simulation (3) W Belliss
Unified approach to modeling of systems, and computer simulation of systems behavior, selecting system variables: writing state, loop, and node equations; object and state transition response; system functions and convolutions; analog and digital control of vibrations, and other problems. Prerequisite: 374.

M 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, CER 476, CESSM 476, and MET E 476.

M E 481 Internal Combustion Engine Principles (3) AWSp Guidon Study of Otto and Diesel cycles; fuels, combustion, ignition, combustion, and engine performance characteristics. 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 requirements, economic requirements, and emission regulations. Prerequisite: 481 or permission of instructor.

M E 490 Naval Architecture (3) A Adae Theory of naval architecture; ship's lines, hydrostatics 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 Adae 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 engineering or permission of instructor.

M E 492 Naval Architecture (3) Sp Adae Theory of naval architecture; dimensional analysis, resistence, model testing, propellers, steering. Offered jointly with O ENG 492. Prerequisites: junior standing in engineering or permission of instructor.

M E 495 Mechanical Engineering Design (3) AWSp Low 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: 333 and senior standing in mechanical engineering.

M E 496 Brittle Material Design Foundation (3) Sp Application of appropriate criteria and the interdiscipli-
Mechanical Engineering

Courses for Graduates Only

M E 503 Plastic Metal Forming (3) Sp Wolak
Stress-strain and stress-strain-rate relations in metal 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, Wolak
Nature of the processes of friction and wear. Temperature rise at contact surfaces during sliding, and resulting wear. 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 or basis only.

M E 521 Thermodynamics (3) A Depew, Emery, Wolak
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 mechanical engineering or permission of instructor.

M E 522 Thermodynamics (3) W Corlett, Depew, Emery, Roberts, Walbler
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, Malee
Chemical and physical processes of combustion with applications to design of combustors, fuel selection, and consideration of environmental effects. Prerequisite: graduate standing in engineering or permission of instructor. (Offered even-numbered years.)

M E 525 Acoustics in Engineering I (3) W Chalupnik, Ishihara, 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 mechanical or electrical engineering, or permission of instructor.

M E 526 Acoustics in Engineering II (3) Sp Audh, Chalupnik, Merchant, Sigelmann
Continuation of 525. Material differs each year, covering such topics as scattering, moving media, ultrasonics, acoustic holography, optoacoustics, transducer propagation, and applications. 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 Corlett, Depew, Emery, McFeron
Fundamentals of thermal radiation for black, gray, non-gray, gray, and specular surfaces. Gas emissive and radiative properties of thermal radiation. Prerequisite: graduate standing in mechanical engineering or permission of instructor. (Offered even-numbered years.)

M E 531 Conductive Heat Transfer (3) Sp Corlett, Depew, Emery, McFeron
Analysis of thermal conduction in single and multidimensional systems by mathematical, graphical, numerical, and analogical methods. Prerequisite: graduate standing in engineering or permission of instructor. (Offered odd-numbered years.)

M E 532 Convective Heat Transfer (3) W Depew, Emery, Walbler
Introduction to fluid flow and boundary layer theory as applicable to forced- and natural-convection heat transfer. Convection and boiling heat transfer. Prerequisite: graduate standing or permission of instructor.

M E 533, 534 Fluid Mechanics (3, 3) A, W Bodola, Corlett, Gesner
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. Prerequisite: 533 or permission of instructor for 534.

M E 535 Computational Techniques in Heat Transfer (3) A Corlett, Depew, Emery, Kippenhan, McFeron, Walbler
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 Bodola, Corlett, Gesner
Selected fluid mechanics research topics relevant to current advances in mechanical engineering practice are examined 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 heat transfer, fluid mechanics, energy management, and manufacturing processes. Applicability of research results to the resolution of design and development problems is delineated in new material appropriate to this end. (Offered odd-numbered years.)

M E 538 Turbulent Boundary Layer Theory (3) A Bodola, Chilas, Gesner
Characteristic features of turbulent boundary layers; development of the turbulent boundary layer equations; equilibrium boundary layers; integral methods of solution based on power law and wall-wake velocity profiles; methods of solution based on higher order constitutive equations; application to diffusion 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 engineering materials as affected by various conditions of loading and environment. Lecture, laboratory. Prerequisite: graduate standing in mechanical engineering or permission of instructor.

M E 542 Topics in Engineering Materials (3) Sp Daly, Taggart
Selected topics of current importance concerning the nature 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 Gesner, Satcher
Statistical and phenomenological theories of turbulence. Introductory concepts, velocity correlations, the energy equation, homogeneous turbulence, scalar fields, turbulent transport, shear turbulence, wall turbulence, phenomenological theories of energy transport, turbulent modeling, boundary layer, turbulence 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
Generalized plane stress-strain relations in homogeneous, isotropic, elastic materials. Elastic stress distributions in machine components; plane-stress and plane-strain problems; elastic bending; elastic-strain analysis in mechanical engineering or permission of instructor.

M E 552 Applied Plasticity (3) W Kobayashi, Wolak
Elastic-plastic stress distributions in machine components; stress-strain relations in the plastic range; yield in thick-walled pressure vessels, rotating cylinders and disks; torsion and bending of machine members; thermal effects in shells, rotating disks, and plates. Prerequisite: 551 or permission of instructor.

M E 553 Applied Viscoelectricity (3) Sp Daly, Emery, Kobayashi, Sherrer
Time-dependent aspects of stress and strain, and stability in structural or engine 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 Thermoelectricity (3) W Emery
Basic equations of thermoelectricity for isotropic elastic solids. Analysis of disks, cylinders, spheres, beams, and plates under steady temperature distributions and heating and cooling. Introduction to thermoelectric stability. Prerequisite: 551 or permission of instructor. (Offered even-numbered years.)

M E 556 Experimental Stress Analysis (3) A Day
Theory and practice of experimental techniques including photoelasticity; brittle fractures; birefringent fractures, and interferometry. Lecture and laboratory. Prerequisite: graduate standing or permission of instructor.

M E 557 Experimental Stress Analysis (3) W Day
Continuation of 556 with extended applications and theory of experimental mechanics techniques. Fstodbildung; residual stress analysis methods; moire; three-dimensional photoelasticity; acoustoelasticity. Lecture and laboratory. 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.)

M E 559 Applied Fracture Mechanics (3) W Kobayashi
Applications of linear fracture mechanics to failure analysis and fracture control based on actual case studies. Fracture toughness and fatigue testing techniques, crack initiation and propagation fatigue life prediction of mechanical components subject to environmental effects.

M E 560 Advanced Theory of Fracture (3) Sp Kobayashi
Theories of linear fracture mechanics, fracture dynamics, ductile fracture, stable crack growth and mixed mode fracture. Discussion of advanced topics from recent literature. Prerequisite: 559 or permission of instructor.

M E 564 Mechanical Engineering Analysis (3) A Ballis, Galle, Jorgensen
Application of mathematical methods to the description and analysis of systems in mechanical engineering. Analy­ogies in heat transfer, fluid flow, stress distribution, dyn­amics, and feedback control. Prerequisite: graduate standing in mechanical engineering or permission of instructor.

M E 565 Mechanical Engineering Analysis (3) W Ballis, 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 Ballis, Galle, Jorgensen
Linear and introductory nonlinear feedback system analy­sis and design. Prerequisite: 471 or permission of instruc­tor.

M E 572 Servomechanisms (3) Sp Ballis, Galle, Jorgensen
Continuation of 571 to include topics of current importance. Further study of nonlinear control, statistical analysis of feedback systems, sampled-data methods, and active systems. Prerequisite: 571 or permission of instructor.

M E 575 Systems Theory (3) Sp Ballis, Garbhini
State variable approach as applied to multivariable sys­tems. Continuous and discrete variables, system vectors
and matrices, distinct and multiple eigenvalues, controllability and observability, computer algorithms. Geometrical and physical interpretations of the mathematical models. Prerequisite: 474 or permission of instructor.

ME 579 Fluid Power Systems (3) W Garbin, Jorgensen Design, analysis, and control of fluid power systems. Study static and dynamic analyses of hydraulic and pneumatic systems. Dynamic modeling, response, stability, and control analysis via linear element representation and computer simulation. Prerequisite: graduate standing in engineering or permission of instructor.

ME 584 Gas Turbines (3) Sp Corretti, Male Applications of the gas turbine; gas turbine cycles; compressors; turbines; combustion systems; gas turbine power plant material; plant performance. Prerequisite: graduate standing in engineering or permission of instructor. (Offered even-numbered years.)

ME 588 Dynamics and Vibrations (3) A Chalupnik, Merchant, Sherrer Variational techniques, Hamilton's principle, Lagrange's equations applied to dynamics of particles and rigid bodies. Vibration analysis of multi-degree-of-freedom and continuous systems. Prerequisite: graduate standing in engineering or permission of instructor.

ME 589, 590 Vibrations (3-3) W,Sp Chalupnik, Merchant, Sherrer Study of systems with nonlinear damping and restoring forces solved by perturbation or random inputs. Applications in measurement, testing, and design of mechanical systems. Nonlinear systems are emphasized in 589 and random inputs in 590. Prerequisite: 588 or permission of instructor. (Offered even-numbered years.)

ME 598 Topics in Research (1) A WSp Doctoral seminar. May be repeated for credit. Offered on credit/no credit basis only.

ME 599 Special Projects (1-5, max. 9) A WSpWSp Written report required. Prerequisite: permission of department Chairperson.

M E 600 Independent Study or Research (4) A WSpWSp Written report required.

M E 700 Master's Thesis (4) A WSpWSp

ME 800 Doctoral Dissertation (1) A WSpWSp

MECHANICAL ENGINEERING

INDUSTRIAL ENGINEERING

Courses for Undergraduates

MEIE 313 Engineering Operations Research (4) WSp W Marshall Introduction to the major tools and techniques to operations research as used by industrial engineers and management scientists. Topics include linear, dynamic, and integer programming, as well as the theories of games, inventory, and queuing. Laboratory stresses stress current practice by plant visits, projects in industry, and case studies. Prerequisites: 315, ENGR 141.

MEIE 315 Statistical Analysis of Engineering Measurements (3) A WSpWSp Roberts Application of probability theory and statistics to engineering problems, distribution theory and discussion of particular distribution of interest in engineering, statistical estimation and data analysis. Illustrative statistical applications may include quality control, linear regression, analysis of variance, and experimental design. Prerequisite: MATH 238.

MEIE 317 Work Systems Design (4) A WSp Drai Work design and measurement principles; time utilization, flow shop and operations study; principles of motion economy, time study, principles and practices, physiological and psychological aspects of work. Lectures and studies in local industry as laboratory. Corequisites: HHS 350.

MEIE 351 Human Factors in Design (3) WSp W Drai Engineering considerations of the abilities and limitations of the human aspect in the design of operational systems and components. Functional, psychological, physiological, and environmental considerations. Prerequisite: 315.

MEIE 408 Manufacturing Optimization (3) A WSp W 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. Laboratory exercises and applications in local industrial plants. Prerequisite: M E 504 or permission of instructor.

MEIE 410 - Industrial Organization and Management (3) A WSpWSp Drai 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) A WSpWSp W Ford The evaluation of engineering alternatives. Use of interest compensation in value analysis, and cost estimates to predict the economic result of the application of engineering products or processes.

MEIE 412 Industrial Cost Analysis (4) A WSp W Drai 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) A Sp W 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 W Drai Design of new or expanding facilities. Considers layout, heating, ventilation, power, acoustics, sanitation, illumination, protection, and other environmental factors. Lectures and local industry as laboratory.

MEIE 420 System Safety and Reliability Engineering (4) A Sp Roberts Applications of statistical and algebraic techniques to systems 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) A WSp W Drai, Ford, Marshall A quantitative approach, using decision models, for engineering and management problems in increasing the output 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-money criteria; alternative recognition and choice. Offered 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 Sherrer Revised simplex and decomposition methods for computer management of large-scale linear programming problems; stochastic models in queuing theory and in inventory theory; introduction to methods used in nonlinear programming; simulation modeling. Prerequisite: 315 or equivalent.

MEIE 516 Advanced Topics in Engineering Statistics (3) W Sp Marshall, Roberts Topics are flexible and tailored to the needs of the particular student group involved. Topics usually considered regression, correlation, experimental design, Monte Carlo techniques, Markov processes, extreme value theory, time-series analysis. Prerequisite: graduate standing or permission of instructor.

MEIE 599 Special Projects in Industrial Engineering (1-6, max. 9) A WSpWSp Prerequisite: permission of department Chairperson.

MINING, METALLURGICAL, AND CERAMIC ENGINEERING

CERAMIC ENGINEERING

Courses for Undergraduates

CER E 198 Career Planning II (1) WSp C Miller Career opportunities in ceramic engineering and the required educational curricular planning. Offered on credit/no credit basis only.

CER E 199 Materials Analysis (1) A WSp W Mueller Practical use of optical and electron microscopy, x-ray diffraction, x-ray spectroscopy, electron microprobe, and scanning electron microscopy in the analysis of common ceramic engineering materials. Offered on credit/no credit basis only.

CER E 202 Ceramic Engineering I (2) W Sp W Mueller Study of ceramic materials and ceramic industries; use of ceramics as engineering materials; economic importance.

CER E 203 Ceramic Engineering II (2) Sp W Mueller Theory and methods used in measuring properties of ceramic materials; control of ceramic processes.

CER E 300 Introduction to Ceramic Engineering (5) W Mueller Introduction to ceramic engineering materials and processes; standards, testing, and evaluation; types of industry and employment; career and curriculum 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 1: Transport (3) W Miller Transport in ceramic processing systems; fluid flow, heat flow, mixing, and applications of drying and firing.

CER E 303 Ceramic Processing II: Methods (5) Sp Whitmore 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 equilibrium, nonequilibrium processes, and the interpretation of three component diagrams.

CER E 312 Physical Ceramics II: Microstructure Analysis (3) A Sp Fischbach Crystalline and glassy state; defects, diffusion, and physical-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.

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CER E 399 Introduction to Research and Design (1) Sp Scott Research planning, library search techniques, the engineering design process, 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 402 Ceramic Engineering Design I (3) W Campbell Includes design of a specific plant or process, including materials, equipment, layout, feasibility, and optimization. To be taken in sequence with 403. Prerequisite: 401.

CER E 403 Ceramic Engineering Design II (3) Sp Campbell Continuation of 402.


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 stress and failure with emphasis on the brittle mode; statistical nature of strength of brittle materials; elements of fracture prediction; thermal gradient stresses; composition gradient stresses; thermal shock and thermal compositional strengthening. Prerequisites: 311, 312.


CER E 420 Colloidal Ceramics (3) W Whitmore Properties and surface chemistry of ceramic colloids. Topics include absorption, adsorption, gels and their contributions to cementitious bonding, leach exchange, rheological properties, and analytical techniques applicable to these studies.

CER E 422 Electronic Ceramics (3) Miller, Scott, Stoebbe Principles and theory of conductive, ferromagnetic, piezoelectric, thermoelectric, and electro luminescent materials.

CER E 423 Special Composite Materials (3) Theory, properties, and practice in fibrous composite materials; adhesives in tension and compression; basic mechanisms for failure in fiber; properties of individual phases; properties of the interfacial region; elastic and failure properties of composites; composite fabrication; emphasis on glass and carbon 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 correspondence, person contacts, interview planning and job selection campaign. Offered on credit/no credit basis only.

CER E 442 Experience in the Arts (1) W Leaky, 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 carbon; influence of structure on behavior. Preparation methods, structure and properties of diamond; synthetic and natural graphites; glassy, coke, pyrolytic, black, and fiber carbons.

CER E 455 Research Techniques (3) A Fischbach, Stoebbs Philosophy of experimental: effort analysis; vacuum technique; production and measurement of high temperatures; small and model experimental techniques. Meets with MET E 455.

CER E 460 Ceramic-Metal Systems (3) W Campbell Vitreous and crystalline coatings for metals; ceramic-metal composites.

CER E 470 Refractories (3) W Whitmore 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 Campbell 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 For physical science or engineering graduate students planning graduate study in ceramic engineering, or those in other engineering programs interested in a concentrated first-year course in ceramic engineering. Intensive, short-term coverage of reaction kinetics and equilibria, processing, microstructure, and properties of ceramics as engineering materials. Laboratory. Not acceptable for graduate degree credit in ceramic engineering. Prerequisites: basic graduate 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 interdisciplinary team approach in the design of structural components and ceramic materials. Laboratory. Not acceptable for graduate degree credit in ceramic engineering. Prerequisites: basic graduate degree in physical science or engineering and permission of instructor.

CER E 498 Special Topics (1-5, max. 6) AWSp Special topics in ceramic engineering offered as a course with lectures, laboratories, or both. Prerequisite: permission of division head.

CER E 499 Special Projects (1-4, max. 4) AWSp Projects in ceramics; laboratory investigations and bibliographic research.

Courses for Graduates Only


CER E 511 Advanced Physical Ceramics I (3) W Theories and principles of diffusion in solids; phenomenological and atomic concepts; equilibrium defects; impurity, chemical potential gradient, grain boundary and dislocation effects in metals and nonmetals.


CER E 514 Thermodynamic Topics in Ceramics (3) Scott Applications of thermodynamics to predict behavior of materials at high temperature. Techniques of measurement 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) Scott Design of 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) AWSp Interdisciplinary team approach in design of structural 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 Independent Study or Research (*) AWSp

CER E 700 Master's Theses (*) AWSp

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 materials for reactor fuels, moderators, shields, control elements, and structural components; corrosion and oxidation; effects of radiation on the structure and properties of materials. Offered jointly with NUC E 434. Prerequisite: ENGR 170 or equivalent.

METALLURGICAL ENGINEERING

Courses for Undergraduates

MET E 198 Career Planning in Metallurgy (1) W Lynch, Stoebbe Introduction to the field of metallurgical engineering. Includes interdisciplinary aspects of the field, laboratory, demonstrations, introduction to laboratory tools and techniques, and discussion of curriculum and career opportunities with current students.

MET E 202 Special Projects (1-3) AWSp Projects on topics of current interest in metallurgical engineering. Prerequisite: permission of instructor.

MET E 301 Metallurgical Systems and Instrumentation (3) A Archbold, Stoebbe Instrumentation, equipment, and laboratory techniques in
metallurgical engineering. Metallographic laboratory practice, microscopic examination of system principles, heat generation and control, vacuum methods. Laboratory experiments designed to illustrate basic metallurgical principles.


MET E 325 Extractive Metallurgy II (4) W Rave Physical and chemical principles of mineral preparation and concentration. Communion; classification, thickening, filtration of mineral suspensions; sampling; transport and related physical processes. Physical and chemical theory applied to concentration processes; surface phenomena, electromagnetism, electrostatic, phase change, solution, and precipitation. Laboratory illustrates fundamental principles.


MET E 361 Structure of Solids (4) A Lynch Elements of crystallography and the structure of metals and alloys, superconductors, 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 Rave 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 experiments related to the measurement of the properties of engineering solids. Prerequisite: 361.


MET E 402 Educational Projects in Materials Science (1-5) A AWSp Sobe 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 Rave Applications of thermodynamics to the solid state. Statistical interpretation of phase equilibrium and thermodynamics of surfaces and of defects in solids. Prerequisite: 322 or equivalent.


MET E 426 Extractive Metallurgy II (4) A Lynch Application of physical and chemical principles to high-temperature processes. Particle extraction and refining of metals. Descriptions of processes and unit operations, with emphasis on the thermodynamic and kinetic aspects. Prerequisite: 322, 325, and metallurgical science requirement.

MET E 455 Metallurgical Experimental Techniques (3) A Fichtboch, Sobe A review of experimentation; error analysis; vacuum techniques; production and measurement of high temperatures; selected topics in advanced experimental techniques. Meets with CER E 455.

MET E 461 Engineering Physical Metallurgy (3) W Lynch Stress and strain relationships, combined stresses, mechanical modeling of materials, ductile flow and fracture, brittle fracture, elements of fracture mechanics, design considerations. Influence of microstructure on mechanical behavior. For majors and nonmajors. Prerequisite: 363 or M E 345, or permission of instructor.


MET E 463 Reliability and Design in Metallurgical Systems (3) W Rave Properties of commercially important engineering alloys. Metallurgical design problems and failure analysis. Prerequisite: 363.


MET E 468 Undergraduate Seminar (1, max. 3) A AWSp Offered on credit/no credit basis only.

MET E 471 Hydrometallurgy (3) Sp Sobe 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 475 Pollution Control of Metallurgical Plants (3) Lynch Current issues related to the causes and control of pollution in metallurgical extraction and processing plants. Analysis of environmental protection in terms of plant systems 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.

MET E 476 Introduction to Design With Brittle Materials (3) W Lynch 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, CSEM 476, and M E 476. Prerequisite: 476.

MET E 499 Topics in Metallurgical Engineering (1-4) A AWSp 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 (1-6) A AWSp 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 512 Transmission Electron Microscopy (3) Sp Archbold Fundamentals of electron optics as applied to microscopy. Applications of coarsen theory and electron diffraction with emphasis on defect and multiphase structures in crystalline solids. Prerequisite: 511 or equivalent.

MET E 520 Seminar (1) AAWSp Review of research problems and recent literature. Required for all graduate students. Offered on credit/no credit basis only.

MET E 523 Advanced Extractive Metallurgy (3) A Rave Physical chemistry of metals, mashes, 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 Lynch, Rave Application of reaction rate and diffusion theories to metallurgical processes; solid/gas reactions in calcining, roasting, sintering, and reduction; liquid/gas reactions as in refining and solid/liquid reactions as in leaching. Prerequisite: 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 interest.

MET E 526 Dynamic Behavior of Metallurgical Systems (3) W Archbold 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 simulation response, and review of current industrial control processes. Prerequisite: graduate standing in engineering or permission of instructor.

MET E 531 Advanced Metallurgy (*) A AWSp Study of selected problems, with particular attention to recent developments and scientific applications in physical or extractive metallurgy.

MET E 536 Brittle Material Design Problem (1-9) A ASp Selected topics in design of structural components utilizing brittle (ceramic) materials. Offered jointly with CER E 536 and CSEM 536. Prerequisite: 496.

MET E 541 Theoretical Structural Metallurgy I (3) A Lynch 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 Sobe Dislocation arrays in crystals and their plastic properties; the elastic and plastic properties of real crystals; cold work; mechanical properties of polycrystalline and single crystal materials; creep and grain boundaries; cleavage. Prerequisite: 541.

MET E 561 Phase Transformations in Metals and Alloys (3) W Lynch 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) Sp
Stoebe Theories of magnetic phenomena, including diamagneti-
cism, paramagnetism, ferromagnetism, and antiferromagnet-
ism. Details of magnetization processes in materials; an-
isotropy, magnetocrystallinity; domain energies and con-
ditions; applications to magnetic materials. Pre-
requisite: 466.

MET E 567 Electronic Processes In Materials (3) Sp
Stoebe Lattice dynamics, including vibrational modes and pho-
noelectric, electromechanical, and ferroelectric materials; with applications in the theory of electrical conduction and in the semiconduction theory. Optical properties of solids, including color centers and luminescence. Pre-
requisite: 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 explo-
vatives. Theory of fragmentation; design of blast and ex-
ploding loading patterns; nuclear explosives in industry; safe
practices, and elements of costs. Applications in tun-
neiling 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 placer; drill hole and
coring methods; geological aspects; estimation of depos-
its; economic aspects 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 instru-
ments, stope measurements, shaft surveying, solar obser-
vations, and surveying of medical undergrounds; 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-
tios; effect of removing overburden and its disposal; ultil-
imate 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 termi-
nation of operations; stabilization of waste rock and tail-
ing sites; revegetation of mined land and mine dumps; general economics of land rehabilitation. Prerequisites: 502, ECON 101, or permission of instructor.

MIN E 350 Mineral Resource Development,
Feasibility, and Valuation (3) A
Anderson Underground and surface excavation of rock: theory 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 mining; machinery including drills and core-drill and
ductivity studies. Mineral land valuation; geologic aspects; estimation of ore reserves by sampling, core

Nuclear Engineering

Courses for Undergraduates

NUC E 444 Nuclear Materials (3) W
Miller Structure, properties, and performance of materials in nu-
clear reactor applications; engineering requirements and
selection of materials for reactors; technology of materi-
als for reactor fuels, moderators, shields, control ele-
ments, and structural components; corrosion and oxidiza-
tion; effects of radiation on the structure and prop-
ties of materials. Offered jointly with MTL E 444. Pre-
requisite: ENGR 170 or equivalent or permission of in-
structor.

NUC E 484 Introduction to Nuclear Engineering (4)
A
Vlasius, Woodruff Introductory course in nuclear engineering for seniors, graduate students, and practicing engineers. The course is designed to demonstrate the application of the prin-
ciples of nuclear science to the processes associated with the
release, control, and utilization of all forms of energy
from nuclear sources, including nuclear reactors; eleme-
nentary nuclear reactor theory; control of nuclear reactors;
thermodynamic properties. Prerequisite: MATH 330 or per-
mission of instructor.

NUC E 485 Nuclear Instruments (3) W
Chalk, Woodruff Principles, mechanisms, and detection of various types of nuclear particles and charged particles; an
alogue and digital 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
Balogh Applications of nuclear energy to power generation. Dis-
cussions of various types of nuclear reactor systems in-
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 the world views of the availability and
consumption of nuclear fuels. Various design concepts for
reactors 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.

NUC E 488 Nuclear Systems Design I (4) A
Chalk Design laboratory involving the synthesis of nuclear sys-
tems, engine analysis, material specifications, and
processes to meet the design specifications for modern nuclear industry applications. Prerequisite: 484 or per-
mission of instructor.

NUC E 490 Reliability and Decision Analysis (3) W
McCormick Emphasis on the principles of reliability and safety analy-
sis, including fault tree construction and decision theory. 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, max. 6) A
Sp
Discussion 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, max. 6) A
Sp 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, multigroup
diffusion theory; calculations of eta, thermal utilization,
and resonance escape probability; reactor kinetics; pertur-
bation theory. Prerequisite: permission of department
adviser.

NUC E 506 Nuclear Engineering Laboratory (4) Sp
Chalk, Woodruff Advanced laboratory course in which experimental re-
search is conducted. Practical experiments are performed
that involve the use of such equipment as the reactor as a
neutron and gamma ray source, pulsed neutron generator,
neutron ionization chamber, neutron diffraction spec-
trometer; pile oscillator, pile-noise analysis equipment,
time-of-flight equipment, and analog and digital comput-
er. Prerequisite: 485 or permission of instructor.

NUC E 510 Nuclear Reactor Engineering (3) A
Balogh Advanced course in engineering analysis of nuclear reac-
tor 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

a163
and licensing procedures. Prerequisite: 500, which may be taken concurrently, or permission of instructor.

NUC E 512 Nuclear System Design (4) W
Babb, Woodruff
Design laboratory involving the synthesis of reactor theory, operating 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 advisor.

NUC E 521, 522, 523 Graduate Seminar (1,1,1) A,W,S
Offered on credit/no credit basis only.

NUC E 524 Seminar In Nuclear Systems Analysis (1) A W S
Studies of recent advances in nuclear systems analysis with students, faculty, and visiting scientists and engineers 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 Studies (4) S
McCormick
Emphasis on methods for calculation of neutron and gamma-ray distributions in nuclear reactors and shields. Coverage includes Boltzmann equation solution and the spherical harmonics, discrete ordinates, and Monte Carlo tech­niques. Explicit solutions to simple transport problems are obtained. Prerequisite: 500 or permission of instructor.

NUC E 540, 541 Nuclear Energy, Man, and His Environment I, II (3,3) W,S
Reid
For majors and nonmajors interested in evaluating the impact of nuclear power technology on man and his environment. Studies of modern nuclear power cycles, nuclear reactor safety, the biological effects of radiation, and the environmental impact of nuclear power. Prerequisite: 540.

NUC E 556 Introduction to Plasma Theory (4) W, S
Ribe, Vlasov
Introduces plasma theory and lays the foundation for application to a variety of research and development goals. Topics covered include dynamics of charged particles in electromagnetic fields, plasma kinetic theory, transport phenomena, development of various fluid models, and wave phenomena.

NUC E 557 Plasma and Controlled Fusion (3) S
Ribe, Vlasov
Emphasis on the problem of controlled thermonuclear fusion. After an introduction to the general problem, the basic ideas and concepts of fusion, interaction of beam and plasma, feedback mechanisms, stability criteria, power coefficients. Prerequisite: 550, 427, 428, or permission of instructor.

NUC E 560 Nuclear Reactor Dynamics I (4) W
Albrecht
Nuclear reactor dynamic equations, delayed neutron representations, response of reactors to various perturbations, feedback mechanisms, stability criteria, power coefficients. Prerequisite: 500, 427, 428, or permission of instructor.

NUC E 561 Nuclear Reactor Dynamics II (3) S
Albrecht
Experimental nuclear reactor dynamics, oscillators, pulsed neutron, stochastic processes; dynamics of heat removal nuclear components; analysis of closed loop systems, space-dependent dynamics. Prerequisite: 560.

NUC E 565 Fusion Reactor Fundamentals (3) A
Woodruff
Introductory course covering the basic engineering features 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 and physical obstacles to development of economic fusion power, such as material problems, magnet design, and nuclear heating. Prerequisite: 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 include superconducting magnets, neutronics, plasma confinement, reactor systems, power handling, and fusion-fission hybrid 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 economics, fuel cycle economics, irradiated fuel processing, isotopes separation, utilization of fissional products and other radioactive isotopes. Prerequisite: 484 or permission of instructor.

NUC E 600 Independent Study or Research (*) A W S
Offered on credit/no credit basis only.

NUC E 800 Doctoral Dissertation (*) A W S
Offered on credit/no credit basis only.

OCEAN ENGINEERING

O ENG 401 Introduction to Ocean Engineering (3) A
Adey, Richley
Special design considerations for the ocean environment, including corrosion, biological encrustation, hydraulic 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 attention given not only to technical function but also to safety and the environmental and social implications of operational failure. Offered jointly with CEW A 541. Special topics course requiring student participation in a special ocean engineering consideration in design, operation, and maintenance. Prerequisite: MATH 238 or permission of instructor.

O ENG 425 Introduction to Underwater Acoustics (3)
A Ehrenberg, Lytle
Introduction to acoustic propagation, reflection, and refraction in the ocean. Characteristics of transducers, time and frequency limits and characteristics of acoustic noise and acoustic signal-processing systems. Prerequisite: senior standing in engineering, MATH 234, or permission of instructor.

O ENG 444 Coastal Engineering I (3) W, S
Richley
Linear theory of water waves, wave transformations due to boundary conditions, sediment motion, elementary tidal theory; applications illustrated by laboratory experiments and selected case histories. Offered jointly with CEWA 444. Prerequisites: CIVE 342.

O ENG 450 Marine Corrosion and Its Prevention (3) S
Skaugum
Causes and prevention of corrosion damage by marine environments (immersed, tidal, atmospheric). Behavior of various metals and alloys, sacrificial protection systems. Prerequisite: MATH 341, or permission of instructor.

O ENG 490 Naval Architecture (3) A
Adey
Theory of naval architecture; ship's lines, hydrostatics, stability, failure and damaged stability, launching. Offered jointly with M E 490. Prerequisite: junior standing in engineering or permission of instructor.
<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Description</th>
<th>Prerequisites</th>
</tr>
</thead>
<tbody>
<tr>
<td>FISH 101</td>
<td>Introduction to Fisheries Science (5) AS</td>
<td>Select identification, distribution, and life histories of selected fish and shellfish; commercial and recreational fishing; utilization of fisheries products; problems faced in fisheries conservation and management. Recommended for both majors and nonmajors.</td>
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</tr>
<tr>
<td>FISH 311</td>
<td>Functional Anatomy of Fish and Shellfish (4) AS</td>
<td>Smith</td>
<td>Functional capabilities and limitations of fish and shellfish as reflected in their anatomy, biology, and ecology.</td>
</tr>
<tr>
<td>FISH 314</td>
<td>Methods and Instruments for Fishery Investigations (3) Wsp</td>
<td>Hansen</td>
<td>Theory and practice of instrumentation and sampling in fisheries; shipboard experience with equipment, collecting and recording data from biological samples, and the physical environment.</td>
</tr>
<tr>
<td>FISH 340</td>
<td>Applications of Digital Computers to Biological Problems (3) AW</td>
<td>Brown</td>
<td>Methods and procedures for processing biological and natural resource data by means of digital computers; problem analysis, elementary programming, use of packaged programs for statistical analysis.</td>
</tr>
<tr>
<td>FISH 352</td>
<td>Fundamentals in Fisheries Biochemistry (3) A</td>
<td>Brown</td>
<td>Occurrence and role of carbohydrates, lipids, proteins, amino acids, vitamins, nucleic acids, and other compounds in fishes and other aquatic organisms. Topics include respiration, digestion, absorption, growth, reproduction, excretion, body fluids, general metabolism, intermediate metabolism, energy metabolism, and detoxification. Emphasis on biochemistry as it relates to nutrition and fish.</td>
</tr>
<tr>
<td>FISH 367</td>
<td>Recreational Fisheries (4) Sp</td>
<td>Posey</td>
<td>History of recreational fishing; present trends in sport fishing and prediction of future trends; types and characteristics of recreational fisheries; value of recreational fisheries; habitat requirements; ecology and behavior that are important considerations in management; management philosophy and techniques. Recommended for majors and nonmajors. Field trips.</td>
</tr>
<tr>
<td>FISH 379</td>
<td>Fisheries of the World (3) A</td>
<td>Anderson</td>
<td>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; status of the United States fishing industry; prospects of aquaculture.</td>
</tr>
<tr>
<td>FISH 398</td>
<td>Literature Search in Fisheries and Food Science (3) AS</td>
<td>Welch</td>
<td>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.</td>
</tr>
<tr>
<td>FISH 401</td>
<td>Ichthyology (5) ASp</td>
<td>Petch</td>
<td>Concepts of systems and organic evolution as applied to the diversity of fishes; classification of fishes of the world by habit; geographic distribution and ichthyozoogeography. Prerequisites: 10 credits in biological science and junior standing or above.</td>
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<tr>
<td>FISH 405</td>
<td>Economically Important Mollusca (5) Sp</td>
<td>Chew</td>
<td>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.</td>
</tr>
<tr>
<td>FISH 406</td>
<td>Economically Important Crustacea (5) W Armstrong</td>
<td>Classification, life histories, distribution, methods of capture, and economic importance of crabs, shrimp, lobsters, crayfish, and the smaller Crustacea. Mandatory laboratory fee. Prerequisite: 10 credits in biological science.</td>
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<tr>
<td>FISH 415</td>
<td>Principles of Fish Physiology (3) W Smith</td>
<td>Survey of the functions of the organs systems of teleost fishes, emphasis on salmonids. Prerequisite: 10 credits in biological science.</td>
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<tr>
<td>FISH 416</td>
<td>Fish Physiology Laboratory (2) W Smith</td>
<td>Exercices and projects in fish physiology. To be taken concurrently with or following 415.</td>
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<tr>
<td>FISH 425</td>
<td>Life History of Marine Fishes (5) W Miller</td>
<td>Fecundity, spawning, incubation, and hatching of marine fishes; identification and survival of larvae and juveniles; feeding of adults; migration; recognition of subpopulations. Prerequisites: 401 and major status or permission.</td>
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<tr>
<td>FISH 430</td>
<td>Biological Problems in Water Pollution (5) W</td>
<td>Biological and ecological changes in the aquatic environment resulting from domestic, industrial, radioactive, and agricultural wastes and methods for their evaluation. Prerequisite: major status or permission of instructor.</td>
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<tr>
<td>FISH 434</td>
<td>Ecological Effects of Waste Water (3 or 5) A Welch</td>
<td>Principles of aquatic ecology with emphasis on aspects related to waste-quality problems and methods of measuring associated biological changes. Topics include introduction to aquatic ecology, distribution of chemicals and their role in metabolism, nutrient cycles and effects of urban and man-made changes in environmental factors on aquatic plant and animal communities. Offered jointly with CEWA 434.</td>
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<tr>
<td>FISH 435</td>
<td>Physiological Effects of Water Pollutants (3) Sp Brown</td>
<td>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 result of waste effluents. Offered jointly with CEWA 435. Prerequisites: upper-division or graduate standing, organic chemistry, and some background in one of the following: general biology, cell biology, biochemistry, chemical biology, sanitary engineering.</td>
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<tr>
<td>FISH 444</td>
<td>Fishers Genetics (3) A Herschberger</td>
<td>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 variability in aquatic species, natural and artificial selection, and the effect of these processes on fish populations. Prerequisites: GENET 451 or equivalent.</td>
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<tr>
<td>FISH 450</td>
<td>Salmonid Behavior and Life History (3) A Brannon</td>
<td>Marine distribution, body migration, and spawning behavior of salmon: incubation, emigration, migration, and residence of fry; fingerling distribution and residence with reference to species interaction and population evolution. Prerequisites: 401 and 15 credits in biology.</td>
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<tr>
<td>FISH 451</td>
<td>Reproduction of Salmonid Fishes (3) A Brannon</td>
<td>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.</td>
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<tr>
<td>FISH 452</td>
<td>Fish Nutrition (3) W Hadley</td>
<td>Nutritional requirements of fish; importance and role of carbohydrates, lipids, proteins, vitamins, and minerals in fish nutrition; essential and nonessential classification of nutrients; nutritional disturbances. Prerequisites: 352, organic chemistry, 10 credits in biology.</td>
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<tr>
<td>FISH 453</td>
<td>Salmonid Culture Technology and Enhancement (4) Sp Brannon</td>
<td>Design of fish production facilities; methods of incubation, rearing, and handling of fish; problems encountered in hatchery water supplies. Management goals and strategy; assessment of production; stocking; interest on natural populations. Prerequisites: 451, 452, or permission of instructor.</td>
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<td>FISH 454</td>
<td>Commensal Diseases of Fishes (3) A Landolt</td>
<td>Cardiovascular diseases in fishes; prevention and known treatments of fish diseases. Prerequisites: 10 credits in biology and 10 credits in chemistry.</td>
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<tr>
<td>FISH 455</td>
<td>Commensal Diseases of Fishes Laboratory (2) A Landolt</td>
<td>Laboratories to study bacteria, viruses, and parasites that cause diseases of fishes and to study diagnostic techniques. Prerequisite: permission of instructor.</td>
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<tr>
<td>FISH 457</td>
<td>Management of Exploited Animal Populations I (4) W Mathews</td>
<td>Equilibrium yield model; spawner-recruit models, management methods; use of catch-effort statistics in estimation and management, computer simulation in management decisions. Offered jointly with Q SCI 457. Prerequisites: Q SCI 281, 292, BZOL 210 or FISH 425, or permission of instructor.</td>
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<tr>
<td>FISH 459</td>
<td>Aquatic Food Chains (5) W Tully</td>
<td>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 rising pollution are considered. Prerequisite: major status or permission of instructor.</td>
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<tr>
<td>FISH 460</td>
<td>Water Management and Hydrology (4) ASp Brannon, Kent, Schell</td>
<td>Nomenclature water cycles and soil retention, water flow measurements in streams, flow in pipes and channels, determination of pressure drop, design of pressure drop, and closed systems, screening of water diversions, upstream and downstream fish passage. Prerequisites: 401, MATH 105, and physics, or permission of instructor.</td>
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<tr>
<td>FISH 461</td>
<td>Culture and Reproduction of Temperate Water Fishes of the Northeast (3) A Brannon, Congdon, Posey</td>
<td>History of pond fishes, reproduction, and culture of carp,</td>
<td></td>
</tr>
</tbody>
</table>
FISH 499 Undergraduate Research (1-5, max. 9) AWSpS
Individual research within the College of Fisheries or on-the-job training in governmental or industrial fisheries organizations. Prerequisite: permission of instructor.

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
Pleisch
Biosystematic theory and practical application in ichthyology; analysis of recent advances and current problems in phylogeny and zoogeography. Prerequisite: 401 or equivalent.

FISH 504 Invertebrate Pathology (5) W
Dordt, Pauley
Pathological effects and communicable diseases in invertebrates. The discussion is phylogentic and comparative. Juniors and seniors may take the course, but they have course prerequisites. Prerequisite: 454 and Invertebrate zoology or equivalent.

FISH 507 Special Problems in Fisheries (1-5, max. 15) AWSpS
Classroom, laboratory, or field studies of problems of current interest. A maximum of 6 credits of 507 is permitted to apply to a master's degree program. Prerequisites: 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 (3) Sp
Smith
Selected experimental techniques in fish physiology. Prerequisite: 515 or concurrent registration.

FISH 520 Graduate Seminar I (A)
Introduction to research in fisheries. Offered on credit/no credit basis only.

FISH 522 Graduate Seminar in Fisheries I, (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; diet and seasonal migration; emphasis is on fishes of the nearshore environment. Prerequisites: 401 or equivalent, and permission of instructor.

FISH 527 Aquatic Microcosms (3) Sp
Taub
Use of microcosms to evaluate biosphere processes. Students select a limited topic, such as a type of microcosm or a process (e.g., carbon cycling) or a group of organisms (e.g., aquatic ecosystems). Students design experiments that manipulate environmental factors or stressors; collect and analyze data; and prepare oral and written reports. Focus is on laboratory microcosms such as estuarine microcosms; subtropical microcosms; and marine microcosms; and on field microcosms such as oceanic microcosms; estuarine microcosms; and marine microcosms. Prerequisites: undergraduate level biology and oceanography.

FISH 535 Metabolic Effects of Chemical Pollutants (4) W
Brown
Physiological and biochemical effects of industrial, urban, 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 status in aquatic chemistry, general physiology, biochemistry, or cell physiology. (Offered alternate years.)

FISH 540 Application of Digital Computers to Problems in Aquatic Ecology (3) AW
Brown
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 fishery resources manipulation. Includes genetics of domesticated and wild salmonids; genetics and breeding, and use of genetic markers for population analysis. Prerequisites: 444, 451, Q SCI 382, 363, and upper-division or graduate standing.

FISH 556 Introduction to Quantitative Population Dynamics (3) A
Fletcher
Simple analytic approaches to population management; principles of population model building and analysis; population models; and types of models. Prerequisites: basic biology and calculus. Prerequisite: permission of instructor.

FISH 557 Theoretical Models of Exploited Animal Populations (3) W
Fisher
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 analysis of studies of populations; and population parameter estimation and computer laboratory work on digital computer. Prerequisite: 557 or permission of instructor.

FISH 560 Methods of Stock Assessment (3) Sp
Mathisen
Theoretical 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 vision, color pattern determinants, adaptive radiation, competition and predation, fish behavior, reproductive patterns, community organization, and species diversity. Offered jointly with ZCOL 575. Prerequisite: graduate standing or permission of instructor.

FISH 600 Independent Study or Research (A) AWSpS
Offered on credit/no credit basis only.

FISH 700 Master's Thesis (A) AWSpS
Offered on credit/no credit basis only.

FISH 800 Doctoral Dissertation (A) AWSpS
Offered on credit/no credit basis only.

FOOD SCIENCE

Courses for Undergraduates

FD SC 102 Food—The Technological Challenge (A)
Laster, Pigott
Reviews the scientific and technological developments leading to the present food supply and food industry.
Outlines of principles of food science related to preservation, nutritional quality, food safety, and food supply. Considered additives, health and organic foods, preservation, food-borne illness, and other topical concerns related to foods in terms of technological function, utility, and safety. Presenting and impending technological developments 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 components of foods: lipids, proteins, carbohydrates, and 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 commercial 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; biochemical and microbiological changes in fish-postmortem; nature and effects of processing 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 processing 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 foods 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. Prerequisite: 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 quality, food safety, food laws; the microbiological aspects of food spoilage, food-borne illnesses, and food processing; effects 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-processing plants. Offered jointly with NUTR 442. Prerequisites: 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 science majors must take 481 concurrently with 486. Prerequisite: permission of instructor.

FD SC 482 Food Chemistry (3) A
Iwakwa Chemical composition, structure, and properties of foods and some of the chemical changes they undergo. Components of formulated foods, including additives and naturally occurring toxins. Prerequisite: BIOL 406 or permission of instructor.

FD SC 483 Food Analysis (3) W
Iwakwa 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. Changes resulting from micro-organisms' growth and activity. Fermentation and other microbiological processes in foods. Food science majors must take 494 concurrently with 496. Prerequisites: 481 and major status, or permission of instructor.

FD SC 485 Food Engineering II (3) W
Pigott Unit operations in food processing, emphasizing engineering 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
Iwakwa, 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 operations such as freezing, chilling, canning, brewing, milk processing, and spice processing. Food science majors must take 491 concurrently with 481.

FD SC 492 Food Chemistry Laboratory (2) A
Iwakwa Experiments in qualitative and quantitative analysis for components of foods, using physical and chemical techniques. Food science majors must take 492 concurrently with 482.

FD SC 493 Food Analysis Laboratory (2) A
Iwakwa 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 foods, fermentation processes, 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 nutrient 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 Theses (2-4, max. 6)
AWSpS Prerequisite: permission of instructor.

Courses for Graduates Only

FD SC 504 Principles of Technological Research in Food (3, max. 6) AWSpS
Liston Designed to familiarize graduate students with the methods used in technological research. Prerequisite: permission of instructor.

FD SC 523 Advanced Marine Food Processes (3) 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 or permission of instructor. (Offered alternate years; offered 1981-82.)

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 concurrently 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 operations such as evaporation, drying, distillation, pumping, and heat transfer in the handling, processing, and packaging 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
Iwakwa Selected 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 responsible for teaching the courses: FOR B—Biological Sciences Division, FOR M—Management and Social Sciences Division, FOR P—Physical Sciences Division.

BIOLGICAL SCIENCES

Courses for Undergraduates

Students taking undergraduate and graduate courses, structured or unstructured, that require field trips,
FOR B 302 The Conservation Movement—Past, Present, and Future (2)
Brubaker
Origins of the conservation movement, factors that have shaped its direction and directions it may take in the 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 environment in a number of essential ways. The facts and fallacies of conservation 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 management objectives. Presentation of new trends in insect manipulation.

FOR B 210 Introductory Soils (3)
Cole, Hondo, Zasoski
Introductory course in basic soils explores the physical, chemical, and biological properties that affect distribution and structure of this important ecosystem component. Includes soil morphology and genesis, plant nutrition and nutrient cycling, soil water, microbial soil processes, and the application of soil properties to environmental concerns. 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 220 Forest Community Ecology (3)
Oliver, Scott
Forest community dynamics as related to environmental variation, particularly plant succession and vegetation zoning. Study of techniques of vegetation quantification. Taught at Pack Forest only. Prerequisites: 300, BIOL 101-102, Q SCI 281.

FOR B 231 Silvics (3)
Oliver, Scott
Anatomy, morphology, and physiology of forest tree species underlying ecological patterns of behavior. Prerequisite: 320.

FOR B 232 Silvicultural Methods (3)
Oliver, Scott
The theory and technique of applying silvicultural knowledge in the establishment, maintenance, and growth of forest stands. Includes reproduction methods and intermediate cuttings. Prerequisite: 321, FOR M 360.

FOR B 233 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 234 Forest Biology II (3)
Gara
Theory and applied aspects of forest pathology and entomology. Introduction to the forest ecosystem as related to forest development, soils, and tree water relationships. Introduction to silviculture. Prerequisite: junior standing.

FOR B 235 Forest Ecology (5)
Scott
Introductory course in ecology for majors in outdoor recreation only. Lectures and field exercises on: organisational interactions as related to environment; ecological characteristics of sites; structure pattern and successional dynamics of forest communities. Prerequisites: statistics, 10 credits in biology, and permission of instructor.

FOR B 236 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 habitants 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 237 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 presented in 236. For majors in wildlife science and forest management only. Prerequisite: permission of instructor.

FOR B 239 Micrometeorology (3)
Edmonds, Fritsch
Study of 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 ATM S 329. Prerequisite: ATM S 101 or 201 or 301.

FOR B 333 Forest Protection (4)
Driver, Edmonds, Gara, Pickford
General aspects of protecting forests from diseases, insects, and fire. Application of protective technologies to resource arrangement activities. Prerequisite: 302.

FOR B 410 Forest Soil Microbiology (4)
Edmonds
Types and numbers of microorganisms in forest soils. Growth and survival in relation to environmental conditions. Quantitative methods in soil microbiology, importance of microflora and microfauna in decomposition and nutrient mineralization in managed forest ecosystems. Integration and modeling of decomposition processes. Prerequisite: 310 or permission of instructor.

FOR B 412 Soil Genesis (5)
Ugolini
Soil, the excited skin of the earth. Processes of soil formation, land use, and weathering. Examination of major soils in the world. Prerequisites: CHEM 145, GEOG 205.

FOR B 413 Soil Distribution and Classification (4)
Oliver
Study of the distribution, morphology, and classification of soils in relation to environmental factors. Lectures and 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; relationships and processes that control essential plant nutrient levels and forms in soil solutions. Prerequisite: 310.

FOR B 415 Applied Forest Hydrology (4)
Schissel, 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 standing.

FOR B 416 Micrometeorological Measurements and Environmental Quality (5)
Fritsch
Principles and theories of biometeorological instrumentation. Accuracy, measurement, and calibration. Heat, air and soil temperature, atmospheric moisture content, wind. Prerequisites: MATH 126, PHYS 123.

FOR B 417 Environmental Biophysics (3)
Fritsch
Introduction to the physical environment concerning the transfer of heat, mass, and momentum in nature. Principles are applied to environmental effects,IAS specific emphasis on the movement of water in the soil-plant-atmospheric continuum and methods of estimation. Prerequisite: 329.

FOR B 420 Forest Chemistry (3)
Covers all aspects of the use of forest chemicals in forestry: laws, safety, application techniques, and biological effects. Specific chemicals are discussed as to formulation, 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
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, insect infestations, pest management, and current weather conditions. Laboratory and field exercises construct tree-ring chronologies to study environmental histories of selected forest stands. Prerequisites: introductory botany and senior or graduate standing.

FOR B 423 Reproduction Methods in Silviculture (3)
Edmonds
Advanced silviculture course that examines the characteristics 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 425 Advanced Forest Ecology (3)
Oliver
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
Seminar in silviculture for advanced undergraduate and graduate students. Topics selected for relevance to the interests of the participants; field trips required. Prerequisite: previous course work in silviculture.

FOR B 426 Forest Anteculture (4)
Brubaker, Oliver
The morphological, anatomical, and physiological responses of forest trees to the natural environment. Includes growth forms, seasonal and life-cycle changes, root systems, hormones, nutrition, and regeneration. Prerequisite: 320.
FOR B 427 Forest Genetics (3)
Sexton
Genetic theory as applied to the biological manipulation of forest trees. Principles of genetics and organic evolution are discussed and related to management strategy and silvicultural practices. Prerequisites: 300.

FOR B 428 Forest Community Ecology (4)
Brubaker, Oliver
Advanced course in forest community ecology for undergraduate and graduate students. Includes organizational interaction, soil pollution and classification, and forest population dynamics and productivity as influenced 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 silviculture. Includes those operations designed to direct an existing forest into the desired form such as clearing, 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 to controlling the regeneration and development of forest ecosystems for social values other than wood. Prerequisite: 322.

FOR B 431 Ecological Aspects of Forest Fires (3)
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 Pacific 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.

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 ecosystems relevant to man's use. Prerequisite: 333.

FOR B 433 Biology of Forest Diseases (5)
Edmonds
Detailed studies on the biology of host-pathogen relationships exhibited by certain forest diseases. Prerequisite: 432. (Offered alternate years; offered 1981.)

FOR B 435 Forest Entomology (3)
Gara
Introduction to general entomology, characteristics, life histories, ecological relations, prevention, and control of forest insects.

FOR B 436 Laboratory in Forest Entomology (2)
Gara
Introduction to the insect orders, identification of forest insects and their diseases. One field trip to study insect problems required. Prerequisite: 435, which may be taken concurrently.

FOR B 437 Ecology of Forest Insects (4)
Gara
Host-insect interactions, introduction to population dynamics, research technique, and pertinent forest entomological literature. One field trip required. Prerequisite: permission of instructor. (Offered alternate years; offered 1981.)

FOR B 440 Soil Physics (4)
Frithagen
Physical properties of soil and water. Thermodynamic properties of soil water mixtures and osmotic effects. Darcy's law and application to the movement of water in the field. Horizontal and vertical unsaturated flows: rain infiltration, evaporation, soil moisture, water redistribution and hysteresis, heterogeneous soils and instability. 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, including 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; secondary growth. Prerequisite: 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, Uopolit
Interdisciplinary seminar series. Topics of discussion emphasize the environmental history of the Pacific Northwest; 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, Uopolit
Interdisciplinary seminar series. Topics of discussion emphasize the environmental history of the Pacific Northwest; ecological relationships associated with present-day environmental conditions; interaction of past and present social systems; and aspects of resource management.

Courses for Graduates Only

FOR B 500 Graduate Seminar (2)
Bethel, Gesell, Stettler
Discussion of current issues and problems in forestry and forest research.

FOR B 511 Mineral Cycling in Forest Ecosystems (3)
Cole, Gesell
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. Prerequisite: 210 or 310 or equivalent.

FOR B 512 Topics in Soil Chemistry (3)
Zaskeit
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 Soil 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)
Woodbridge
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 water in forest ecosystems. Prerequisite: graduate standing.

FOR B 517 Soil Plant-Athmospheric Relations (3)
Fritzen
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 329.

FOR B 518 Weathering of Minerals in Soils (3)
Uopolit
Mineral weathering is the chemical changes and transformations of soils inorganic material under the influence of the atmosphere, hydrosphere and biosphere. These changes and transformations can be quantitatively estimated by analytical techniques and explained by invoking 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)
Seminar
Discussion by invited speakers on current research related 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 (5)
Scott
Detailed study of the literature dealing with recent applications of silviculture in world forestry. Entry card required.

FOR B 527 Advanced Forest Genetics (3)
Stettler
Discussion course relating concepts of quantitative and population genetics to forest-tree populations, both natural and artificial. Offered on credit/no credit basis only. Prerequisite: GENET 451 or equivalent. (Offered alternate 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 Aetiology (4)
Hinckley, Stettler
Review of concepts of soil formation, soil fertility, micromineral, 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 populations. (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 537 Topics in Forest Zoology (3)
Graduate seminar considering applied and basic zoological topics related 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, field and laboratory work. The courses are offered in all quarters, and credits can vary from 1 to 3, 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 B 510 Graduate Studies in Forest Soils (1-5)
Cole, Gesell, Uopolit

FOR B 515 Graduate Studies in Forest Influences (1-5)
Fritzen, Woodbridge

FOR B 516 Graduate Studies in Forest Meteorology (1-5)
Fritzen
FOR M 520 Graduate Studies in Forest Ecology and Silviculture (1-5)
Scott

FOR M 523 Graduate Studies in Range and Wildlife Management (1-5) FWS
Driver, Gestel, Manuwai, Taber
Prerequisite: 326 or permission.

FOR M 526 Graduate Studies in Forest Genetics (1-5)
Hathaway, Stender

FOR M 534 Graduate Studies in Forest Pathology (1-8)
Driver

FOR M 535 Graduate Studies in Forest Entomology (1-5)
Gara

FOR M 555 Graduate Studies in Wildlife Management (1-5)
Manuwai, Taber

FOR M 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, special 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)
Tomas
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
Analysis of resource management policies, with particular emphasis on the social, political, economic, and resource implications of conflicting resource uses. Examination of proposed policies and practices designed to deal with conflicting uses, including critical review of operational 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 examples 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 legislation affecting resource management; origins 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 different patterns of use through coordinated managerial planning. Taught at Pack Forest only. Prerequisites: 100, BSHI 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 24-hour field trip for the Labor Day. Prerequisite: outdoor recreation major.

FOR M 351 Introduction to Outdoor Recreation (5)
Sharpe
History and philosophy of outdoor recreation development and a determination. A survey of visitor needs and preferences, trends in use, and objectives of outdoor recreation in a modern society. Emphasis on county, state, and national levels.

FOR M 353 Interpreting the Environment (5)
Sharp
Role of interpretive specialist in heritage and natural resource areas. Increasing visitor enjoyment, encouraging thoughtful use to reduce human impact, and promoting public understanding of agency programs. Interpretative media selection, personnel and personal services, supporting activities, and professional development. Prerequisite: permission of instructor.

FOR M 354 Introduction to Management of Recreational Areas (5)
Odgegaard, Sharpe
Acquaints the student with the problems of administration, preservation, and management of the public lands. Emphasis on the integrated approach. Includes control of public use, protection of environmental quality, determining carrying capacity, organization structure, and other administrative details.

FOR M 355 Resource Planning Processes (3)
Revised processes in the formulation of forest resource programs; planning process as a systematic method for the identification of goals, information requirements, analysis methods, and implementation techniques at both 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 organization's policies, procedures, and operations, in the park or forest setting. Preparation of professional assessment report and internship seminar based on internship experience in recreation management, planning, and interpretation. Prerequisite: 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
Evaluation of information needs for decision making by forest managers. Study of data collection, sampling design, and estimation processes applied to forestry. Measuring instruments 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)
Schroeder
Photo interpretation and photogrammetry with applications 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, Waggener
Basic concepts of supply and demand, investment, and capital theory, and their application to the management of forested properties. Prerequisites: ECON 250 and Q 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 programming, multidisciplinary programming techniques, computer simulation, decision theory, and statistical forecasting (Introductory Statistics Q SCI 170). Prerequisites: 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 programs related to the use of public and private forest resources in the United States. Emphasis on the integrated framework in which the policy-making, legal, and planning processes function in forest resource management and administration. Current issues illustrate the basic concepts in forest policy, law, and planning. Prerequisite: junior standing in forest resources management or 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 fertilizer use. Use of soil maps to guide land-management activities. Provides a practical and working knowledge of soil in the production of firewood. Preparation in soil 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 management; land management. Meteorological and thermophysical bases for forest fire behavior. 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. Influence 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
Origin of forest fuel complexes; physical and chemical properties of fuels; fuel types and fuel succession in North America; forest inventory classification and hazard evaluation; fuel treatment methods and site effects; economics of fuel management. Intended for forest management majors specializing in forest protection. 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 with legal requirements, road reconnaissances, grade lines, curve layout, road survey, design and construction staking. Observation of road harvesting machinery operation and capabilities. Road construction techniques, drainage, and maintenance. Timber volume sale estimation, appraisal, and sale. Prerequisite: junior standing and timber harvesting option of forest resources management curriculum, or permission of instructor.

FOR M 450 Law Enforcement for Outdoor Recreation Professionals (2)
Barns
Nature and methods of dealing with criminal conduct in recreational settings; survey of criminal laws and procedures; rights of victims; rules and procedures dealing with evidentiary material; role of recreation professional as a witness. Prerequisite: permission of instructor. (Offered alternate years.)

FOR M 451 Outdoor Recreation Economics (3)
Dowdle
The application of economic principles to outdoor recreation problems. The elements of demand for outdoor recreation opportunities, the evaluation of recreation alternatives, and the allocation of resources for recreational
FOR M 452 Sociology of Leisure and Outdoor Recreation (5) Field Focuses upon an understanding of human behavior in leisure settings. An examination of basic sociological concepts as contemporary theories concerning leisure behavior; research techniques and problems of measurement in leisure research. Implications for the management of recreational areas provide an applied orientation and integration of substantive material. Prerequisite: SOC 110.

FOR M 453 Advanced Environmental Interpretation (5) Sharp Interpretive management and planning. Includes independent 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) Sharp Examination of principles of park maintenance management, including: organization, standards, scheduling, contract relationships, facilities and equipment, materials; 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 recreation opportunities. Emphasis on forecasting recreational demand, development of environmental information systems, and allocation of recreational use, based on user-recreation requirements. Case study approach. Prerequisite: 355.

FOR M 456 Wilderness Preservation and Management (3) Sharp Review of American wilderness philosophies, concepts, and values. Development of the Wilderness Act. Examination of current wilderness management policies, problems, 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, Sharp Application of professional field experience to develop proficiency in one of three subject areas: park interpretation, park planning, or park management. Advanced field experience course gives in conjunction with a recreation agency. Preparation of evaluation of professional internship experience. Prerequisites: 357, senior standing in 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 approach. Prerequisite: 455.


FOR M 461 Advanced Forest Recreation Management (3) Turnbull Forest tree and stand models. Studies of forest tree and stand management, satellite applications, growth and yield analysis. Prerequisites: 360, Q SCI 281 or STAT 311.

FOR M 463 Contemporary Problems in Forest Land Use (3) Waggener 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) Greenleaf Market structure of major forest-related industries. Supply and demand aspects of commercial forests on a world scale. Economics of alternative distribution and marketing 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 investment, inventory, management, and harvesting programs, and regulation models. Prerequisite: 365.

FOR M 467 Economics of Forest Land Use (3) Dowdle, Waggene Application of economic concepts to the use of forest lands and recreation of land to alternate uses. Relation of physical and biological factors as determinants of land value. Considerations of institutional factors affecting forest land and land-use decisions. Prerequisite: 365 or ECON 201.

FOR M 468 Timber Resources Management Case Studies (5) Rautaste Application of case study methodology to selected problems of forest land management. Specifically related to field aspects of operational forestry. Forest inventories and their use in management planning. Regression and steering control decisions. Description of the target forest, 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 encourages students to function as members of a multicenter source 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 computing 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 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 problems. Prerequisite: senior standing in forest land-use planning or permission.

FOR M 484 Urban Forestry Case Study (5) Application of social, administrative, and biological principles to the formulation and solution of urban forestry problems. Application of case-study methodology to selected 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) Consideration of the natural resources bases, social factors, and development methods in providing regional forest recreation opportunities. Emphasis on the forecasting of recreation demands, the development of environmental information systems, and the allocation of recreational use based on user-recreation requirements. Case study approach. Prerequisite: senior standing in forest 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 credit varies 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 forest ecosystems. Diverts and forest industry comparisons among tropical forested biomes. The structure and properties of tropical forest trees and woods. Problems in the development of tropical forest management practices. For treatment of the use practices and problems in the tropical regions of the world. Entry card required.

FOR M 531 Forest Fire Science Seminar (2) Pifford 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 research 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) Schreuder Principles of combustion and heat transfer. Basic properties of gases used in fire science. High intensity fires. Emphasis on free-burning fires in cellulose fuels. Offered on credit/no credit basis only. Prerequisites: MATH 100, PHYS 110, or permission. (Offered alternate years; offered 1981).

FOR M 540 Forest Statistics (4) W Schreuder Uses of probability distributions, tests of hypothesis, interval estimation, regression, analysis, experimental designs, and sampling techniques in forestry. Applications stressed in depth include: growth, yield models, individual tree versus whole stand models, regeneration survey methods such as stock quadrant and random sampling techniques; sampling for fuels over time and space; concepts of productivity; data collection and analysis techniques used for nonimber products such as wildlife and recreation; quality control models for monitoring environmental changes. (For mid-career students.) Prerequisite: Q SCI 281 or 381.

FOR M 551 Current Problems in Outdoor Recreation (3) Sharp 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 collection, 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.
FOR M 562 Advanced Forest Resources Management (3)
Bare, Rustagi
Overview of concepts and procedures involved in managing forested lands for the production of commodity and amenity values. Use of systems analysis techniques for evaluating alternative land-use programs and manipulations of the forest ecosystem. Prerequisites: graduate standing and permission of instructor. (Offered even-numbered 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 attention to forest resources. Development, persistence, and change of selected institutions in the context of prerequisite: senior standing. Entry card required.

FOR M 575 Forest Products Economics (3)
Dowdle, Waggener
Economic analysis of the forest products industries; market structure, regional impact of forest products industries, current problems in forest products economy. 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 competing, conflicting, often incommensurate objectives (goals). L.P. and G.P. computer programs are used to study impact of change in relative importance of goals. Goal programming applications in natural resource areas are discussed. Offered jointly with Q SCI 576. Prerequisite: 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

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 Management (1-5)
Rustagi, Turnbull

FOR M 565 Graduate Studies in Forest Management (1-5)
Bare, Schreuder, Waggener

FOR M 566 Graduate Studies in Forest Photography (1-5)
Schreuder

FOR M 588 Graduate Studies in Forest Economics (1-5)
Dowdle, Schreuder, Waggener

FOR M 589 Graduate Studies in Forest Sociology (1-5) AWSpS Field

PHYSICAL SCIENCES

Students taking undergraduate and graduate courses, structured or unstructured, that require field trips, special laboratory (and for special industrial) applications 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 P 101 Introduction to Wood and Paper (1)
Horuff
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. Offered on credit/no credit basis only.

FOR P 102 Introduction to Pulp and Paper Technology (3)
Horuff
Technology of production of pulp and manufacture of paper. Laboratory study of papermaking.

FOR P 205 Pollution Problems in the Forest Industries (2)
Horuff
Consider the causes and the control of pollution problems associated with the forest industries. Air, water, and solid-waste problems are identified during the forest's growth, utilization, and conversion into the many forest products. The state of the art in controlling these problems 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 Decoratum (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, carving and sculpture, furniture, architecture, and interior decoration. Effects of finishes on appearance and performance of wood. Credit in both 303 and 304 may not be received.

FOR P 304 Wood: Properties and Best Use (3)
Loney
Special course for the nonspecialist. Description of wood as a fibrous material, its properties and variability as influenced by species differences and growth conditions. Conditioning 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)
Loney
Demonstrations and laboratory experiments on topics presented in 304 that should precede or be taken concurrently.

FOR P 309 Creativity and Innovation (2)
Allen
Meaning and understanding of the basic nature of creativity and creative thinking. Challenge and dynamics of thinking. Blocks in creative thinking; emotional, social, cultural, economic, environmental and habitual. Requirements for creative innovation; knowledge, judgment, 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 negotiation, and open for credit to students who have taken GIS 309. Prerequisite: junior standing or permission of instructor.

FOR P 340 Forest Surveying and Drafting (4)
Schleich
Plane surveying techniques; forest boundary line surveys; GLO corners; traversing; use of transit; compass and tape; contour maps. Drafting techniques; use of drafting machines and lettering; map plotting; type of surveys; road plan and profiles; blueprints. Taught at Pack Forest only.

FOR P 341 Timber Harvesting (4)
Greathall
Timber harvesting methods and planning procedures. Logging cost and production control. Environmental considerations as related to logging and road construction. Prerequisites: 340, FOR B 370, FOR M 360.

FOR P 342 Forest Road Engineering (4)
Burke
 Reconnaissance, preliminary, and location surveys for forest roads. Horizontal and vertical alignment computations. Earthwork computations. Design of forest roads. Prerequisite: ENGR 161.

FOR P 343 Introductory Soil Mechanics (3)
Schleich
Provides necessary soil mechanics background required in logging road design and harvest unit layout courses in forest engineering; various soil classifications, systems and their applications and limitations; basic laboratory and field testing procedures to assist soil mechanical conditions. 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 relief structures, and stream-crossing structures. Prerequisites: 10 credits in physics, 5 credits in mathematics.

FOR P 374 Wood Utilization (3)
Bryant
Nature of the forest products industries from a global and national perspective; major processing steps in manufacturing lumber, plywood, composite boards, pulp and paper; present trends and future possibilities of converting all forest growth into useful products; secondary forest products industries. Prerequisite: junior standing in forest resources.

FOR P 375 Wood Utilization Laboratory (2)
Smith
Familiarization with the processing and economic environment 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
Introduction to the concepts of stress, deformation, and strain in solid materials, including the unique properties of wood. Development of those equations that relate those variables in structures. Laboratory session emphasizes theory. Prerequisite: 243 or ENGR 210.

FOR P 400 Wood and Fiber Structure (5)
Loney
Woody plants. Growth of the tree stem. Development of the bark and the structure of secondary wood, including fiber characteristics. Structure of hardwoods, including fiber relationship of wood structure to its total physical properties. Nature of wood 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 mois.-
tecture and equilibrium thermal properties. Stress, strain, Hook’s law for orthotropic materials. Electrical polarization, axial and bending stress, electric-
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, time-
dependent electrical behavior, inelastic behavior and vi-
tilation. Prerequisite: 401. (Offered alternate years; of-
fered 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 bending 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-
lighter interactions and adhesion. Fiber modification by
physical and chemical processes and theory and design of
fiber composite materials. Prerequisite: 403. (Offered al-
terate 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, hemi cellulose, and extractsive. 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)
Hrubiiord
Nature, origin, and occurrence of the extraneous compo-

nents of wood, their influence on pulp and paper prepara-
tion, and their utilization.

FOR P 410 Energy From Wood (3)
Explores principal characteristics of wood fuels and fo-
cuses 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 facil-
ities. 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: CEVEC 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)
Greasely
Description and analysis of the logging and road pro-
cess within a system's framework: application of man-
agement science methods in data collection, data
analysis, and decision making to forest engineering prob-
lems 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, 5)
Burke, Greasley, Sarkanen, Hrubiiord
446: route projection and logging planning. 447: recon-
naissance and preliminary surveys. 448: road location and
correction; surveys. 449: cost estimates and reports.
Development of a complete logging plan for a timber act.
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 forest processes. Prerequisites:
374, 377.

FOR P 473 Plywood and Board Processes (4)
Bryant
Familiarization with the technology of the modern lumber
laminating, plywood, and composite board indus-
tries; product properties as related to process and species
variables; uses and markets for these products. Prerequi-
site: 472.

FOR P 475 Wood Dairying Technology (3)
Leney
Analysis of the wood-drying process: technology of re-
ducing the moisture content of wood in the form of lum-
berr, 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)
McKea.n
Fiber sources and properties. Secondary fibers. Stock
preparation, sheet forming, water removal, flocking,
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. Prerequisite:
476.

FOR P 479 Analysis of Wood Processing Facilities
Benthel
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 move-
ment.

FOR P 480 Wood Process Development and Design
Benthel
Study of the factors influencing feasibility judgements
with respect to industrial development and factory de-
sign. Feasibility of new forest products manufacturing in-
stalations with reference to raw material supply, mar-
kets, transportation, and manpower. Analysis of case
histories of forest products manufacturing and facility de-
velopment. Use of operations research methods in feasibil-
ity studies.

FOR P 481 Pulp and Paper Unit Operations (3)
McKea.n
Unit operations of particular interest in the pulp and pa-
er 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
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)
Hrubidiord
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 distribu-
tions, and solid-state and solution properties.

FOR P 489 Wood Biochemistry (3)
Hrubihord
Biochemistry of carbohydrates, phenolic and terpene
compounds in forest trees, and biochemistry of wood
degradation. Prerequisite: 487 or BI0C 405. (Offered al-
terate 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 Hook’s law for the or-
thotropic continuum. Tensor transforms of stress, strain,
and the elastic coefficients. The compliance and stiffness
tensors. Stress energy. Distribution functions of descrip-
tions of internal geometry of composites. Orthotropic
elasticity of the fiber wall. Elasticity and two- and three-
dimensional 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 mois-
ture and energy in composite materials. Coupled mois-
ture 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 pe-
neration, liquid movement in wood, chemical effects on
wood. Entry card required.

FOR P 572 Wood Chemistry and Analysis (3-5)
Hrubiiord
Application of instrumental methods 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.)
INTERDISCIPLINARY GRADUATE DEGREE PROGRAMS

These programs are administered by interdisciplinary groups of the Graduate School. Courses carrying the particular program prefix appear below; other courses with the same prefix appear elsewhere as indicated. These courses include those programs selected 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 engineering; illustrated by case studies from many fields. Appropriate for seniors and graduate students in engineering and science who require a survey of techniques, who are not prepared for, or do not seek, advanced material at the 500 level. Applications of first-order and linear ordinary differential equations, first-order integral transforms, Fourier series, and complex variables. Offered jointly with ENGR 403. Prerequisite: MATH 236.

AMATH 402 Analytical Methods in Engineering II (3)
See AMATH 401.

AMATH 403 Analytical Methods in Engineering III (3)
See AMATH 401.

AMATH 501 Seminar in Applied Mathematics (1, max. 6) A,W,S
Special topics and selected problems of current interest in applied mathematics. Offered on credit/no credit basis only.

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-master's sequenced. Offered jointly with A A 562, 563, 564. Prerequisite: 469. (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 problems. Cylindrical coordinates. Complex variables, contour integration, conformal mappings. Offered jointly with MAT 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; variational methods: asymptotic expansion, perturbation, regular and singular, difference equations; numerical procedures. Offered jointly with a A 568. Recommended: 567.

AMATH 569 Partial Differential Equations (3) Sp
Properties of diffusion, wave, and Laplace-type equations; initial and boundary-value problems; series expansions; transform methods; singularities; Green's functions; eigenfunction expansions; second-order equations; applications and method of characteristics; numerical techniques. Offered jointly with a A 569 and MATH 569. Prerequisite: 566 or MATH 428.

BIOMATHEMATICS

For related course work, see listings for the departments of Statistics and Biostatistics.

BMAT 554 Stochastic Processes in the Life Sciences (3) Sp
Bell Modeling of various biomedical phenomena in terms of the basic stochastic processes—binomial, Poisson, and Gaussian. Extensions to include basic applications of random walk, compound, and nonhomogeneous Poisson processes, as well as Wiener processes and certain fundamental time series. Estimation, testing, and interval estimation for parameters in parametric models. Introduction to nonparametric stochastic processes and associated inference. Special emphasis in air-pollution models, water-pollution models, epidemic-seizure models, and cancer-related nutrition models. Prerequisites: basic course in each of statistical inference, probability, and biology.

BMAT 597 Seminar in Quantitative Ecology (1, max. 9) A,W,S
Lectures and discussions of current problems in quantitative ecology. Prerequisite: permission of instructor.

BMAT 598 Special Topics in Quantitative Ecology (1-3, max. 12) A,W,S
Elective topics in quantitative ecology, including population and community ecology, systems ecology, and physical processes in ecosystems. Prerequisite: permission of instructor.
BMATH 599  Research in Quantitative Ecology (1-5, max. 5) A WSp
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 (*) A WSp

IPHD 800  Doctoral Dissertation (*)

Restricted to graduate students approved for a special individual Ph.D. program in the Graduate School. Requires permission of the student's Supervisory Committee chairperson. 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 Programs section under Institute for Marine Studies.

PHYSIOLOGY-PSYCHOLOGY

PPSY 800  Doctoral Dissertation (*)

RADIOLOGICAL SCIENCES

RAD S 503, 504 Laboratory in Radiation Biology (1,1,1,1) A W
Chemists 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
Chemists 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) A Sp
Chemists Discussion of radiation-induced chemical reactions and their contribution to biological radiation damage, including alterations in enzymes, viruses, bacteria, and mammalian 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) Robkin
For majors and nonmajors interested in evaluating the impact of nuclear power technology on man and his environment. Studies of modern nuclear power cycles, nuclear reactor safeguards, thermal effects, control of radioactivity releases, biological response to radiation, environmental monitoring, evaluation of new energy resources and energy-conversion systems. Offered jointly with NUC E 540, 541.

RAD S 550 Field Practice in Radiological Health (*, max. 6) S
Chemists Student rotation through laboratories engaged in radiological 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 (*) A WSp

RAD S 700  Master's Thesis (*) A WSp

SOCIAL WELFARE

SOCWL 552 History of Poverty and Inequality: The Anglo-American Experience (1400-1900) (5) W
Examines the role of the modern social welfare policy program in two historic periods: the reign of the Tudors (1485-1603) and the evolution of welfare policy compatible with the aims of the nation-state, and the significant societal and intellectual developments preceding the English Poor Law Reform of 1834. The English welfare heritage as it subsequently shaped public and private welfare measures in the United States also receives attention, as does the relevance of these early beginnings to today's conceptualization of welfare policy.

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 implementation: contemporary income maintenance policies and their effectiveness in reducing income inequality. This course is closely linked to, and built upon, 552. Selected cases and dilemmas followed in this course, which serve as the focus for policy debates, are examined in the context of current welfare programs.

SOCWL 580 Introduction to Advanced Research Methods and Design (3) A
Introduction to the broad scientific issues and the specific methodological strategies used in formulating and answering research questions within the field of social welfare. Required of all first-year students in the social welfare 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 research project. Offered on credit/no credit basis only.

Seminar assesses the current state of knowledge in selected major areas of social work and social welfare, examines analytic and methodological problems in conducting 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. Prerequisite: admission to social welfare Ph.D. program or permission.

SOCWL 600  Independent Study or Research (*)

SOCWL 800  Doctoral Dissertation (*) A WSp

INTERSCHOOL OR INTERCOLLEGE PROGRAMS

BIOENGINEERING

Administered by the School of Medicine and the College of Engineering.

BIOEN 299 Introduction to Bioengineering (1) A Sp
Lectures, discussions, and reading assignments on the various aspects of bioengineering: orientation in bioengineering studies and practice. Offered on credit/no credit basis only.

BIOEN 401 Fundamentals of Bioengineering I (3) Sp
Introduction to major physical, chemical, and biological properties of major components of living systems. Application of engineering to measurement and characterization of these properties. Introduction to synthetic biomaterials and a case study of musculoskeletal system. Recommended: basic course in physiology (e.g., ZOOL 208, P BIO 360).

BIOEN 402 Fundamentals of Bioengineering II (3) Sp
Engineering principles and technology applied to investigation, diagnosis, and therapy in vascular, heart, and respiratory systems, as well as selected topics dealing with skin, eyes, and ears. Prerequisite: 401.

BIOEN 403 Fundamentals of Bioengineering III (3) Sp
Engineering principles and technology applied to investigation, diagnosis, and therapy in renal, digestive, and reproductive systems. Selected topics in engineering contributions to health-care delivery. Prerequisite: 402.

BIOEN 410 Creative Prescriptions for Health-Care Delivery (3) Sp
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 future 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 NYT MED 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 and cartilage, the interaction between the mechanical and biological characteristics of bones and joints. Offered jointly with ENS 420. Prerequisite: M E 352 or equivalent. (Offered even-numbered years.)

BIOEN 436 Medical Instrumentation (4) Sp
Stimpson
Introduction to the application of instrumentation to medicine. Topics include transducers, signal-conditioning amplifiers, electrodes and electrochemistry, ultrasonic
systems, electric safety, and the design of clinical electronics. Laboratory included. Offered jointly with E 430. Prerequisites: 244 or permission of instructor. Recommended: 402. Entry card required.

BIOE 460 Waves In Bioengineering (3) Sp
Lee
Ultrasound, electromagnetics, and optical wave effects in biological materials. Applications to biomedical uses in diagnosis, therapy, and surgery. Offered jointly with E 460. Prerequisites: 381 or prerequisite course in wave propagation approved by instructor.

BIOE 472 Diagnostic Ultrasound (3-6) AWSp
Basic principles of ultrasound. A-mode applications, including delineation of midline structures, differentiating solid from cystic lesions, and measurement of biparietal diameters. TM-mode applications, including delineation of intracranial structures, such as mitral valve and pericardial 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 various ultrasound techniques. Prerequisite: permission of instructor.

BIOE 490 Engineering Materials for Biomedical Applications (3) W
Hoffman
Considers applications of the principles of physics, chemistry, biochemistry, materials engineering, mass transfer, and fluid mechanics to biomedical problems. Case studies include the selection of materials design, and the operation of instruments, components of, or entire, artificial organs (heart, kidney, lung) and artificial systems, such as blood, dial, for use in contact with body fluids. Offered jointly with the CH E 490. Prerequisite: organic chemistry or permission of instructor. (Offered even-numbered years.)

BIOE 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. Release mechanisms include diffusive, convective, or erosive driving forces. Applications to the biomedical, agricultural, forestry, and oceanography fields. Some special case studies covered in detail. Offered jointly with CH E 491. Prerequisite: permission of instructor. (Offered odd-numbered years.)

BIOE 499 Special Projects (2-6, max. 6) AWSp
Individual undergraduate bioengineering projects under the supervision of a faculty advisor. Credit given for selected topics of current interest as announced. Prerequisite: permission of instructor. Entry card required.

BIOE 510 Bioengineering Seminar (1) AWSp
Topics of current bioengineering interests presented by faculty, students, and students. Students must attend regularly, 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.)

BIOE 531, 532, 533 Electron Microscopy (1-5, 1-5, 1-5) A, WS, Sp
Johnson, Lufi
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.

BIOE 547 Engineering Aspects of the Fluid Mechanics of the Human Body (3) W
Oates
Engineering background to the many flow regimes existing in the human body. Some examples of flow problems such as cardiovascular, bronchial, microcirculatory, urethral, etc. Offered jointly with A A 547. Offered on credit/no credit basis only. Prerequisite: permission of instructor. (Offered odd-numbered years.)

BIOE 550 Circulatory Mass Transport and Exchange (3) W
Bassingthwaighte
A bringing together of stochastic theory, network analysis, and chemical reactor kinetics to the kinetics of mass transport through the vascular system, dispersion in the capillary and arteriolar, and the microcirculation of and cell membranes. Prerequisites: graduate-level knowledge of cardiovascular physiology, elementary statistics, and differential equations. (Last time offered: Winter Quarter 1981.)

BIOE 559 Special Topics In Bioengineering (2-6, max. 15) AWSp
Offered at a graduate level periodically by faculty members with the permission of the instructor. Prerequisites: undergraduate or graduate course in certain areas of research activities with current and topical interest to bioengineers. Prerequisites: undergraduate or graduate course in physiology, engineering, disease, and cell behavior. Entry card required.

COMPUTER SCIENCE Courses for Undergraduates

CSCI 201 Introduction to Computer Science (5) AWSp
Rigorous introduction to the theoretical and practical components of computer science: topics in programs, data structures, machines, computability, applications, social aspects. Prerequisite: MATH 124.

CSCI 241 Programming (3) AWSp
Basic algorithms, programming techniques, and basic hardware of current high-level language Pascal. Prerequisite: 201 or permission of instructor or departmental adviser.

CSCI 321 Discrete Structures (3) W
Fundamentals of set theory, graph theory, Boolean algebra, and logic in the context of computing. Prerequisites: MATH 126 and major standing.

CSCI 322 Introduction to Formal Models In 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 rigorous use of basic techniques of analysis. Induction proofs, simulation, diagonalization, and reduction arguments. Prerequisites: 241, 321, and major standing.

CSCI 326 Data Structures (5) Sp
Sequential and linked allocation of linear structures; tables, arrays, stacks, queues, trees, and graphs; searching and sorting techniques; memory allocation and garbage collection. Prerequisites: 321, 378, and major standing.

CSCI 341 Programming Languages (5) W
Designed to make the student reasonably fluent in several radically different high-level languages. Prerequisite: 326 or 445 or equivalent knowledge of computing. Prerequisite: 241 or 445 or equivalent knowledge of computing. For non-computer science majors: no credit if 326 has been taken.

CSCI 378 Machine Organization and Assembly Language (5) W
Differences and similarities in machine organization; central processors; fundamentals of machine language and addressing; assembly language programming, including macros; operating system interfaces. Prerequisites: 241 and major standing.

CSCI 384 Data Structures and Algorithms (3) AWSp
Fundamental algorithms, and data structures for their implementation. Symbol tables, Merge sorting, Linear algebra, tree searching, linked lists, binary search trees, balanced trees, hashing. Offered jointly with E E 373. Prerequisite: 241 or 445 or equivalent knowledge of computing. For non-computer science majors: no credit if 326 has been taken.

CSCI 401 Introduction to Assemblers and Compilers (3) W
Fundamentals of assemblers, compilers, and interpreters. Symbol table, Macro programming. Lexical analysis, tax analysis, semantic analysis, and code generation for general-purpose programming languages. Offered jointly with E E 401. Prerequisites: 373, 378 or E E 371.

CSCI 421 Introduction to the Analysis of Algorithms (3) A
Analysis of behavior of algorithms. Techniques for design of efficient algorithms. Methods for showing lower bounds on computational complexity. Discussion of particular algorithms for searching, string manipulation, arithmetic, graph problems, pattern matching, and their implementations. Prerequisites: 322 and 326.

CSCI 431 Introduction to Theory of Computation (3) Sp
Models of computation, computable and noncomputable functions, space and time complexity, tractable and intractable functions. Prerequisite: 322.

CSCI 445 Computer Programming Laboratory (1) 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 coexistence with the instruction of two weeks of the quarter with a number of programming assignments. 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, PORTAN, or PL/I.

CSCI 451 Introduction to Operating Systems (3) W
Principles of multiprogramming systems. Process management, resource management, and file systems. Prerequisites: 326 or 373 or permission of instructor.

CSCI 470 Computer Design (4) AW
Fundamental gating circuits are developed into large logic structures through the use of state machines in the design of central processing units, memories, and peripheral equipment is illustrated. For computer science majors. Prerequisites: 378 or permission of instructor.

CSCI 473 Introduction to Artificial Intelligence (3) Sp
Principal ideas and developments in artificial intelligence; LISP and SNOBOL as the basis of precise description. A predetermined proving and problem-solving methods; representation of knowledge in procedures and in frames; natural language analysis and synthesis; the design and implementation of expert systems. Not a substitute for 378; no credit given if 378 has been taken. Prerequisite: significant programming experience in a high-level language; 241 or 445 must be taken concurrently.

CSCI 478 Computer System Concepts (4) AWSp
For experienced computer users from other departments seeking a better understanding of the underlying mechanisms. Topics include microprogramming, machine-level architecture, computer system organization, assemblers and microprocessors, compiled and high-level language, compilers, and operating systems. Not a substitute for 378; no credit given if 378 has been taken. Prerequisites: senior standing in computer science major.

CSCI 499 Senior Projects (1-9, max. 9) AWSp
Conduct of a research (and possibly dissertation) describing a development, survey, or small research project completed by the student in an area of specialization. Objectives are: (1) applying and integrating the classroom 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 standing in computer science major.

CSCI 499 Reading and Research (1-24, max. 24)
Available for special study for advanced computer science majors to do reading and research in the field. Offered on credit/no credit basis only. Usable as a free elective, but not to place in a core course or computer science elective. Prerequisites: senior standing and permission of instructor.

Courses for Graduates Only

CSCI 500 Computers and Society (2) W
Study of the impact of computer technology on present and future societal computer technology and economics; political, economic, cultural, social, and moral issues. Seminar with frequent guest lectures and discussion leaders. Each student is required to complete a
521. Desigga and Analyses and applications of ocean data and information to selected examples of ocean use and resource exploitation. The nature and availability of such information is reviewed in terms of its applications in policy planning, decision making, regulation, and enforcement. The constraints imposed by ocean conditions are identified and the consequences of human activities examined. Prerequisite: 500 or permission of instructor.

IMS 505 Marine Uses and Resourc3 Living Resources (3) W Alverson Survey of living marine resources; factors affecting distributions and abundances; direct and indirect impact of human activities; bases for management; the origin and changing role of 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 fisheries exploitation, pollution, transit rights, scientific research, energy and mineral development, military uses, emplacement of installations, 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 organizations attempt to manage and regulate the uses of the ocean. Primary emphasis is on the analysis of processes that support or constrain the work of these organizations and on the search for alternative policies and offerings. Offered jointly with PB FL 507. Prerequisite: 500 or permission of instructor.

IMS 508 Economic Aspects of Marine Policy (3) W Craddock, 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.
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 resources; organizational and policy issues associated with overlapping jurisdiction and spheres of interests; the development 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, including the definition and ownership of the coastal zone; federal, state, and local and international law jurisdictional issues; legislative and administrative controls; federal and state constitutions. Offered jointly with LAW B 560.

IMS 511 Coastal Zone Environment Management (3) Sp Dauscher, 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 environmental information in planning and decision making. Washington State case examples and practical exercises. Prerequisite: OCEAN 580 or permission of instructor.

IMS 512 Ocean Environment and Living Resources (3) W Wooster
Analysis of characteristics and processes in the ocean environment affecting abundance of marine organisms; implications for management of oceanic fisheries. Prerequisite: permission of instructor.

IMS 517 Marine Uses: Transportation and Commerce (3) W D. K. Flemming
Role of the oceans in the transportation of men and materials; character and trends in vessel design and terminal facilities; policy and oversight of the shipping industry; 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, to the pattern of oceanic use at a time. Prerequisite: 507 or permission of instructor.

IMS 538 Economic Aspects of Marine Policy II (3) Sp States
Development of pertinent economic concepts and their application to selected topics in marine policy. Offered jointly with CON 538. Prerequisite: 508 or permission of instructor.

IMS 550 Special Topics in Marine Studies (1-3, max. 18) AWSp
Examination of various aspects of marine studies. Content varies, depending upon the interests of the faculty and students. Intended for the joint participation by the faculty and advanced students in the investigation of selected topics. One or more groups are organized each quarter.

IMS 851, 852 Ocean Engineering Designs I, II (3, 3) W,Sp Vesper
Interdisciplinary ocean systems design, choice of system management by problems of current interest; participation by students and faculty from engineering, law, oceanography, biology, etc., in order to study complete system; practical design and analysis of engineering hardware; direct interaction with government and industry concerned with ocean problems. Offered jointly with OEN 551, 552. Prerequisites: graduate standing; 551 for 552.

IMS 552-563 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 involving the development and structure that are under particular stress due to social, including technological, change. Problems examined change from year to year. Offered jointly with LAW B 563, 564. Open to third-year and law students; open to second-year law students with permission of instructor. Prerequisites: 506, 507, or permission of instructor.

IMS 571-572-573 Advanced Seminar In Coastal Zone Management (1-3-1-3, 1-3, max. 6) A, W,Sp
Hirasaki, C. C. LeGrand
Students develop analytical and conceptual papers addressing an important theme in coastal zone management and analysis and discussion in selected topical subjects. Papers can complement theses or other degree requirements. Designed for students with career orientations toward coastal zone management. Prerequisite: 509 or permission of instructor.

For students who select marine resource management as an area of concentration within the marine science program. Topics are from living resources, ocean mining, energy production from the ocean, and other areas. Integration of multidisciplinary analysis and supervised student research, leading to completion of the thesis, are primarily objectives. Offered jointly with PB PL 587-588.

IMS 600 Independent Study or Research (*) AWSp
IMS 700 Master's Thesis (*) AWSp

QUANTITATIVE 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 to marine science. Emphasis on logical thinking. Prerequisites: 281, or permission of instructor.

Q SCI 291, 292 Analysis for Biologists (4, 4) A
Differentiation; integration; multiple integrals and partial derivatives. Numerical and computing techniques in analysis. Emphasis on biological problems, particularly in population and ecological models. Prerequisites: MATH 105 for 291; MATH 124 for 292.

Q SCI 340 Applications of Digital Computers to Biological Problems (5) AW
Methods and procedures for processing biological and marine resource data, digital computer problem analysis, elementary programming, use of package 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, Rusagi
Basic concepts of management science applied to forest resource management problems, including linear programming, multiple objective programming techniques, computer simulation, decision theory, and statistical forecasting. Offered jointly with FOR M 366. Prerequisites: 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 and the application of these in examining, defining, analyzing, and solving complex problems of resource management. Emphasis is placed on networks and graphs, principally PERT analysis, and on linear programming and its extensions, such as the transportation assignment and transshipment models. Sensitivity analysis and duality also are presented. Prerequisite: 391, which may be taken concurrently.

Q SCI 381 Introduction to Probability and Statistics (4) AWSp
Elementary concepts of probability; sample space; theory, random variables, expectations, variances, covariance, normal, hypergeometric, Poisson, negative-binomial, geometric, uniform, normal, chi square, "t" and "F" distributions; point and interval estimation, basic concepts of hypothesis testing; applications to biological problems. Open for credit to students who have taken 281. Prerequisite: MATH 105 or equivalent.

Analysis of variance and covariance; chi square tests; multiple and curvilinear regression; sampling theory; discrete distributions; experimental design and power of test; and the use of computer 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 matrices in determining matrix, solving systems of equations and other matrix operations; applications in operations research and biology. Prerequisites: 381, MATH 125, and FISH 340 or equivalent course in computer use, or permission of instructor.

Q SCI 392 Techniques of Applied Mathematics in Biology (3) A Ordinal, differential equations—linear and nonlinear; systems of differential equations; solution techniques, numerical solution techniques; applications to biological processes. Prerequisites: 292 or MATH 126, or permission of instructor.

Q SCI 393 Techniques of Applied Mathematics in Biology II (3) D Prerequisites: of advanced ordinary differential equations, special functions, and partial differential equations to descriptions of biological phenomena. Particular emphasis is placed 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 energy flow models, food chain models, animal population life-cycle models, and Leslie matrices. Students review selected papers in the ecological modeling literature as they develop, 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, Swartzman
Unified review of the physical and biological processes that make up natural and near-managed ecosystems. Ecosystems are defined as systems of interactions and processes that develop, change over time, and are sustained by energy and matter flux. Prerequisites: 292, 340, 450, or permission of instructor for 451; 451 for 452. (Offered even-numbered years.)

Q SCI 455 Mathematical Models In Population Biology (4) A Allee, Beddington, L veilles Models
Definition and role of mathematical models in population biology; types of models; population processes and populations; representation of systems, the use of computer programs, sampling and other methods of estimation of population parameters. Prerequisites: 281, 340, 450, or permission of instructor for 451; 451 for 452. (Offered even-numbered years.)

Q SCI 457 Management of Exploited Animal Populations (4) W Mathews
Equilibrium yield model; spawn-recruit models, management of fisheries; the use of 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.
Social Management of Technology

QUAT 501 Seminar in Quaternary Environments (1, max. 6) WSp
Interdisciplinary seminar in the changing natural environments and development of human societies over the Quaternary Period, with emphasis on climatic changes and their effects. Speakers from the University and elsewhere present lectures on their specialties, followed by discussion. 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.

SOCIAL MANAGEMENT OF TECHNOLOGY

SMT 301 Creating the Future (5) A Sp

SMT 310 Social Constraints on Engineering Design (3) WS

SMT 401 Introduction to Technology as a Social and Political Phenomenon (3) A Berane

SMT 410 Technology Assessment—Concept and Methods (3) A Berane

SMT 454 Alternative Technology (3) A Berane

SMT 461 Energy Technology and Public Policy (5) WSp

SMT 498 Special Research Projects: Technology, Society, and Public Policy (3-5) A WSp

SMT 520 Seminar (2, max. 6) A WSp

SMT 530 Technology Assessment Methods and Analysis I (3) or 5 W Berane

SMT 531 Technology Assessment Methods and Analysis II (3) Sp

SMT 540, 541, 542 Social Management of Technology I, II, III (3, 3, 3) A, WSp

SMT 554 Cost-Benefit Analysis and Economic Methodology (3) WSp

For students in social management of technology, economics, engineering, public affairs, environmental studi
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 504. Prerequisite: ECON 200 or 400.

(Upon last offered: Spring Quarter 1981.)

SMT 565 Seminar in Atmospheric Science Policy Problems (1-3) W

Flexible

Decision making and policy determination in major national atmospheric programs. Case studies of policy development for the Global Atmospheric Research Program, transportation, weather modification, and air quality. Individual student study of selected topics, with emphasis on developing and evaluating alternate policies. Oral report and written paper. Offered jointly and ATM S 565. Prerequisite: 540 or permission of instructor.

SMT 568 Women and Technology (3) Sp

Berenson

Introductory graduate-level seminar for those interested in an investigation of the interaction between technology and women. Topics include comparison of technological development and historical models 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 labor force; technologies that particularly impact women (such as gynecological and contraceptive); and a discussion of how the needs of women can be met through technological means. Offered jointly with SOC 568.

SMT 582 Energy Conservation (3) Sp

Heyman

Examination of past, present, and projected patterns of energy use in this country: opportunities for reducing wasteful practices and for developing more efficient technologies of energy utilization; use of price and other forms of economic incentives to induce energy conservation; case studies from the residential, commercial, industrial, and transportation 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

Bowman

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 solar-assisted thermal gradients; examination of governmental research programs, institutional constraints, and financial incentives as they apply to solar energy.

SMT 588 Special Topics: Technology, Society, and Public Policy (3-5, max. 15) AWSp

Seminars designed primarily for graduate students. Readings, 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 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

UCON 411 Psychology of Aging (3) W

Rybak

Focuses on developing the skills necessary for critically evaluating current psychological theories of aging, research findings in this area, and the implications of findings for the aging person. Special consideration given to the effects of socioeconomic, sex, and ethnic differences in the psychology of aging. Open to upper-division undergraduates and beginning graduate students interested in the field of gerontology.

UCON 415 Drug Abuse (2) Sp

Hammarlund

In-depth and multidisciplinary course covering selected topics of drug abuse primarily designed for upper-division 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 previous knowledge of drugs of abuse and basic pharmacology or biology and biochemistry. Teachers in the areas of law, nursing, pharmacy, pharmacology, psychiatry, social psychology, and social work instruct in their areas of expertise, possibly including some off-campus visits. Offered on credit/no credit basis only. Prerequisite: permission of instructor.

UCON 420 Biological Safety Practices (1) A

General introduction to appropriate laboratory procedures used for handling potentially hazardous biological agents. Participation focused on laboratory safety and appropriate protocols that should be employed by those engaged in recombinant DNA research. Offered on credit/no credit basis only.

UCON 422 Venerable Diseases: An Overview (2) A

Physically oriented course designed to train upper-class health science students to the point they are stimulated and qualified to participate effectively in community outreach programs and prevention of venerable diseases. Lecture-discussion session each week with emphasis on the nature of the prevalent sexually transmitted diseases. Each session includes field exercises and extensible speaking engagements. Offered cooperatively by the departments of Pharmaceutical Sciences, Medicine, and Epidemiology in the College of Pharmaceutical Sciences responsible for administration of course. Offered on credit/no credit basis only. Prerequisite: permission of the course coordinator.

UCON 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 interprofessional teams representing each discipline. Classes are conducted in didactic and seminar mode. Faculty history and professional socialization experiences form the core of the course. Focuses on peer consultation with other disciplines and communication skills. Students observe role behavior in selected clinical teams and begin to function as a team in a selected primary-care site. Prerequisite: permission of instructor. Limit: six students from each discipline.

UCON 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 of the delivery of care in a primary-care setting. Students continue to examine and conceptualize the multidisciplinary process in primary care in seminal and plenum sessions. Variable credit is based on clinical hours taken for credit. Prerequisite: 493 and permission of instructor.

UCON 497 Health Care in a Rural Community (3) Sp

Hull, Schoettla

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 stabilizing community resources and support for a comprehensive rural health-care system. Pharmacy students, nurses, and other health professionals study the structure of the medical appropri
cate clinical setting within the conceptual framework of each student's professional field.

UCON 510 Seminar in Neurobiology (8) AWSp

Weekly seminars organized each quarter by one of the faculty. Emphasis on the biological structure, physiology and biophysics, psychology, and zoology. Required of graduate students supported by the Systems and Integrative Biology Training Program.

UCON 584 Plant Tumors (1, max. 9)

Grosberg

Discussion of the literature of plant tumors and current research work being carried on in this area at the University of Chicago. Topics to be covered include Cell Wall Biochemistry, Botany, and Microbiology and Immunology. Offered on credit/no credit basis only. Prerequisite: offered only to persons actively pursuing work in this area.

a180
WILDLIFE SCIENCE
Administered by the College of Fisheries and the College of Forest Resources.

WLF S 250 Survey of Wildlife Biology and Conservation (4) Manuwal, Taber
Wildlife ecology and population biology, and interrelationships between wild animals and man, including encouragement of wildlife population growth and productivity, control of pests populations, and preservation of endangered species. Open to nonmajors. Prerequisite: junior standing.

WLF S 401 The Biology and Conservation of Birds (3) Manuwal
Prerequisite: 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 birds and mammal populations, including relations of range, forest, and farm management to wildlife conservation. Emphasis on Europe and North America. Prerequisite: 350.

WLF S 403 Biology and Conservation of Mammals (3) Taber
Prerequisite: 404.

WLF S 451 Birds in the Forest Environment (3) Laboratory
Prerequisite: 401 or ZOOL 466. (Offered alternate years; offered 1980-81.)

WLF S 452 Ecology of Marine Birds (4) Manuwal
Focus on the driving forces for the adaptive radiation of marine birds, particularly the Auklines of the northern hemisphere and the Procellariiformes of the southern hemispheric oceans. Emphasis on the major patterns of natural history, resource division, and reproductive strategies of the different bird groups. Prerequisite: 401 or ZOOL 466 or permission of instructor. (Offered alternate years; offered 1981-82.)

WLF S 475 Marine Mammalogy and Conservation (3) Erickson
Lecture and laboratory in marine mammalogy: the evolution, taxonomy, physiology, life history, and behavior of marine mammals; the techniques of studying them and the management and conservation of them. Offered jointly with FISH 475. Prerequisite: 15 credits in biology; recommendations: 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. Consider 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 undergraduate. (Not offered every year.)

LAW 443 The Legal Process (3) Designed for, and limited to, students who are not regularly enrolled in the School of Law. Both graduate students and undergraduate students who have completed at least three-fourths of the work toward the undergraduate degree. Further, the purpose of the course is to assist the student 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 (3-4, max. 6) Examines the relationships between the Constitution of the United States and the American system of public education, excluding higher education; constitutional freedoms and the obligations of the school, constitutional freedom and the legal controls over curriculum, teachers and students; constitutional freedom and racial desegregation; constitutional freedom and equal educational opportunity. Includes practical applications 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 military justice system is studied and compared with other Anglo-American. Specific subjects include sources of military law, jurisdiction, apprehension, kinds of court martial, nonjudicial punishment, pretrial procedures, role in the judicial process, crimes, trial procedures, rules of evidence, and the view and appellate process. Emphasis on procedures and the techniques used by armed forces in substantive crimes. Discussion and lecture include the study of cases 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, legislative, and judicial in form, a number of the courses involves a study of the relationship of administrative agencies with these more traditional departments of government. Both formal and informal administrative procedures are examined.

LAW A 501- Contracts (2-4, max. 8) Principles that regulate the creation, operation, and extinguishment of the legal relation known as contract. Major subdivisions covered are mutual assent, consideration conditions (express and constructive), performance, breach, damages, discharge, assignment, and beneficiary rights. Modern developments in the law of contracts, the parol-evidence rule, the statute of frauds and illegality.

LAW A 502- Civil Procedure I (2-4, max. 6) Fundamentals of procedure in civil litigation. Major subdivisions include jurisdiction of courts, venue, commencement 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 in real estate contracts, the recording system, title insurance, and fixtures. Only those topics that may be covered in varying 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, nuisance, products liability, invasion of privacy, misuses of legal procedures, and interference with advantageous relationships.

LAW A 505- Criminal Law (2-5), max. 5) Examination of the basic principles, concepts, and procedure of substantive criminal law, including legalli­

Second-Year and Third-Year Courses

LAW A 510 Commercial Transactions (3) Covers Articles II, III, and IV of the Uniform Commercial Code (Sales and Negotiable Instruments) basic principles of law relating to sales, contracts of sale, and drafts, and checks. Emphasis is given the Uniform Code, including basic coverage of personal property security under Article IX, property under Article IX.

LAW A 512 Personal Property 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 between competing security interests and between a security interest and another kind of property interest, to payment and redemption, and to realization procedures. Emphasis on Article IX of the Uniform Commercial Code. Course is considered a sequel to A 511 and involves a more advanced treatment of personal property security.

LAW A 513 Creditor-Debtor Law (3 or 4) Principal rights and remedies of unsecured creditors, individual and corporate.ジュリ、executions, attachments, garnishments, fraudulent conveyances, compositios, assignments for the benefit of creditors, and deeds' exceptions. Emphasis emphasized. 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 provisions governing the formation of corporations; allocation of control, profit, and risk among the constituents of the corporation; financial statements; voting rights; and the issuance of debt and equity securities; duties of officers, directors, and controlling shareholders; rights of shareholders; issuance of stock. Also fundamental changes in the corporate structure.

LAW A 516 Bankruptcy (3 or 4) Bankruptcy law and practice. Covers main provisions of federal bankruptcy law. Includes discharge, priority, and discharge of debtors; rehabilitation, reorganization, and liquidation; effect of bankruptcy on the debtor and creditors; bankruptcy exemptions; avoidance of fraudulent transfers; discharge in bankruptcy; and bankruptcy proceedings generally.

LAW A 517 Bankruptcy (3 or 4) Bankruptcy law and practice. Covers main provisions of federal bankruptcy law. Includes discharge, priority, and discharge of debtors; rehabilitation, reorganization, and liquidation; effect of bankruptcy on the debtor and creditors; bankruptcy exemptions; avoidance of fraudulent transfers; discharge in bankruptcy; and bankruptcy proceedings generally.
Emphasis on the "Federal Corporation Law" evolving out of the SEC proxy rules and Rule 10b-5.

LAW A 515 Associations (3)
Introduction to law relating to association in business and its nonprofit analogues through agency, partnership, other unincorporated forms, and corporate forms. Emphasis throughout on the legal, financial, and tax factors bearing upon the type of structure to be selected for a group activity. Basic principles concerning operation of agency and partnership relationships are considered along with an introduction to related corporate law doctrines, all in the context of both profit and nonprofit activities. Complete in itself, this course can 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, and the economic regulation of business. Critical examination and evaluation of alternative concepts of profit and valuation under both state and federal law. Special emphasis is placed on legal issues in accounting for proprietary equities, business combinations, goodwill and other intangibles, and interperiod income and expense allocation. Emphasis is given to study of taxation as a method of raising revenue and as a guide to fair competition by establishing regulations. Coverage includes income, water, and pesticides law and policy.

LAW A 528 Natural Resources: Energy (3)
Survey of energy issues developed against the background 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, state and federal mining, and profit-sharing 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 estates, current cash, property, or other objects, 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 be taxed, to whom it should be taxed, and its character as earned, or capital-gain income. Deductions and credits in computing income are analyzed. Prerequisite: A 520.

LAW A 532 Federal Income Taxation of Business Enterprises (5)
Examination of the tax law consequences of conducting business enterprises in partnership and corporate form. After a preliminary review of taxation of partnership income, the tax law problems and opportunities of forming, operating, dissolving, selling, and reorganizing corporations are examined. Specific areas include: incorporating existing entities, current cash, property, and stock distributions, stock redemptions and partial liquidations, complete liquidations and sales of corporate enterprises, and changes in the form of business enterprises pursuant to liquidations, corporate divisions and amalgamations whether by means of corporate reorganizations or otherwise, assets of the earnings of personal holding company taxes, and special taxation of electing small business companies.

LAW A 533 Federal Income Taxation II (3)
Survey of the basic structure of federal income taxation undertaken in the context of planning personal and corporate transactions of individual taxpayers. Matters considered: items of income, transactions concerning capital assets, deductions, tax accounting, indirect and deferred compensation for services, family transactions, elementary business transactions, and special tax problems of creative persons and investors. (Not offered every year.)

LAW A 534 Private Land Development (3)
Emphasis on the problems encountered by a lawyer representing parties involved in the development 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, control of land use, and other areas of financing, choice of developing entity, commercial leases, platted, and those of "overpromising." It is desirable that students have previously taken A 523. (Not 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 federal, 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 administrative issues, including permits and enforcement. Coverage includes air, water, and pesticides law and policy.

LAW A 528- Alternative Dispute Resolution (3)
Survey of the use of alternative dispute resolution procedures and methods. Emphasis on the development and use of alternative dispute resolution systems and methods within the legal system. Coverage includes conciliation, mediation, fact finding, arbitration, and ombudsman programs. Prerequisites: A 520 and A 523.

LAW A 531 Property (II) (2-3+, max. 8)
Problems of voluntary disposition of assets, primarily through wills and trusts. Attention is paid to disposition by will, creation of the trust by a will, and the effect of the disposition in the creation of present and future interests in property. Some consideration is given to substantive aspects of wealth transmission and to the basic tax framework important in formulating plans of disposition.

LAW A 531 Death and Gift Taxation (3-5)
Federal and state transfer tax systems fiduciary income tax. Major subdivisions covered include basic application of death, gift, and generation-skipping transfers, the application of transfer taxes to the central institution of property, and life insurance. Income taxation of trusts, estates, and their beneficiaries. Prerequisite: A 520.

LAW A 532 School of Law:
Introduction to the relationship of law to human behavior. An examination of the legal and economic problems arising from the development, operation, and control of educational institutions and processes.

LAW A 533 Political Economy: Economic Aspects of Government and Business (3)
Introduction to the relationship of government and business to the economy. An examination of the legal and economic problems arising from the development, operation, and control of educational institutions and processes.

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Introduction to the relationship of government and business to the economy. An examination of the legal and economic problems arising from the development, operation, and control of educational institutions and processes.

LAW A 536 Property Law (3)
Introduction to the relationship of law to human behavior. An examination of the legal and economic problems arising from the development, operation, and control of educational institutions and processes.

LAW A 537 Business Planning (2-3+, max. 6)
Advanced work in corporations and federal taxation in the context of business planning and counseling. Examination will be made of a series of problems involving common business transactions and presenting corporate and tax issues for analysis and resolution. The problems considered include such issues as: corporate organization, formation, and operation; the formation of corporations, both closely held and publicly owned, stock redemption, the sale and purchase of businesses, mergers and acquisitions, and reorganization of corporations, 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 death time methods of disposing of property to meet the owner's objectives at the least cost in terms of inconvenience to the owner and his successors and in terms of income, gift, and estate taxes. Includes a consideration of selected provisions of the federal estate tax law, and gift tax laws and the analysis of problems. Prerequisites: A 520 and 531. Limit: thirty students.

LAW A 551 Constitutional Law: Federalism and American Education (4)
Examines the relationship between the Constitution of the United States and the American system of public education. Focus is on the federal government's role and its power to assist local and state governments in enhancing educational opportunities. The course also covers the relationship between federal law and state law, and the interplay between the federal and state governments in the provision of educational services.

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 control and regulate business behavior. The course also covers the relationship between federal law and state law, and the interplay between the federal and state governments in the provision of educational services.

LAW A 553 Labor Law (3)
The law governing problems that arise prior to the establishment of the collective bargaining relationship and the organizational rights of employees and unions, including study of the relationship of individual employees with the union; the economic weapons used to undermine the power of the union; and the 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 procedures of the National Labor Relations Board, the labor disputes, and the role of labor relations in the economic life of the nation.

LAW A 555 Administrative Law (3)
Introduction to the relationship of law to human behavior. An examination of the legal and economic problems arising from the development, operation, and control of educational institutions and processes.

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LAW A 570 Administrative Law (3)
Introduction to the relationship of law to human behavior. An examination of the legal and economic problems arising from the development, operation, and control of educational institutions and processes.
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 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 institutions. A paper in lieu of a final examination may be required, depending upon enrollment and instructor preference.

LAW B 543 Islamic Law (3)
Origins of the shari'ah, its development throughout the Islamic period, and the modern reform of this law. Offered jointly with NE 432. (Not offered every year.)

LAW B 544 Justiceability Under the Civil Law and the Common Law (4)
Problems of justiciability in the transnational settings, with particular emphasis on the differences between the civil laws of France and English common law. Considered are the potentials and limitations in litigation, arbitration, and conciliation in transnational transactions and problems about the arbitrability of disputes. Topics covered are: jurisdictional rules of Japan and the United States; governing law clauses and their enforceability, preemption clauses including arbitration clauses; choice-of-law; proof of foreign law; trial differences: enforcement of foreign judgments. The purpose is to understand the important differences between the United States and Japanese litigation process by comparing the relevant rules at each stage of a lawsuit in the order in which they are encountered by counsel.

LAW B 545- United States-Japanese Contract and Sales Principles (3 or 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 differences between the United States and corporate law in the United States and a Japanese kabushiki kaisha.

LAW B 547 United States-Japanese 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 Japan by American aliens. The operation 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 year.)

LAW B 548 Japanese Administrative Law (3)
Introduction to the Japanese public law system with particular emphasis on the organization and role of bureaucracy, formulating and carrying out national policy, 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 ability and, with the instructor's permission, to students with background and interest in Japanese public policy. Offered jointly with 404 every year.

LAW B 549 Government Regulation of Business in Japan (3)
The Japanese approach to regulation of economic activity, focusing on monopoly and consumer protection, the promotion of small and medium enterprise, and regulation of international trade and investment. Emphasis on government-business relationships, administrative guidance, and limits of legal controls in Japan as compared to other legal systems. Emphasis on Japanese law; also open to second- or third-year students. Open to nonlaw students with instructor's permission. Not law preference. Not law 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
Introduction to the projection 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. Limit: eight students. Offered to graduate students who have already attained a professional standing in law, but who require experience 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 and structural processes of selected countries, followed by 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 interest of the students and instructors.

LAW B 552 Tutorial in Japanese Law (1-4), max. 4
Individual research project handled on a tutorial basis involving an area of law of mutual interest to student and tutor. In the case of a student whose basic training was in a civil law jurisdiction, the subject matter of the tutor 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. Offered to law students with at least one year 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 B 553- Seminar on Japanese Law (2-6), max. 4
Selected topics in the structure, function, and operation of Japanese law. Problems not covered in depth, or at all, in the Federal Court Seminar 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 557- Federal Tax Policy Seminar (2-6), max. 6
Intensive examination of the substance of limited areas of federal income tax law and the policy underlying that law. Different 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. Focuses on student research and writing and on the student preparation and discussion of the research efforts of the group. Prerequisite: A 530. Limit eight third-year students.

LAW B 564 Consumer Protection Seminar (2-6), max. 6
Examination of consumer protection laws, including those arising from use of consumer credit, disregard of credit information, fraud, and deceptive practices, etc. Consideration given to methods of providing protection, such as legislation, proposed Uniform Consumer Credit Code, and consumer education. Each student expected to produce high-quality paper.

LAW B 575- The Supreme Court and the Constitution (2-4), 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 minority groups. Current, problems, as illustrated by recent or pending Supreme Court cases, are emphasized. Students required to do substantial amounts of in-depth research, including, but not limited to, isolation of the history of the doctrines involved, their relationship to intellectual endeavor in related areas, and an exploration of alternative approaches to the problems. Offered in Spring quarter, with occasional recesses to facilitate student preparation of high-quality paper, which, in turn, is the subject of discussion at weekly meetings of the seminar. Limit: six second- or third-year students, with permission of instructor.

LAW B 576- Selected Problems on Environmental Protection Seminar (2-6), max. 6
Examination of legal problems resulting from impairment of the environment by technological advances and urban growth. Various issues, including air and water pollution, use of pesticides, protection of wildlife, and transporation, are considered. Special emphasis on examining the utility of litigation as an instrument for ensuring protection of the environment. Pending cases are examined. The current poll, such as the legal efforts of groups, such as the Sierra Club and the Washington Environmentl Council, are also considered. Experts in various fields are invited to participate.

LAW B 577- Human Ecology Seminar (2-6), max. 6
Selected problems drawn from such areas as poverty, welfare, health, or correction programs. Emphasis on the relationship of a given system (e.g., medicine and law related to alcoholism; social casework and law related to child abuse; parole board and law, etc.) to the scientific study of behavior, and organization and law related to "model city" structure, etc. In order to evaluate interaction. It is anticipated that students will work with another law student or a nonlaw student, or a professional student in another discipline is welcomed.

LAW B 578 International Legal Order Seminar (3)
Focuses on the international legal context of developments in 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 accused or convicted. Possibility for individual research include field studies of enforcement practices and studies of the procedure in quasi-criminal proceedings. Crimes that allege mental incompetents, and other persons subject to a loss based on a violation of official norms. Prerequisites: A 550, B 502. Limit eight students.

LAW B 579- 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 Federal Court Seminar 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.

Seminar
ment, especially bilateral or multilateral foreign-aid mechanisms that promote or inhibit democratic development and economic growth: income redistribution (including land reform), state of the economy, population size and growth, civil disorder, 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 paper. Limit: eight third-year students. Prerequisite: A 552.

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 special rules 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. Research includes judges and other judicial officers at all levels of the courts and persons and agencies in other related disciplines and fields. A scholarly written document must be submitted and accepted by the professor. Prerequisite: A 570. Mandatory group sessions are scheduled during each quarter. For students who have completed B 524, special permission may be obtained to pursue investigation of problems begun in the workshop course.

LAW B 582 - Appellate Advocacy Seminar (2, max. 4)
Advanced instruction in techniques of advocacy, primarily by briefing, consisting of practice arguments and ex-ecutions, meetings with prominent appellate practitioners and judges, and submission of amicus curiae briefs (under faculty supervision). Restricted to the Washington Court of Appeals and the Washington Supreme Court, and the U.S. Court of Appeals for the Ninth Circuit. In addition, students discuss trends in, and theories of, judicial decision making and the principles of appellate 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 Quarter.

LAW 600 - Independent Study or Research (*)
LAW 800 - Doctoral Dissertation (*)

SCHOOL OF LIBRARIANSHIP

LIBR 450 - Survey of Children's Literature (3)
Bennet, Shaw
Designed 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 - Survey 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 librarianship majors.

LIBR 470 - History of the Book (3)
Skelly
Survey of the development of the book from hieroglyphics 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 its processes and materials of its production, viewed in the context of changing technologies and various cultural, esthetic, economic, and trade influences. Includes aspects of book collecting.

LIBR 471 - Storytelling: Art and Techniques (3)
Skelly
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 techniques necessary to maintain this artistic skill in a professional field. Preparation of work for inclusion in special interest and general literature. Not open to librarianship majors.

LIBR 490 - Introduction to Information Resources (2)
Designed to assist students in all subject fields in developing research skills. Emphasis on principles of research strategy applicable to all subject fields. Includes an introduction to various types of information sources, including libraries, computer data bases, and government agencies. Prerequisites: S 100, S 221, or permission of instructor. Lecture/discussion approach supplemented with practical experience related to the student's field of interest. Open to non-law students. Offered on credit/no credit basis only. Prerequisite: junior or higher standing.

LIBR 499 - Study Projects in Library Development (1-5)
Hunt, Stover
Individual or group study projects, workshops, or seminars on the improvement of library services.

LIBR 500 - Society, Users, and Libraries (6)
Introduction to librarianship. Society's information problems, with emphasis on information sources found in their environments, and the role of libraries and librarians. Students develop skills basic to other courses, establishes personal use of library resources, 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 bibliographic 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)
Zweig
Management concepts critical to provision of library services. The planning process applied to library problems and opportunities. Communications awareness and skills in the professional environment. Organizational concerns, including personnel, budgeting, control techniques, theories of management, and evaluation of effectiveness. Prerequisites: 500, 501, or permission of instructor.

LIBR 511 - Library Administration Skills (3)
Zweig
Provides practice in the administrative skills related to personnel, administration, management, and budget planning and budgeting processes in the library setting. Topics include work specification, performance evaluation, personnel formulation, budgeting, personnel and budget preparation and control. Prerequisites: 500, 501, and 510 or permission of instructor.

LIBR 512 - Community Analysis and Library Change (3)
Zweig
Review of the concepts, strategies, and tools for study of the community, response to community change, and promotion 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
Introduces to principles and techniques of standard methods of organizing library materials for use. Includes fundamentals of descriptive cataloguing, primary systems of subject analysis, and developments in bibliographic services. Prerequisites: 500, 501, or permission of instructor.

LIBR 522 - Descriptive Cataloguing (3)
Page, Soper
Continuation of 520, with emphasis on rules of descriptive cataloguing for monographic print materials of all kinds and nonbook materials. Includes applications of information retrieval techniques to electronic bibliographic 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 Congress and Dewey decimal classification, Sears and Library 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 replacement, serials 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)
Mignon, Soper
Techniques of vocabulary control and thesaurus construction as applied to indexing and abstracting processes. Design, selection, and evaluation of indexing systems. Computerized methods for free text, full text, and controlled 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 literature searching. Organization of computerized bibliographic 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 searching using a variety of standard searching languages, including the Dialog and Orbit systems. Prerequisites: 500, 501, or permission of instructor.

LIBR 540 - Material for General Information Needs (3)
Nelson
Consideration of the individual in the generalized information environment. Interdisciplinary sources for the selection of library materials. Forms of materials for nonspecialized information retrieval and referral. Development of skills in question negotiation and search strategy. Prerequisites: 500, 501, or permission of instructor.

LIBR 541 - Information Access in the Humanities (3)
Nelson, Skelly
Description and analysis of information problems and information sources in the humanities. Fields considered are philosophy, religion, visual arts, performing arts, language, and literature. Prerequisites: 500, 501, or permission of instructor.

LIBR 542 - Information Access in the Social Sciences (3)
Skelly
Description and analysis of information problems and information sources in the social sciences. Fields considered are anthropology, business economics, education, geography, history, political science, psychology, and sociology. Prerequisites: 500, 501, or permission of 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 information transfer; characteristics and organization of bibliographic and reference sources; information retrieval from manual and computer on-line sources; search strategy; 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. Prerequisites: 500, 501, or permission of instructor.

LIBR 546 - Library Audiovisual Services (3)
Program services, administration, organization, and bibliographic control of library 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 evaluation, selection, and use of audiovisual materials and their accompanying technologies. Focuses on previewing the full range of audiovisual formats found in all types of libraries. 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 of various ages. Topics 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 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 for 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 criteria 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 instructor.

LIBR 553 Information Access in Health Sciences (3)
Migeno
Characteristics of users of biomedical literature. Survey of information resources in health sciences and health-care planning and information retrieval systems, emphasizing services of the National Library of Medicine. Organization of medical and hospital libraries. Problems of information policy, professional standards, and certification. Prerequisites: 500, 501, and 543, or permission of instructor.

LIBR 554 Library and Information Retrieval Skills for Clinical Applications (3)
Migeno
Practical introduction to effective use of research libraries, bibliographic services, and information retrieval systems, emphasizing the use of databases and textbooks as it is used in the practice of clinical medicine. 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 legal reports and statutes; quasi-legal and commissioners' reports of the states; bar association reports, legal periodicals, indexes and digesta, and comparative 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 permission of instructor.

LIBR 560 Information Needs, Uses, and Users (3)
Blume
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 perceivably and re-
ANESTHESIOLOGY

Courses numbered with a P suffix are not graduate courses and are restricted to medical student enrollment only.

ANEST 498 Undergraduate Thesis (1) AWSpS
Hornbein By special arrangement. Time and credit to be arranged.

ANEST 499 Undergraduate Research (1) 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 600P 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 evaluation, 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 (0.5) AWSpS
Hornbein Clerkship for students interested in some facet of anesthesia or desiring greater exposure to anesthesiology as a specialty. Individual programs can be arranged in the following areas: respiratory care, surgical anesthesia, obstetrical anesthesia. Prerequisite: 600P; first two weeks on surgical anesthesia. (Four weeks, full time. Limit: one student in each area.) All affiliated hospitals.

ANEST 697P Anesthesiology Special Electives (1, max. 24) AWSpS
Hornbein By specific arrangement for qualified students, special clerkships, externship, or research opportunities can at times be made available to students 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 registration. Prerequisite: permission of instructor. (Six to twelve weeks, full time.)

BIOCHEMISTRY

Courses numbered with a P suffix are not graduate courses and are restricted to medical student enrollment only.

BIOC 440, 441, 442 Molecular Biology (3,4,3) A.W.Sp
Davey, Morris, Parson, Walsh, Young Interdisciplinary course in general biochemistry with a strong component in molecular biology. Designed for undergraduate students enrolled in the curriculum in molecular and cellular biology and graduate students in other science disciplines. Prerequisite: 437 or permission 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 (1) AWSpS
Investigative work on enzymes, proteins, 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 Contact similar to 444. When possible, the relationship of the biochemical techniques or experiments being performed to clinical or diagnostic medicine is demonstrated or discussed. For first-year and second-year students and others by permission. Prerequisites: HUBIO 514P, 524P or equivalent, and permission of instructor.

BIOC 515P Biochemistry Review I (1) A Elective quiz section to clarify and amplify material presented in HUBIO 514P. Offered on credit/no credit basis only.

BIOC 520 Seminar in Biochemistry (1) AWSpS 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) A Quiz section to clarify and amplify material presented in HUBIO 514P. 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, mechanisms of action, and the control of mammalian systems on cyclic AMP in pro- and eukaryotic organisms, allosteric and covalent 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 533 Advanced Biochemistry (3) P Graduate-level discussion of nucleic acid structure, viruses including oncogenic viruses, RNA biosynthesis, and eukaryotic cell cycle. Prerequisites: a comprehensive course in biochemistry and permission.

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 hydrodynamic and optical properties of macromolecules. Prerequisite: physical chemistry.

BIOC 570 Current Topics in RNA Tumor Virology (2) Sp Eisenman, Linde 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. (Owed 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 limited 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 582 Advanced Techniques in Biochemistry (3, max. 9) A Intensive course involving conferences, reading assignments, and laboratory procedures, including ultracentrifugation, electrophoresis, chromatography, spectrophotometry, 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) AWSpS 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 Davey, Fisher 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 covalent 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 repeated for credit. Prerequisite: permission of instructor.

BIOC 589 Connective Tissue Macro molecules (1) AWSpS Bornstein Seminars designed to discuss current knowledge of the biochemistry and pathophysiology of fibrous proteins and other structural molecules, with emphasis on current research and results of 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 Herrriott, Jensen Topics on the determination of protein structure by x-ray crystallography, and on relationships between structure and chemical properties of 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 aspects of cellular differentiation in early development 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) A, WSpS 
Fischer 
Weekly conferences on research in glycogen metabolism. 
May be repeated for credit. Prerequisite: permission of instructor.

BIOC 595 Membranes, Bioenergetics (1) A, WSpS 
Shapiro 
Weekly research conferences on biochemical processes that occur in membranes. May be repeated for credit. Offered on credit/no credit basis only. Prerequisite: permission of instructor.

BIOC 596 Gene Expression (1) A, WSpS 
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) A, WSpS 
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) A, WSpS 
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 (*) 
A, WSpS 
BIOC 700 Master's Thesis (*) 
A, WSpS 
BIOC 800 Doctoral Dissertation (*) 
A, WSpS 

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 system human anatomy, with correlated lectures and laboratory demonstrations. Limited to students who have declared majors in health education, physical education, physical therapy, occupational therapy, or orthotics and prosthetics; others by permission of instructor.

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 system, 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 
Brodersen 
Lecture and laboratory work in neuroanatomy and gross anatomy. Emphasis on head and neck anatomy. For dental students; others by permission of instructor.

B STR 441 Microscopic Anatomy for Dental Students (3) A 
Prethero 
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 
Dissection of oral cavity and related areas, emphasizing the location, relationships, and functions of anatomical structures pertinent to the practice of dentistry. Prerequisite: 440.
of scientific botany, with an attempt to show how much of the widely proliferated herbal literature of the Renaissance still influences the present-day revival of interest in the medicinal use of plant material. Recommended: some background in biology or botany.

BI HS 430 Medicine and Society in the Age of Reason (3) Sp Bodemer
Detailed consideration of medicine and its institutions during the seventeenth and eighteenth centuries. Emphasis on the interacting forces and ideas leading to the development 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 century, emphasizing medical theory and practice.

BI HS 432 Madness and Civilization (3) W Bodemer
Survey of attitudes toward madness, concepts of psychopathology, and the treatment of the mentally ill at different periods in the development of Western civilization. Special emphasis placed on the various social, psychological, 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 twentieth-century origins of modern medical psychology, the mental health movement, and mental institutions. Special attention is devoted to the philosophical and physiological 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 instructor. 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 protect from medical knowledge, and the roles of participants in the medical care system and of the state. Special topics include: licensure; doctor-patient relationship; 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 (*) AWiSp
Prerequisite: permission of instructor.

BI HS 498 Undergraduate Thesis (*) AWSp
Prerequisite: permission of instructor.

BI HS 499 Undergraduate Research (*) AWSp
Investigative work in history of the biomedical sciences Prerequisite: permission of instructor.

BI HS 500 Biomedical Histology (4, 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) W Bodemer
Survey course tracing the development of Western biological 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 society. Prerequisite: permission of instructor.

BI HS 506 Historical and Ethical Aspects of Modern Biology (3) W Bodemer
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 recommended, 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 presentations, utilizing guest resource persons and a variety of audiovisual 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 McCorkell
Readings and discussion of critical contemporary ethical issues arising from progress in the biomedical sciences and modern technological impact on the mod­ern biology and medicine upon human values, the relation 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 McCorkell
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 judgements, to de­velop increased awareness of feelings and values con­cerning life and death and the ethical dilemmas of caring for the dying. Prerequisite: permission of instructor.

BI HS 523 Biomedical Ethics and The Life Sciences (3) A McCorkell
Brief history of the development of biotrics 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. Pre­requisite: 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. Prerequisite: 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 cause 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.
BI HIS 600 Independent Study or Research (*) AWSp
Prerequisite: permission of instructor.

BI HIS 700 Master's Thesis (*) AWSp
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) Sp
Gaddum-Rosse, Landau
Human physiology with anatomical demonstrations. Intro-
troductory course integrates 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-
tes: 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
Legdes, 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 electives are an individual pro-
ject 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 (3) A
Gilliand
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
permission of instructor. Coordinator: Department of Micro-
biology 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
orders.

CONJ 503 Somatic Cell Genetics (2, max. 6) A
Garrett, Martin, Pfau
Introductory course in the methodology and the biology of cul-
sed somatic cells; analysis of heritable phenomena in somatic
cells. A series of seminars emphasizes selected
original literature concerned with such topics as mutation
fission, 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
Introductory techniques used in transmission and scan-
ning 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
Sabl, Jag
Introductory neurochemistry course covering chemistry and
metabolism, chemical pathology of disorders of lipid,
amino acid, and carbohydrate metabolism, trans-
port proteins, the nervous system, and unique proteins of the
central and peripheral nervous systems. This course is recom-
manded for graduate

Family Medicine

centers of Harborview Medical Center and University
Hospital. Through association with investigators from the
clinical departments, the student gains first-hand experi-
mental design and laboratory techniques used in clinical
research. Each student is expected to prepare a scholarly
report and present an oral presentation at the annual
student research symposium. Prerequisite: acceptance to
attend meetings of the CRC Student Advisory Committee
and Biomedical Sciences Review Committee, where crit-
ical evaluation of experimental protocols and the ethical
considerations of clinical investigation are considered.
Prerequisites: basic curriculum and permission of instruc-
tor. Coordinator: Department of Medicine. (Six or twelve
weeks.)

CONJ 677P Clinical Allergy (*, max. 12) AWSp
Van Arsdel (University Hospital)
Clinic and office experience in diagnosing and managing
allergic disease. Clinical conferences, hospital rounds on
hypersensitivity and immunity and allergy research
seminars. Students taking four-week elective may have
two half-days free for other electives. Student may elect
a writing program, depending on time and departmental
availability. Prerequisite: PEDES 665P or MED 665P or FAMED 665P. Coordinator:
Department of Medicine. (Four or six weeks, full time.)

CONJ 661P 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. Focus on medical student enrollment
programs, accompanied by a variety of lectures and
discussions. (Two, four, or six weeks.)

CONJ 690P Clinical Oncology Outpatient Elective (*) AWSp
Fjigge, Gerson, Jones, Moe, Smith
One to five half-day oncology clinics, including surgical
treatment, radiation oncology, head and neck tumor,
GYN tumor, and medical oncology (Clinic 4). Student
works with new patients and follows them through
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
possible. The student works closely with clinic, faculty
and arranges the number and combination of clinics desired.
Prerequisite: permission of instructor. Coordinator:
Department of Radiology.

FAMILY MEDICINE

Courses numbered with a P suffix are not graduate
courses and are restricted to medical student enrollment
only.

FAMED 699P Undergraduate Research (*) AWSp
English, C. K. Smith, S.
Research activities are arranged with faculty members
doing research in various areas related to family medi-
cine. Areas include: clinical strategies, health-care deliv-
er, curriculum development at the undergraduate and
residency levels, interdisciplinary activities, continuity of
care, audit and retrieval studies. In addition, students
will have the opportunity to observe medical practice.
Research is generally clinically orien-
ted and centered around patient care. Prerequisite: per-
mission of instructor

FAMED 501P Introduction to Family Medicine: Preceptorship (2H) AWSp
W. Phillips
Students are introduced to family medicine and its prac-
tice through the preceptorship. The student works closely
with a family physician clinical faculty, selected readings,
directed observations, and monthly seminars. Each student
spends one to two days per week in the pre-
ceptor’s medical practice. Each student will also
attend one seminar each month discussing readings and practice experiences.
Year-long (occasionally second-year) medical students.

FAMED 520P-521P-522P Ambulatory Care In Family Practice (2H-2H-2H) AWSp
Hadac, Smith
In the University or an affiliated teaching family practice
the student works in a small group of famil-
ities. 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-

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FAMED 523P-524P SEMINAR—TOPICS IN FAMILY MEDICINE (1-3) 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 675P ADVANCED PRECEPTORSHIP IN FAMILY MEDICINE (12, max. 24) AWSp KLINGENSTEIN AN OPPORTUNITY FOR THE STUDENT TO APPLY AND EXTEND HIS OR HER CLINICAL SKILLS WORKING WITH A PERIODIC FAMILY PHYSICIAN IN AN ACTUAL PRACTICE. THIS COURSE HAS THREE PARTS: (1) IN MEDICALLY URBAN AREAS; (2) IN THE UNITED STATES; AND (3) ABROAD. THE EXPERIENCE IS DESIGNED TO PREPARE MEDICAL STUDENTS FOR THE COMPETITION OF PRACTICE IN THE COMMUNITY, WHERE HE OR SHE MAY PRACTICE UNDER THE SUPERVISION OF FAMILY PRACTICE FACULTY AND RESIDENTS (E.G., MED 665P, PEDS 665P, SURG 665P, ETC.).

HUMAN BIOLOGY COURSES NUMBERED WITH A "P" SUFFIX ARE NOT GRADUATE COURSES AND ARE RESERVED TO MEDICAL STUDENT ENROLLMENT ONLY. THIS COURSE 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 PRACTICE SITUATIONS. DURING THIS INTRODUCTORY PERIOD, THE STUDENT IS ASSIGNED TO WORK WITH A SHELTERED PRACTICE FACULTY MEMBERS IN THEIR OFFICES IN ACCORDANCE WITH THE STUDENT'S PREFERENCE OF DISCIPLINE AND THE WAMI SITES. REGISTRATION LIMITED TO FIRST-YEAR MEDICAL STUDENTS AT WAMI SITES.

HUBIO 501P HUMAN BIOLOGY SPECIAL PROJECTS (*) AWSp LOEBER DESIGNED FOR MEDICAL STUDENTS ELECTING A SPECIAL STUDY PROJECT RELATED TO THE INTRODUCTION TO MEDICAL OR OTHER HUMAN BIOLOGY COURSES, WHICH ARE OFFERED DURING THE FIRST AND SECOND YEARS IN THE SCHOOL OF MEDICINE. PRIORITIZED FOR STUDENTS IN MEDICAL OR OTHER HUMAN BIOLOGY COURSES, WHICH ARE OFFERED DURING THE FIRST AND SECOND YEARS IN THE SCHOOL OF MEDICINE. PREREQUISITE: PERMISSION OF ASSISTANT DEAN OF CURRICULUM.

HUBIO 510P ANATOMY (MICROSCOPE) (*) A,W G. EDDY LECTURES AND LABORATORY EXERCISES DESIGNED TO SURVEY THE HISTOLOGY AND FUNCTIONS OF THE BODY. CORRELATES STRUCTURAL AND FUNCTIONAL CONCEPTS AND RELATES MATERIAL WITH THE CONTENT OF SINI, WHICH IS GENERALLY TAKEN CONCURRENTLY.

HUBIO 511P ANATOMY (GROSS) (*) A,W ROSE DEVELOPMENT OF THE EMBRYO FROM FERTILIZATION AND IMPLANTATION TO FULL ORGAN AND ORGANISATIONAL DIFFERENTIATION, WITH ILLUSTRATION OF BASIC BODY PLANS. IMPORTANT CONCEPTS AND CONCEPTUALIZATION OF CONCEPTS IN NORMAL AND ABNORMAL DIFFERENTIATION LEADING TO A STUDY OF BASIC HISTOLOGY. DEVELOPMENTAL AND MORPHOLOGICAL ASPECTS OF HEMOPHILIC SYSTEM.

HUBIO 512P MECHANISMS OF CELLULAR PHYSIOLOGY (*) A, W. DREXLER PHYSIOLOGICAL MECHANISMS. MEMBRANE TRANSPORT, EPITHELIAL TRANSPORT, EXCITABILITY, SENSORY RECEPTORS, JUNCTIONAL TRANSPORT, ELECTRONIC TRANSPORT, ET AL. MECHANISMS OF HOMEOSTASIS, INTEGRATION OF MECHANISMS, NEURAL AND HORMONAL-SERIAL REFLEX, AUTONOMIC NERVOUS SYSTEM, ENDOCRINES, GASTROINTESTINAL SECRETIONS AND MOTILITY, TEMPERATURE REGULATION.

HUBIO 513P INTRODUCTION TO CLINICAL MEDICINE (2) A C. K. SMITH INTRODUCTION TO COMMUNICATION SKILLS AND INTERVIEW TECHNIQUES TO FORM THE BASIS FOR THE EVENTUAL DOCTOR-PATIENT RELATIONSHIP AND FOR THE SKILL OF COMMUNICATING WITH PATIENTS. THE PRIMARY ELEMENTS OF THE EXAMINATION PROFILE IS OBTAINED, AND THE CONCEPT OF PROBLEM IDENTIFICATION IS INTRODUCED.

HUBIO 514P MOLECULAR AND CELLULAR BIOLOGY I (*) A, W. A. SHEPHERD MECHANISMS IN COVERAGE COVERING CLASSICAL MOLECULAR AND CELLULAR BIOLOGY, PHYSIOLOGICAL CELLULAR, AND MOLECULAR GENETICS. METABOLIC INTERRELATIONSHIPS AS THEY OCCUR IN THE INDIVIDUAL ARE STRESS, AND HISTOLOGICAL DIFFERENCES IN DISEASE STATES.

HUBIO 515P THE AGES OF MAN (*) A, W. A. SHEPHERD PHYSICAL AND PSYCHOLOGICAL DEVELOPMENT OF THE INDIVIDUAL FROM BIRTH THROUGH OLD AGE, INCLUDING NEONATAL ADAPTATION, NUTRITION, AND DEVELOPMENTAL MILESTONES IN CHILDHOOD AND ADULTHOOD, DEGENERATIVE PROBLEMS OF AGING.

HUBIO 520P CELL AND TISSUE RESPONSE TO INJURY (*) A, W. SCHWARTZ PATTERNS OF CELL AND TISSUE RESPONSE TO INJURY. IMMUNITY AND IMMUNE RESPONSES. IMMUNOGLOBULIN SECRETION, IMMUNORESISTANCE, IMMUNE RESPONSE, IMMUNODEFICIENCY, IMMUNOLOGICAL (INCLUDING SKIN, PHARYNX, AND LARYNX). AUDITION AND SMELL. PHYSIOLOGICAL AND CLINICAL EVALUATION. MULTILATERAL POINTS, DISEASES OF THE NERVOUS SYSTEM, AUTONOMIC NERVOUS SYSTEM, NEUROPHYSIOLOGICAL Ex. PHYSICAL EXAMINATION.

HUBIO 516P CARDIOVASCULAR SYSTEM (*) A, W. D. GRANER CARDIOVASCULAR SYSTEM (INCLUDING SKIN, PHARYNX, AND LARYNX). AUDITION AND SMELL. PHYSIOLOGICAL AND CLINICAL EVALUATION. MULTILATERAL POINTS, DISEASES OF THE NERVOUS SYSTEM, AUTONOMIC NERVOUS SYSTEM, NEUROPHYSIOLOGICAL Ex. PHYSICAL EXAMINATION.

HUBIO 517P NEUROLOGY INTRODUCTION TO CLINICAL MEDICINE (3) SP CLARK SCREENING PHYSICAL EXAMINATION IS TAUGHT. FURTHER EXPERIENCE AND INSTRUCTION IN THE MEDICAL HISTORY ARE OFFERED. THE PROBLEM-BASED WRITE-UP IS AN ADDITIONAL OBJECTIVE OF THIS COURSE.

HUBIO 518P NEUROLOGY INTRODUCTION TO CLINICAL MEDICINE (3) SP CLARK SCREENING PHYSICAL EXAMINATION IS TAUGHT. FURTHER EXPERIENCE AND INSTRUCTION IN THE MEDICAL HISTORY ARE OFFERED. THE PROBLEM-BASED WRITE-UP IS AN ADDITIONAL OBJECTIVE OF THIS COURSE.
HUBIO 552P Reproductive Biology (*, max. 5) W Blundau
The microscopic anatomy, physiology (including endocrine physiology), pathology, and physical diagnosis of the reproductive system; gametogenesis, gamete transport, fertilization, implantation, placentation, developmental, ovulation and its control, menstruation and menopause, the physiology of pregnancy and labor, the gynecologic examination, and gynecologic pathology.

HUBIO 553P Musculoskeletal System (*, max. 5) W Greenlee
Cross, surface, applied, and x-ray anatomy of system, including entire spine but excluding head and neck. Histology of bone, cartilage, tendon-myoendinous juncture and joints, Muscular skeletal trauma and healing. Pathology and clinical manifestations of other degenerative, inflammatory, metabolic, nutritional, and congenital disorders. Physical examination.

HUBIO 554P Genetics (*, max. 2) W Segre
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, antimetabolites; 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. Condon
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 550. Introduction to clinical and laboratory diagnosis.

HUBIO 561P Hematology (*, max. 4) Sp McKean
Familiarizes students with the basic pathophysiological 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 Culley
Physiology, pathology, and examination, including radiology, of lower urinary tract, kidney, mesoblastic; anatomy; physiology of the kidney, including fluid and diuretic therapy; pathology, microbiology, and immunology of the urinary tract; disease with clinical examples; physical and laboratory examination.

HUBIO 563P System of Human Behavior II (360) Sp M. Scher
Provides the student with a basic knowledge of clinical psychopathology, its etiology, objective clinical description, and methods of treatment. Students obtain a working knowledge of the cognitive, affective, biologic, and social factors that contribute 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 (360) Sp Hortis
Lectures and conferences on drugs that act on the central nervous system. Emphasis on physiological and biochemical mechanisms, with consideration of therapeutic and adverse effects. Prerequisite: permission of instructor.

HUBIO 565P Saturday Morning Clinical Conferences (3-9) AWPsp
Feather medicine,
Didactic seminars covering the basic content of the basic science and clinical curriculum. The lecture-seminar occurs on Saturday mornings from 9:30 to noon, are problem-oriented and include a question-and-answer period. All third- and fourth-year medical students 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, Hamerynkl, LeCroner
Lectures in the morphology and histology of cells, the anatomical and clinical aspects of selected hematologic diseases. Prerequisite: permission of instructor.

LAB M 322 Medical Technology: Introductory Clinical Chemistry (4) A LeCroner, Szabo
Lecture and laboratory covering the theoretical and practical concepts associated with cellular morphology, instrumentation, quality control, and selected hemato logical diagnostic studies. Prerequisite: permission of instructor.

LAB M 418 Topics in Clinical Chemistry (4) Sp Clayton, Gavin, Hamerynkl, 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
Lecture and laboratory covering the theory and pathology of coagulation, with inclusion of selected diagnostic procedures. Prerequisite: permission.

LAB M 420 Clinical Microscopy (3) S Hamerynkl
Lecture and laboratory covering urinalysis testing procedures 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 clinical microbiology laboratory. Prerequisite: permission of instructor.

LAB M 422 Topics in Hematology (2) S Behrens
Advanced didactic coverage of topics relating to theoretical concepts and pathology in hematology. Prerequisite: permission of instructor.

LAB M 423 Clinical Chemistry (10) AW Szabo, Staff
Clinical testing related to protein and amino acid determinations, pancreatic functions and intestinal absorption, renal and liver function, enzymes, electrolytes, and acid-base balance, lipids, toxicology, and endocrinology. Prerequisite: permission of instructor.

LAB M 424 Clinical Microbiology (8) AW McGonagle, Szabo
Critical 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 Hamerynkl, 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, Gavin, Hamerynkl, LeCroner, McGonagle, Szabo
Selected study in either one of the major disciplines of laboratory study, selected from all major disciplines of this field; or pursuance of a clinical research problem. Prerequisite: permission.

LAB M 499 Undergraduate Research (*) AWPsp
Specific project in clinical laboratory investigation. Offered on credit/no credit basis only. Prerequisite: permission of department.

LAB M 501 Clinical Laboratory Diagnosis (3) W Benjamin
Orientation to role of clinical laboratory in diagnostic medicine. Emphasis on appropriate test selection, interpretation, principles, problems, and limitations. Lecture-discussion with illustrative case presentations and demonstration of methods for third- and fourth-year medical students and graduate students. Prerequisite: permission of instructor. Recommended: HUBIO 560P or 563P.

LAB M 502 Laboratory Medicine Seminar (1, max. 6) AWPsp
Dexter
Current topics in the field of laboratory medicine. Open to graduate students in laboratory medicine and other medical disciplines. Offered on credit/no credit basis only. Prerequisite: permission of instructor.

LAB M 510 Clinical Chemistry Research Conference (1, max. 6) AWPsp
Kenny, Staff
Current topics in research and development in clinical chemistry and immunology. Open to graduate students 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 Strawford, Staff
Core course for the degree Master of Laboratory Medicine. 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 techniques, personnel selection and management, data processing, 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 Dexter, K. Kodin
Lecture demonstrations of laboratory diagnosis in clinical hematology. Detailed description of laboratory instrumentation, special cytological and immunological analyses for analysis of complex diagnostic problems in leukemia, lymphoma, gammapathies, and red cell disorders. Emphasis on clinical and immunohematological correlation. For physicians and laboratory medicine graduate students with special interest in diagnostic clinical hematology. Students are 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) AWPsp
Kodin
Biweekly seminar on diagnosis of disorders affecting bone marrow, lymph nodes, thymus, and spleen. Emphasis on clinical and diagnostic laboratory analysis, including differential diagnosis and clinical correlation. Prerequisite: permission of instructor. Reading in preparation for seminar is recommended. Offered jointly with PATH 522. Designed for graduate and postgraduate students. Prerequisite: permission of instructor.

LAB M 590P Research Projects in Laboratory Medicine (*) AWPsp
Schmer
Six or ten weeks to investigate one problem in a laboratory medicine subspecialty area. Topics are assigned by staff. Designed to demonstrate methods, tools, principles, and particularly problem-solving nature of laboratory investigations. Entry card required.

LAB M 596 Clinical Chemistry Seminar (1) AWPsp
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) AWPsp
Charless, Wilkes
For third- and fourth-year students who desire to acquire...
familiarity with the techniques, interpretive criteria, and clinical applications of electroencephalography.

LAB M 680P Clinical Laboratory Testing: Methods and Interpretation (*) AWSpS

Methods, tools, and principles used in the modern clinical laboratory. Choice of one to three specialty areas, including chemistry, coagulation, hematology, immunology, microbiology, and virology. Investigates 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

Data: 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 within carefully selected clinical faculty members in their offices. Contact the Student Scheduling Coordinator (registrars) 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 499 Undergraduate Theses (*) AWSpS

For medical students. Prerequisite: permission of department.

MED 499 Undergraduate Research (*) AWSpS

Case studies, with laboratory research. For medical students. Prerequisite: permission of department.

MED 531P Human Genetics (*) AWSpS

Hall, Monday

Weekly seminar dealing with a variety of topics in medical 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 (3) Sp

Wood

Emphasis on the most major and dependable symptoms, signs, laboratory tests, and therapy for clinical endocrinopathies. Patient illustrated.

MED 534P Clinical Respiratory Physiology (2) AWSpS

Calver, Hlastala, Hudson, Lakshminarayan

Intermediate-level course in respiratory physiology. Basic physiology, pulmonary function testing, applied physiology to clinical problems, and review of related literature. Covers clinical respiratory physiology in three sequences. Students may register for any single quarter if desired. Prerequisite: permission of instructor. (Twelve weeks.)

MED 548P Genetics, Medicine, and Society (1) WSp

Moulady, Omen

Students and faculty discuss in lectures and seminars the aspects of genetics relevant to medicine and society. Prerequisite: HUBIO 562P.

MED 644P Clinical Preceptorship in Internal Medicine—Bremerton (8) AWSpS

Hamon

Working closely with primary-care physicians, the student is exposed to the private practice of internal medicine in a small community. Operating on a one-to-one basis with an internist (tutor), the student evaluates and treats inpatients and outpatients on a primary care, consultative, and emergency basis. In addition to varied subspecialty exposure through his tutors, the student has responsibility for following patients. The student assumes responsibility for all aspects of patient care in parallel with his interest and ability. Prerequisite: 665P. (Four weeks, full time.)

MED 646P Dermatology Clinic (*, max. 5)

Ghezzi

Students attend dermatology clinic on Monday mornings and Thursday afternoons for twelve weeks. Two half-days per week. Prerequisite: 665P.

MED 647P Clinical Gastroenterology (8) AWSpS

Geoffroy (Virginia Mason Clinic)

Combined inpatient-outpatient elective in clinical gastroenterology, which includes practical experience in GI en-doscopy. Direct patient work. Special arrangements can be made for students with special interests. Prerequisite: 665P. (Four, five weeks, full time.)

MED 642P Clinical Oncology (*, max. 24) AWSpS

Becker, Thomas (Fred Hutchinson Cancer Research Center)

Students are responsible for the week-ends and daily care of patients receiving marrow transplants, high-dose chemotherapy or immunotherapy on an intensive-care research ward. Emphasis is on the management and supportive care of patients with pancytopenia and immunosuppression, transplantation biology, cancer chemotherapy, and infectious disease problems. Experience in clinical oncology and hematology is a part of the rotation with clinical experience included. Students function independently as clinicians for assigned patient 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

Andrew

Clinical experience is provided in the diagnosis and treatment of patients with adverse drug reactions, drug interactions, other significant therapeutic problems, utilizing outpatient clinics and inpatient care at University Hospital. Emphasis on small problems in clinical pharmacology, and utilization of the library. Students register for one or two days per week. Observation and/or tutorial time is offered on the wards, clinic, or in the library. Prerequisite: 665P. (Six, eight, or twelve weeks, full time.)

MED 645P Clinical Dermatology, Spokane (8) Sp

Oland

Participation in clinical dermatology in private offices of four Spokane dermatologists who are on the University of Washington clinical faculty. Supervised clinical care and observation for one day in each office for a total of approximately twenty-eight hours; two hours of inpatient ward rounds. Selected reading assignments in the literature and diagnostic conferences covered in dermatology for one hour each week with staff. Attendance at com mittee noon teaching conferences, Sacred Heart and Deaconess Hospitals. Prerequisite: 665P. (Limit: two students, four weeks.)

MED 649P Application of Genetic Principles to Medicine (*) AWSpS

Hall, Monday, Samutangamopoulos

Ward rounds, clinical rounds, 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 and Thursday afternoons. Course includes reading of pedigrees from patients, examining patients and families with genetic diseases, and discussing cases with faculty. Prerequisite: 665P.

MED 665P Clinical Clerkships (*, max. 24)

Brown, Dale, Enlen, Gilliland, Goodell, Larson, Lazor, Russel, Tard

Hospital patients are assigned to each student for a complete work-up. Daily ward rounds; weekly lectures, clinics, and conferences. Students must register for HUBIO 565P and obtain the consent of the student. Prerequisite: HUBIO 563P: third- and fourth-year students. A written examination for this course is given annually. Students are required to pass this examination to receive a passing grade. (Eight weeks, full time. Limit: forty-nine students per term.)

MED 666P Clinical Clerkship in Internal Medicine—WAMI (12) AWSpS

Wallace

Advanced clinical preceptorship in internal medicine in three small urban communities in Washington and Montana, under the WAMI experiment in medical education. The student has a supervised and structured experience in dealing with situations peculiarly encountered by the practicing internist. Continuity of care and the relationship between care given in the ambulatory setting and in the hospital, as well as by other community health services, is emphasized. Prerequisite: 665P. (Six weeks, full time. Limit: six students.)

MED 667P Advanced Medicine Clerkship (8)

Dale, Turck

Student will participate in care of acutely ill hospitalized patients under supervision of internal medicine residents. Instruction by various medical specialists provides in-depth understanding of internal medicine and management of major diseases affecting adult patients. Prerequisite: 665P. (Third- and fourth-year medical students only. (Four weeks, full time. Limit: twelve students.)

MED 671P Clinical Gastroenterology (8) AWSpS

Oland (University Hospital)

Participates in gastrointestinal clinics and inpatient consultations at University Hospital, Harborview Medical Center, United States Public Health Service Hospital, Veterans Administration Hospital, and Children's Orthopedic Hospital and Medical Center. Journal club and conferences each week with entire staff. A continuous rotation of principles for advanced gastroenterology conferences. Prerequisite: 665P. (Six weeks, full time.)

MED 679P Clinical Endocrinology (8) AWSpS

Dunbar (University Hospital)

Full-time inpatient-outpatient clerkship in endocrinology. Clinical experience provided in diagnosis and treatment of endocrine diseases, utilizing inpatient and outpatient clinics and hospitalized patients at the University Hospital and the Harborview Medical Center. Emphasis on concepts in pathophysiology, diagnosis, and treatment of these diseases. In addition to patient contact, reading, seminars, and preceptorship sessions are the methods of instruction. Prerequisite: 665P.

MED 681P Advanced Clinical Endocrinology (8) AWSpS

Paulson (University of Washington Hospital)

Full-time inpatient-outpatient clerkship in clinical endocrinology at United States Public Health Service Hospital. Library review on selected topics in the field and participation in medical clinical research problems optional during this clerkship. Prerequisite: 665P. (Four, six, or twelve weeks.)

MED 683P Clinical Cardiology and Electrophysiology (8) AWSpS

Bruce (University Hospital), Cobb (Harborview Medical Center), Eriksson (Boise Veterans Administration Medical Center), Kennedy (Veterans Administration Hospital), McNamara (Madigan Hospital), Preston (United States Public Health Service Hospital)

Clerkship in clinical cardiology-combined inpatient-outpatient 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 685P Clinical Pulmonary Disease and Pulmonary Physiology (8 or 12) AWSpS

Cody (University Hospital), Hudson (Harborview Medical Center), Husey (United States Public Health Service Hospital), Lakshminarayan (Veterans Administration Hospital)

Training in respiratory disease diagnosis and pulmonary therapy, with special emphasis on cardiopulmonary function testing, and research using inpatient and outpatient teaching rounds, conferences, and basic science integration. Prerequisite: 665P. (Four weeks.)

MED 684P Clinical Hematology/Oncology (*, max. 24) AWSpS

Filk, (University Hospital), Harber (Harborview Medical Center), Adamos (Veterans Administration Hospital), Thompson (United States Public Health Service Hospital)
Outpatient and inpatient experience with hematologic/oncologic disorders. The elective includes teaching rounds, conferences, and evaluation of laboratory work. Prerequisite: 66SP. (Five weeks.)

MEDI 66SP Clinical Genetics (max. 12) AWSpS
Hall, Mounkly, Stamatyanopoulos
Intensive study of genetic principles required in clinical work. May be repeated once or more than one clinical problems or get broader experience in working up a variety of clinical cases. Prerequisite: 66SP. (Six weeks.)

MEDI 66SP Clinical Neurology (max. 8) AWSpS
Swanson (University Hospital)
Intensive study of clinical experience in clinical neurology at University Hospital, Veterans Administration Hospital, United States Public Health Service Hospital, Harborview Medical Center, Virginia Mason Hospital, or Children's Orthopedic Hospital and Medical Center. Students work closely with staff, work-up and present patients on attending rounds, attend clinical conferences, and become familiar with diagnostic neurologic procedures. Students from all participating hospitals assemble twice weekly with the neurology staff on topics in clinical neurology. In addition, students attend one or more clinics per week. For students taking a linear quarter, an exclusively outpatient experience can be arranged. Weekly work-up (limit twelve students, eight students during summer.)

MEDI 66TP Ambulatory Medicine Elective (max. 12) AWSpS
Clark (Harborview Medical Center), Featherstone (University Hospital)
Students acquire knowledge and skill in dealing with ambulatory patients with problems commonly encountered in the office, to gain understanding of first-line responsibility for patient care under the supervision of an attending physician, students become acquainted with patients in the long-term and short-term ambulatory 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). Students may divide internal medicine clinics either at University Hospital (mornings and Monday afternoons) or at Harborview Medical Center (afternoons). M.D.-P.H.R. students must register for one half-day per week providing the M.D.-P.H.R. students take two or more quarters of this elective. Prerequisite: 66SP or FA66SP. (Three weeks. Enrollment limits: five at University Hospital, eight at Harborview Medical Center.)

MEDI 66SP Ward Medicine Subinternship (max. 24) AWSpS
Goodsell (University Hospital), Leonard (United States Public Health Service Hospital), McNamara (Madigan Hospital), Turck (Harborview Medical Center)
Students work-up and follow individual patients on the medical wards under supervision of house staff and visiting physicians. They attend regular medical rounds and conferences in their schedules permit. Prerequisite: 66SP. (Six weeks.)

MEDI 66SP Clinical Infectious Diseases (max. 12) AWSpS
Kirby (University Hospital)
Students participate in the consulting service throughout the hospital, attend daily patient rounds, conferences, and seminars. Prerequisite: 66SP. (Two, four, or six weeks.)

Turck (Harborview Medical Center), Holmes (United States Public Health Service Hospital), Florio (Veterans Administration Hospital)
Students participate in the consulting service throughout the hospital; they have opportunity to learn the microbiological aspects of infectious diseases through the clinical laboratories. Prerequisite: 66SP. (Four weeks.)

MEDI 669P Cardiology Subintemship (8) AWSpS
Bruce
Students act in the capacity of interns on the white service under the supervision of house officer. Prerequisite: 66SP. (Four weeks.)

MEDI 662P Clinical Endocrinology and Metabolism (max. 12) AWSpS
Goodrow (Harborview Medical Center), McCrawn (Madigan Hospital), Wood (University Hospital)
Participation in inpatient rounds, conferences, and outpatient clinics at University Hospital and Harborview Medical 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 consultation. One student at a time may participate. Flexible schedule. (Two to six weeks, full time.) Prerequisite: 66SP.

MEDI 663P Nephrology and Fluid Balance (8) AWSpS
Ouellet (Harborview Medical Center), Scribner (University Hospital), Sherrard (Veterans Administration Hospital)
Nephrology/renal balance clerkship at University Hospital, Harborview Medical Center, Veterans Administration Hospital. Students see clinical nephrologic problems under close supervision, participate in nephrology and transplant rounds, examine patients with renal fellow and attending, 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. Prerequisite: 66SP. (Four weeks.)

MEDI 664P Metabolism and Diabetes (4 or 8) AWSpS
Nielson (Virginia Mason Clinic)
In addition to the clinic evaluation of patients with endocrine disorders, this elective period provides opportunity 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 students. Prerequisite: 66SP. (Two or four weeks, full time.)

MEDI 665P Clinical Aspects of Aging (7) AWSpS
Pribble
On-the-scene training and experience in the special medical environment of the elderly. 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 own approach to the elderly and to the disabled. Students work-up and follow individual diagnostic, therapeutic, and social problems. Prerequisite: 66SP. (Twelve weeks, one morning per week.)

MEDI 667P Medicine Special Electives (max. 24) AWSpS
Dale
By specific arrangement, for qualified students, special clerkship, externship, or research opportunities can at times be arranged at institutions other than the University of Washington. The faculty can advise students of possible opportunities. The department is particularly interested in placements of older 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 own approach to the elderly and to the disabled. Students work-up and follow individual diagnostic, therapeutic, and social problems. Prerequisite: 66SP. (Twelve weeks, one morning per week.)

MEDI 669P Medical Special Electives (max. 24) AWSpS
Dale
By specific arrangement, for qualified students, special clerkship, externship, or research opportunities can at times be arranged at institutions other than the University of Washington. The faculty can advise students of possible opportunities. The department is particularly interested in placements of older 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 own approach to the elderly and to the disabled. Students work-up and follow individual diagnostic, therapeutic, and social problems. Prerequisite: 66SP. (Twelve weeks, one morning per week.)

MEDI 679P Medical Microbiology and Immunology

MICRO 101 The Microbial World (5) W
Lara
For majors in the social sciences and humanities, but open to premajors and to science majors other than biologists. Activities of bacteria, viruses, or other microorganisms and their interactions with humans and their environments are examined and a number of major microbial 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 microorganisms and their activities. The understanding of basic biological principles is also emphasized through investigations of microorganisms. 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 recommended.

MICRO 302 General Microbiology Laboratory (2) AWSpS
Bicknell, Lasson, 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 prerequisites. Permission required for previous registration in 301 or permission of instructor.

MICRO 310 Laboratory Techniques in Microbiology (1) AWSpS
Parkhurst
Self-instruction, self-scheduled laboratory in which the student performs the techniques fundamental to microbiology. Instructional material is presented in visual, audiovisual, and written form. Not recommended for those who have already taken a laboratory in microbiology. Offered 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
Parkhurst
Practical work in the preparation of culture media. Nutritional requirements of microorganisms and sterilization methods are considered. For students expecting to enter vocations involving laboratory work with bacteria. Offered on credit/no credit basis only. Prerequisites: 301 and 302, or equivalent, and permission of instructor.

MICRO 322 Applied Clinical Microbiology (5) AWSpS
Schwabescheibe
Practical experience in a clinical or public health laboratory; fifteen hours per week. For students majoring in medical microbiology. Three quarters advance sign-up in QMIS 203, Scoring a B or better is selected by interview. Prerequisites: 443 and permission of instructor. (Limit: three students.)

MICRO 351 Introduction to Medical Microbiology (3) Sp
Eberl
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 response. Provides a background of understanding that will be supplemented during subsequent professional training. Students who need to take a laboratory to fulfill their degree requirements should register concurrently in 302. Other students are encouraged to take 319 if they have the full curriculum. Because 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 other 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 prokaryotes, and a survey of the general properties of viruses. Required for students majoring in microbiology, recommended for students majoring in biology. Prerequisites: BIOL 210, 211, 212 and two quarters of organic chemistry.

MICRO 402 Fundamentals of General Microbiology Laboratory (3) AW Laboratory course currently by students taking 400 or 401. Isolation by enrichment culture techniques of a wide selection of nonpathogenic bacteria. The isolates are identified, and experiments are performed to illustrate the kinetics of growth, quantitation of micro-organisms, genetic transfer in bacteria and yeast, and isolation of bacterial viruses. No background in microbiology required. Prerequisites: BIOL 210, 211, 212, and two quarters of organic chemistry; previous or concurrent 400, or permission of instructor.

UNCOJ 420 Biological Safety Practices (1) A For course description, see Intercollege or Interschool Programs.

MICRO 431 Methods in Microbiology (3) Sp
Bicknell, Groman
Laboratory exercises emphasizing methods used in microbial metabolism, virology, and ecology. Limited to microbiology majors. No auditors. Prerequisites: 400, 401, 402.
MICRO 432 Mechanisms of DNA Exchange in Procaroytes (2) Sp
Crank, Falkow, Gorman, Nester
Emphasizes mechanisms of DNA exchange in procaroyte 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 blue-green algae, play in environmental processes. The interrelationships among micro-organisms and the effects of the physical, chemical, and biological properties of their environment are discussed and assessed. Prerequisites: 400 and 401 or equivalent, or permission of instructor.

MICRO 440 Introductory Bacteriology for Medical Technology Students (2) AWSp
For medical technology students and others who need a limited introduction to basic microbiology, with focus on structure, function, and metabolism of some important bacteria. Prerequisite: Medical Technology student, or permission of instructor.

MICRO 441, 442 Medical Bacteriology, Virology, and Immunology (3, 3) A,W
Evans, Sherris
Virus-host relationships, and the study of pathogenic bacteria. 442: continuing study focused by consideration of specific viral diseases. Students are expected to synthesize all components of 441 and 442 continuously, and this expectation is reflected in the examinations. Laboratory course, 443 coordinates with 442. Prerequisites: 10 credits in basic biology, 6 credits in organic chemistry and previous or concurrent course work covering procaroyte cell structure and function (e.g., 460, 460-1 credit); 441 for 442.

MICRO 443 Medical Microbiology Laboratory (3) AW
Coyle, Memmer, Schoenbach
Laboratory course for medical technology students, microbiology majors, and on elective basis for medical students. Procedures used in the medical microbiology laboratory for isolation and identification of pathogenic micro-organisms and testing of their susceptibility to antibiotics. Selected reading assignments and demonstrations. Not audited. Prerequisites: enrollment in 441, 442 sequence or HUBIO 521P and permission of instructor.

MICRO 444 Medical Mycology and Parasitology (4) Sp
Coyle, Cramer, Ploffe
Consideration of medically important fungi and parasites, with emphasis on their biology in relation to disease and its laboratory diagnosis. For medical technology students and on elective basis for medical students and others. Prerequisites: 10 credits in basic biology and 6 credits in organic chemistry, and permission of instructor.

MICRO 447 Fundamentals of Immunology (3) Sp
For undergraduate and graduate students in microbiology, medicine, and other areas requiring substantial knowledge in immunology. Occurrence and properties of antibodies and antigens; synthesis, fate, roles, and activities of antibodies; antigen-antibody interactions; mechanisms of antibody-mediated and cell-mediated immunity and hypersensitivity, including discussions on allergens, tissue transplantation, principles of blood transfusion, tumor immunology, allergic diseases, and autoimmune diseases; immunity to parasites. Prerequisites: 441 (for medical students, HUBIO 520P), or equivalent, and upper-division standing.

CONJ 448 Fundamental Immunology Laboratory (2) See Conjoint Courses.

MICRO 450 Molecular Biology of Viruses (3) Sp
Champagne
Introduction to the molecular biology of viruses and virus-host relationships. Designed for advanced undergraduate and graduate students in the biological sciences. Coverage includes bacterial and animal viruses, the nature of infection, the variety of virus-host relationships and discussion of some models of viral replication. Prerequisites: 400, 401, and/or GENET 451.

MICRO 495- Honors Undergraduate Research (*) A WSp
Specific problems in medical and general microbiology or immunology. Prerequisite: permission of honors advisor.

MICRO 496 Undergraduate Library Research (2) AWSp
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 (*) A WSp
Falkow
By specific arrangement with the Department of Microbiology, the instructor may arrange for special instruction, research or seminar, under which circumstances the student may earn credit on a basis 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 and contact the Chairperson of the Department of Microbiology and Immunology at least one month before preregistration. Limited to medical students. Prerequisite: permission of instructor.

MICRO 498 Undergraduate Thesls (5) A WSp
For medical students. Prerequisite: permission of instructor.

MICRO 499- Undergraduate Laboratory Research (*) A WSp
Whiteley
Specific problems in medical and general microbiology or immunology. Prerequisite: permission of departmental advisor; senior standing desirable.

Courses for Graduates Only

MICRO 500 Introduction to Research (*, max. 20) A WSp
Nester
Introduction to research areas of the faculty and the techniques employed in their investigations. Offered on credit/no credit basis only. Prerequisites: graduate standing in microbiology and/or permission of instructor.

MICRO 506 Techniques in Electron Microscopy of Micro-organisms (3) Sp
Lara
Techniques used in the preparation of micro-organisms for electron microscopy, the operation of the electron microscope, and the photographic reproduction of observations. Offered on credit/no credit basis only. Prerequisites: 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 processes. 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) A WSp
Whiteley
Weekly one-hour seminar in which students discuss current literature dealing with selected aspects of microbial physiology. Offered on credit/no credit basis only. Prerequisites: 400, GENET 552, 553, BIOC 440, 441, 442, and permission of instructor. (Offered alternate years; offered 1980-81.)

MICRO 520 Seminar (1) A WSp
May be repeated for credit. Offered on credit/no credit basis only.

MICRO 525 Cell Surface Membranes in Cell Sociology and Immunology (2) Sp
Hakomori
Structure and function of cell surface membranes in relation to various immunological and pathological phenomena (differentiation, organization, infection, and cancer, etc.). Prerequisites: 447, BIOC 440, 441, 442, and permission of instructor.

MICRO 530 Advanced General Microbiology (4) A
O'Connor, Staley
Emphasis on isolation, and comparative morphology and physiology of selected bacteria. Open to qualified undergraduates. Prerequisites: 400, 401, and 402, or equivalent, and permission of instructor.

MICRO 532 Seminar in General Microbiology and Microbial Ecology (1, max. 15) A WSp
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 emphasized. Prerequisite: permission of instructor. (Offered alternate years; offered 1981-82.)

MICRO 550 Selected Topics in Immunology (3, max. 18) A WSp
Hellstron, Storb
Formal seminar-discussion course for advanced students focusing on recent developments in the field of immunology and consisting of lecture literature and intensive 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 infectious 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 440 or HUBIO 521P and permission of instructor. (Offered alternate years; offered 1981-82.)

MICRO 554 Seminar in Molecular and Medical Microbiology (1, max. 15) A WSp
Cross, Falkow, Gorman
Weekly one-hour seminar in which recent advances in molecular biology and medical microbiology or the current research of the participants is presented and discussed critically. Offered on credit/no credit basis only. Prerequisite: permission of instructor.

MICRO 555 Advanced Clinical Microbiology (25) A Sp
Schoenbach, Sherris, Tompkins
Attendance at daily plate rounds and the weekly journal club of the Division of Microbiology. Designed to increase understanding of clinical microbiological work and its application to the care of the patient. Offered on credit/no credit basis only. Prerequisites: 443 and permission of instructor.

MICRO 556 Clinical Microbiology Training and Research (*, max. 12) A WSp
Tompkins
Training in clinical microbiology and research. Attention is to daily laboratory rounds in addition to bedside training and research. For medical students and microbiology graduate students only. Offered on credit/no credit basis only. Prerequisites: 443 and permission of instructor.

CONJ 560, 561 Tumor Biology (3, 3) 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, this course provides an in-depth treatment of basic immunology. Pass/Fail or credit/no credit basis only. Prerequisites: 447 or equivalent, biochemistry, genetics. (Offered every three years; offered 1982.)
NI 528P Neurosurgical Seminar (1) A WSpS

Culmination of simulated research topics with discussion by staff and students. Prerequisite: HUBIO 552P or permission.

NR 541P Neurosurgery for the Generalist and Clinical Specialist (2) W


Series of lectures, seminars, and clinical demonstrations designed to identify and describe those diagnostic and therapeutic approaches to neurological diseases, the understanding of which is essential in the general practice of medicine. This course does not include experience in patient care, nor does it emphasize research data or techniques. The initial diagnosis and management of such conditions as head and spinal injuries, intracranial hemorrhage, 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. Prerequisite: HUBIO 552P; detailed information about any of the neurosciences is not required.

NR 542P Clinical and Basic Research Correlates of Epilepsy (2) A

G. Ojemann, Westram

Clinical syndromes and treatment of epilepsy; related basic research in neuroanatomy, neurophysiology, neurochemistry, and neuropharmacology of epilepsy. Prerequisite: HUBIO 552P for medical students; permission for others.

NR 680P Neurosurgical Clerkship

(Read: [MJ14, 732P.]

For students planning to take 680P. Prerequisite: HUBIO 552P; detailed information about any of the neurosciences is not required.

NR 681P Seizure Clinic Clerkship (6) A WSpS

A. Wilensky, Staff

Students participate in the initial evaluation and follow-up of patients with seizure disorders in the outpatient seizure clinic. The definition of the medical and social problems and drug therapy is stressed. Alternate forms of therapy are considered. Linear follow-up of patients seen throughout the clinic is maintained. Limited contact with inpatients is possible. This clerkship provides not only a specialized contact with a common specific neurological problem, but uniquely provides an experience in prolonged follow-up and management planning for a chronic disease. Prerequisite: MED 663P and permission.

NR 697P Neurosurgical Special Electives

(Read: [MJ14, 732P.]

Ward

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.

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 (*) A WSpS

Vonvor.

By arrangement.

OB GY 499 Undergraduate Research (*) A WSpS

Vonvor.

Prerequisite: permission.

OB GY 579P Obstetric and Gynecologic Investigation (*) A WSpS

Vonvor.

The investigation may cover any one of the following fields: uterine muscle physiology, toxemias of pregnancy, hormone assays in obstetrics and endocrinology, obstetric and gynecologic oncology. By arrangement.

OB GY 665P Introduction to Obstetrics and Gynecology, UI-USPHS (*, max. 12) A WSpS

Vonvor.

Introductory clerkship for medical students in the provision of comprehensive medical care and counseling services to adult and adolescent female patients. Inpatient and outpatient settings with management and delivery of obstetrical care as well as diagnosis and management of gynecologic conditions and diseases. Students participate in clinical and teaching rounds on obstetric and gynecologic patients, in outpatient clinics, in seminars, tutorials, and community health-care agencies for women. Rotation between the University of Washington Hospital and U. S. Public Health Service Hospital. Prerequisite: HUBIO 552P. (Six weeks; unlimited: six students.)

OB GY 666P Introduction to Obstetrics and Gynecology, Boise (*, max. 12) A WSpS

Vonvor.

Clerkship equivalent to 665P offered at Boise, Idaho (WAMI). Includes experience in several private physicians' offices. Prerequisite: HUBIO 552P. (Six weeks; unlimited: three students.)

OB GY 667P Introduction to Obstetrics and Gynecology, Madigan (*, max. 12) A WSpS

Vonvor.

Clerkship equivalent to 665P, offered at Madigan General Hospital, Tacoma, Washington. During Summer Quarter, available for last six weeks only. Prerequisite: HUBIO 552P. (Six weeks; unlimited: three students.)

OB GY 668P Introduction to Obstetrics and Gynecology, Spokane (12) A WSpS

Vonvor.

Clerkship equivalent to 665P, offered at Spokane (WAMI). Includes experience in several private physicians' offices. Prerequisite: HUBIO 552P. (Six weeks; unlimited: three students.)

OB GY 669P Introduction to Obstetrics and Gynecology, Swedish (12) A WSpS

Vonvor.

Clerkship equivalent to 665P, offered at Swedish Hospital. Prerequisite: HUBIO 552P. (Six weeks; unlimited: three students.)

OB GY 670P Introduction to Obstetrics and Gynecology, Group Health Cooperative (12) A WSpS

Vonvor.

Clerkship, equivalent to 665P, offered at Group Health Cooperative of Puget Sound, a prepaid medical plan法人. Prerequisite: HUBIO 552P. (Six weeks; unlimited: three students.)

OB GY 671P Introduction to Obstetrics and Gynecology, Anchorage (12) A WSpS

Vonvor.

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; unlimited: three students.)

OB GY 680P Clinical Clerkships (*, max. 12) A WSpS

Vonvor.

For students who wish to conduct research in general obstetrics/gynecology who wishes to have 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 dysmenorrhea, infertility, endocrinology, oncology, and genetics. By prior arrangement, options such as sexual counseling and routine gynecology are available. Prerequisites: 665P and permission of instructor. (Limit: one-third- or fourth-year medical student each four weeks.)

OB GY 684P Endocrinology of Reproduction (*) (, max. 12) A WSpS

Vonvor.

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 arrangement with instructor.

OB GY 685P Obstetrics Gynecology Preceptorship (*) (, max. 6) A WSpS

Vonvor.

Consists of a close working relationship with a physician
engaged in the private practice of obstetrics and gynecology, including; hospital rounds, surgery, deliveries, and office and business aspects of private practice as individually 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 (6 credits), or as four weeks full time or other combinations, not to exceed 8 credits. Prerequisites: 66SP or equivalent and permission of instructor. (Limit of students per quarter.)

OBGY 697P Obstetrics and Gynecology Special Electives (*, max. 24) AWSpS

Votaw

By specific arrangement, for qualified students, special clerkship, externship, or research opportunities can be arranged 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. The department reserves the right to evaluate student 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, biochemistry, 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) Sp Hendrickson, Rodieck

Seminars covering modern developments in the anatomy, physiology, biochemistry, and pharmacology of the visual system. (Last time offered: Spring Quarter, 1981.)

OPHTH 681P Ophthalmology Clerkship (8) AWSpS Benninger (University Hospital)

Student works with a faculty member in the diagnosis and treatment of ocular diseases or in outpatient population. Experience in common ocular disorders is gained, and neurological and other consultations seen. Prerequisite: completion of human biology series. (Limit: one student.)

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 (24) AWSpS Kalina (Children's Orthopedic Hospital and Medical Center)

Examination and observation of treatment of children with ocular diseases and learning to differentiate these from potentially blinding disorders. A programmed text in general ophthalmology will be studied. One-half day per week for two years. Prerequisite: completion of human biology series. (Limit: two students.)

OPHTH 684P Ophthalmic Pathology (1) AWSpS Wilmes (University Hospital)

Student participates with the eye pathologist in gross and microscopic examination of surgical and autopsy eyes. Emphasis on anatomical study and correlation of observations with clinically recognized ocular and systemic disease processes. Third- and fourth-year medical students. Prerequisites: Must be taken concurrently with 681P. Prerequisite: completion of human biology series.

OPHTH 685P Ophthalmology Externship (4) AWSpS Kramar (Veterans Administration Hospital)

Clinical training 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.

OPHTH 686P Ophthalmology Externship (4) AWSpS Borsen (Group Health Hospital)

Student works with a clinical faculty member in the diagnosis 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 findings pertinent to the future practice of primary-care physicians. Opportunity to learn examination techniques, including tonometry, ophthalmoscopy, and biomicroscopy. Prerequisite: completion of human biology series.

OPHTH 697P Ophthalmology Special Electives (*, max. 24) AWSpS

Kalin

By specific arrangement, for qualified students, special clerkship, externship, or research opportunities can be arranged 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.

ORTHOPAEDICS

Courses numbered with a P suffix are not graduate courses and are restricted to medical student enrollment only.

ORTH 498 Undergraduate Thesis (*) AWSpS Greenlee

Student works directly with a preceptor in selecting a suitable area for laboratory or clinical research in the area of orthopedics, and develops a thesis recognition. Prerequisites: HUBIO 523P and permission of department. (Twelve weeks.)

ORTH 499 Undergraduate Research (*) AWSpS Greenlee, Lippert, Matsen, Spengler

Involves investigation of problems pertinent to the study of musculoskeletal problems in the orthopedic laboratory as part of the research group. Prerequisite: permission of department. (Twelve weeks.)

ORTH 515P Orthopaedic Biomechanics (2) Sp Lippert, Spengler

Designed to provide a relevant engineering background for the understanding and solution of orthopaedic problems. Emphasizes statics, dynamics, strength of materials, and metallurgy. Prerequisite: membership of the hospital staff or, by arrangement, a student enrolled in bioengineering courses.

ORTH 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 nutritional 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, laboratory work, and completion of one related field project. Prerequisite: upper-division or graduate standing or permission of department.

ORTH 675P Preceptorship In Orthopaedics (*, max. 4) AWSpS

Student spends a half day per week 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 in the private orthopaedic practice. Prerequisites: SURG 665P or HUBIO 563P and permission of department. (Two weeks, full time.)

ORTH 676P Pediatric Orthopaedics (*, max. 8) AWSpS Stait

Specifically designed to acquaint the student with all aspects of musculoskeletal problems in childhood. In addition, the student gains opportunities for active participation in both inpatient and outpatient care at the Children's Orthopedic Hospital and Medical Center, and the corrective anatomy and patient care that are associated with it. Prerequisites: SURG 665P or HUBIO 563P. (Four weeks, full time.)

ORTH 677P Musculoskeletal Trauma (*, max. 8) AWSpS Bramwell, Greenlee, Hansen, Lippert, Matsen, Spengler

Instruction takes place largely at Harborview Medical Center, where there is a high concentration of musculoskeletal trauma. The student follows the patient from the emergency room onto the wards and into the operating 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 examination of the patient. Students take correlative anatomy special arrangements as in 680P. Prerequisites: SURG 665P and HUBIO 563P. (Four weeks, full time.)

ORTH 680P General Orthopaedic Clerkship (*, max. 8) AWSpS Bramwell, Greenlee, Hansen, Lippert, Matsen, Spengler, Winquist

This clerkship offers the student the unique opportunity to study the wide variety of problems presented to a general orthopaedic service. University Hospital offers general inpatient and outpatient clinics covering general trauma, bone and joint infections, degenerative joint disease, rheumatoid arthritis, and outpatient pediatrics. The Veterans Administration Hospital is primarily an inpatient service involved with a wide variety of musculoskeletal 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 registered 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.)

ORTH 679P Orthopaedic External Elective (*, max. 12) AWSpS Greenlee, Spengler

Special arrangements can be made for students desiring to take orthopaedic electives at other institutions. Programs generally approved include orthopaedic clerkships at other universities or at large orthopaedic institutions. 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 490O Neural Mechanisms of Hearing (3) Sp Clapton

Major areas within auditory neurophysiology, including peripheral mechanisms of analysis and encoding, central aspects of the development of auditory structures, binaural 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 recognition. 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 Internship (*, max. 8) Fae (United States Public Health Service Hospital)
Student serves in otolaryngology in outpatient clinic, where visits average six hundred per month, supplemented by inpatient assignments. Individual training provides 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 ward conferences. Prerequisite: completion of human biology series. (Four weeks, full time.)

OTOL 683P Otolaryngology Internship (*, max. 8) AWSpS
Hayes (Madigan Hospital)
Individual internship 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 wards and hospital conferences. Prerequisite: completion of the otolaryngology internship, including facility of BQ and hospital mess. Subsession and quarters charged, approximately $2 per day.) Prerequisite: completion of human biology series. (Two or four weeks, full time.)

OTOL 684P Otolaryngology Clerkship (*, max. 8) AWSpS
Duckert, Weymuller (Harborview Medical Center)
Student participates in evaluation and care of outpatients and inpatients at the University Hospital. He or she assists in surgery, and in addition, the student attends department conferences at both Harborview Medical Center and University Hospital in conjunction with department training. Prerequisite: completion of human biology series.

OTOL 685P Otolaryngology Internship (*, max. 8) AWSpS
Cummings (Children's Orthopedic Hospital and Medical Center)
To give medical students additional training in pediatric otolaryngology at Children's Orthopedic Hospital and Medical Center. He or she participates in patient work-ups, surgery, and postoperative care, and study general otolaryngology problems with special emphasis on childhood disease entities. Prerequisite: SURG 663P. (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 interest is in pathology of the head and neck. Reasonable flexibility to arrange the content of the course, which provides exposure to all aspects of patient care in the outpatients clinic, operating room, and ward-care activities. The student pursues a topic of current interest in otolaryngology by review of the literature and presents a paper.

OTOL 687P Otolaryngology Clerkship (*, max. 8) AWSpS
Dobie (Veterans Administration Hospital)
Student participates in the evaluation and care of outpatients and inpatients at the Veterans Administration Hospital, to provide him or her with adequate introduction to ear, nose, and throat problems. In addition, the student attends department conferences at University Hospital. Prerequisite: completion of human biology series. (Four weeks; limit one student.)

OTOL 687P 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 prerequisites are met. Prerequisite: permission of instructor.

**PATHOLOGY**

_Courses numbered with a P suffix are not graduate courses and are restricted to medical student enrollment._

**PATH 410 Introduction to Pathology (3) A**
_Wolf_
Study of causes, processes, and effects of important diseases. Required for students in medical technology, physical therapy, and respiratory therapy. Prerequisites for other students: CONF 317-318, and MICRO 281, or equivalent.

**PATH 444 General Pathology (4) A**
_Ford_
Study of basic pathologic processes that underlie disease, including inflammation, neoplasia, infection, and cellular alterations. An attempt is made to correlate the gross, functional, and biochemical alterations. Lectures, demonstrations, small-group discussions are used to convey these concepts. The course is designed for second-year dental students, graduates, and others with a reasonable grounding in biologic and chemical sciences. Prerequisite for nonstudents: permission of instructor.

**PATH 445 Systemic Pathology (3) W**
_Wolf_
Survey of pathologic processes affecting organs and systems pertinent to the practice of dentistry. Lectures and demonstrations present a coherent picture of systemic disease. For second-year dental students, graduates, and others with a reasonable background in biologic and chemical sciences. Prerequisite for nonstudents: permission of instructor.

**PATH 498 Undergraduate Thesis (*) AWSpS**
_Bendin, Staff_
Elective. Prerequisite: permission of instructor.

**PATH 499 Undergraduate Research (*) AWSpS**
_Bendin, 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 critical analysis of human and 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 structures is strongly recommended. Prerequisite: permission of instructor.

**PATH 501 Cellular Response to Injury (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.)

**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, Plous_
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 special presentations by those in the area being discussed. May be repeated for credit. Offered on credit/no credit basis only. Prerequisite: permission of instructor.

**PATH 510 Anatomical Analysis of Disease (*) AWSpS**
_Barker, Norris_
The anatomical features of human disease as revealed at surgery or postmortem by gross examination and light microscopy, and are correlated with chemical and physiologic changes. Prerequisites: graduate student standing and permission of instructor.

**PATH 511 Introduction to the Anatomical Analysis of Animal Disease (5, max. 10) AWSpS**
_Glidden_
Designed for students who will use animals in the experimental study of disease, and with an introduction to: (1) techniques of animal necropy, (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, students conduct necropsies, gross and microscopic examination of tissues, correlation with clinical and laboratory data, work up a final report, and present cases at a conference. Laboratory pirrites with both naturally occurring and experimentally induced disease are utilized for necropsy. (Limit: two students per quarter.)

**PATH 514 Comparative Pathology Conference (1, max. 6) AWSpS**
_Glidden, Landolt_
Focus on the histopathology of naturally occurring and experimentally induced lesions of primates, laboratory and domestic animals, fish, wildlife, birds. Participants discuss the lesion and 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 visiting scientists. May be repeated for credit. Offered on credit/no credit basis only. Prerequisite: permission of instructor.

**PATH 522 Hematopathology Seminar (1, max. 3) AWSpS**
_Bailey_
Weekly seminar on diagnosis of disorders affecting bone marrow, lymph nodes, thymus, and spleen. Emphasis on current clinical material. Morphologic, cytochemical, and immunologic criteria are applied to each case. Clinopathologic correlation with prognosis and therapy are determined. Current controversial topics in hematopathology are discussed by local and guest lecturers. Reading as preparation for seminar is recommended. Offered jointly with LAB M 522. Designed for graduate 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**
_Motter_
Graduate student participation in the observation and study of human disease processes as they are seen in autopsy cases at the University and Veterans Administration 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 disease assigned. Consists of analysis of the problem from the research perspective emphasizing the cellular, subcellular, and biochemical aspects of the body's reaction to injury and of using experimental methods where applicable. Students present their observations and analysis of the disease processes at a weekly seminar. Prerequisites: 444 or 500 or 555, and permission of instructor.

**PATH 536 Microscopy of Human Disease (3) W**
_Motter_
Previously completed cases; examples of human disease are selected to cover the major patterns of disease processes. Summary of the clinical and autopsied findings in the area being discussed. May be repeated for credit. Offered on credit/no credit basis only. Prerequisite: permission of instructor.
literature. Emphasis is on the critical evaluation of the literature and areas where research needs to be done. Prerequisites: 444 or 500 or 555 and permission of instructor.

PATH 551 Experimental and Molecular Pathology (3-4) Max. 50 AWRSS
Schwartz, Staff
Introduction to experimental pathology. A tutorial course designed to cover clinical, genetic, developmental (medical, dental) or senior undergraduate to selected methods and problems through literature surveys and/or laboratory experience. Exploration of causes of the cellular and molecular levels in the study of disease is emphasized. Prerequisite: permission of instructor.

PATH 552 Contemporary Anatonic Pathology (2-5, max. 30) AWRSS
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 presented to medical and postdoctoral residents, fellows, and trainees. Offered on credit/no credit basis only. Prerequisite: permission of instructor.

PATH 555 Environmental Pathology (3) Sp Motet
Survey of exogenous environmental agents (chemicals—agricultural, industrial, household; physical—kinetic, electrical, thermal, radiation) and of how they are involved in the causation and expression of human disease processes such as developmental anomalies, mutagenesis, carcinogenesis, and degenerative diseases including atherosclerosis. Prerequisites: 544 or 500 or HUBIO 520F, or permission of instructor.

CONJ 560, 561 Tumor Biology (3,2)
See Conjunct Courses.

PATH 560P Introduction to the Analysis of Human Disease I (3) AWRSS
Motet (University Hospital, Harborview Medical Center)
Autopsy participation and review serves as an introduction to the analysis of the 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 microscopic aspects of cancer, developmental, and congenital anomalies and biochemical and physiological abnormalities as they relate to disease processes. Students are assigned in groups of three or four in one of the hospitals indicated. Prerequisites: second-year medical student standing and permission required in order to make appropriate group assignment.

PATH 562P Cardiovascular Pathology Conference (*) AWRSS
Reichenbach
Course consists of two parts: a laboratory review of gross and microscopic cardiovascular pathology of selected autopsy cases followed by a combined clinical (medical and surgical) and pathology conference discussing these cases. Prerequisites: HUBIO 540F and permission of instructor.

PATH 563 Neuropathology (*) AWRSS
Alvord, Shaw, Sumi
Course consists of ten parts, some or all of which may be taken separately or concurrently. Conferences on gross neuropathology and clinical and clinicopathologic correlations (held at various hospitals—Children’s Orthopedic Hospital and Medical Center, Harborview Medical Center, University Hospital, Veterans Administration Hospital, Virginia Mason Hospital, and Swedish Hospital—constitute, respectively, the first six parts of the course. Study of selected cases and weekly surgical neuropathology conferences (as part 7) and/or weekly neurology neuropathology conferences (as part 8), at which a case is presented and biopsy slides are discussed. Participation in a scheduled neuropathology slide show is another option in this course, as is a neuropathology laboratory case study (parts 9 and 10, respectively). Designed for graduate students, residents, and interns, and open to interested medical students. Prerequisite: permission of instructor.

PATH 564 Neuropathology Brain Modeling (4) S
Alvord
Designed along clinically important, functional, neuroanatomic lines, generally based first on the embryologic development of the most primitive segmental elements (sensory, motor and association cells, and simple reflexes), followed by the more elaborate suprasegmental elements (cerebellum, colliculi, and forebrain). Lectures emphasize comparable (phylogenetic) and developmental aspects of the segmental, intersegmental, and supersegmental 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 (retroflexional; formation, segmentation, colliculi, and forebrain) components. Clinicopathologic correlations are emphasized in the discussions of the syllabus and study sets of 35-mm. lantern slides. Prerequisites: HUBIO 525P 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 inflammatory, infectious, vascular, traumatic, metabolic-toxic, degenerative, and neoplastic diseases peculiar to the nervous system. Prerequisites: 571 or permission of instructor. An introductory pathology course, 410; for graduate students, 544 or 555; for medical students, HUBIO 540 or Module 21; and permission of instructor for all students.

PATH 574P Systemic Pathology I (3) W
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 systems reviewed include cardiovascular, respiratory, gastrointestinal (including liver and pancreas), central nervous, and endocrine. For graduate, postdoctoral, and medical students. Prerequisites: for paramedical students, an introductory pathology course, 410; for graduate students, 544 or 555; for medical students, HUBIO 540 or Module 21; and permission of instructor for all students.

PATH 575 Systemic Pathology II (3) Sp Motet
Analysis of disease processes organized on the basis of the organ systems with emphasis on dynamics of lesions and physiologic and biochemical correlations. Organ systems reviewed include cardiovascular, respiratory, gastrointestinal (including liver and pancreas), central nervous, and endocrine. For graduate, postdoctoral, and medical students. Prerequisites: for paramedical students, an introductory pathology course, 410; for graduate students, 544 or 555; for medical students, HUBIO 540 or Module 21; and permission of instructor for all students.

PATH 576 Systemic Pathology Laboratory I (3) W
Reichenbach
Common and uniquely informative specimens of lesions from human autopsies are reviewed grossly and microscopically. 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 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 students.

PATH 577 Systemic Pathology Laboratory II (3) Sp
Motet
Common and uniquely informative specimens of lesions from human autopsies are reviewed grossly and microscopically. 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 576 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 students.

PATH 584 Neuropsychiatric Brain Modeling Laboratory (4) S
Alvord
Designed along clinically important, functional, neuroanatomic lines, generally based first on the embryologic development of the most primitive segmental elements (sensory, motor and association cells, and simple reflexes), followed by the more elaborate suprasegmental elements (cerebellum, colliculi, and forebrain). Three-dimensional 'neuropsychiatric relationships, critical for understanding neuropathology, can best be obtained in the construction of a model of the brain. May be taken concurrently with 584.

PATH 600 Independent Study or Research (*) AWRSS
Offered on credit/no credit basis only.

PATH 665P Surgical Pathology (*) AWRSS
Motet
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) AWRSS
Striker
Conference-seminar on the histopathologic aspects of renal disease. May be taken concurrently with MED 693P. For third- and fourth-year students. Prerequisites: permission of instructor.

PATH 667P Renal Pathology Laboratory (*, max. 6) AWRSS
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 those accompanying certain systems, and pancreas. Ten more than 3 credits, student must submit a paper on a topic agreed upon with the instructor. All students earn 1 credit. Course satisfies one of the requirements of the major in pathology. Credit is 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 (*) AWRSS
Barka
Histopathologic aspects of skin diseases are presented and discussed in a group-conference type of seminar. Current literature and general principles are emphasized. Prerequisites: 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 pathologic mechanisms responsible 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 graduate students covering the developmental, inflammatory, neoplastic, and degenerative diseases of the gastrointestinal tract, esophagus, stomach, intestine, 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 541F. (Limit: six students.)

PATH 673P Cardiovascular Pathology (*) W
Reichenbach
The spectrum of cardiovascular pathology is covered in depth by case studies by gross and microscopic material. Case studies for presentation are taken from autopsies, clinical and gross and microscopic material, is prepared outside of class time. Topics covered include coronary thrombosis in the male, aneurysm and neoplasms, inflammatory diseases, diseases of the pericardium, valvular heart disease, hypertension, arteriosclerosis, and congenital heart disease. Clinicopathologic correlation is emphasized. Prerequisites: HUBIO 540P and permission of instructor and second-year medical student standing. (Limit: fourteen students.)
PEDIATRICS
Courses numbered with a P suffix are not graduate courses and are restricted to medical student enrollment only.

Peds 498 Undergraduate Thesis (*, max. 24) AWSP
Morgan
For medical students. Prerequisite: permission of instructor.

Peds 499 Undergraduate Research (*, max. 24) AWSP
Morgan
An opportunity to gain research experience through participation 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 teratology, metabolic disease, nutrition, neuroembryology, pediatric cardiology; metabolic aspects, pediatric cardiology; physiological aspects, pediatric endocrinology and metabolism, pediatric immunology, respiratory disease, dysmorphology. Prerequisite: permission of instructor.

Peds 501P Survey of Human Growth and Development (15h) AWSP
Baker (Clinical Training Unit)
Clinical observation and study of normal growth patterns in multiple areas of human development, within the setting where growth is taking place. Experience in interacting and participating in patient interview, examination, and treatment plan. This course covers briefly the subjects covered in MOPP-503P. Credit is not allowed for both 501P and 502P-503P-504P sequence.

Peds 502P-503P-504P Human Growth and Development (15h-19h-19h) A,W,Sp
Bennet, Dunn
The student learns more about physical growth and behavioral development through the supervised intensive 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 developmental patterns through the more casual observation 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 followed. In the next five years, family background is studied. There is an opportunity to participate in the doctor-patient relationship. 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) AWSP
Detzer
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 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 conjunction with the clinic experience. Emphasis is on understanding the impact of the differing life-styles and values on the individual's health status are explored through interviews with ethnic, racial, and sexual minority youth.

Peds 512P Laboratory in Human Embryology and Teratology (*, max. 8) AWSP
Shepard
Teaches and stimulates interest in human teratology and helps the student understand clinical manifestations. 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, followed by a presentation of terminology and methods in clinical use. Normal electrocardiograms are studied, followed by abnormal tracings, including adult material such as myocardial infarction. Prerequisite: HUBIO 540P.

Peds 553P Nutrition for Physicians and Allied Health Professionals (2) Sp N. Smith
Nutrition for health professionals presented in a series of lecture discussions and patient presentation seminars. Nutrition principles as related to health maintenance and fitness emphasized, with little emphasis given to complex disease states. Prerequisites: zoology and organic chemistry.

Peds 665P Pediatric General Clerkship (*, max. 24) AWSP
Robertson
General introductory impatient and outpatient pediatric clerkship. Exposes students to environments where children are receiving medical and health services. Approximately half of the six-week experience takes place in a hospital setting (at Children's Orthopedic Hospital and Medical Center, University Hospital, Madigan Hospital, etc.), with the other half in an outpatient department, a clinic, or a series of offices. Student's preferences for locations are considered. Opinionnaires with student-suggested changes have been introduced. Course is open to all students, not just those planning on pediatrics as a career. The twelve-week clerkship is broader and allows for more individual selection of rotations. Locations available: Children's Orthopaedic Hospital and Medical Center, University Hospital, Harborview Medical Center (maximum enrollment, 14); Madigan General Hospital (maximum enrollment, 2); Mary Bridge Hospital (maximum enrollment, 3); WAMI units (maximum enrollment, 5). Prerequisites: HUBIO 563P and third- and fourth-year clinical course work. (Six weeks full time, or twelve weeks, limited to twenty-four students.)

Peds 665P Neonatal Pediatrics—Clerkship (*, max. 24) AWSP
Hodson
Participation in the activities in the newborn and prematurity divisions; ward rounds, seminars, conferences, and familiarization with neonatal laboratory techniques, particularly those relating to acid-base balance. Prerequisite: 665P.

Peds 670P Pediatric Infectious Diseases (*, max. 24) AWSP
A. Smith
Elective primarily based at Children's Orthopedic Hospital and Medical Center and oriented toward medical students at the third- or fourth-year level. Material includes the broad range 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 with the student understand clinical problems and didactic presentations. Opportunity for experience in clinical research and laboratory techniques is provided. Prerequisite: 665P 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
Fitz-Gibbon, Ledin
Clinical experience with behavioral problems in children and a behavioral approach to child development. Selected students will have experience with clinical experience in an ambulatory pediatric clinic, University Hospital. Prerequisite: permission of instructor. (Two or four weeks, full time.)

Peds 673P Office Practice (*, max. 12) AWSP
Reinhart
Opportunity to observe and function in the private office settings of a number of clinical pediatric faculty and to accompany the faculty as they perform their daily activities in the community. Prerequisite: 665P.

Peds 676P Pediatric Clerkship With the Mentally Handicapped (*, max. 12) AWSP
Ravalcabo (Rainier School), Hayes (Fircrest School)
Total involvement of hospitalized and outpatients, incorporating general pediatric knowledge of mental retardation and neurology, plus other specialties related to mental deficiency. Participation may be obtained from Dr. W. O. Robertson, Children's Orthopedic Hospital and Medical Center. Prerequisite: 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) AWSP
Holl
Experience in multidisciplinary evaluation of the handicapped 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 evaluations, consultation, seeing patients, or conferences, and by observing additional professional assessments (e.g., psychological testing) as indicated in the total evaluations of the child. Opportunity to provide parental counseling. Prerequisite: 665P.

Peds 680P Pediatric Clinics (*, max. 24) AWSP
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 following areas: general pediatrics, endocrinology, neurology, immunology, arthritis, cardiology, congenital defects and retardation, well-child, teratology, adolescent medicine, allergy, cystic fibrosis, hematology, prematurity, nephrology, and poison control center. Prerequisite: 665P.

Peds 681P Pediatric Genetics (*, max. 24) AWSP
Scott
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 inborn errors of metabolism. Emphasis on understanding genetic mechanisms that cause human disease. Both University Hospital and Children's Orthopaedic Hospital and Medical Center are used as clinical settings. Prerequisite: 665P. (Four, six, or twelve weeks.)

Peds 682P Congenital Defects—Clinical Experience (*, max. 24) AWSP
Shurtief
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) AWSP
Harrman
Introduction to the problems in children with malignant or hematologic disease. Didactic sessions are held four times per week, and in addition to "one-on-one" counseling with the fellow or attending physician. Self-learning programs are available, as well as specific training in the techniques and interpretation of bone marrow aspirates, intravenous 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) AWSP
Guntheroth, Morgan
The clerkship deals with both inpatients and outpatients with pediatric cardiology in the adult cardiology service group. Emphasis on acquiring skills in physical diagnosis and electrocardiography and on clinical knowledge of diagnostic techniques related to congenital heart disease. Opportunity for the student to become familiar with the cardiac catheterization laboratory and with the techniques of cardiovascular operations may be arranged at the option of the student. There are weekly cardiac clinics, and rounds on inpatients with cardiac vascular problems occur twice daily. On average, two or
three catheterizations and one cardiac surgery are performed weekly. Prerequisite: 665P.

PEDS 677P Advanced Clinical Clerkship In Child Neurology (4, max. 8) AWSpS

Robertson, Staff

Advanced course in neurology dealing with neurological disease in children. Both inpatient and outpatient experiences are included. Prerequisite: 665P.

PEDS 688P Adolescent Clinic (*, max. 24) AWSpS

Deisher

Advanced pediatric clerkship dealing with special problems of the adolescent. Medical students are offered an experience in a multidisciplinary clinic. Prerequisite: 665P.

PEDS 691P Advanced Pediatric Clerkship (*, max. 24) AWSpS

Advanced second-year medical students participate in the affiliated program, excluding residents.

PHCOL 234 General Pharmacology (4) Sp

Lectures and demonstrations concerning the action of drugs on physiological and pathologic processes with special emphasis on agents of special importance in the practice of dentistry. For dental hygiene students.

PHCOL 401 General Pharmacology (5) A

Cutter, Juchau

Introduction to general aspects of pharmacology. Consideration of principles governing drug absorption, distribution, excretion, metabolism, interaction with living tissues, and pharmacologic effects of drugs. 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.

PHCOL 402 General Pharmacology (5) W

Beavo, Storm

For pharmacy students. Further 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. Basic pharmacologic phenomena are considered in their relations to present-day pharmacy, medicine, and society. Prerequisite: 401 or equivalent, or second-year medical student or permission of instructor.

PHCOL 434 General Pharmacology (4) Sp

Lectures and demonstrations concerning the action of drugs on physiological and pathologic 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

Partial fulfillment of class research projects. Open to medical students. Prerequisite: permission of instructor.

PHCOL 507 Pharmacology Seminar (1) AWSpS

Presentation of comprehensive reports on recent medical and scientific literature in fields of current importance. Research progress reports, and reports on completed research. Prerequisite: permission of instructor.

PHCOL 511 General Pharmacology (5) A

Cutter, Juchau

Consideration of principles governing drug-receptor interactions, dose-effect relationships, drug absorption, distribution, excretion, and metabolism. Systematic pharmacology of drugs influencing the autonomic and cardiovascular systems, with emphasis on sites and mechanisms of action. Current research in these areas of pharmacology is discussed. Prerequisite: 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 endocrine systems. Emphasis on physiological and biochemical mechanisms with consideration of their therapeutic, diagnostic, and toxic effects. Prerequisites: 511, graduate standing and organic chemistry, introductory anatomy, physiology and biochemistry, or permission of instructor.

PHCOL 515 General Pharmacology Laboratory (3) W

Juchau

Selected laboratory experiments in pharmacology for demonstration of basic principles of drug actions. Autonomic nervous system, central nervous system, and cardiovascular drugs, and their effects on isolated mammalian systems. One lecture and one four-hour laboratory per week. Prerequisite: permission of instructor.

PHCOL 525 Cardiovascular Pharmacology (2) Sp

Vincenzi

Advanced considerations of drug actions on the heart. Emphasis on cellular and membrane mechanisms of drug influences on 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 instructor. (Offered alternate years; offered 1980-81.)

PHCOL 526 Autonomic Pharmacology (2) A

Horita

Advanced treatment of pharmacologic effects on storage, release, 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, ultrastuctural considerations, intermediary metabolism, kinetics of inhibition and activation, sterol and amino metabolism, and implications in modern therapy. Open to medical and graduate students. Offered jointly with PHSCI 527. Prerequisite: one year graduate, medical, or dental biochemistry, or permission of instructor. (Offered alternate years; offered 1981-82.)

PHCOL 528 Neurpsychopharmacology (3) A

Holpern

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 drugs and hormones acting on enzymes, drug, and hormone receptors, and ion transmision in the plasma membrane of cells. Discussion of current research emphasized. Prerequisites: 401, 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 effect of cyclic nucleotides on physiological processes. Topics include adenylate cyclase and hormone receptors, cyclic nucleotide phosphodiesterases, and protein kinase in current research emphasized. Offered to medical and graduate students. Prerequisites: BIOL 440, 441, 531, or permission of instructor. (Offered even-numbered years.)

PHCOL 533 Methods of Toxicology (2) Sp

Levine

A combined laboratory-demonstration and didactic considerations of chemical, physical, and biological methods involved in studies of harmful effects of chemicals on biological tissue. Prerequisites: 401, 402 or 434, or permission of instructor. (Offered alternate years; offered 1980-81.)

PHCOL 534 Advanced Dental Pharmacology (3) Sp

In-depth treatment of the pharmacology of drugs commonly employed in the practice of dentistry. Prerequisite: 434 or equivalent.

PHCOL 541 Special Pharmacological Techniques (3) S

Laboratory treatment of biochemical, biophysical, and surgical approaches employed in pharmacological investigation. Prerequisites: 401, 402 or 434, or permission of instructor.

PHCOL 600 Independent Study or Research (*) AWSpS

PHCOL 677P 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) WA, WSp

See Conjoint Courses.

P BIO 300 General Human Physiology (5) A

Course Lecture, laboratory, and laboratory conference instruction in the basic principles and basic laboratory techniques of physiology. For students of pharmacy and others. Prerequisites: general zoology, chemistry, physics, and microbiology, or permission of instructor.

P BIO 401 Basic Human Physiology: Neurophysiology (3) A

Kenedy, Panikkar

This course (401, 402, 403) covers basic human physiology at an intermediate level. It is desirable to take the three parts in sequence. Covers nerves, muscle, synapse, reflex arc, general and special sensory systems, and motor systems of the brain. Prerequisites: general chemistry, elementary physics, or permission of instructor.

P BIO 402 Basic Human Physiology: Transport and Exchange Organ Systems (3) W

Rengermans

Covers cardiovascular system, respiration, acid-base balance, renal system, temperature regulation. Prerequisites: general chemistry, elementary physics, or permission of instructor.

P BIO 403 Basic Human Physiology: Metabolism and Endocrinology (3) Sp

Koerker, Steiner

Covers energy metabolism, gastrointestinal system, endocrinology, and reproduction. Prerequisite: general chemistry, elementary physics, or permission of instructor.

P BIO 405-406 Human Physiology (3-3) A, W

Intensive coverage of advanced physiology through lectures and demonstrations. Autumn—Neurophysiology from basic properties of membranes through sensory and motor systems. Introduction to autonomic nervous system. Winter—available systems: cardiovascular, respiratory, renal, endocrine, and gastrointestinal. Required for first-year dental students; also offered for graduate students. Entry card required.

P BIO 424 Vision and Its Physiological Bases (5) A

Teller

Phenomena of human vision, including: spectral sensitivity, color vision, spatial interactions, light and dark adaptation, distance perception, and binocular interactions. Techniques for the study of vision in human sub-
Physics and Biophysics

jcts; emphasis on correlation of human visual functioning with known optical, biochemical, anatomical, and physiological factors. Offered jointly with PSYC 424. Prerequisite: permission of instructor; some background in a physical or biological science recommended.

P BIO 498 Undergraduate Thesis (*) A WSpS For medical students. May be repeated for credit. Prerequisite: permission of instructor.

P BIO 499 Undergraduate Research (*) A WSpS For medical students. May be repeated for credit. Prerequisite: permission of instructor.

P BIO 503 Biological Instrumentation (4) S Fett Introduction to linear systems and electronic instrumentation concepts. Topics include basic circuitry, step and frequency response of first and second order linear systems (RC and RL 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 conversion; basic computer operations; sources of noise; digital/analogue 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.

P BIO 504 Biological Instrumentation Laboratory (2) S Fett Laboratory exercises designed to provide working experience with topics presented in 503. Experiments include: responses of RC and RL 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) W Van Hassel Current concepts in areas of physiology related to dentistry, including pain, taste, speech, microbiocirculation, occlusion. Emphasis on basic physiologic mechanisms, survey of recent literature and design of applied dental research in each area. Offered jointly with ENDO 525. Prerequisite: permission of instructor.

P BIO 508 Physiology Laboratory (1-2) A WSpS Kerrick, Patton, Rowell Small-group experiments to complement the content of courses 509 through 514. Four or five different laboratories are used each quarter. May be repeated for credit. Prerequisite: permission of instructor.

P BIO 509 Physiology of Transport Organ Systems (3) A Stirling Detailed consideration of diffusion and active sodium-potassium transport provides a foundation for a subsequent presentation of transport phenomena of the alimentary and respiratory systems. Emphasis is 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 cooperation of skeletal, cardiac, and smooth muscles. Aim is to convey the concepts of excitable, synaptic, and contractile phenomena. Prerequisite: permission of instructor.

P BIO 511 Neurophysiology (3H) W Patton An advanced course on functioning of the central nervous system (somatic and visceral); special senses (audition, vision, vestibular); descending systems (cortical and subcortical, reticular, thalamic; behavior and neurophysiology; comparative neurophysiology. Prerequisite: permission of instructor.

CONJ 511 Functional Neuroanatomy (4) See Conjoint Courses.

P BIO 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 human lungs. Prerequisites: elementary physics and biology, and permission of instructor.

P BIO 514 Physiology of Metabole and Endoerine Regulation (2H) Sp Gale Control functions of endocrine systems: pituitary, hypothalamus, target organs, thyroid, adrenal cortex and medulla, pancreas, parathyroid, reproduction physiology. Prerequisite: permission of instructor.

P BIO 515, 516, 517 Physiological Prosenram (7.7, 7.7, A, WSpS Guided survey of the experimental literature of major topics in physiology. Course conducted as seminar with oral presentations of papers and topics. Prerequisite: permission of instructor.

P BIO 518 Research Topics in Cardiovascular Physiology (1) WSpS Feigl Graduate students and faculty members present and discuss current literature and research. May be repeated for credit. Prerequisite: permission of instructor.

P BIO 519 Membrane and Muscle Biophysics Seminar (1) A WSpS Almers, Hille, Kerrick Detailed discussion 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 (*) A WSpS Selected topics in physiology. May be repeated for credit. Prerequisite: permission of instructor.

P BIO 521 Biophysics Seminar (*) A WSpS Selected topics in biophysics. May be repeated for credit. Prerequisite: permission of instructor.

P BIO 522 Pulmonary Mechanics and Gas Exchange (1-3) A WSpS Hillabrains Viscous and elastic properties of chest-tung system; flow of gases and gas transport through tissue. May be repeated for credit. Prerequisite: permission of instructor.

P BIO 523 Heat Transfer and Temperature Regulation (2-4) Sp Bengelmann Thermal exchange between the body surface and the environment. Heat production and distribution within the body. Properties of cutaneous and deep temperature receptors. Neural integration and homeothermy. Prerequisite: permission of instructor.


P BIO 525, 526, 527 Readings in Advanced Physiology and Biophysics ( *, *, *, * A, WSpS 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) A WSpS Hillabrains Chemical and neural control of respiration stability. May be repeated for credit. Prerequisite: permission of instructor.

P BIO 530 Synaps and Reflex Seminar (4) A Patton Guided survey of the literature pertaining to reflex and synaptic physiology. Course is conducted as seminar with students giving oral reports on assigned topics. Prerequisites: 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 models in forms of ordinary or partial differential equations, for physiological systems. Topics covered usually include solution of differential equations using the Laplace transform linear 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) W 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 response and Bode plots; s-plane description of feedback systems; synthesis of descriptive functions of experimental results; effect of nonlinearity on control system response. Basically a course in mathematical analysis of feedback systems, using biological examples. Recommended background: Some background in some differential equations and course work in vertebrate or mammalian physiology. Prerequisite: permission of instructor. (Offered alternate years with 534.)

P BIO 535 Applications of Biological Control Systems (3) W Fuchs Examples of biological control systems are discussed in detail. Problems in mass transfer, cardiovascular, respiratory, endocrine, neural, hormonal, metabolic, oculomotor, and other regulatory 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, stereotactic localization, transcranial magnetic stimulation, endocrine implants, anesthesiology. Aesthetic 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 Laschei 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 concepts 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 instructor. (Offered alternate years: offered 1980-81.)

P BIO 543 Motor Systems III: Cerebral Cortex and Cerebellum (3) Sp Fein, Kennedy Critical reading and discussion of classical and current papers on motor cortex, cortico-spinal, cortico-cerebellar, and cerebro-cerebellar function and function, and cerebrocerebellar relations. 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 545 Physiology of Vision (3) Sp Teller Selected readings from recent literature on visual system. Emphasis is placed on studies of single neuron discharge, but other topics, such as biochemical
ual pigments and optical properties of the eye, are usu-
ally included. May be repeated for credit. Prerequisites:
permission of instructor. (Not offered every year.)

P BIO 550 Cortical Potentials (4)
Towne
Properties of continuous and evoked potentials and their
interactions, including the biophysics of their cellular ori-
gins. Prerequisites: 515 and permission of instructor.

P BIO 559 Integrative Neurophysiology (3) Sp
Towne
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 empha-
sis on regulatory mechanisms in mammals. May be re-
peated for credit. Prerequisite: permission of instructor.

P BIO 594 Neurological Study Unit (2) AW
Crisl
Faculty and student discussion of neurological topics il-
lustrated by clinical cases or demonstrations on the follow-
ing: physiology, neuroanatomy, neurology, neuropsychiatry, neuurosurgery, and psychiatry. May be repeated
cr. 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.

P BIa 267 Mental Health and the Community (2)
BraZenham
Explores mental health and mental illness in a commu-
nity context, including: prevention, treatment, psycho-
social intervention. Emphasis on understanding of com-
monsense views of mental health issues from a consumer as well as a societal perspective. For nonmedical students.

P BIa 451 Principles of Personality Development
(2) Heilbrun
Development of the personality from infancy through ad-
vanced age traced to its physiologic, experiential, and cul-
tural sources with emphasis on psychodynamic con-
cepts and behavior.

P BIa 453 Clinical Psychiatry (2 or 3) W
Kecsketh
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 health and behavioral sciences. Di-
ductible only for 2 credits; didactic plus patient demonstra-
tions for 3 credits. Enrollment unlimited. Prerequisites:
permission of instructor for didactic plus patient demon-
sration only.

P BIa 497 Seminar on Recent Advances in Medical
and Psychiatric Anthropology (3) Sp
Christman, Kleitman
Review of selected recent advances in theory and re-
search in medical and psychiatric anthropology. Includes
comparative studies of medical systems; cultural con-
struction of illness categories and behaviors; culture-
bound health behaviors; comparison of indige-
nous and biomedical practitioner-patient transactions;
cross-cultural studies of the healing process; cultural
analysis of affective and behavioral disorders; and ap-
pied clinical relevance of anthropological concepts and
findings. Offered jointly with ANTH 498. Prerequisites:
321 and/or permission of instructor. (Limit: thirty stu-
dents.)

P BIa 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. Prerequisite: permission of responsible faculty
teacher. No credit/credit only. Prerequisite: 498. Entry
card required.

P BIa 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.

P BIa 525P Forensic Issues in Mental Illness (3) Sp
Goldhoffer
Concentration on major areas in psychology and law
(e.g., criminal, civil); several outside speakers from pro-
fessionals, legal, and public community. Lectures and
readings discussed by group discussions; and case presen-
tations. Background in psychopathology and diagnosis
required. For psychology students in the allied health
sciences, and advanced law students.

P BIa 530P Developmental Psychopathologic
Therapy (2) Thorpe
Focus on application of modern psychodynamic theory
good psychotherapy; object relations) to developmental
psychology, psychoanalytic diagnosis, and psychopharmaco-
therapy. Borderline, narcissistic, and psychotic disor-
der discussed and illustrated with clinical cases. Prerequisites:
some familiarity with psychodynamic theory; in good standing as medical student, graduate stu-
dent, or psychology intern.

P BIa 535P Basic Concepts of Modern
Psychopharmacology (2)
Seminar centering on discussion of assigned readings,
augmented by comments from several visiting psychoph-
armacologists. Emphasis on theory with a certain amount of prac-
tice discussed for illustration. Recommended as a desir-
able prelude to 530P and 556.

P BIa 539 Interviewing and Case Formulation
(2, max. 6) W
Becker, Carlin
Systematic interview between intake interviewing of
a patient one week and a case presentation on the follow-
ing week. Emphasis on developing interviewing skills that
facilitate psychodynamic classification (by the Research Diag-
nostic Criteria), case formulation, treatment planning,
and case presentation. For graduate students in psychol-
ogy, educational psychology, nursing, social work, an-
thropology, advanced medical students. Offered jointly
with PSYCH 539. Offered on credit/no credit basis only.
Prerequisite: graduate or professional student standing.
(Limit: fifteen students.)

P BIa 540P Physiology of Emotions (*) AWSpS
Hollers
Seminar based on discussion of selected readings or
original articles in psychopharmacology and psycho-
sociological literature. Designed for interest and inter-
ests for participation in current or future research
projects and clinical medicine. For medical students;
graduate students by permission of instructor. Entry card
required.

P BIa 541P Clinical Geropsychiatry (3)
Cohen, Rakind
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. Emphasizes training in the
physical and behavioral changes associated with aging
and their relationship to clinical manifestations; differen-
tial diagnosis of the brain syndromes, depression, parano-
a, psychopharmacological and behavioral treat-
ment and management strategies; techniques for the as-
sessment of change; community and institutional care; in-
fluence of the environment on dependence; and models
of dementia. Offered jointly with the completion of a
human biology series for third- and fourth-year medical
students; others by permission of instructor.

P BIa 544P Etiology and Epidemiology of
Alcoholism and Drug Abuse (3) A
Ragins
Intensive survey of the historical evolution of etiological
concepts pertaining to alcoholism and drug abuse; review
and critique of current research on etiological hypo-
deses. 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 591. Prerequisite: graduate or doctoral standing in social, behavioral, or biological sciences and
permission of instructor. Entry card required.

P BIa 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 developmental stages; evalua-
tion of families in distress; couples and couple therapy;
family therapy, nonspecific intervention, and specific
syndromes; intervention; indications and contraindica-
tions. Open to third- and fourth-year medical students
and graduate students.

P BIa 548P Aging and Adult Development (2)
A Spr
ing
Aging in Western technologically advanced societies fre-
quently involves losses in status, in stamina, and in eco-
monic and social status. Consideration is given to vari-
sus aging across the life span. Students select individual
projects in the area of aging and work at their own levels of expertise and sophistication. Open to students regarding of major. Seminar format with guided reading.

P BIa 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 bas-
ic 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.

P BIa 553P Psychodynamics of Psychopathology
(2) Sp
Heilbrun
General psychopathological phenomena and their defense
reactions are traced to the developmental history of the
individual with attention to constitutional and organic
causation. The general phenomena are applied to the most
important psychiatric syndromes. Relevant case illus-
tions are offered as bases for therapeutic intervention.

P BIa 555P 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. Recommended background equivalent of undergraduate courses in
basic psychology.

P BIa 557P Behavioral Medicine (2)
Armstrong, Carr
Theory and techniques of behavioral medicine and behav-
ior modification as applied to medical practice. Focus on
the use of behavioral techniques in the management of var-
adous medical and behavioral problems in the elderly, sec-
third-, and fourth-year medical students and graduate stu-
dents in clinical psychology. Others by permission of in-
structor.

P BIa 558P Psychosocial Growth and Development
(2) A Landerman-Dwyer
Current theories and research related to children's de-
velopment, with emphasis on the interaction of biological, psychological, and sociocultural factors. Open to medical
students and to advanced undergraduate students.

P BIa 560P Community Psychiatry (3) A
Broughton
Familiarizes students with the role of physician, adminis-
trator, and mental-health professional in community mental health centers. Introduces the student to community
resource systems and analyzes some of the social

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problems contributing to community mental health concerns. Open to medical students and other graduate students by permission of instructor. (Limit: twelve students, minimum four.)

PBSCI 562P Principles of Hypnosis (2) WSp
Dworkin, Wall

PBSCI 566 Biological Correlates of Psychiatry (2) HUIll
Hampson, Hill
Anatomie, chemical, and electrical communication systems in the brain. Emphasizes normal and pathological 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
Maeda
Biological, 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 instructor. (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 reading 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
Diagnostic criteria, depression as a discrete illness, and combined forms of psychological treatment of less severely incapacitated patients. Some discussion of similar problems in animal models. Emphasis on the role of environmental factors. Open jointly with PSYCH 579. Prerequisites: graduation or professional student standing or permission of instructor. Graduate course in psychotherapy and personality.

PBSCI 591P Seminars and Conferences in Psychotherapy (*) AWsp
Scher, Staff
Special seminar and conferences on a variety of topics can be arranged to accommodate the particular needs and interests of students. Prerequisite: permission of responsible faculty member. Entry card required.

PBSCI 592P Behavioral Science Study Unit (*) AWsp
Maeda
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, BCMHC, or Clinic II (12)
Hampson, Hunt, Womack
Opportunity to experience a variety of ambulatory services 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 for the given psychiatric diagnostic dysfunction, and identifying psychiatric dysfunction; gaining familiarity with psychopharmacology; and gaining exposure to, and facility in management of, problems seen in both psychiatric emergency medicine as well as family practice settings. Offered six weeks full time or twelve weeks half time divided in one of one and one half days per week during the 1st year in internal medicine, or 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 attendance responsibility under the direction of attending psychiatrists and residents for diagnosis and care of patients at University Hospital, Harborview Medical Center, or Veterans Administration Hospital. Experience limited to inpatient medicine, crisis intervention, and consultation service experiences complement inpatient experience. Students refine interviewing skills and diagnostic skills. Principles in the use of ward milieu management, group psychotherapy, physical and pharmacological therapies, and psychotropic testing stressed. Students are elected in lieu of 664P, 665P, and 666P. Prerequisite: HUBIO 563P. (Limit: two students.)

PBSCI 666P WAMI Psychiatry and Behavioral Sciences Clerkship (12) AWsPS
Wright
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, In­dian, and Eskimo children and adults in outpatient and community settings, both urban and rural. For third- and fourth-year medical students only. Other basic clerkships that may be elected in lieu of 665P are 664P, 666P, and 667P. Prerequisite: HUBIO 563P. (Limit: two students.)

PBSCI 670P Clerkship in Consultation-Liaison Psychiatry (*, max. 24)
Kleinman
Evaluation and treatment of patients with major psychosocial problems associated with physical disease, including problems stemming from patients' perception of illness, the relationship between personal and social factors in health and illness, and the relationship between patients' duties and responsibilities and their health problems. For third- and fourth-year medical students only. Other basic clerkships that may be elected in lieu of 664P, 665P, and 666P. Prerequisite: HUBIO 563P. (Limit: two students.)

PBSCI 680P Clerkship in Emergency Psychiatry (*, max. 24)
Daggett
Patients present emergency rooms with a spectrum of acute and emergent psychiatric problems, often com­ pared by associated severe nonpsychiatric illness; acute psychosis, suicidal behavior, violent behavior, acute alcohol or other substance use disorders, and a vari­ ety of substance intoxications. Emphasis on clinical eval­ uation, acute management, and treatment planning for indi­ vidual patients in consultation conferences. Emphasis on skills useful to physicians in any specialty. For third- and fourth-year medical students only. Prerequisites: either 664P, 665P, or 666P.

PBSCI 690P Adult Development Program (*, max. 24) AWsp
Dagdasky
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 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 treatment techniques, including group experiences, role playing, couples workshops, fixed-role workshops, etc. Third- and fourth-year medical students in primary care medical students with special permission from Dr. Dagdasky. Twelve-week course option recommended, because it provides leading experience in clinical experience. This clerkship may be elected in lieu of fulfilling requirement for a basic clerkship (664P, 665P, 666P, or 667P) in psychiatry. Prerequisite: HUBIO 523. (Six to twelve weeks, full time; limit three students.)

PBSCI 695P Advanced Clerkship in Child Psychiatry (12-24) AWsp
Reicher, Trapin
Child psychiatry provides students an opportunity to participate in a variety of ways and to observe and participate in outpatient and inpatient settings. Experience in specialized clinics such as Drug Evaluation Clinic, Learning Disabilities Clinic, and the Child Development and Men tal 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)
Eidesker, Scher
By special arrangement, clerkships, externships, and research opportunities may be available at the Department of Psychiatry and the Department of Family Medicine. Others by permission. Entry card required.

RADIOLOGY
Courses numbered with a P suffix are not graduate courses and are restricted to medical student enrollment only.

RADGY 498 Undergraduate Theses (*) AWsp
Figtley
The student may write a thesis in either therapeutic or di­agnostic radiology. Medical students only. Prerequisite: permission of instructor.

RADGY 499 Undergraduate Research (*) AWsp
Figtley
Ongoing projects or a new project designed for the stu­dent. Opportunities in clinical or laboratory investigation in diagnostic and therapeutic radiology and nuclear med­icine can be provided. Prerequisite: discussion with Dr. Figtley or Dr. Iceman.

RADGY 505, 506 Radiological Physics I, II
(1,3, max. 5; 1,3, max. 3) A, W
Wooton
Application of physical concepts methodology and instru­mentation in the study, production, and measurement of ionizing radiations and their interactions with biological materials. Prerequisite: permission of instructor.

RADGY 517 Radiation Dosimetry (3) Sp
Bickert
Examines the interactions of ionizing radiations with matter and the physical principles involved in their measure­ment in greater depth than 505. Presented in group tutorial as well as didactic lecture in class. For students contemplating a career in research concerned with ioniz­ing radiation and assumes a sound background in physics. May be limited to members of the Research Scientists 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
Figtley, 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 disease processes studied in the first-year curriculum. In radiation oncology 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 Techniques, Physics, and Instrumentation (24) S
Levellen
Practicum familiarization with basic nuclear phenomena and with the instrumentation used in the practice of nu­clear medicine. There are discussions and laboratory ex­ercises. Practical work will be done in a laboratory. All student enrollment with the instructor and sample counting are provided. Prerequisite: permission of instructor.

RADGY 600 Independent Study or Research (*) AWsp
Prerequisite: permission of instructor.
SCHOOL OF MEDICINE

RADGY 693P Diagnostic Radiology Clerkship (*, max. 12) AWSp

Basic clerkship provides a survey of radiology, the depth and breadth of which are individually structured. Instruction and experience in radiation therapy and nuclear medicine is provided; however, the majority of the time is spent in the diagnostic department. Students observe and participate in operations, therapy, and special procedures. A variety of x-ray and clinical conferences can be attended, supplementing daily film-reading sessions and seminars with the staff. Opportunities for self-instruction are provided in the form of reading material and a large x-ray teaching file. A short experience in community radiology is designed to provide insight into radiologic care delivery in community practice. Prerequisite: completion of human biology series.

RADGY 695P Clinical Cancer Management (*, max. 8) AWSp/S Gerdes (University Hospital)

Supervised formal and clinical management of the patient with cancer. Includes clinical evaluation, planning of treatment, and follow-up examination of patients.

Daily teaching conferences. Prerequisite: MED 665P or HUBCO 563P, or permission of instructor. (Two weeks.)

RADGY 696P Nuclear Medicine Clerkship (*, max. 12) AWSp/S

Help

Student participates from 8:00 a.m. to 5:00 p.m. daily in the nuclear medicine clinical laboratory, where diagnostic studies of various types are performed. The student has responsibility for patients admitted into 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) AWSp/S

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/Bekker

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. Offered on credit/no credit basis only. Prerequisite: permission of instructor.

REHAB 320, 321 Medical Science (5.5, 5.5) W,Sp

Staffs of departments of Medicine, Obstetrics and Gynecology, Orthopaedics, Pediatrics, Rehabilitation Medicine, Psychiatry and Behavioral Sciences, Radiology, Surgery, and community agencies serving various disability groups

Lectures in medical science fields related to: general surgery, obstetrics and gynecology, internal medicine, neurology, rehabilitation medicine, orthopaedics, psychiatry and behavioral sciences, rheumatology, and pediatrics. Required for occupational therapy, prosthetics and orthotics, and physical therapy students, and rehabilitation counseling students. Offered on credit/no credit basis only.

REHAB 332 Pathologic Physiology for Physical Therapists and Occupational Therapists (3) A Anderson

Emphasis on normal and pathologic physiology of the circulatory, respiratory, nervous, and gastrointestinal systems as basis for treatment in occupational therapy, physical therapy, and prosthetics-orthotics. Required 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

Draile, Simons

Instruction in, and experience with, the use of orthotic components and materials, including layout, measurement, and fitting of orthoses for management of spinal pathologies. 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 Daily

Instruction in, and experience with, the use of prosthetic components and materials, including preprosthetic care, prosthetic components, principles of fabrication and harnessing, and techniques of checkout and prosthetic training for all amputation types. Required for prosthetics and orthotics majors; others by permission of instructor.

REHAB 342 Upper-Limb Orthotics II (4) Sp

Draile

Instruction in, and experience with, the use of prosthetic components and materials, including preprosthetic care, prosthetic components, principles of fabrication and harnessing, and techniques of checkout and prosthetic training for all amputation types. Instruction in, and a review of, anatomy, biomechanics, normal and abnormal locomotion, and motor disability as they pertain to upper-limb prostheses. Emphasis is placed on prosthetic components and prescription considerations. Instruction and practice in immediate postoperative fitting techniques.

REHAB 343 Upper-Limb Orthotics (6) S

Simons

Instruction in, and experience with, the use of orthotic components and materials, including preprosthetic care, prosthetic components, principles of fabrication and harnessing, and techniques of checkout and prosthetic training for all amputation types. Required for prosthetics and orthotics majors; others by permission of instructor.

REHAB 380 Occupational Therapy in the Health-Care System (2) A Hausen

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) Sp

Herling, Kester

Functional anatomy, biomechanics, clinical assessment and management of mechanical problems with emphasis on 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

Herling, Kester

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. Laboratory. Required for physical therapy students.

REHAB 413 Special Studies In Physical Therapy (1-5, max. 15) Sp

Series of courses on theory and practice in specialized areas of physical therapy. Includes organization and administration of specialty programs, and required clinical experience. Centered on evaluation 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) AW

Fried, Steger

Psychological processes underlying adjustment to disability, application of behavioral/analytical systems in patient therapy, examination of the role of intellectual and perceptual 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 (2-12) A, W, Sp McMillan

Basic principles of medical ethics; history, scope of physical therapy; relationships of physical therapy, occupational therapy, nursing, rehabilitation counseling, social 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, operational policy, and ethical and legal influences. Required for admission to physical therapy department. Required for physical therapy students.

REHAB 420 Lower-Limb Prosthetics I (8) A

Draile, Simons

Instruction in fabrication, fitting, and alignment of the patellar-tendon-bearing prosthesis. Emphasis is placed on the biomechanics of below-knee fit and alignment, dynamic alignment, and the use of the below-knee adjustable heel and duplication devices, as well as methods of suspension. Required for prosthetics and orthotics major; others by permission of instructor.

REHAB 421 Lower-Limb Prosthetics II (11) W

Simons

Instruction in stump casting, cast modification, socket fabrication and dynamic alignment, alignment duplication, and suspension system. Required for prosthetics and orthotics majors; others by permission of instructor.

REHAB 422 Lower-Limb Orthotics (8) A

Simons

Instruction in, and experience with, the use of orthotic components and material, including measurement and fitting of lower-limb orthoses and shoe modifications to patients. Each student will complete cases and plans, fabricate, and check 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

Daly, Dalle, Bertet

Further clinical experience in patient evaluation, planning, fabrication, and fitting of prosthetic and orthotic devices, and attendance at prosthetics and orthotics clinics at University Hospital and University-affiliated Seattle hospitals. Experience in immediate postoperative prosthetics. Required for prosthetics and orthotics majors; others by permission of instructor.

REHAB 429 Immediate Post-Operative and Early Follow-up (2) Sp

Daly, Simons, Zenl

Lecture and laboratory designed to introduce the student to the principles of immediate posturgical prosthetic fitting, including patient management for both upper and lower extremities.

REHAB 430 Advanced Limb Prosthetics and Engineering Concepts (4) Sp

Daly, Dalle, Simons

Instruction and experience in the use of prosthetic components and materials including casting techniques and alignment procedures used for hip disarticulation patients and transtibial prostheses. Instruction in, and review of, anatomy, biomechanics, normal and abnormal locomotion, and motor disability as they pertain to hip disarticulation and Symes prosthetics. Instruction in the physical principles that underlie modern prosthetic/orthotic devices and practice. Hydraulic control, material behavior, force analysis and basic electronics with emphasis on 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 small-group interaction and dynamics. Focus on principles and purposes of effective interpersonal and organizational communication. Analysis of selected examples of dysfunctional behavior. Emphasis on laboratory experience includes practice with various interpersonal and small-group communication techniques. Prerequisite: occupational therapy major.
REHAB 510 Somatopsychology: Psychological Aspects of Disability (3) Sp

Forces
Psychological adjustment to disability; techniques of milieu management; application of conditioning techniques to treatment of emotional and perceptual deficit; rehabilitation team management. Required for residents: others by permission of instructor.

REHAB 513 Special Studies In Physical Therapy (1-5, max. 15) AWSp

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 a credit/no credit basis only. Prerequisite: permission of instructor.

REHAB 516 Medical Information and Rehabilitation Counselors (4) Sp

Jamer
Lectures in medical science field regarding the etiology, prognosis, and physical restoration of common disabling conditions. Case studies are used extensively, and major emphasis is placed on vocational implications of physical disability. Required for rehabilitation counseling students; others by permission of instructor.

REHAB 520 Seminar (1-5) AWSp

Lehmann, Moore

Conferences and seminars, discussions of advanced physical medicine and rehabilitation topics for residents and post-doctoral fellows in rehabilitation medicine. Lectures, discussion, and supervisory work in selected aspects of occupational therapy appropriate to elected area of study for applicants for Master of Occupational Therapy degree. May be repeated for credit.

REHAB 522 Neurophysiological Topics In Rehabilitation Medicine (2) S

Anderson

Review of traditional concepts and an exposition of recent advances in neurophysiological research related to the practice of physical medicine. The mechanisms underlying facilitation techniques and other techniques used in neuromuscular re-education are examined. Prerequisites: resident M.D. standing in physical medicine.

REHAB 524, 525, 536 Approach to Treatment Strategies In Occupational Therapy (4,A,4) A,W,Sp

Process of collecting, analyzing, and interpreting assessment data, formulating treatment objectives, and selecting and utilizing treatment media. Emphasis on the importance of ascertaining all ability requirements for human functional performance, with the social, emotional, physical, and psychological handicapped. Prerequisite: occupational therapy major.

REHAB 530 Medical Aspects of Vocational Counseling (3) A

Jamer

Introduction to vocational implications of physical and occupational disabilities: Medical, counseling techniques, therapeutic modalities, community resources used in producing vocational assistance for the handicapped. Prerequisite: resident standing in rehabilitation medicine.

REHAB 532 Clinical Affiliation for Rehabilitation Counselors (5-6) A

Tyler

Under the general preceptorship of the rehabilitation counseling professional staff, the student counsels and evaluates patients who have severe physical, emotional, or social problems, arranges for and administers vocational testing, obtains placement on job stations, and works with community resources in planning for vocational/educational placement after follow-up, and develops activity-oriented schedules. Prerequisite: permission 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. Prerequisite: permission of instructor.

REHAB 535 Administration (3) W

Introduction to administration, management, and supervision 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

Beukelman

Overview of communication disorders secondary to central and peripheral nervous system impairment. Emphasis on facilitating identification of speech/language disorders with discussion of implications for rehabilitation. Prerequisite: graduate student status (postdoctoral fellow).

REHAB 540 Application of Measurement Systems (3) W

Brookway, 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

Crawe

Provides opportunity to integrate information pertinent to pediatric occupational therapy research, theory, and practice as it relates to development disabilities, cerebral palsy patients 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

Lehmann, Simon

The physical and mechanical properties of the musculoskeletal system are discussed. Mechanical principles in the functional replacement, using ambulation aids, braces, and prostheses, are reviewed. Emphasis is on basic understanding of the biomechanical principles involved, as well as on detailed discussion of clinical application at the level of residents and academician trainees. 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

Hulitt

Explores through lecture, demonstration, patient interview, and readings the disabling diseases, their functional impairment, the family problems produced, and the interplay between disease and the environment. Medical, psychological, and social aspects considered. For medical students during their first year. (Two-two hour sessions per week or one-half day per week.)

REHAB 555P Neuromuscular Electrodiagnosis (2H)

Kraft

Demonstration of fundamentals of electromyography and peripheral nerve stimulation followed by student participation in clinical electrodiagnosis examinations. An effort 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 develop proficiency in performing these examinations. Prerequisites: HUBIO 564P and permission of instructor.

REHAB 566 Special Topics In Rehabilitation (3)

Philosophy and concepts in the interdisciplinary rehabilitation of persons with major disabilities, including advanced content in the rehabilitation theory and process of selected categories: post-CVA, post-spinal cord injury, and chronic back pain.

REHAB 568 Biophysics as Applied To Physical Medicine (3) A

Lehmann

Propagation and absorption characteristics of physical factors, and the effects on rehabilitation. Physiologic effects basic to prescription of the physical therapy modalities. Prerequisite: resident standing in rehabilitation medicine; others by permission of instructor.

REHAB 596 Electromyography and Electrodiagnosis (3) S

Kraft

Comprehensive didactic course covering all aspects of clinical electromyography and electrodiagnosis. The course is given in two parts: (1) covering the physical, neurophysiological and the second covering clinical electromyography, with emphasis on disease states. Prerequisite: residency in rehabilitation medicine; others by permission of instructor.

REHAB 597-599-599 Electromyography and Electrodiagnosis Laboratory (1-1-1) AWSp

Kraft

Elective work in clinical electromyography and other electrodiagnostic methods. Prerequisites: permission of instructor.

REHAB 600 Independent Study or Research (*)

AWSp

Offered on credit/no credit basis only.

REHAB 684P Second-Year Clinical Elective In Physical Medicine and Rehabilitation (20 or 24) WS

O'Shaughnessy, Stolov

Special emphasis on the technique of eliciting historical and physical evidence of function to function in his environment. Topics include transfer abilities, normal and abnormal gait, reambulation, communication disorders, rehabilitation in physical medicine, psychological aspects of disability, learning aspects in chronic disease, vocational evaluation, principles of physical and occupational rehabilitation, treatment planning, physical rehabilitation, neuromuscular electrodiagnosis, braces, and prosthetics. Patients with stroke, amputation, spinal cord injury, traumatic brain injury, or 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 process. Prerequisite: HUBIO 532P. (Ten or twelve weeks, full time.)

REHAB 685P Basic Rehabilitation Medicine (4)

AWSp

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) AWSp

Stolov

Clerkship experience in the specific rehabilitation approaches for the disabling pediatric diseases. Includes school planning, family counseling, and community support services. The 6-credit (four-week) package is an inpatient experience. The 9-credit (six-week) package includes, in addition, a two-week clinic and consultation experience. Prerequisite: HUBIO 564P; PEDS 665P recommended. (Four or six weeks, full time.)

REHAB 687P Rehabilitation Medicine Clerkship—Medical (8 or 12) AWSp

Stolov

Clerkship experience in the specific rehabilitation approaches for the various nonsurgical diseases. Primarily for those interested 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 686P or 688P for ten or twelve weeks.)

REHAB 688P Rehabilitation Medicine Clerkship—Surgical (8 or 12) AWSp

Stolov

Clerkship experience in the specific rehabilitation approaches for the various surgical problems. Primarily for those interested in the surgical specialties and tailored to the individual student's requirements. Offered on a credit/no credit basis. Prerequisite: HUBIO 563P. (Four or six weeks, full time; limit: ten students. In summer, offered with 686P or 687P for ten or twelve weeks.)
REHAB 695P Rehabilitation Medicine Outpatient Clinics (4) AWSp

Sodof
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 management problems. Designed for those interested in family practice and internal medicine. Prerequisite: HUBIO 564P.

REHAB 697P Rehabilitation Medicine Special Electives (*, max. 24) AWSp

Sodof
By specific arrangement, for qualified students, special clerkship, externship, or research opportunities can at times be made available to students 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

Stooff
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

Stooff
The student participates in current urology research projects under supervision of full-time staff. Certain specific projects are limited to qualified medical students. Prerequisite: permission of sponsor and department.

UROL 675P Urology Preceptorship (*, max. 8) AWSpS

Stooff
Preceptorship
Student follows a preceptor in all of his or her work in order to better understand the pathophysiology and management of the problems of the urogenital system and to become acquainted with the office management of urological problems. Prerequisite: HUBIO 562P. (Two or four weeks.)

UROL 680P Urology Clerkship (*, max. 8) AWSpS

Stooff
Ansell, Berger, Chapman, Correa, Mason, Mayo
Student participates in the full activities of the clinical service, which includes both inpatients and outpatients. Students have a daily follow-up of assigned patients. Students will be advised on the case material and should obtain from the Dean’s office a “Special Assignment” form at least one month before preregistration. Prerequisites: 565P or PDS 665P or permission of instructor.

UROL 685P Urology Subinternship (*, max. 12) AWSpS

Stooff
Ansell, Berger, Chapman, Correa, Mason, Mayo
Subintern is responsible for patient work-up and for preoperative and postoperative care and participates in the operating room at the appropriate level of competency and inpatient care. The student participates in ward rounds and urology conferences at selected hospitals. Participating individuals should be prepared to work hard and, in turn, expect measurable dividends in their future as those of the standard clerkship. Prerequisite: MED 665P or PDS 665P or permission of instructor.

UROL 697P Urology Special Electives (*, max. 24) AWSpS

Stooff
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 243 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
individuals and analyzing the interactions required. Open to nursing majors only. Prerequisites: sophomore standing and PSYCH 101.

NURS 291 Nursing Process I (6) WS
Beginning course in nursing process: systematic method of assessing, planning, implementing, and evaluating optimal health. Theory, seminar, and clinical laboratory include application of the process to selected functional states in patients in various clinical settings. Three hours theory; seminar; eight hours laboratory weekly. Prerequisites: sophomore standing, MATH 101, 102, and CSCI 373-318. CHEM 101, 102, KINPE 205, PHARM 315, NURS 301.

NURS 290 History of Nursing (2) AWSp
History of nursing from antiquity to the present. Examines forces that shaped nursing, including the social, cultural, economic, and scientific roles of woman and its influence on nursing, with special emphasis on past and present leaders of nursing and their unique contributions to nursing. Reviews the present role of the nurse. Elective course open to all interested students.

NURS 297 Human Development I: Adolescence Through Adulthood (3) WS
Study and practice include parameters of growth and development from early childhood, through late childhood and middle age to old age; developmental tasks related to these age periods; environmental influences that affect these tasks; and current life style and development trends. Open to non-nursing majors with permission. Two hours lecture, one hour seminar weekly. Prerequisites: sophomore standing, and PSYCH 201 or equivalent, or permission of Undergraduate Advising Office.

NURS 300 Human Development II: Conception Through School Age (3) AWSp
Further development of knowledge and skills established in 297. Development of child 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 behavior patterns; environmental influences on growth and development. Open to non-nursing majors with permission of Undergraduate Advising Office. Prerequisites: 297 and sophomore standing.

NURS 302 Nursing Process II (6) AWSp
Continuation of 281. Theory and seminar: nursing process related to selected human needs. Clinical laboratory increases depth and breadth of nursing process and skills. Three hours theory; seminar; eight hours laboratory weekly. Prerequisites: 281; 300 and 305 may be taken prior to or concurrently.

NURS 303 Psychosocial Care in Adaptive and Maladaptive Behaviors (2) AWSp
Behavioral responses to social, psychological, and physiological factors. Ratios and techniques for care and treatment: community nursing, and counseling. Contemporary issues in prevention and treatment. Open to nursing majors only. Prerequisites: 263, sophomore standing, and PSYCH 101, or permission of Undergraduate 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 or prior to, or 322, or permission of Undergraduate Advising Office.

NURS 322 Nursing Care of Ill Adults I Laboratory (5) ASp
Application of scientific principles to the nursing care of ill adults in the acute-care setting. Emphasis is on increasing skills in area of assessment, developing competency with common nursing therapies, and identifying common elements and significant differences in the nursing care of adults with a known or predicted physiological alteration. Three weeks of operating room experience included or in 324. Two hours clinical seminar; four 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 Ill Adults II (5) WS
Alteration of function in selected systems leads to broadening and deepening knowledge relevant to the care of ill adults. Emphasis on the preventive, maintenance, and restorative theories of common concerns pertinent to immediate, acute, and long-term care. Prerequisites: 321, 322; 323 taken concurrently with, or prior to, or 324, or permission of Undergraduate Advising Office.

NURS 324 Nursing Care of Ill Adults II Laboratory (5) WS
Comprehensive nursing care of hospitalized adults with more complex physiological alterations. Practical knowledge and skills are increased, with emphasis on the synthesis and application of knowledge underlying critical thinking, sound clinical judgment, and evaluation in the nursing process. Three weeks of operating room experience included or in 324. Two hours clinical seminar; four hours laboratory weekly. Offered on credit/no credit basis only.

NURS 327 Nursing of Children (4) AWSp
Weekly course on adaptation of skills and knowledge to nursing 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. Emphasis on synthesis of the theory and guest lectures when possible. Offered on credit/no credit basis only. Prerequisites: 300, 324, taken concurrently with, or prior to, or 328, or permission of Undergraduate Advising Office.

NURS 328 Nursing of Children, Laboratory (3) AWSp
Clinical experiences on adaptation of skills and knowledge to nursing 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. Emphasis on synthesis of the theory and guest lectures when possible. Offered on credit/no credit basis only. Prerequisites: 300, 324, taken concurrently with, or prior to, or 328, or permission of Undergraduate Advising Office.

NURS 350 Advanced Nursing Process (5) WS
Advanced course for registered nurses on the decision-making process used in the identification and solution of problems and selected skills used in the assessment and implementation phases. Students analyze and test in clinical practice the manner in which the systems impact on the nursing process; the theoretical rationale as a basis for the nursing process; a conceptual system for organizing the knowledge base 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 junior standing or concurrent upper-division credit. Four hours seminar, six hours laboratory weekly, work-study option.

NURS 351 Changing Concepts of Professional Nursing (4) WS
Emphasis on current concepts of nursing and nursing education including present and potential roles, responsibilities and required competencies of professional nurses in 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 physiology that may result in a pathological state, to derive appropriate nursing interventions, and to evaluate outcomes of nursing actions and related therapies.

NURS 354 Comprehensive Maternal-Child Nursing (4) ASp
Current theories, concepts, and principles applicable to maternal-child nursing. Emphasis on application of relevant principles from the humanities, natural and social sciences to the childbearing family. Three hours theory, six hours of clinical laboratory weekly, work-study option.

NURS 356 Comprehensive Medical-Surgical Nursing (4) ASp
Current theories, concepts, and principles in assessing, planning, and evaluating the nursing care of selected adult medical-surgical patients. Emphasis on prevention, rehabilitation, and family-centered processes. Three hours theory, six hours of clinical laboratory weekly. Prerequisite: junior year standing in the registered nurse curriculum pattern, and 351 and 353.

NURS 361 Cultural Variation and Nursing Practice (3) WS
Ethnocultural 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. Prerequisite: upper-division standing. Recommended: ANTH 202.

NURS 397 Scientific Basis for Nursing Interventions (5) ASp
For registered nurses. Builds on basic knowledge of normal and abnormal physiology and incorporates concepts from social and psychological sciences. Functional adaptations to changes in the external and internal environment and with complex alterations in normal physiological states, maintaining homeostasis and the responses elicited by selected 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 Ill Adults III (4) ASp
For registered nurses. Synthesis and application of the nursing process are demonstrated in the comprehensive care of selected clients with complex alterations in normal physiological function. Emphasis on critical thinking, sound clinical judgment, and evaluation. Offered on credit/no credit basis only. Prerequisites: concurrently with, or prior to, 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) AWSp
Focus on the normal family through pregnancy, childbirth, child rearing, and climacteric. Clinical experiences are provided in community and institutional settings. Twenty-fours hours laboratory weekly. Prerequisites: 327, 328, 403, 407 and 400 prior to 425 in maternal and child nursing.

NURS 402 Maximizing Health in the Community (5) AWSp
Synthesis and application of the process of community health nursing, community organization, and public health and epidemiological principles. Emphasis on prevention of disease, health maintenance and health promotion within households, families, groups and community. Students collaborate with health-team members, using an interdisciplinary approach in a variety of settings. Twenty-four hours laboratory weekly. Prerequisites: 327, 328, 403, 407; 402 must be taken prior to 423.

NURS 403 Psychosocial Nursing Care in Adaptive and Maladaptive Behaviors II (3) AWSp
Concepts and principles of care of emotionally disturbed persons. Emphasis on understanding individuals in study of dynamics and behavior patterns associated with maladaptive behavior, plus theories and rationale of nursing intervention and rehabilitation. Open to nursing majors 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 nonmajors majors with permission of Undergraduate Advising Office. Prerequisite: upper-division standing.

NURS 406 Introduction to Research in Nursing (3) AWSp
Introduction to concepts and processes of research utilized in investigation of nursing problems. Prerequisites: one elementary statistics course, SOC 223, EDPSY 490 or BIOST 472.

NURS 407 Psychosocial Nursing Practice (7) AWSp
Application of principles and concepts in care of emotionally disturbed persons with emphasis on treatment modalities such as group therapy, client-centered therapy, and family therapy. Includes individual and group therapy. Includes experiences in acute care, day care, congregate care, and outpatient facilities. Two hours of clinical seminar and twelve hours of laboratory weekly. Open to
nursing majors with junior standing. Taken concurrently with NURS 403, with permission of the 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 practice. Prerequisites: senior standing, RN licensure or equivalent in other "helping" discipline.

NURS 413 Practice Teaching in Maternal and Child Nursing (3) Guided experience in selected teaching-learning situations 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 420 Special Field of Community Health 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 interests (3-8) of the student. Nine to twenty-four hours clinical laboratory weekly, including two hours of conference. Prerequisites: 402 or equivalent and postbac calvalureate 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 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 lecture, twenty-one to thirty hours of laboratory weekly. Prerequisites: 402 and senior standing.

NURS 424 Senior Practicum in Psychosocial 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 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 lecture, twenty-one to thirty hours of laboratory weekly. Prerequisites: 402 and 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 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 lecture, twenty-one to thirty hours of laboratory weekly. Prerequisites: 402 and senior standing.

NURS 426 Senior Practicum in Advanced Medical-Surgical Nursing (12) AWSpS Further 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 lecture, twenty-one to thirty hours of laboratory weekly. Prerequisites: 402 and 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 persons from biogeographic concepts. Prerequisite: permission of instructor.

NURS 499 Undergraduate Research (1-5, max. 5) AWSpS Supervised individual research on a specific nursing problem. For freshmen and sophomores 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. Practicum. Emphasizes teaching and evaluation strategies to assist professionals or students working, or intending to work, with patients in centers serving children. Introduction to basic communication theory. Sessions with individuals and analysis of interactions are required. Audiorvisual equipment included for the purposes 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. Prerequisites: senior standing, RN licensure or equivalent in other "helping" discipline.

NURS 438 Practice Teaching in Maternal and Child Nursing (3) Guided experience in selected teaching-learning situations in clinical nursing. Identification, analysis, and solution of teaching-learning problems in clinical nursing. 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, identifying available teaching-learning strategies, and evaluating results in selected situations in community health nursing. An application of core concepts presented in 255. A minimum of four hours of guided experience weekly. Prerequisite: 532.

NURS 452 Health Assessment of Adults and Children (5) A Systematic approach to the collection, analysis, and evaluation of physical, psychosocial, and historical data necessary to formulate primary health care for adults and children. Delineation of subjective and objective findings as they deviate from normal. Selected diagnostic procedures. Seven hours of self-directed multimedia study and supervised fieldwork in the primary health-care setting.

NURS 458 Practice Teaching Community Health Nursing (3) Sp Guided experience in selected teaching-learning situations in community health nursing. Identification, analysis, and solution of teaching-learning problems. A minimum of seven hours of guided experience weekly. Prerequisite: 450.


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 differences, social status differences, and selected group differentiation in community structure. Measurement and comparison of health outcomes with emphasis on comparison 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 education programs in various institutions and agencies. Includes the application of adult learning principles to a variety of situations, such as workshops, in-service and staff development programs. 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 nursing settings. The use of evaluation as a method for the support and development of the nurse. A concept examination as it relates to guidance of students or staff toward personal satisfaction and growth, and toward improved patient care.

NURS 470 Practicum in Interpersonal Approaches in Nursing (3-6) AS Supervised experience in working with individuals who are experiencing emotional distress. Guided experiences in the areas of communication, teaching, and using self towards improvement of the client's or the individual's approach towards assisting the client to identify and alter maladaptive behaviors. Prerequisite: 460, which may be taken concurrently, or equivalent.

NURS 488 Effects of Alcohol and Its Relation to Health and Disease (4) AS Intensive inquiry into the effects of alcohol on the total person with emphasis on the physiological effects, utilizing case studies, research reports, and audiovisual materials. Prerequisite: passing the basic core examination 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) AWSpS Analysis of family problems associated with alcoholism. Emphasis on psychological, cultural, and social implications of selected therapeutic interventions. Weekly conferences provide guidance to learning. Credit variable, depending upon objectives agreed upon by student in counsel with faculty advisor. Offered on credit/no credit basis only.

NURS 491 Alcohol Practicum I (2-4, max. 6) AWSpS Guided practicum in nursing of alcohol- and drug-dependent persons; prevention, management, and rehabilitation of the alcoholic. Major components include the critical assessment of patients, including physical examinations, nursing histories, evaluation of therapeutic interventions, and analysis of preventive methods employed with specific groups. Weekly conferences provide guidance to learning. Credit variable, depending upon objectives agreed upon by student in counsel with faculty advisor. Offered on credit/no credit basis only.

NURS 492 Social Sensitivity in Health Care (3) AWSpS For course description, see Interschool or Intercollege Programs.

NURS 491 Alcohol Practicum II (2-4, max. 6) AWSpS Continuing 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 auditapes, videotapes, and process recordings of student 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, cultural norms, and health behavior of children and adolescents in different societies. Comparative approaches, diverse theoretical postures, and empirical research findings are used to study socialization practices and their relationship to cultural, social, and health systems of selected cultures. Offered jointly with ANTH 440. Prerequisite: permission of departmental advisor.

NURS 502 Applied Group Development Principles (3) AWSpS Evaluation of selected theoretical concepts relating to dynamics operating in groups; analysis of process and development of skills to increase group productivity through class and laboratory sessions.

NURS 503 Seminar in Psychosocial Family Theory (4) W Examination of theories relevant to psychosocial family intervention and 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 process. Analysis of existing treatment methods regarding adaptation to psychosocial nursing practice. Prerequisite: 503.

NURS 505 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 discussion of selected topics and readings, with implications for research and health care.

NURS 506 Seminar in Nursing Administration (3) Sp Critical analysis of problems affecting the administration of nursing. Intensive directed study of the conditions that influence human behavior in nursing work environments. Prerequisites: graduate standing, ADMN 510, and permission of departmental advisor.

NURS 508 Historical and Contemporary Perspectives in Personality Theories (3) Sp Social history is examined as influenced by selected per-
NURS 509 Practice Teaching in Physiological Nursing (3) A
Guided experience in selected teaching-learning situations in nursing, in both classroom and clinical situations. Identification, analysis, and solution of teaching-learning problems in clinical nursing. Minimum of seven hours of guided experience weekly. 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 elements of the curriculum as described in a curricular design. 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
Seminar and evaluative experiences centering on interrelations 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 the implementation of solutions within sociopsychological factors that affect high-risk mental illness populations. Includes study of multidisciplinary relationships, psychiatrist's role, and psychiatric traditions 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 group counseling techniques for use with various treatment groups. Analysis of selected approaches to group treatment. Analysis of leader responsibilities and functions in the development of therapeutic group experiences.

NURS 514 Practicum for Community Mental Health (3-3) WSp
Field study in community assessment and social action relative to mental health. Experiences include the development 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 Field Study (3, max. 6) AS
Theory and supervised field experience in self-management 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 evaluating intervention techniques. 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 statistics.

NURS 521 Methods of Research in Nursing (3) W
Continuation of 520, with emphasis on methods of research applied to the solution of problems in all fields of nursing.

NURS 522 Seminar in Therapeutic Nursing Process I (3) AS
Analysis and synthesis of concepts relevant to therapeutic nursing based upon consideration of the reality 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 Processes (3) ASp
Considers the dynamic processes involved in leadership roles assumed by nurses in nursing situations. Included in the course is an explanation of the complex human-relationships 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 the reality 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 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, the selection of quantitative and qualitative research techniques, experimental design, reliability and validity of measurements, and goal attainment scaling as a means for measuring treatment outcome. Prerequisite: one quarter of statistics.

NURS 527 Practicum in Family Treatment (2-6) Sp
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. Offered on credit/no credit basis only. Prerequisites: 503, 504, which may be taken concurrently, or equivalent, and permission of departmental adviser.

NURS 528 Field Study in Evaluative Analysis for Family Social Work Programs (3) Sp
Field study in evaluating. Experiences include pre-evaluation studies; consultation with community members, community groups, and agency personnel to operationalize health-care program objectives in terms of measurable goals; construction of evaluation protocols; and assessment of program functioning in relation to program objectives. Offered on credit/no credit basis only. Prerequisite: 526.

NURS 529 Practicum in Group Treatment (2-6) Sp
Supervised experience working as primary therapist or cotherapist in a group. Opportunity is provided to practice selected therapeutic techniques in therapy groups. Supervision is provided by nursing faculty member. Offered 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 help students understand, evaluate, and analyze selected topics of the theoretical framework, societal influences, 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 care of the infant and young child, and handicapped-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 life. Alternative seminars and pathway field experiences available in nursing 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. 6) Sp
Therapeutic approaches to care of mothers, infants, and children in various settings. Includes individual and group strategies of health-care delivery. Student continues in selected pathway directions. 3 credits required for all students, major 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 similarities and differences in: definitions of ideal parenting; socializations into a parent role; social support for, and control 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: Evaluations (3) A
Systematic observation and assessment methods designed to evaluate growth and development of newborns, infants, and the young child, and recognition of developmental 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 those interactions. 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
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 program is to provide a framework of reference within which each can operate. Minimum of eight hours field study weekly. Prerequisites: 523, 535.

NURS 538 Nursing the Child With Handicaps: Community Relations (2) F
Evaluation of essential components of resources for the handicapped that are presently or potentially available in the community, and the 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
Focus on selected physical health problems that occur in many disease states. Relates physiology to pathophysiology of the body's regulatory and emphasizes 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
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 psychological sciences; proficiency 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) W
Systematic inquiry into the influence of physical and emotional factors on pathophysiology underlying selected cardiovascular conditions; group study of current therapies with emphasis on prevention and rehabilitation. Individual study of topic of interest. Prerequisite: 540 or permission of departmental adviser.

NURS 543 Seminar in Nursing for 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) Sp
Continuation of 541. Guided experience in selected situations in area of clinical interest. Minimum of seven hours of practice and evaluation of behavior. Prerequisites: 540, 541, and permission of departmental adviser.
NURS 545 Special Topics In Physiological Nursing (3, max. 9) AW/WS
Guided survey of the experimental literature of major topics in physiological nursing, including cardiology, pulmonary, biology of aging, neuromuscular, cancer, and endocrine. Course conducted as a seminar with analysis and discussion of selected topics and readings. Implications for future research and health care are emphasized.

NURS 546 Rehabilitation Nursing Seminar I (3) S
Analytical comparison of underlying rehabilitation and utilization of scientific rationale in clinical nursing studies, with emphasis on prevention and maintenance. Twelve 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 underlying psychological and physiological responses to selected life situations, such as sleep alteration, pain, anxiety alterations, and physical and emotional stress. Implications for nursing management in integral 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 dysfunctions. Major topics include selected physiological states. Lectures and laboratory sessions develop knowledge and skill necessary to problem solving and management of the patient and role of the expert practitioner. Prerequisite: 540 or comparable preparation, or permission of departmental adviser.

NURS 550 Advanced Community Health Nursing (3) W
Development of community health nursing concepts and principles. Identification of current and complex community health problems. Role of the nurse in their solution. Prerequisite: 402 or equivalent.

NURS 551 Advanced Primary Health Care I: Childbearing Age (4) S
Critical analysis of physiological, developmental, psychosocial, and anthropological theories related to women and children in the context of the childbearing and childrearin g family for the purpose of development of the framework for advanced nursing intervention. Application of the theoretical framework developed will facilitate the independent and interdisciplinary clinical decision-making skills of the nurse practitioner within the boundaries of primary care. Articulates with Advanced Fieldwork Seminar I: Childbearing Age and Children and Women of the Childbearing Age. Prerequisite: 550.

NURS 552 Advanced Fieldwork Seminar In Primary Health Care I: Children and Women of the Childbearing Age (4) S
Supervised fieldwork will include selected primary health-care settings. Emphasis on children and women of child-bearing ages. Seminar focus on relating nursing theory, recent research, and scientific rationale to fieldwork experience 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 physiological, psychological, and social factors on adult health. In-depth study of the unifying aspects and clinical manifestations of the inflammatory and immune responses in selected adult illnesses with emphasis on the framework of reasoning for independent and interdisciplinary actions of the advanced nurse practitioner within the defined limits of primary health care. Prerequisites: core competence in biologic science and primary nursing care skills. Articulates with Advanced Fieldwork Seminar In Primary Health Care II: Adults.

NURS 555 Advanced Primary Health Care III: The Elderly (4) Sp
Critical analysis of the theories of aging. Systematic inquiry into the influence and detection of specific physical, psychological, and environmental factors on the elderly. Heavy emphasis on the framework of reasoning for independent and interdisciplinary actions of the advanced nurse practitioner within the defined limits of primary health care. Prerequisites: basic competence in biological 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 family and community. Focus on application of the primary and secondary concepts presented in 555. Process of clinical decision making emphasized. Students will evaluate discussion, seek research findings, scientific rationale, and appropriate evaluation methods for measuring outcomes. Offered on credit/no credit basis only. Prerequisites: 452, 553, 554, 555 to be taken concurrently.

NURS 557 Advanced Fieldwork Seminar: Primary Health Care In Urban and Rural Communities (4) S
Intensive supervised fieldwork in either rural or urban communities. Focus on theoretical models for analyzing community health problems and their 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, and social) as they relate to the 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
Examines concepts and techniques of industrial engineering, system analysis, and operations research applicable to making decisions in current practice. The seminar analyzes administrative problem setting and related issues in nursing administration. Student demonstrates application and critical appraisal of concepts and techniques. Prerequisites: ADMIN 510 or equivalent, and permission of departmental adviser.

NURS 562 Implications of Concepts From Anthropology for Nursing (3) A
Examination of selected core concepts from anthropology and their implications for current practice in nursing research. Prerequisite: permission of departmental advisers.

NURS 564 Nursing Administration (3) W
Elements of the administrative process as applied to organized nursing service. Exploration of concepts related to organizational structure, administrative behavior, personnel management, and the technology of administration. Prerequisite: permission of departmental standing, and permission of departmental advisers.

NURS 565 Implications From Microbiology for Nursing (2) W
Exploration of selected major fields in microbiology. Examination of particular aspects of these fields and of current research progress in microbiology. Prerequisite: permission of departmental advisers.

NURS 566 Program Development In Clinical Areas (3)
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, community needs, and consumer and community demand. The development will include projected evaluation plans, two-hour seminar, and three hours field study each week. Prerequisites: 553, 554, 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 health-care financing and organization of health-care service. Examines the framework for the evaluation and quality assurance of nursing practice in health-care and educational settings. The multiprofessional responsibility of health-care team for the development and evaluation of the legal and professional mechanisms of peer review practices. Prerequisites: graduate standing, 520, 521, re­ search in nursing.

NURS 568 Field Study In Nursing Administration (4) A
Field study provides opportunities to study and analyze the relationships between espoused theories and theories in practice, in the real-time environment. Fieldwork in a selected core: 16 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 Supervision (3) A
Seminar and guided experiences that explore the interpersonal processes in consultation and supervision in psychosocial nursing. Students examine the effects of the organization and the setting on the therapeutic relationships. Mental health consultation theories are studied in relation to the roles of the consultative, supervisory, and instructor in psychosocial nursing. Each student is required to develop a consultative or supervisory relationship, working individually or in groups of three to make a comparative analysis of structure and behavior of management systems. Minimum of sixteen hours of field study and a two-hour seminar weekly. Prerequisites: 464, 502, and 508, plus core 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) AW/WS
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) AW/WS
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 readings. Implications for research, development, and health care stressed.

NURS 574 Selected Topics In Comparative Nursing Care Systems (2 or 3, max. 10) Sp
In-depth examination of the literature pertinent to major theoretical and methodological issues in care and delivery of health-care systems. Seminar with analysis and discussion of selected topics and readings. Implications for research and health care stressed.

NURS 575 Death Influence In Clinical Practice (4) W
Analysis and study of social, cultural, and psychological conditions that influence human death in modern society. Research findings, selected readings, and indirect experience 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. Prerequisite: 536 and permission of departmental advisers.

NURS 578 Seminar In Cross-Cultural Nursing (3) Sp
Analysis, synthesis, and evaluation of selected theories of cultural universals, cultural relativism, and the delivery of health care cross-culturally. Includes a consideration of community study methods as relating to the assessment of health needs, cultural beliefs about health, illness, and health-seeking behaviors. Provides the stu-
SCHOOL OF PHARMACY

PHARMACEUTICAL SCIENCES

Courses for Undergraduates

PHSCI 320, 321 Pharmaceutical Sciences Laboratory (3,5,2) A,W
Laboratory demonstrates by experimentation basic analytical procedures and the properties of drugs in different physical and biological systems. Prerequisites: CHEM 236, 250 (for 321).

PHSCI 332 General and Physical Principles (3) W
Brady
Presentation of those physical-chemical properties of drug systems that have a significant effect on the therapeutic 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) Sp
Principles of physical organic chemistry relevant to processes of drug metabolism, binding, elimination, specificity, and mechanism of action in general. Prerequisites: 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 relationship of concentration-time curves in blood and urine. Prerequisites: PHARM 333, 369.

PHSCI 406 Clinical Pharmacokinetics (3) Sp
Levy, Slattery
Applications of pharmacokinetics to the clinical setting including: determination of patient-specific dosage regimen, role of disease in drug requirements, mechanisms and importance of drug interactions, influence of age and disease on therapeutic monitoring, and nonlinear pharmacokinetics. Prerequisites: 405.

PHSCI 412, 413, 414 Pharmacogeny (3,3,2) A,W,Sp
Bradyc, Elmer
Medically and pharmaceutically useful products of plant, microbial, and animal origin. Biologic and chemical properties are emphasized. Prerequisites: BIOL 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 radiocardiode detection equipment and techniques used in radiotherapeutic studies. Experiments illustrate applications of nuclear chemistry to problems in pharmaceutical sciences. Prerequisite: permission of instructor.

PHSCI 435 Diagnostic Medicinal Chemistry (3) A Edwards, S. Nelson
Examinations of clinical diagnostic tests with regard to the chemical or biochemical rationale of the testing method, interpretation of test results, and major factors influencing test values and emphasis on the effects of medications. Clinical laboratory data from patients considered in light of these factors. Prerequisite: BIOC 406.

PHSCI 440, 441, 442 · Medicinal Chemistry (3,3,3) A,W,Sp
Krupski, S. Nelson, W. Nelson, Trager
Study of the various classes of medicinal compounds with particular emphasis on biological activity, mechanism of action, bioavailability, and the structural and physical properties governing absorption, distribution, and excretion. Prerequisites: CHEM 236 and P BIO 360.

PHSCI 445 Radiopharmaceuticals (3) W
Hwang
Fundamentals of radioactivity; properties of radiation; instrumentation used to detect and measure problems associated with the formulation, production, and use of radiopharmaceuticals; and a discussion of radiopharmaceuticals currently in use. Prerequisite: permission of instructor.

PHSCI 490 Metabolism of Drugs (3) M McCarthy
Study of the processes of drug metabolism and their implications in modern therapy. The influence of metabolism on effect, duration, potency, use, and design of drugs is considered. Prerequisite: PHICOL 402.

PHSCI 497 Toxicology (2) W Krupski
Study of the properties and toxic effects of various substances used in medicine, as well as chemicals employed in industry and as insecticides, rodenticides, and fungicides. Includes symptoms, treatment, anticoagulants and prohystasis for various classes of poisons, and also a study of environmental pollutants and their effect on biological systems. Prerequisite: PHICOL 402.

PHSCI 499 Undergraduate Research (*, max. 6) A,W
Research problems in biopharmaceuticals, medicinal chemistry, pharmaceutical chemistry, pharmacogeny, and radiotherapeutics. Prerequisites: cumulative grade-point average of 2.50 and permission of instructor.

Courses for Graduates Only

PHSCI 510 Topics in Pharmacogeny (3, max. 6) S Reading, conference, and laboratory work in physical pharmacy and biopharmaceutics. Prerequisite: permission of instructor.

PHSCI 520 Seminar (1, max. 5) A,W,Sp Graduate students attend seminars and individual presentations formal or semiannual in time during a calendar year. Credit or no credit basis only.

PHSCI 521, 522 Advanced Medicinal Chemistry (3,3) W,Sp Mccarthy, S. Nelson, W. Nelson, Trager
Application of integrated data from the physical and biological sciences to problems of chemotherapy, including transport of drugs to site of action, biotransformation of drugs, interaction of drugs with enzyme systems, and recent advances in drug design. Prerequisites: CHEM 457, 531, and BIOC 442, or permission of instructor.

PHSCI 527 Drug Metabolism (3) W Juchn, Nelson
Considerations of the biochemical mechanisms for the biotransformation of drugs and foreign compounds. Includes consideration of mechanisms, aldehydes, reduction, hydroxylation, hydrolysis and conjugation reactions with emphasis on the effects of medications. Prerequisites: BIOL 406, BIOC 212, and CHEM 236. Prerequisites: CHEM 302, MICRO 302, and 351.

PHSCI 581 Topics in Pharmacogeny (1, max. 2) A,W,Sp
Bradyc
Discussions and readings of topics of current interest in the field of pharmacogeny. Subject matter changes from year to year. Prerequisite: reading knowledge of German.

PHSCI 582 Topics in Pharmaceutical Sciences (1, max. 10) A,W,Sp Discussion of pertinent articles from current literature. Offered on credit/no credit basis only.

PHSCI 600 Independent Study or Research (*) A,W,Sp
Offered on credit/no credit basis only.

PHSCI 701 Master's Thesis (*) A,W,Sp
Offered on credit/no credit basis only.

PHSCI 800 Doctoral Dissertation (*) A,W,Sp
Offered on credit/no credit basis only.
PHARMACY PRACTICE

Courses for Undergraduates

PHARM 304 Profession of Pharmacy (3) A
Orr
Overview of the profession of pharmacy: description of professional practice opportunities, specializations, pharmaceutical education, professional associations and publications, laws governing pharmacy, ethics, and professional responsibilities. Prerequisites: permission of instructor.

PHARM 310 Drugs in Our Society (3) SpS
Hammerland
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
Hammerland
For nonmajors only. The student undertakes a worthwhile in-depth project on some aspect of drug abuse prevention or education and submits a satisfactory report in the form of a term paper on the findings of the study. Prerequisites: 310, which may be taken concurrently, and permission of instructor.

PHARM 315 Introduction to Pharmacoepidemiology (3) SpS
Pitis
Introductory course in drug therapy. Includes drug information resources; principles of pharmacology; pharmaceutical 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 concurrent courses in anatomy, physiology, and microbiology strongly recommended.

PHARM 330 Pharmaceutical Calculations (1) A
Hammerland
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
Hammerland
Introduction to the study of pharmacy as a laboratory science. The intent of the course is to study the theory and the problems involved in incorporating chemicals into forms suitable for administration as medication and stable enough to be transported and stored. Prerequisite: CHEM 236.

PHARM 333 Dispersing Practice (2) W
Hall, Hammerland
Dispensing of drug products on prescription order. Includes laboratory exercises, patient drug profiles, and patient 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 assurance, and national health insurance; and implications to pharmacy. Prerequisite: pharmacy major.

PHARM 369 Pharmacy Experience Project I (PEP B) (1) AS
Jones, Romano
Role of a pharmacist in practice. Overview of drug action. Students complete a practice-related project in a community or hospital pharmacy and complete a self-instructional program on introductory pharmacodynamics and pharmacy practice. Prerequisite: credit/no credit basis only. Prerequisite: pharmacy major standing.

PHARM 407 Prescriptions Practice (4) A
Hall, Hammerland
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, Hammerland
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
Componding 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 Service. Prerequisites: 331 and permission of instructor. 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 influencing health practitioner and patient behavior. Focus on health and illness behaviors, pharmacist and other health professional interpersonalships, pattern of drug prescription orders, and work relationships of pharmacists in rendering care. Open to second or third professional year pharmacy students; graduates of pharmacy practice; others with permission of instructor.

PHARM 436 Social and Behavioral Aspects of Pharmacy Practice II (2) A
Christensen, Romano
Continuation of 435. Basic concepts of the sick role, as well as patient and health professional behavioral belief systems, attitudes, roles, and motivations. Communication theory and practice opportunities to enhance interaction skills with patients and health professionals in pharmacy practice settings. Prerequisite: 435.

PHARM 450 Pharmacy Laws (3) W
Tansiguchi
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 pharmacy in health-care delivery. Offered on credit/no credit basis only. Prerequisite: third-year standing.

PHARM 460 Principles of Professional Practice Management (4) A
Campbell, Christensen, Romano
Topics include organization of time and objectives, management of financial resources, inventory, and marketing management. Emphasis on developing specific skills, such as burden rate analysis, and financial planning. Students are expected to develop a plan or prospectus for the management of students who are interested 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
Selection of seminar, development of seminar skills in pharmacy. Practitioners discuss third-party reimbursement programs, inventory control, and professional communication. Individual reports 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 instructor.

PHARM 469 Pharmacy Experience Project II (PEP B) (1) AWSpS
Prescription practice. Under guidance of practicing pharmacist, student completes the required in pharmacy prescription orders, including filling prescriptions, maintaining drug profiles, counseling patients, and solving related problems. Offered on credit/no credit basis only. Prerequisites: 333 and 369.

PHARM 470 Externship in Pharmacy (*, max. 15) AWSpS
Hall, Orr
Synopsis of study experience periods in community and hospital pharmacies. Ordinarily, students rotate through two periods of five weeks each, and they participate 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 appraising a drug's potential for beneficial and adverse effects, counseling techniques. Consideration of variables affecting patient behavior. Prerequisites: PHCOL 401, 402.

PHARM 482 Introduction to Clinical Clerkship (3) AWSpS
Introduction to patient medication monitoring and education techniques. Students participate in daily medical rounds at various institutional sites. In-depth review of patient care histories provides practical application of pharmacological knowledge. Communication skills are strengthened through patient discharge counseling, provision of drug therapy, and oral or written communication techniques. 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 techniques of pharmacy practice in ambulatory care settings. Students participate in direct patient care in the setting of affiliated hospitals. Prerequisite: permission of instructor.

PHARM 484 Clinical Pharmacy (3) Sp
Clinical roles of the pharmacist in management of more common 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 are emphasized. Offered on credit/no credit basis only. Prerequisite: 484.

PHARM 485 Clinical Pharmacy II (2) A
Continuation of 484 with emphasis on disease states and their drug therapies. Lectures stress assessment of drug therapy and applications of basic pharmacokinetic principles to selection of drugs in patient care. Prerequisites: 484.

PHARM 487 Clinical Clerkship: Inpatient Care (*, max. 15) AWSpS
Supervised experience in the clinical roles of pharmacy professional in both inpatient and outpatient settings. 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 facilities. Under supervision of a faculty member, students participate in medical and pharmacy rounds, take drug-use histories, monitor drug therapy of patients, instruct patients about discharge medications, provide consultation on drug therapy problems to other health-care professionals, provide in-service education programs for patients, and participate in interdisciplinary conferences. 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 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 providing written and oral information related to the Drug Information Service. Techniques of preparing, checking, and delivering written and oral information are also included. Offered on credit/no credit basis only. Prerequisites: PHSCI 405 and permission of instructor.

PHARM 490 Fluid and Electrolytes and Parenteral Nutrition (2) W
Principles of fluid and electrolyte therapy, including saline, water, and acid-base balance. Carbohydrate,
GRADUATE SCHOOL OF PUBLIC AFFAIRS

Courses for Graduates Only

PHARM 505 Clinical Pharmacokinetics (3) W
Koop
Clinically oriented introduction to advanced pharmacokinetic theories. First half devoted to didactic presentation of the above concepts; second half consists of discussion sessions dealing with the clinical pharmacokinetic concepts of particular drugs or classes of drugs. Reference materials provided prior to sessions. Prerequisites: 484, 530, PHSCI 405, and permission of instructor.

PHARM 506 Clinical Pharmacokinetics (3) Sp
Koop
Continuation 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 pharmacokinetics, biopharmaceutics, drug metabolism and drug toxicity, 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 deliver 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
Research methods and protocols designed to help develop skills in preparing research proposals and conducting research in pharmacy practice. Selected research methods, sources of data, analysis designs, and statistical methodologies to be covered; one statistics course or permission of instructor.

PHARM 582 Primary Care Pharmacy II (3) A
Erickson, Fuller, Kradjan
Introduction to the use of protocols for monitoring chronic diseases, treatment of specific protocols for anticoagulation, diabetes, hypertension, and others. Prerequisites: permission of instructor.

PHARM 584 Seminar in Clinical Pharmacy (3, max. 9) AWSp
Edwards, Erickson, Fuller, Horn, Koup, Kradjan, Smith, Wu
Readings and in-depth discussions of rational management 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 Clerkships: Inpatient Care (4, max. 15) AWSp
Under faculty supervision, students participate in medical and pharmacy patient rounds in hospitals or long-term care facilities. Focus on drug therapy, inpatient patients concerning proper use of medications, and drug consultation to other health-care providers. Students also participate in drug-use review and in-service education programs. Interdisciplinary approaches to providing care are emphasized through conferences with faculty. Offered on credit/no credit basis only. Prerequisites: 484, 485, or equivalent, and permission of instructor.

PHARM 588 Advanced Clinical Clerkship: Outpatient Care (4, max. 15) AWSp
Under faculty supervision, students refine skills in developing and maintaining a drug-use data base for ambulatory patients. Activities include taking drug histories, developing patient medication profiles, and documenting drug-use experience. In addition, students deliver services to outpatient facilities through patient counseling, interprofessional consultation, and patient monitoring activities. Emphasis is placed on the critical importance of drug patient care is emphasized. Offered on credit/no credit basis only. Prerequisites: 484, 485, or equivalent, and permission of instructor.

PHARM 589 Advanced Clinical Clerkship: Drug Information Service (4, max. 15) AWSp
Under faculty supervision, students refine skills in the retrieval, 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. Techniques for locating and evaluating 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 (4) AWSp
Offered on credit/no credit basis only.

PHARM 700 Master's Thesis (4) AWSp
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
Analysis of the relationship between the bureaucracy and those institutions, 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)
Context of public administration from the perspective of the administrator. Through case and research materials, the roles of administrators and the roles of others in setting goals, developing strategies, implementing programs, and changing the public policy. Offered jointly with POL S 571.

PB AD 503 Administrative and Executive Leadership (3) Sp
PB AD 505 The Law of Public Administration (3) W
Legal framework of public administration in the United States, emphasizing: administration: 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) Sp
PB AD 507 Social Theory and the Public Policy Process (3) Sp
PB AD 511 Administrative Problems: Micro-Organization (3) A
PB AD 511 Administrative Problems: Micro- Organization (3) A
Analysis of selected problems involving the interaction of individuals and groups within organizations. Emphasis is placed upon the differences between the traditional approach and the behavioral approach to the understanding of the organizational process, the motivation of the persons involved in the decision process, the nature of conflict and innovation, and the limits of rationality.

PB AD 512 Administrative Problems: Macro- Organization (3) W
PB AD 513 Administrative Problems: Program Analysis (3) Sp
Analysis and solution of problems inherent in the characteristics of large-scale organizations and multigenerational systems. Approaches are interrelated with systems theory; functional problems are interfaced with types of organizations resulting from the public purpose served, and information flows are analyzed. Emphasis is given to concepts of organizational effectiveness and change.

PB AD 514 Administrative Problems: Program Planning and Budgeting (3) AWSp
Applicability of systems approaches and systems modeling to various types of program problems. Emphasis is upon comprehensive program planning, approaches to facilitating the planning process, and the role of budgeting in the policy process. The approaches to budget formulation and analysis, the development of the PPB approach, and the aspects of budget control are discussed.

PB AD 515 Administrative Problems: Program Planning and Budgeting (3) AWSp
Budgeting as a management process. Study of formulation and implementation of PPB, methods of budgeting, and the role of budgeting in the policy process. The approaches to budget formulation and analysis, the development of the PPB approach, and the aspects of budget control are discussed.
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 compensation levels, collective bargaining, selection, 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 Region Interagency Training Program for Federal administration network, and to address substantive issues in training and management education in the public sector. The role of the local and state training director in developing 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 theory to executive training, and methods of evaluation also are examined.

PB AD 525 Organization Development In Public Agencies (3) A
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 theoretical frameworks of the OD approach, emphasis 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 involvement in policy disputes between competing interest groups. Diagnosis of organizational problems, administrative responses to political and social environmental pressures, the organization as a learning system, and the limits of public organizational change. Theoretical considerations in intervention, as well as the internal contradictions faced by static organizations in changing society. Prerequisite: permission of instructor.

PB AD 527 Quantitative Analysis (3) AW
Provides a non-technical approach to statistical analysis, the logic of statistical testing, and data presentation as applied to the field of public policy and administration. Covers such commonly used techniques as tests concerning mean and proportion differences, contingency tables, and simple regression. Student's understanding is deepened by a required interpretative 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 nonparametric versions of statistical tests as applied to the field of public policy and administration. Practical, analytical, and interpretive skills are included in 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 the SPSS package. Prerequisite: 527 or equivalent.

PB AD 529 Quantitative Applications in Public Affairs (3) Sp
Examines specific public policies by utilizing quantitative 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 recommendations for improvements, and to identify and assess other relevant factors. Policies issues are drawn from such functional areas as education, manpower, law enforcement, natural resources, and experiments in negative income 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. Concepts of cash control, financial planning, budget control, fund accounting, cost accounting, asset accounting, internal audits, 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 in the study of complex organizations and their environments, stressing development 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 administration. 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 development, political impact of administering major programs. 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) Sp
Survey of the manner in which international organizations attempt to manage and regulate the uses of the ocean. 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 mathematical and quantitative methods as an aid to decision making in the public sector. Both deterministic and probabilistic models are explored. Formal decision models are used to examine how uncertainty can be formally dealt with in a quantitative approach to decision making. Cost-benefit analysis and discounting are emphasized. The model is an aid in the decision-making process. 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 grant revenue sharing, and tax deduction and credit systems. Selectors use the techniques examined to determine probable impact on beneficiaries, fiscal and program relations, and program accountability. Political and constitutional limitations are also discussed. Prerequisite: permission of instructor.

PB PL 534 American Foreign Policy Formation (3)
A
American foreign policy viewed whieh, including the relationships of foreign policy to domestic policies and priorities, and the full range of historical, constitutional, institutional, political, and theoretical traditions. Emphasis is on the evolution and the various elements 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 execution. 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 role of society and technology through general principles and case studies of contemporary issues and policies: the nature of the technological enterprise; its scientific basis; conflicts of values; specialized manpower, organizational structure and management; employment of public and private institutions; policies, and reasoning and manage technology so as to maximize opportunities and to minimize unwanted consequences; institutional conflicts; developments in knowledge, technology, and policies; legal and economic considerations; process of public decision making. Offered jointly with CIV 540, 541, 542 and SMT 540, 541, 542. Prerequisites: permission 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 resources. Topics include labor demand and supply, education 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 majors.

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 perspective of individual and group participation in the policy process, the individual's role in the political analysis of the functions of the public servant in the making of policy decisions, and the realities of policy formulation in relation to political values. Enables the student to professionally commit 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 567.

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 disadvantages 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 background in organizational theory and are expected to engage in fairly extensive reading and in a research project.

A two-semester graduate course in the structures, functions, and processes of government in cities, with special emphasis on the origins, content, and implementation of public policies. Major focus is on the political process at the urban level, the distribution of influence, the political actors, the decision-making machinery, and the policy outputs. Of special interest to graduate and professional 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, political 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 and the contemporary role of the police in the context of law enforcement in urban America. Emphasizes the external tensions between the stated ideals of a democratic society and the reality of institutionalized crime control methods and procedures, internal conflicts between the quest for professionalism of the police function, the demands of funding requirements, effectiveness and accountability, and current efforts toward institutional 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
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the future role, organization, and function of urban po-
licy. Nine of these issues are explored, with emphasis on the
tenant movement and the "users" who shape the ar-
ticulation, and the parameters of the debate, legal con-
straints, and sociopolitical considerations, in the
development of policy alternatives, and emerging pat-
terns of resolution. Prerequisite: 357 or equivalent.

PB PL 571, 572, 573 Public and Educational Policy Issues in the Development of Human Talent (3,3,3) A,W,Sp

High school and the nation's human resources; trends, projections, policy issues, and problems in the relation between education and utilization of profes-
sional and specialized personnel. Offered jointly with EDEPS 571, 572, 573. Prerequisite: permission of in-
structor.

PB PL 583, 584, 585 Seminar in Science and Public Policy (3,3,3) A,W,Sp

Seminars designed: first, to analyze the relationships between R&D policy, capabilities, and national technolog-
ical strategies for advanced industrial and less-devel-
oped countries; second, to deal with the international im-
portance of different technologies as countries try to
make policy for them in regional and global organiza-
tions. Examples of specific technologies are taken from
such fields as space telecommunication, weather and cli-
mate modification, airplane technology, nuclear energy and
seafood exploitation.

PB PL 587-588 Research Seminar In Marine Resources Management (3-3) A,W Crutchfield, Wooster

For students who select marine resource management as an area of concentration within the marine affairs pro-
gram. Topics from living resources, ocean mining, en-
ergy production from the ocean, and other areas. Integra-
tion of concepts and methodologies from various fields
with emphasis on the status of the marine environment.
Offered jointly with IMS 587-588.

PB PL 590, 591, 592 Midcareer Seminar (3,3,3) A,W,Sp

Interdisciplinary seminar in public policy for midcareer executives. Open to participation in the Education for
the Public Management Program; others by permission of in-
structor.

PB PL 593-594-595 Policy Development and Administration: Natural Resources (3-3-3) A,W,Sp

Interdisciplinary seminar in natural resources policy development and administration. Major concerns
are with the processes of natural resources policy formulation and analysis of natural resource policy tools.
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, implementing, and evaluating social policy models. Students will be introduced to SPSS, and, by working in
tandem with researchers to develop relevant methodologies and with the agency bureaucracy to develop 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. Prerequisite: permission of in-
structor, 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 (*) A WSpS

PB PL 604, 605, 606, 607 Degree Project (2-6, 2-6, 2-6, 2-6)

The economics courses below serve as an integral part of the Graduate School of Public Affairs curriculum.

ECON 592 American Indian Economic Development Problems (5) W Econometric analysis of economic development events in the American Indian community. Emphasis is placed on the impact of American Indian workers into the labor force of the United States. Prerequisite: 300 or equivalent.

ECON 400 Fundamentals of Micro-Theory (3) A Hajnakeow

Fundamentals of microeconomics with emphasis on applications 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 macroeconomics with emphasis on applications 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 416 Urban Economics (5)

Examines what is happening in urban areas. Use of economic analysis to explain urban trends; urban govern-
ment organization; and problems of housing and renewal, transportation, poverty, and race, and the environment.
Offered jointly with GEOG 416. Prerequisite: 300 or equivalent.

ECON 435 Natural Resource Utilization and Public Policy (5) ASpS

Special emphasis on the role of economic theory relat-
ing to resource-oriented industries. Course studies in
the theory and practice of resource management dealing with both stock and flow resources. Benefits-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 in-
structor.

ECON 451 State and Local Public Finance (3)

Analysis of state and local government revenue and expenditures and concepts of their use. Includes taxation, user charges, debt financing, and intergovernmental fiscal rela-
tions. Emphasis on metropolitan fiscal problems. Prereq-
requisites: 200, 400, or equivalent.

ECON 482 Economic Approaches to Political Analysis (3)

Application of economic theory and methodology to po-

tical phenomena. Emphasis on theory construction with applications in American context. Offered jointly with POL 546. Prerequisites: 201, 400, or equivalent.

ECON 583 Economic Analysis and Government Programs (3) Sp

Application of economic analysis to public enterprises and programs. Prerequisites: 480, 460, or equivalent.

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For related course work, see Department of Statistics and Biometrics Group.

BIOSTATISTICS

Courses for Undergraduates

BIOST 472 Introduction to Statistics in Health Sciences (4) ASpS

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.

BIOST 473 Application of Statistics to Health Sciences (4) Sp

Broddy, 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 equiva-
 lent.

BIOST 479 Biostatistics Special Electives (*) A WSpS

Offered when demand is sufficient.

BIOST 499 Undergraduate Research (*) A WSpS

Courses for Graduates Only

BIOST 511 Medical Biometry I (4) A Rea, Kramm, Tendal

Presentation of the principles and methods of data de-
scription and elementary parametric and nonparametric statistical analysis. Examples are drawn from the biomedicine 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, BMDS, SBB, MINITAB, etc.). This course includes:
descriptions of sample, comparison of two sample means and proportions, simple linear regression and cor-
errelation.

BIOST 512 Medical Biometry II (4) W Brody, Dellepour

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. Prereq-
quisite: 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 D. R. Martin

Techniques of exploratory data analysis; plotting and dis-
play techniques, QQ and P-P plots; parameter estimation
and confidence intervals; data transformations, Box-Cox transformations; techniques for multivariate samples, esti-
maters of precision, 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 E 519. Prerequisite: E E 505 or equivalent.

BIOST 520 Nonparametric Methods (3)

D. C. Martin

Methods course in nonparametric statistics with some dis-
ussion of robust data analysis. No advanced mathem-
atics or statistics required. Useful to nonmajors with
only a statistical methods course background and some
research experience. The level is about that of J. W.
Bradley's Distribution-Free Statistical Tests or Hollander and Wolfe's Nonparametric Statistical Methods. Primary emphasis on rank tests, correlations and confidence inter-
vals, and a few selected topics. Prerequisite: 511 or equivalent or permission of instructor.

BIOST 522 Applications of Vital and Health Statistics (3) Sp

Leh

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 im-
portance of data forms and the evaluation of the analysis of programs and the recognition of new hazards. Offered jointly with EPI 522. Prerequisite: 472 or equivalent or permission of instructor.
BIOST 523 Computer Applications in Biostatistics (3) A
Bates, Fishman
Multiple regression emphasized. Other topics (analysis of variance, analysis of covariance, path analysis, and discriminant analysis) treated in text distal as subsets of multiple regression. Factor analysis and automatic interaction detector (AID) also used. Examples from the health sciences and other literature stressed. Modified case-method approach used, with each student assigned a data set to analyze throughout the class. Prerequisites: 511 or 473.

BIOST 524 Design of Medical Studies (3) A
Fisher, Peterson
Design of medical studies, with emphasis on randomized controlled clinical trials. Bias elimination, controls, treatment assignment and randomization, precision, replication, power analysis and sample size, study design, 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, 515, EPI 512, or STAT 473. (Offered even-numbered years.)

BIOST 528 Special Topics in Intermediate Biostatistics (3)
Intermediate statistical topics in biostatistics offered by regular and visiting faculty. Prerequisites: 472 and 473, or 511, or equivalent.

BIOST 529 Sample Survey Techniques (3) Sp
Thompson
Design and implementation of selection and estimation procedures for probability sampling of human populations, although principles apply to other sampling problems. Topics include simple, stratified, and cluster sampling, and two-stage and two-phase procedures, optimal allocation of resources, estimation theory, replicated designs, variance estimation, national sample and census materials. Offered jointly with QMETH 529 and STAT 529. Prerequisite: 511 or permission of instructor.

BIOST 571 Applied Regression Analysis (3) A
Krommal, Wahl
Advanced statistical methods course for biologists and other graduate students already familiar with the general linear hypothesis. Develops extensions of usual simple 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 homework assignments. Analyses of residuals, use of transformations, polynomial models, models of model selection, 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
Beller, Fisher, Martin
Use of the advanced normal sampling theory, linear transformations of random variables, one- and two-sample tests, profile analysis, partial and multiple correlation, multivariate ANOVA and least squares, discriminant analysis, principal components, factor analysis, robustness, and some special topics. Some computer use included. Prerequisites: QMETH 573, matrix algebra, STAT 545, 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 regression models for binary response variables, and selected examples of the use of these models in epidemiologic and medical research. Introduction to the theory and applications of loglinear models for discrete data. Selected special topics. Offered jointly with STAT 573. Prerequisites: 513, STAT 473, and STAT 581, or permission of instructor.

BIOST 574 Statistical Computing (3) W
Krommal, Wahl
Introduction to topics in statistical computing: application of mathematics to statistical problems; generation of pseudorandom numbers; design and execution of Monte Carlo studies; comparative evaluation of statistical algorithms; statistical methods and least squares; computation of probabilities; data structures; and data base management. Offered jointly with STAT 574. Prerequisites: STAT 473 and programming, or permission of instructor.

BIOST 575 Population Models (3) Polsiar
Models in demography, using real and simulated data. Estimation of demographic rates, the life table; stationary, 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
Beeby, Prentice, Peterson
Statistical methods for censored survival data arising from follow-up studies on human or animal populations. Parametric and nonparametric estimation and testing for different survival models with different hazard functions. 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, followed by discussion of the specific problems of prospective observational studies and clinical trials. Determination of sample size, randomization methods, sequential designs, and data-management systems. Some knowledge of experimental design is assumed. Offered jointly with STAT 571. Prerequisites: 512 and STAT 473. (Offered alternate years.)

BIOST 587 Special Topics in Advanced Biostatistics (*, max. 3)
Advanced-level topics in biostatistics offered by regular and visiting faculty. Offered jointly with STAT 576. Prerequisite: permission of instructor.

BIOST 589 Seminar in Biostatistics (*, max. 9)
AWSP Presentation and discussion of special topics and research results in biostatistical areas. Students include resident faculty, visiting scientists, and advanced graduate students. Required of students in the Biostatistics Pathway of the Biomathematics Group. Prerequisite: permission of instructor.

BIOST 590 Biostatistical Consulting (*) AWSP
Feigl, van Belle
Training in consulting on the biostatistical aspect of research problems arising in the biomedical field. Students, initially under the close supervision of a faculty member, participate in discussions with investigators leading to the design and/or the analysis of a quantitative investigation of a problem. With experience, independent associations of students and researchers are encouraged, with subsequent review by faculty of resulting design and analysis. Required of doctoral students in the Biostatistics Pathway of the Biomathematics Group. Prerequisite: permission of instructor.

BIOST 600 Independent Study or Research (*) AWSP
Prerequisite: permission of instructor.

BIOST 700 Master's Thesis (*) AWSP
Prerequisite: permission of instructor.

ENVIRONMENTAL HEALTH

Courses for Undergraduates

ENVH 411 Introduction to Environmental Health (3) AW
Hales, Van Dusen
Haines, Von Dusen
Relationship of people to their environment, how it affects their physical well-being and what they can do to influence the quality of the environment and to enhance the protection of human health. Emphasis on social factors involved in transmission of communicable diseases and hazards due to exposure to chemical and physical materials in our environment.

ENVH 430 Methods in Environmental Sampling and Analysis (3) A
Wetzel
Field sampling methods and selected laboratory analyses of 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, including enumeration of sub groups in populations, selective inhibitor, characteristics of normal form, rationale of "healthy" organisms, etc. Prerequisites: junior standing, 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
Wetzel
Pertinent methods for collection of food and foodstuffs 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 sanitation 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.

ENVH 440 Water and Waste Sanitation (4) A
DeWalle, Haines
Study of the health implications of water use and sewage disposal methodology. Focal concerns include water quality evaluation, pollution factors, individual and public water and sewage facilities, site selection criteria, and legislative and agency activities. The knowledge and skills required for effective field performance by the environmental health specialist is emphasized.

ENVH 441 Food Sanitation (3) W
Haines
Advanced study of the sanitary control of the production, processing, and distribution of food products, emphasizing 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
Haines
Advanced study of the impact of and the control of rodents and arthropod vectors of disease, including consideration 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 health specialist's responsibility in promoting health in both private and public accommodations including schools, migrant housing, jails, and institutions; and the interrelationships between health and sanitation. Prerequisites: 411 and environmental health major, or permission of instructor.

ENVH 444 Institutional Environmental Health (3) Sp
Fish
Examination of the environmental health and safety hazards that can adversely affect hospital and nursing home patients, the institution, and surrounding communities, particularly those hazards which cannot 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 Waste (2) W
Examination of the public health, environmental, economic, 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. Prerequisite: environmental health major or permission of instructor.

ENVH 448 Environmental Health in the Third World (3)
Appropriate technology for water supply, excreta disposal, and pollution control for urban and rural communities. Factors in development, implementation, economic and institutional requirements, and health issues related to development. Prerequisites: graduate standing and permission of instructor.

ENVH 449 Recreation, Circulation, and Environmental Health (2)
Morgan
Structure and function of the respiratory and cardiac systems. Factors that improve or degrade health; specific air pollutants, such as ozone, carbon monoxide, SO2, etc. Air-quality criteria and the economic costs of disease are discussed. Several classroom demonstrations. Prerequisite:
SCHOOL OF PUBLIC HEALTH AND COMMUNITY MEDICINE

Utilities: sophomore standing, and 450, CEWA 461, or permission of instructor.

ENVH 450 Measurement and Control of Air Pollution (2) W Horstman
Description of methods for air pollution research and control, including field-survey techniques, stack sampling, continuous monitoring, and use of control equipment. Administrative problems are also discussed.

ENVH 451 Mechanisms of Cellular Responses to Air Pollution (2) W Lucht
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 pathological changes due to air pollutants; biochemical reactions of oxidant irritants, hydrocarbons, and particulates; relationships between air pollution and degenerative aging processes. Prerequisites: general and organic chemistry 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 effects, evaluation, prevention, and legislation. Prerequisite: 411 or permission of instructor.

ENVH 454 Industrial Hygiene Research Laboratory (2) W Montieth, Schumacher
Series of laboratory experiments illustrate the use of a wide variety of industrial hygiene sampling equipment. Included are airflow calibration, chemical calibration, detector tubes, personnel sampling devices, both continuous and spot, personal dosimeters, and 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 control planning; survey of existing programs and legislation. Term paper field project and report.

ENVH 462 Laboratory Management and Safety (1) W Breyaze
Design 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 (1, max. 6) AWSp VanDusen, Staff
Individual projects involving library, laboratory, or field study of a specific environmental health problem. Prerequisite: environmental health major or permission of instructor.

ENVH 483 Field Practice—Technology (2-6) AWSp
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) AWSp
Assignment to a local health department for supervised observation of environmental health program planning. Prerequisites: environmental health major and permission of departmental adviser.

ENVH 484 Field Practice—Community Resources (3) AWSp
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 (*) AWSp
Off-campus course for non-environmental health majors.

ENVH 499 Undergraduate Research (*) AWSp VanDusen, Staff
Individual research on a specific topic in environmental health upon approval specific conclusions, judgments, or evaluation can be made or facts can be presented. Prerequisite: 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 environments. Group discussion by didactic instruction where appropriate.

ENVH 521 Environmental Components and Problem Identification (3) A Faigenblum
Examination of the physical components that influence people's health and their efficiency of performance. Application of techniques for the gathering of information and identifying environmental problems in the community or in industry. The techniques used include: questionnaire and interview schedule development, issue analysis, nominal, and environmental impact statements. Prerequisites: environmental health graduate 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. Prerequisite: 521, environmental health graduate student, or permission of instructor.

ENVH 523 Environmental Health Program Management (3) Sp Fish, Halten
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 personal recruitment, utilization, and evaluation.

ENVH 545 Drinking Water and Health (3) W DeWalle
Study of health implications of drinking water collection, treatment, and distribution, including presence of organic and inorganic pollutants, toxics, and biological agents in water supplies; their entry, prevention of their entry, and removal by government 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 as the water source. 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 function 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, Schumacher
Laboratory focuses on theory and practical use of various chemical analytical instruments utilized to evaluate potential 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 emphasis on design of exhaust-ventilation systems. Prerequisite: 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 principles of industrial ventilation to the analysis and 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 explored; governmental, management, and union motivations are related to safe working conditions; and functional aid is related to relation of line and staff safety are described in detail. Industrial accident prevention planning is developed.

ENVH 561 Administering Industrial Safety Programs (3) W Freeman
Focus on day-to-day operation of industrial safety programs with emphasis on workman's compensation, uses of tools, protective equipment, hazards analysis, behavioral aspects of accident causation, safety communications, and accident investigation and reporting. Prerequisite: 560 or permission of instructor.

ENVH 562 Technical Aspects of Industrial Safety (3) Sp Freeman
Explores specific hazards associated with major industries such as the gas and oil industries. Fire protection, machine guarding, systems safety techniques, functional testing, and explosives safety.

ENVH 563 Psychological Foundations of Safety and Health (2) Freeman
Overview of contemporary psychological models explaining accident etiology and subsequent countermeasures. The three major schools of psychological thought (psychoanalytic, phenomenological, and behavioral) utilized in relation to accident etiology. Specific 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 industrial processes and occupational health and safety problems. Emphasis is placed on an understanding of a case study sequence for the didactic course work in several programs. Provides opportunity to approach and analyze health and safety problems using a multidisciplinary approach.

ENVH 567 Recognition and Evaluation of Industrial Carcinogens (2) W Breyaze, 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, DuPhy
Conceptual framework for occupational health programs, surveys management trends affecting these programs, and outlines strategy for planning, implementation, and evaluation. Practical problems discussed. Offered on credit/no credit basis only. Prerequisite: 453 or permission of instructor.

ENVH 569 Management of Industrial Carcinogens (2) Sp Breyaze, Hibbard, Horstman
Identification of an agent as an industrial carcinogen, a highly virulent microorganism, 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. Information on the design requirement of closed-circuit ventilation systems along with administrative practices and decontamination and disposal procedures for all three agents. Prerequisite: 567.
ENVI 571 Occupational Physiology and Toxicology (3) W
Geble, Miller, 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 231, ZOOL 301, or permission of instructor.

ENVI 573 Health Problems of the Natural Environment (2) Sp
Miller
Considers the methods of prevention and treatment of environmental trauma. Major emphasis on environmental abnormalities encountered in the Pacific Northwest during spiking effects. Topics include forestfire, heat-stroke, high-altitude disease, SCUBA problems, etc.

ENVI 574 Occupational Exposure to Excessive Sound and Hearing Loss (2) Sp
Bryant, Nelson
Introduces sources of noise and the auditory and nonauditory effects of exposure. Noise standards, hearing evaluation, hearing protection and engineering controls.

ENVI 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 occupational infections. Primarily for physicians and medical students. Prerequisite: permission of instructor.

ENVI 576 Occupational Dermatology (2) A
Miller
Anatomy, physiology, and pathology of skin from the point of view of occupational health practitioners: diagnosis and treatment of a variety of industrial skin diseases; plant surveys, medical-legal problems, dermatitis prevention, and rehabilitation problems.

ENVI 580 Environmental Seminar (1, max. 6) AWSpS
Current environmental health research and environmental control programs. Offered on credit/no credit basis only.

ENVI 581 Environmental Reading (1, max. 6) AWSpS
Critical reading of selected basic and applied research publications on environmental health problems and programs. Offered on credit/no credit basis only.

ENVI 590 Selected Topics (1-6) AWSpS
In-depth study of a current environmental health topic. Independent research or advanced major course forms. Credit is determined by instructor. May be taken with HSERV 590 and ENVI 590. Offered on credit/no credit basis only. For more information and permission, consult department program adviser.

ENVI 599 Field Studies (2-6, max. 6) AWSpS
Assignment to an environmental research or service program for application of evaluation techniques. Offered on credit/no credit basis only.

ENVI 600 Independent Study or Research (*) AWSpS
Offered on credit/no credit basis only. Prerequisite: permission of departmental adviser.

ENVI 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 the context of chronic and non-chronic diseases. Includes descriptive statistics as applicable in epidemiology. Prerequisite: HSERV 411, MICRO 301, or permission of instructor, or graduate standing.

EPI 497 Environmental and International Health Special Problems (*) 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
Introduction of epidemiologic principles and examples of the application of these principles to the monitoring of disease occurrence, epidemicologic investigation, disease control, and health programs evaluation. Examples from acute and chronic diseases, environmental health, and health behavior. Prerequisite: for graduate students whose primary interests lie in areas other than epidemiology. Prerequisite: graduate standing and permission of instructor.

EPI 511 Principles of Epidemiology (3-4) A
Gale, Flanigan
Lectures and discussions covering evolution and meaning of epidemiology, concepts of disease causation, basic epidemiologic methods, and descriptive, analytic, and experimental epidemiology. A term paper on the epidemiology 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 chronic diseases. Prerequisites: ENVI 511 and BIOST 511, or permission of instructor.

EPI 513 Epidemiology of Infectious Diseases (3) Sp
Sokol
Study of the principles and the practices of epidemiology, as derived from a study of communicable diseases. Prerequisite: EPI 511 or permission of epidemiology graduate program adviser.

EPI 521 Epidemiology of Maternal and Child Health Problems (3) W
Emans
Consideration of the contribution of epidemiologic to the understanding of the etiology of various perinatal problems, including congenital malformations, fetal, infant, and maternal mortality, abortion, neonatal morbidity, complications of pregnancy, prematurity, and mental retardation, together with the evaluation of control problems. Prerequisite: permission of instructor, school standing and 510 or 511, or permission of instructor.

EPI 532 'Applications of Vital and Health Statistics (3) Sp
Lee
Analysis of routinely collected data on the health status and the care of populations, with emphasis on the potential and the limitations of this approach. Stressed are the importance of such data for the evaluation and the development of programs and the monitoring of new hazards. Offered jointly with BIOST 522. Prerequisite: BIOST 472 or equivalent or permission of instructor.

EPI 542 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 epidemiologic 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 545 Advanced Seminar in Cancer Epidemiology (3) Sp
Lee
Explores current areas of controversy and doubt with the aid of various faculty members: the cancrogenic properties of environmental hazards; the interaction between life-long and shorter-term factors in the etiology of human cancers; the relationship of microbial agents to the etiology of carcinomas 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 biological factors to the 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) AWSpS
Promotes critical reading of scientific papers and increases 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 epidemiologic distribution of disease in a variety of different populations. Factors influencing reproductive outcome and subsequent growth and development. Interaction of genetic and environmental factors to produce multifactorial diseases. Biological costs of cultural transition: interaction of changing demographic profiles with rapid environmental change (including the influence of public health and medical care) to produce new profiles of disease. The genetic consequence of such changes. Prerequisite: PHY A482 or permission of instructor.

EPI 591 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 format. Prerequisite: 511. Also a special summer format presenting introductory material. May be taken with permission of instructor. Prerequisite: permission and instructor. Consult the department program adviser.

EPI 598 Teaching Methods in Epidemiology and/or Preventive Medicine (1-3) AWSpS
Foy
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 650 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 personal health services. The objective is to create familiarity with major issues, terminology, and selected specific programs in the health-care field. For future health professionals and others wanting a broad exposure to health issues.

HSERV 451 Anatomy and Physiology for the MEDEX Practitioner (6) A
Students are taught the anatomy and physiology of the following organ systems: EENT, respiratory, cardiovascular, gastrointestinal, genitourinary, gynecologic (including normal pregnancy), integumentary, musculoskeletal, and nervous. Focus on clinical examples of anatomic and physiologic principles encountered in primary-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 systems. Prerequisites: 451, 453, 457, or permission of instructor.

HSERV 453 Basic Clinical Skills for the MEDEX Practitioner (6) A
Provides the student with mastery of a screening history and physical examination and thoroughness in data-collection skills. Branching examinations of major organ systems and medical record-keeping and verification skills by the problem-oriented method are taught. Prerequisite: admission to the MEDEX program.
RESERVE OFFICER TRAINING PROGRAMS

AEROSPACE STUDIES

Courses for Undergraduates

A S SCI 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 hour and one hour of leadership laboratory per week.

A S 311, 212, 213 Aerospace Studies 200 (1,1,1) A, W, Sp

Course is designed 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 objectives is covered 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 principles and functions, and problem solving. Three classroom hours and one hour of leadership laboratory per week. Prerequisites: 311 or equivalent for 331; 311 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, navigation, and Federal Aviation Agency regulations. Prerequisite: 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 examination of the military professional, his role in the politician, and the role of civil society. Three classroom 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) A, WSp, AWSp, AWSp


M SCI 201, 202, 203 Military Science II: Basic (2,2,2) A, WSp, AWSp, AWSp

Develops proficiency in delivering and evaluating oral instruction. Presents a perspective of the American military position in the World War II, foreign policy, and strategy. Significant military conflicts are examined as they impact the nature of warfare for the future. Prerequisites: Fundamentals of laboratory, 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) A, WSp, AWSp, AWSp

Survival tactics, emphasizing the importance of firepower, movement, and communications. Duties, responsibilities, and methods of employment of basic military units. Leaders role in training and coordinating individuals and military units from squad to company level. Students are introduced to the planning and conduct of individual and collective protective actions, stressing positive motivation to establish high standards of morale and spirit. Principles and techniques of command, control, and management of leadership are taught and practiced throughout the academic year. Three weekend field trips required in the spring.

M SCI 401, 403 Military Science IV: Advanced (2,2) A, WSp, 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 responsibilities and official relationships of an Army officer. Organization and functions of command. Staff relationships. 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 USC and the officer's authority and responsibility within the military justice system). Problem-solving techniques used by small-unit leaders, emphasizing coordination and planning by the junior officer. Three weekend field trips required each year.

NAVAL SCIENCE

Courses for Undergraduates

N SCI 111 The Naval Service (3) A

General introduction to the Navy, its organization, missions, roles, tasks, and operating methods. The relationship to the services within the Department of Defense is emphasized.

N SCI 112 Naval Ship Systems I (3) W

Study of the ship's systems operational in the Navy today, including the principles of characteristic propulsion 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

A concept of weapon systems and the systems approach, 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, the current status of the various nations of the world, the impact of their sea power as they influence the development and implementation of national security policy, and the economic effects of the elements of sea power (the Navy, the merchant marine, port facilities, fisheries, and oceanographic capabilities).

N SCI 213 Sea Power Practicum II (2) Sp

Continuation of 212.

N SCI 311 Navigation (3) A

Course is designed to introduce the science of terrestrial navigation, including dead reckoning, piloting, and electronic means. The laws for prevention of collision at sea (rules of the road) are covered.

N SCI 312 Celestial Navigation (3) W

Theory and practice of celestial navigation. The student performs the equivalent "men's work" of the ship's naviga-

N SCI 313 Naval Operations (3) Sp

Introduction to naval operations, the employment of naval 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 leadership based on the 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 role of the philosophy of management functions 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 administration of personnel in the Navy under the Uniform Code of Military Justice. Emphasis is placed on the leadership and management role of the junior officer in the fleet.

N SCI 413 Naval Organization and Management II (3) Sp

Continuation of 412.

MARINE CORPS OPTION COURSES

N SCI 311 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 312 Evolution of Warfare II (3) W

Continuation of 311.

N SCI 321 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 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 conducted 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, including command relationships, task organization, and other aspects.

N SCI 431 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 (3) Sp

Dunlap, Ellis

Introduction to the practice of social work, theoretical concepts and institutional framework that guides prac-

SOC W 300 Historical Approaches to Social Welfare (3) AW

Berelman, Duplak

Social 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-

SOC W 400 Social Welfare Policy and Programs (3) AW

The role of the social worker in the delivery of social services in the contemporary society. The relationship of social services to other human services. The impact of political and economic restructuring on social services. The role of social work in the provision of social services. The role of the social worker in the delivery of social services in the contemporary society. The relationship of social services to other human services. The impact of political and economic restructuring on social services. The role of social work in the provision of social services.
SOC W 310-311 Social Welfare Practice (3-3) Wsp
Duplice, Hannah, 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 methods 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, Duplice
Policy and program developments in the social welfare field since 1935. Current income maintenance proposals, the emergence of programs to treat specific social dysfunctions (e.g., mental illness, crime, drug addiction), and growth of 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
Historic role of the volunteer, current functions performed by volunteers, and the probable roles of volunteers in the future. Those anticipating becoming volunteers or interested in the role of the volunteer within social work settings gain a perspective on their organizational 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 sexual perspectives. 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 applied to research in social work/social welfare; a beginning 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 student to the dynamics and functions of evaluation in social action agencies, and to provide opportunities to: develop an understanding of the variety and character of various evaluative techniques, to develop competence in evaluating social action programs, and to acquaint the student with the various alternatives for using the results of evaluation studies in improving organizational performance.

SOC W 401 Principles of Interviewing (3) AWspS
Kelley, Miller
Focus on identification and understanding of fundamental skills 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 the relationship between 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.

Two-hour seminar weekly. Student integrates social work and long-term counseling skills with prior and concurrent course work in the social sciences, social work, and research. Includes discussion of case presentations and simulations of practice situations that combine knowledge and skill utilization. Student logs provide a basis for individual goal identification and achievement. Required for, and open only to, social welfare seniors. Prerequisites: 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 Field Instruction (4-4, 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 welfare major standing and 300, 310-311.

SOC W 419 Adult Development and Aging (3) AW
Howman
Designed to introduce the student to the field of adult development. A multidisciplinary perspective stressing the interaction 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)
General component in social work practice. Discussion of value differences across generation lines, life stage development into the later years, social role loss and acceptance in retirement, and confrontation with issues of death and dying as they affect the design and provision 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)
Whitaker
Major focus includes an introduction to the continuum of child welfare services, as well as some practical approaches 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
Meier
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 interrelationships 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 service settings (e.g., family, school, hospital, social work), group relationships, skills, use of play, etc.). Open to majors and nonmajors.

SOC W 424 Chemical Dependencies and Society (3)
Treatment and control approaches and the assessment of their effectiveness. Several concurrent "topic seminars" deal with drug addiction, crime, management, drug philosophy, minority culture, drug counseling, regional planning, and residential programs offered each quarter. Prerequisite: permission of instructor.

SOC W 425 Conceptions of Basic Institutional Change (3) Sp
Herrick
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 perspective and particularly those values underlying social welfare; (2) prerequisites for a change to occur in these values; and (3) dangers and dilemmas in implementing such a change. Recommended: 200 and ECON 200.

SOC W 430 Child Care Work Practice (3) Wsp
Whitaker
Specialized practice with emotionally disturbed and deficient 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 methods of drug control; life-space intervention; token economies; activity programming; group interventions; parent involvement; organizational requisites and community linkages. Prerequisite: 310 or permission of 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)
An introduction to: intervention methods and response to persons in crisis; use of crisis to produce positive change, concepts of crisis and crisis intervention; and the epidemiology and demography of suicide. Learning experiences include mock crisis situations, role playing, and discussion of results 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' contributions to comprehensive 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 related to specific ethnic and racial minority groups. Attention is given to understanding of minority populations and the unique delivery of social welfare services to these communities.

SOC W 502 Income Maintenance and Health Care (3) AW
Dear, Duplace, Patty, Weatherley
Advanced course in policy stemming from the Social Security Act with particular reference to programs of income maintenance and health; social assistance, social insurance, unemployment insurance, and public and private approaches to health care. Emphasis on the development of analytic skills that help to address questions about benefits, comprehensiveness of coverage, financing, 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, Duplace, Patty
Explores 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. Use of the policy process and the proportion of a network of institutions that employ social workers to better serve their clientele is a prerequisite if needed changes and improvements 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, Smith, Roffman
Analysis of major social problems and social welfare service systems providing a systematic approach to assessing the scope, causes, social cost, and public policy alternatives. The purpose of service related to such problems, selected social problems such as poverty and ill health, juvenile delinquency, drug and alcohol addiction, and the impact of the aging are studied and related to the student's field experiences.

SOC W 507 Seminar (3, max. 6) AWsp
Bryant, Duplace, Roffman
Prerequisite: permission of instructor.

SOC W 508 Integrative Seminar (1-3)

SOC W 509 Readings In Social Work (1-5) AWsp
May be repeated for credit. Prerequisite: permission of instructor.

SOC W 515 Field Instruction (2-8, max. 12) AWsp
Social work majors only. Prerequisite: permission of instructor.
SCHOOL OF SOCIAL WORK

SOC W 529, 530-531 Introduction to Human Service Practice (3, 4-5) Farber, Henneman, 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 specific counseling practice stance (behavioral therapy, group treatment). Prerequisites: 529 or 310-311.

SOC W 533 Advanced Human Services Practice (3, max. 9) Griswold, Henneman, Leider, Miller, Mundt, Norton, Resnick, Richer, 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) AWSp Prerequisite: 515.

SOC W 541 Human Behavior and the Social Environment (3) A Delange, Ishiaka, Maier, Resnick, Sier, 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 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 responses that are designed to deal with the specified human 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 FBSCT 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, Sier
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) Pani
Provides conceptual base for analysis and action in human-service organizations. Emphasis on utilization of conceptual tools of organization theory for problem solving 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 566 Seminar in 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 supply of social services, crime, and human capital. Offered jointly with B ECON 513 and ECON 518. Prerequisite: B ECON 500 or ECON 500 or permission of instructor.

SOC W 568 Specialized Community and Organizational Services Skills (3) AWSp Bryant, Dear, Ellis, Pani, Sier, Valdes
Methodologically based course providing graduate social work students with professional analytic and interpersonal skills associated with administration, planning, and program 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, Sier
Methodologically based course for students in second-year graduate program, providing criteria and methods appropriate for designing, developing, and planning social welfare programs, including such elements as building citizen support, legislative sanction, etc. Prerequisite: permission of instructor.

SOC W 571 Advanced Seminar in Social Welfare Administration (3) W Austin, Pani, Weatherley
Requisite concepts and practice skills necessary for the management of social welfare organization, with emphasis on management practices in those settings offering clinical social services. Includes analysis of treatment settings and auspices, the management of interdisciplinary 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. 3) Anderson, Northwood
Analyzes new or expanding areas of social welfare policies and services. Emphasis on developing student's knowledge of, and ability to assess, social welfare programs. 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 program). Includes development of research design, collection 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 students). 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 (*) AWSp

SOC W 700 Master's Thesis (*) AWSp

SOCIAL WELFARE

See Interdisciplinary Graduate Degree Programs.

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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.

A

AAGAARD, GEORGE N.* 1954 (1967), Professor of Medicine and Pharmacology; B.S., 1934, M.B., 1936, M.D., 1937, Minnesota


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, JOHN B.* 1975 (1979), Professor of Geological Sciences; Chairperson, Department of Geological Sciences; B.S., 1956, Stanford; M.S., 1938, 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., 1938, 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

ADMANN, 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


AGABIAN, NINA.* 1973 (1978), Associate Professor of Biochemistry; B.A., 1966, M.S., 1966, 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)


AHMED, SAIYED I.* 1973 (1978), Research Associate Professor of Oceanography; B.S., 1960, D.J. Science College (Karachi); Ph.D., 1963, J.W. Goethe (Frankfurt)

ALAVEDRA, MONTESERRAT, 1978, Assistant Professor of Music; Mozarteum (Salzburg); Escuela Superior de Canton (Spain)


ALBERT, RICHARD K., 1977 (1977), Assistant Professor of Medicine; B.A., 1957, M.D., 1971, Colorado


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


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
BARKER, EDWARD ALLAN,* 1970 (1975), Associate Professor of Pathology; Chief, Pathology Service, Harborview Medical Center; B.A., 1960; M.D., 1964, Ph.D., 1970, Washington

BARKER, FRANK I., 1968 (1978), Assistant Professor of Psychiatry and Behavioral Sciences; B.S., 1958, Washington State; M.D., 1962, Washington

BADLEY, FRANKLIN L.* 1950 (1967), Professor of Atmospheric Sciences; Chairman, Department of Atmospheric Sciences; B.S., 1935, Chicago; M.S., 1948, Ph.D., 1951, New York University

BAER, JUAN-LOUP,* 1969 (1979), Professor of Computer Science; Diplome 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, Kansas State (Kansas City)

BAILEY, WARREN W., 1979, Assistant Professor of Surgery; B.A., 1966, Montana State; M.D., 1970, Tofts

BAIN, LINDA L., 1979, Assistant Professor of Military Science; B.A., 1970, Keuka; M.A., 1972, Michigan State

BAINEBRIDGE, WILLIAM S.,* 1975, Assistant Professor of Sociology; B.A., 1971, Boston; Ph.D., 1975, Harvard

BAKER, D. JAMES, JR.* 1973 (1979), Professor of Oceanography; Chairman, Department of Oceanography; B.S., 1958, Stanford; Ph.D., 1962, Cornell

BAKER, D. JAMES, JR.* 1973 (1979), Professor of Oceanography; Chairman, Department of Oceanography; B.S., 1958, Stanford; Ph.D., 1962, Cornell


BAKER, MARSHALL,* 1962 (1965), Professor of Physics and Applied Mathematics; B.A., 1953, Harvard

BAKKEN, AIMEE H.,* 1973 (1979), Associate Professor of Zoology; B.A., 1963, Chicago; Ph.D., 1970, Iowa


BALICK, BRUCE,* 1975, Assistant Professor of Astronomy; B.A., 1965, Beloit; Ph.D., 1971, Cornell

BALISE, PETER LOUIS, JR.,* 1959 (1961), Professor of Mechanical Engineering; S.B., 1948, S.M., 1950, Massachusetts Institute of Technology

BALLARD, JOHN WESLEY,* 1975 (1977), Assistant Professor of Mathematics; B.A., 1969, New Mexico State; Ph.D., 1974, Wisconsin


BANSE, KARL,* 1959 (1966), Professor of Oceanography; Ph.D., 1955, Kiel

BANTA, MARTHA,* 1970 (1975), Professor of English; A.B., 1955, 1964, Indiana


BARDEEN, JAMES M.* 1976, Professor of Physics; A.B., 1960, Harvard; Ph.D., 1965, California Institute of Technology

BARE, B. BRUCE,* 1969 (1976), Associate Professor of Forest Resources and Quantitative Sciences; B.S.F.P., 1964, Purdue; M.S., 1965, Minnesota; Ph.D., 1969, Purdue

BEACH, KIRK W., 1976 (1979), Research Assistant Professor of Surgery; B.S., 1965, Washington; M.S., 1969, Ph.D., 1971, California (Berkeley); M.D., 1976, Washington

BEACH, LEE ROY,* 1966 (1972), Professor of Psychology; Chairperson, Department of Psychology; B.A., 1957, M.A., 1959, Ph.D., 1961, Colorado

BEAL, JACK L.* 1973 (1977), Associate Professor of Education; B.A., 1957, M.S., 1962, Kansas; Ph.D., 1972, Nebraska

BEALE, JACOB MACARTHUR, JR.* 1948 (1968), Professor of Music; B.A., 1945, Harvard; B.Mus., 1946, M.Mus., 1947, Yale

BEARD, DONALD W.* 1975, Assistant Professor of Business Policy; B.A., 1959, Northwestern; M.B.A., 1961, Harvard; Ph.D., 1975, Nebraska

BEASLY, R. PALMER,* 1967 (1972), Associate Professor of Epidemiology; A.B., 1958, Darmouth; M.D., 1962, Harvard; M.S., 1969, Washington

BEATON, RANDAL D.* 1977, Research Assistant Professor of Psychosocial Nursing; B.A., 1967, California; Ph.D., 1972, Washington

BEAUCHAIN, DEBRA, 1979, Instructor in Community Health Care Systems; B.S.N., 1975, Wisconsin

BEAUMONT, ROSS ALLEN,* 1940 (1954), Professor of Mathematics; A.B., 1936, M.S., 1937, Michigan; Ph.D., 1940, Illinois

BEAVO, JOSEPH A.* 1977, Assistant Professor of Pharmacology; B.S., 1965, Stetson; Ph.D., 1970, Vanderbilt

BECKER, JOSEPH,* 1965 (1968), Professor of Psychiatry and of Behavioral Sciences and of Psychology; A.B., 1950, M.A., 1952, George Washington; Ph.D., 1958, Duke

BECKMANN, GEORGE M.* 1969, Professor of East Asian Studies (Korea); Provost; A.B., 1948, Harvard; Ph.D., 1952, Stanford


BEDER, OSCAR E.* 1952 (1960), Professor of Prosphodontics; B.S., 1936, Rutgers; D.D.S., 1941, Columbia

BEECHER, MICHAEL D., 1978, Assistant Professor of Psychology; B.A., 1964, Reed; M.A., 1965, Ph.D., 1970, Boston

BEEGLE, ROBERT G., 1977, Assistant Professor of Pathology; M.D., 1962, Michigan

BEEN, VALERIE C., 1978, Assistant Professor of Dental Hygiene; B.S., 1971, Washington; M.S., 1975, Columbia

BEESON, PAUL B., 1974 (1979), Professor Emeritus of Medicine; M.D., 1933, McGill

BEHLER, DIANA E.* 1969 (1975), Associate Professor of Germanics and Comparative Literature; Chairperson, Department of Germanics; B.A., 1965, M.A., 1966, Ph.D., 1970, Washington

BEHLER, ERNST H.* 1965 (1966), Professor of Germanics and Comparative Literature; Chairperson, Department of Comparative Literature; Ph.D., 1951, Munich; Habilitation, 1961, Universitiit Bonn

BEHLER, GEORGE K., 1979, Assistant Professor of History; B.A., 1970, California (Santa Barbara); M.A., 1972, Ph.D., 1977, Stanford

BEHNRENS, JOYCE A., 1972 (1976), Assistant Professor of Laboratory Medicine; B.S., 1966, Illinois; M.S., 1971, Minnesota

BEITMAN, BERNARD D., 1977 (1978), Assistant Professor of Psychiatry and Behavioral Sciences; B.A., 1964, Swarthmore; M.D., 1968, Yale
BELCHER, DONALD W., 1976, Associate Professor of Medicine; B.A., 1954, Dartmouth; M.D., 1962, Pennsylvania

BELKNAP, BENJAMIN H., 1971, Associate Professor of Medicine; Associate Dean, School of Medicine; B.A., 1935, Harvard; M.P.A., 1954, Princeton; M.D., 1961, Rochester

BELL, ALDON D.,* 1969, Associate Professor of History; Associate Dean, Continuing Education; B.A., 1931, Oklahoma; B.A., 1953, Ph.D., 1961, Oxford

BELL, CECIL H., JR.,* 1968 (1972), Associate Professor of Administrative Theory and Organizational Behavior; B.A., 1957, M.A., 1959, Ph.D., 1968, Boston

BELL, CHARLES B.,* 1978, Professor of Biostatistics; B.S., 1947, Xavier; M.S., 1948, Ph.D., 1953, Notre Dame

BELL, EARL J.,* 1966 (1979), Professor of Urban Planning; B.A., 1952, B.S., 1957, Ph.D., 1965, California (Berkeley)

BELL, MAE A.,* 1975, Associate Professor of Speech Communication; B.A., 1966, Baylor; M.A., 1968, Ph.D., 1974, Iowa

BELL, MILO CARNER, 1940 (1975), Professor Emeritus of Fisheries; B.S. in M.E., 1930, Washington

BENDA, MIROSLAV,* 1972, Assistant Professor of Mathematics; M.Sc., 1968, Warsaw; Ph.D., 1970, Wisconsin

BENDERSKY, MARTIN,* 1972 (1973), Assistant Professor of Mathematics; B.S., 1966, City College, New York; Ph.D., 1971, California (Berkeley)

BENDICH, ARNOLD J.,* 1970 (1976), Associate Professor of Botany; B.A., 1952, Vermont; Ph.D., 1969, Washington

BENNETT, EARL F. L.,* 1957, Professor of Pathology; Chairperson, Department of Pathology; B.A., 1937, Swarthmore; M.D., 1941, Harvard

BENNETTI, COSTANTINO, 1977 (1979), Assistant Professor of Anesthesiology; B.A., 1962, R.S., 1965, California (Los Angeles); M.D., 1972, Rome


BICE, THOMAS W., 1979, Professor of Health Services; B.A., 1963, Knox; M.S., 1965, Ph.D., 1969, Purdue

BICKNELL, MARY E., 1976, Lecturer in Microbiology and Immunology; B.S., 1958, Wisconsin; M.S., 1962, Washington

BIERMAN, EDWIN L., 1962 (1968), Professor of Medicine; A.B., 1951, Brooklyn; M.D., 1955, Cornell


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MURANO, ROBERT, 1971, Lecturer in Radiology; B.S., 1960, Massachusetts Institute of Technology; M.S., 1966, Washington

MURILLO-ROHIDE, ILDURA,* 1976, Professor of Community Health Care Systems; Associate Dean, School of Nursing; B.S., 1951, M.A., 1953, M.Ed., 1969, Teacher's College, Columbia; Ph.D., 1971, New York University

MURPHY, HERTA A., 1946 (1971), Assistant Professor of Business Communications; B.B.A., 1930, M.A., 1942, Washington

MURPHY, JANET HAWORTH, 1974 (1977), Assistant Professor of Business; B.S., 1964, M.B., Ch.B., 1967, Victoria University (England)

MURPHY, STANLEY R.* 1958 (1968), Professor of Oceanography and of Mechanical and Ocean Engineering; Director, Marine Resources; B.A., 1948, Fresno State; Ph.D., 1959, Washington

MURPHY, TERENCE M., 1968 (1975), Associate Professor of Anesthesiology; M.B., Ch.B., Liverpool (England)

MURRAY, JAMES W., JR.* 1973 (1976), Assistant Professor of Oceanography; B.A., 1966, California (Berkeley); Ph.D., 1973, Massachusetts Institute of Technology-Woods Hole Oceanographic Institution

MUSSETTER, SALLY ANN,* 1978, Assistant Professor of English; B.A., 1960, M.A., 1962, Ohio State; Ph.D., 1973, Cornell


N

NAGAWA, HELEN,* 1968 (1975), Professor of Prehospital Nursing; B.S., 1950, Colorado; M.A., 1956, Columbia; Ph.D., 1968, California (Los Angeles)


NAKATANI, ROY EII,* 1963 (1973), Professor of Fisheries; Associate Director, Fisheries Research Institute; Program Director, Living Resources, Division of Marine Resources; B.S., 1947, Ph.D., 1960, Washington


NAMIKA, ISAAC,* 1963 (1968), Professor of Mathematics; B.A., 1951, Ottawa; M.A., 1953, Kansas; Ph.D., 1956, California (Berkeley)

NARAYANAN, A. SAMPATH, 1971 (1978), Research Associate Professor of Pathology; B.S.C., 1961, M.S.C., 1963, Ph.D., 1967, Madras University (India)

NARDELLA, FRANCIS A., 1976 (1979), Assistant Professor of Medicine; A.B., 1964, M.D., 1968, West Virginia

NARVER, JOHN C.*, 1966 (1972), Professor of Marketing; B.S., 1957, Oregon State; M.B.A., 1960, Ph.D., 1965, California (Berkeley)

NASH, BRENT L., 1959 (1974), Assistant Professor of Forestry; B.S., 1955, Utah; D.D.S., 1958, Washington

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STEVENSON, JAMES G., 1976, Assistant Professor of Pediatrics; A.B., 1966, Occidental; M.D., 1970, Baylor

STEVENSON, JOHN K., 1934 (1972), Professor of Surgery; M.D., 1949, Rochester

STEVIC, ROBERT DAVID,* 1962 (1969), Professor of English; B.A., 1949, M.A., 1951, Tulia; Ph.D., 1956, Wisconsin

STEWART, ANN H.,* 1974 (1979), Associate Professor of English; B.A., 1967, Douglass; Ph.D., 1972, Princeton

STEWART, DOUGLAS, 1971 (1978), Associate Professor of Medicine; B.S., 1961, California Institute of Technology; M.D., 1965, Harvard


STEWART, MILTON LEE, 1976, Assistant Professor of Mäde; B.A., 1966, Toledo; M.M., 1968, Miami; M.A., 1972, Ph.D., 1973, Michigan

STEWART, PATRICIA S., 1976, Assistant Professor of Medicine; B.A., 1965, New York (Buffalo); M.A., 1965, M.D., 1969, West Virginia

STEWART, RICHARD J.,* 1967 (1977), Associate Professor of Geological Sciences; B.A., 1965, Minesota; Ph.D., 1970, Stanford

STEWART-LARSON, BOBBIE JEAN, 1975 (1979), Assistant Professor of Psychology and Behavioral Sciences; B.S., 1969, M.S., 1971, Oregon

STIBBS, GERALD D.,* 1948 (1976), Professor Emeritus of Restorative Dentistry; B.S., D.M.D., 1931, Oregon

STIBBS, HENRY H., 1979, Assistant Professor of Pathobiology; B.A., 1970, Stanford; M.S., 1972, Ph.D., 1978, Tulane


STIER, FLORENCE R.,* 1964 (1970), Professor of Social Work; B.A., 1939, Chatham; M.S.S.A., 1941, Pittsburgh; D.S.W., 1973, Columbia

STIRLING, CHARLES E.,* 1968 (1973), Associate Professor of Physiology and Biophysics; A.B., 1961, George Washington; Ph.D., 1966, State University of New York


STOVER, QUENTIN JEROME,* 1968 (1977), Research Professor of Fisheries; B.S., 1960, M.S., 1962, Ph.D., 1968, Montana State

STODDARD, JAMES W., 1965 (1974), Assistant Professor of Restorative Dentistry and Dental Hygiene; D.D.S., 1961, Washington


STOEL-GAMMON, CAROLINE, 1979, Research Assistant Professor of Speech and Hearing Sciences; B.A., 1965, Smith; M.A., 1968, Ph.D., 1974, Stanford


STOLOV, WALTER C.,* 1960 (1970), Professor of Rehabilitation Medicine; B.S., 1948, City College of New York; M.A., 1951, M.D., 1956, Minnesota

STORB, RAINER, 1965 (1977), Professor of Medicine; Physikum, 1957, Munich (Germany); State Med. Exam., 1960; M.D., 1960, Freiburg Br.

STORB, URSAULA, B.,* 1968 (1975), Associate Professor of Microbiology and Immunology; Physikum, 1957, M.D., 1960, Tübingen

STOLCHA, LAILA, B., 1968 (1978), Professor of Music; Diploma, 1945, Curtis Institute of Music; Diploma, 1957, Academy of Music (Vienna); B.A., 1964, Wilkes

STORCH, RICHARD L., 1978, Research Assistant Professor of Mechanical Engineering; B.S., 1967, Wayne Institute of Naval Architecture; M.S., 1968, Massachusetts Institute of Technology; Ph.D., 1978, Washington

STORM, DANIEL R.,* 1978, Associate Professor of Pharmacology; B.S., 1966, M.S., 1967, Washington; Ph.D., 1971, California (Berkeley)

STOTLAND, EZRA,* 1957 (1965), Professor of Psychology; Director, Program in Society and Justice; B.S., 1948, City College of New York; M.A., 1949, Ph.D., 1953, Michigan


STOUL, LARRY, 1978, Assistant Professor of Naval Science; B.A., 1970, Central Washington


STRANDIIRD, PAUL E., 1969, Professor of Laboratory Medicine; Chairperson, Department of Laboratory Medicine; B.S., 1951, M.A., 1952, Minnesota; M.D., 1959, Stanford


STRAUSS, RICHARD R.,* 1973 (1977), Associate Professor of Zoology; Resident Associate Director, Friday Harbor Laboratories; B.A., 1963, Pomona; M.S., 1966, Ph.D., 1970, Washington


SULLIVAN, JOHN BRENDAN, 1973 (1978), Associate Professor of Mathematics; A.B., 1966, Harvard; Ph.D., 1971, Cornell


SULLIVAN, WOODRUFF T. III, 1973 (1978), Associate Professor of Astronomy; B.S., 1966, Massachussets Institute of Technology; Ph.D., 1971, Maryland


SUMI, MARK,* 1966 (1978), Professor of Medicine and Pathology; A.B., 1956, Toronto

SUMMER, CHARLES E.,* 1969, Professor of Business Policy, Administrative Theory, and Organizational Behavior; B.A., 1947, William and Mary; M.B.A., 1948, Pennsylvania; Ph.D., 1957, Columbia

SUDEM, GARY L., 1971 (1974), Associate Professor of Accounting; Chairperson, Department of Accounting; Carlson; M.B.A., 1969, Ph.D., 1971, Stanford

SUNDESEN, JOHN W.,* 1962 (1970), Associate Professor of Biological Structure; A.B., 1956, Ph.D., 1961, California (Los Angeles)


SUTTON, DWIGHT, 1969 (1971), Associate Professor of Geosciences: B.A., 1969, Research Affiliate, Regional Private Research Center; Principal Investigator, Institute for Laser Research, Virginia Mason Research Center; B.S., M.S., 1961, M.S., 1965, Idaho; Ph.D., 1962, California (Berkeley)

SWANSON, PHILLIP D., 1964 (1968), Professor of Medicine; B.S., 1954, Yale; M.D., 1958, Johns Hopkins


TAYLOR, THOMAS R.,* 1979, Associate Professor of Family Medicine; M.B., Ch.B., 1977, Ph.D., 1972, Glasgow (Scotland).

TEATHER, EDWARD C.,* 1967 (1971), Associate Professor of Social Work; Associate Dean, School of Social Work; B.A., 1959, B.S.W., 1960, M.S.W., 1961, British Columbia.

TELLER, DAVID C., 1965 (1979), Professor of Biochemistry; B.A., 1960, Swarthmore; Ph.D., 1964, California (Berkeley).

TELLER, DAVIDA Y.,* 1965 (1979), Professor of Psychology; B.A., 1960, Swarthmore; Ph.D., 1965, California (Berkeley).

TELZROW, ROBERT W.,* 1976 (1977), Assistant Professor of Pediatrics; B.S., 1964, Xavier; M.D., 1968, Ohio State.


TEMPLETON, FREDERIC E., 1946 (1973), Professor Emeritus of Radiology; B.S., 1927, Washington; M.D., 1931, Oregon.

TENCKHOFF, HENRICH, 1964 (1972), Associate Professor of Medicine; M.D., 1955, Kohn.

TENG, LIN-NAR, 1979, Research Assistant Professor; B.S., 1957, Taiwan; M.S., 1963, Wyoming; Ph.D., 1970, Washington.

TENNISAN, PATRIC O.,* 1979, Assistant Professor of Medicine; B.S., 1961, M.D., 1965, Washington.

TERREL, RONALD L.,* 1967 (1975), Professor of Civil Engineering; B.S.C.E., 1960, M.C.E., 1961, Purdue; Ph.D., 1967, California (Berkeley).


TEUBER, ANDREAS,* 1975, Assistant Professor of Political Science; B.A., 1964, Ph.D., 1975, Harvard.

THALBERG, STANTON PHILIP,* 1965 (1970), Assistant Professor of Education; Director, Psycho-Education Laboratory; B.A., 1957, M.A., 1959, Ph.D., 1964, Iowa.

THIEL, PHILIP,* 1961 (1966), Professor of Architecture and Urban Design; B.S., 1943, Webb Institute of Naval Architecture; M.S., 1948, Michigan; B.Arch., 1952, Massachusetts Institute of Technology.

THIELE, BRIAN L.,* 1977, Assistant Professor of Surgery; M.B.B.S., 1966, Queensland (Brisbane).


THOMAS, DAVID PHILLIP,* 1950 (1966), Professor of Wood Science and Technology; Chairman, Management and Social Sciences Division; B.S.F.T., 1941, M.F., 1948, Washington.

THOMAS, E. DONNALL, 1963, Professor of Medicine; M.D., 1946, Harvard.

THOMAS, MORGAN D.,* 1959 (1966), Professor of Geography; Associate Dean, Graduate School; B.A., 1951, Ph.D., 1954, Queen's (Belfast).


THOMPSON, DONOVAN J.,* 1970, Professor of Biostatistics; Chairperson, Department of Biostatistics; B.A., 1941, Siena Ola; M.A., 1947, Minnesota; Ph.D., 1951, Iowa State.

THOMPSON, GARY,* 1966 (1972), Associate Professor of Speech and Hearing Sciences; B.A., 1953, M.A., 1955, Iowa; Ph.D., 1966, Minnesota.


THORNING, DAVID R., 1975 (1976), Assistant Professor of Pathology; B.A., 1961, M.D., 1965, Kansas.

THORQUIST, RONALD H., Lieutenant Colonel, United States Army, 1979, Professor of Military Science; B.S., 1960, Washington; M.S., 1974, California (Los Angeles).


THRASHER, ALLEN W.,* 1973, Assistant Professor of Russian Languages and Literature (South Asia); A.B., 1967, Ph.D., 1972, Harvard.


TOMPkins, LUCY STUART, 1975 (1979), Assistant Professor of Economics and of Microbiology and Immunology; B.S., 1963, Denver; Ph.D., 1971, Georgetown; M.D., 1973, Dartmouth.

TOMPkins, RICHARD K.,* 1975, Associate Professor of Health Services and Medicine; Assistant Dean of Medicine; M.D., 1963, Colorado.


TONG, Daphne Y.,* 1978 (1979), Assistant Professor of Radiation Oncology; M.B., B.S., 1971, Hong Kong.


WORTHINGTON, PHILIP, 1974 (1976), Associate Professor of Oral Surgery; M.B., Ch.B., 1956, B.Sc., B.D.S., Liverpool


WORTLEY, W. VICTOR.* 1965 (1979), Associate Professor of French Language and Literature; B.A., 1959, M.A., 1961, Ph.D., 1964, Oregon

WRIGHT, FREDERICK,* 1974 (1979), Associate Professor of Medicine; A.B., 1962, Dartmouth; M.D., 1967, Stanford

WYLER, ALLEN R.* 1974 (1976), Assistant Professor of Neurosurgical Work; B.A., 1965; M.D.; 1969, Washington

WYLIE, TURRELL VERL.* 1958 (1968), Professor of Asian Languages and Literature (Tibetan) and of Asian Studies (Inner Asia); B.A., 1952, Ph.D., 1958, Washington


Y

YAGGY, ELMOR MAY, 1943 (1977), Associate Professor Emeritus of English; B.A., 1929, M.A., 1939, Idaho; Ph.D., 1946, Washington


YAMAMURA, KOZO,* 1970 (1972), Professor of East Asian Studies (Japan); Chairperson, Japanese Studies, School of International Studies; B.A., 1957, California (Berkeley); Ph.D., 1963, Northwestern

YAMANAKA, WILLIAM K.* 1974, Associate Professor of Human Nutrition, Dietetics, and Food; B.S., 1955, Hawaii; Ph.D., 1969, California (Berkely)


YARRO-BEJARANO, YVONNE M.* 1974 (1976), Assistant Professor of Romance Languages and Literature and of Comparative Literature; B.A., 1969, M.A.; 1970, Washington; Ph.D., 1976, Harvard

YEE, SINCLAIR S.* 1966 (1974), Professor of Electrical Engineering; B.S., 1959, M.S., 1961, Ph.D., 1965, California (Berkeley)

YEN, ISABELLA YIYUN.* 1960 (1961), Associate Professor of Asian Languages and Literature (Chinese); B.A., 1928, Peking; A.M., 1951, Michigan; Ph.D., 1956, Cornell

YERKA, FENDALL W.* 1965, Professor of Communications; A.B., 1936, Hamilton


YORKSTON, KATHRYN M.* 1978 (1979), Assistant Professor of Rehabilitation Medicine; B.A., 1970, Stanford; M.S., 1972, Ph.D., 1975, Oregon

YOUNG, ALLAN C., 1949 (1974), Professor Emeritus of Physiology and Biophysics; B.A., 1938, M.A., 1941, British Columbia; Ph.D., 1934, Toronto


YOUNG, ELTON T. III.* 1969 (1975), Associate Professor of Biochemistry; B.A., 1962, Colorado; Ph.D., 1967, California Institute of Technology

YOUNG, KENNETH K.* 1967 (1977), Professor of Physics; B.S., 1959, Washington; Ph.D., 1965, Pennsylvania

YOUNGMANN, CARL E.* 1973 (1979), Associate Professor of Geography; A.B., 1965, Midland; M.A., 1968, Ph.D., 1972, Kansas

YUE, AGNES K., 1979, Assistant Professor of Otolaryngology; B.A., 1970, Wellesley; M.D., 1974, Medical College of Pennsylvania


Z

ZARET, THOMAS MICHAEL.* 1977, Research Assistant Professor of Zoology; B.S., 1966, Pittsburgh; Ph.D., 1971, Yale

ZARINA, ASTRA.* 1970 (1979), Professor of Architecture; B.Arch., 1953, Washington; M.Arch., 1954, Massachusetts Institute of Technology

ZASOSKI, ROBERT J.* 1973, Assistant Professor of Forest Soils; B.S., 1967, M.S., 1970, Ph.D., 1973, California (Davis)

ZEDER, SUZAN L.* 1977, Assistant Professor of Drama; B.A., 1969, Trinity; M.F.A., 1972, Southern Methodist; Ph.D., 1978, Florida State

ZERBE, RICHARD O., JR.* 1976, Associate Professor of Social Management of Technology; A.B., 1960, Oklahoma; Ph.D., 1969, Duke

ZETLIN, EMANUEL ROMAN, 1947 (1971), Professor Emeritus of Music; B.A., 1916, Imperial Conservatory (Petrograd); Dr.Mus. (Hon.), 1936, Washington (D.C.) College of Music

ZIADEH, FARKHAT J.* 1966, Professor of Near Eastern Languages and Literature; Chairperson, Department of Near Eastern Languages and Literature; B.A., 1937, American University of Beirut; LL.B., 1946, London; Barrister-at-Law, 1946, Lincoln's Inn (London)


ZILLMAN, LAWRENCE JOHN, 1928 (1972), Professor Emeritus of English; B.A., 1928, Ph.D., 1936, Washington

ZORN, RICHARD A., 1976 (1978), Assistant Professor of Ortopedics; B.S., 1966, North Dakota; M.D., 1972, Washington

ZSIGMONDY-LIEDEMANN, DINES, 1972 (1973), Professor of Music; Baccalaureate, 1940, Gymnasium, Budapest; Liszt-Academy, Budapest; Masterclasse, 1943, Budapest


ZUCKERMAN, HELEN C., 1952 (1973), Lecturer Emeritus in Mathematics; B.S., 1930, M.S., 1935, Washington

ZUM BRUNNEN, CRAIG.* 1977 (1979), Associate Professor of Geography; B.A., 1966, Minnesota; M.S.; 1969, California Institute of Technology; Ph.D., 1975, California (Berkely)

### EXPLANATION OF ABBREVIATIONS

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.

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
<th>Department/College</th>
<th>University</th>
</tr>
</thead>
<tbody>
<tr>
<td>A A S</td>
<td>Asian American Studies (Arts and Sciences)</td>
<td>Asian American Studies</td>
<td>University of the Americas</td>
</tr>
<tr>
<td>ACCTG</td>
<td>Accounting (Business Administration)</td>
<td>Accounting</td>
<td>College of Business</td>
</tr>
<tr>
<td>ADMN</td>
<td>Administration (Business Administration)</td>
<td>Administration</td>
<td>College of Business</td>
</tr>
<tr>
<td>AIS</td>
<td>American Indian Studies (Arts and Sciences)</td>
<td>American Indian Studies</td>
<td>University of Arizona</td>
</tr>
<tr>
<td>AKKAD</td>
<td>Akkadian, Near Eastern Languages and Literature (Arts and Sciences)</td>
<td>Near Eastern Languages and Literatures</td>
<td>University of the Americas</td>
</tr>
<tr>
<td>ALTHI</td>
<td>Altic, Asian Languages and Literature (Arts and Sciences)</td>
<td>Asian Languages and Literatures</td>
<td>University of the Americas</td>
</tr>
<tr>
<td>AMATH</td>
<td>Applied Mathematics (Interdisciplinary Graduate Degree Programs)</td>
<td>Applied Mathematics</td>
<td>College of Engineering</td>
</tr>
<tr>
<td>ANEST</td>
<td>Anthropology (Arts and Sciences)</td>
<td>Anthropology</td>
<td>College of Arts and Sciences</td>
</tr>
<tr>
<td>A ORG</td>
<td>Administrative Theory and Organizational Behavior (Business Administration)</td>
<td>Administrative Theory and Organizational Behavior</td>
<td>College of Business</td>
</tr>
<tr>
<td>ARAB</td>
<td>Arabic, Arts and Sciences</td>
<td>Arabic and Islamic Studies</td>
<td>College of Arts and Sciences</td>
</tr>
<tr>
<td>AS</td>
<td>Aerospace Studies (Reserve Officers Training Programs)</td>
<td>Aerospace Studies</td>
<td>College of Science and Engineering</td>
</tr>
<tr>
<td>ASI</td>
<td>Asian Languages and Literature, Asian Languages and Literature (Arts and Sciences)</td>
<td>Asian Languages and Literatures</td>
<td>University of the Americas</td>
</tr>
<tr>
<td>ASTR</td>
<td>Astronomy, Astronomy (Arts and Sciences)</td>
<td>Astronomy</td>
<td>College of Arts and Sciences</td>
</tr>
<tr>
<td>ATM S</td>
<td>Atmospheric Sciences, Atmospheric Sciences (Arts and Sciences)</td>
<td>Atmospheric Sciences</td>
<td>College of Science and Engineering</td>
</tr>
<tr>
<td>B A</td>
<td>Business Administration (Business Administration)</td>
<td>Business Administration</td>
<td>College of Business</td>
</tr>
<tr>
<td>B A RM</td>
<td>Research Methods (Business Administration)</td>
<td>Research Methods</td>
<td>College of Business</td>
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<tr>
<td>B CMU</td>
<td>Business Communications (Business Administration)</td>
<td>Business Communications</td>
<td>College of Business</td>
</tr>
<tr>
<td>B ECN</td>
<td>Business Economics (Business Administration)</td>
<td>Business Economics</td>
<td>College of Business</td>
</tr>
<tr>
<td>BIOC</td>
<td>Biochemistry (Medicine)</td>
<td>Biochemistry</td>
<td>College of Medicine</td>
</tr>
<tr>
<td>BIOEN</td>
<td>Bioengineering (Interschool or Intercollege Programs)</td>
<td>Bioengineering</td>
<td>College of Engineering</td>
</tr>
<tr>
<td>BIHS</td>
<td>Biomedical History (Medicine)</td>
<td>Biomedical History</td>
<td>College of Medicine</td>
</tr>
<tr>
<td>BIO/L</td>
<td>Biology, Biology (Arts and Sciences)</td>
<td>Biology</td>
<td>College of Arts and Sciences</td>
</tr>
<tr>
<td>BIOST</td>
<td>Biostatistics (Public Health and Community Medicine)</td>
<td>Biostatistics</td>
<td>College of Medicine</td>
</tr>
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<td>BLK S</td>
<td>Black Studies (Arts and Sciences)</td>
<td>Black Studies</td>
<td>College of Arts and Sciences</td>
</tr>
<tr>
<td>BMATH</td>
<td>Biometric Graduate Degree Programs</td>
<td>Biometrics</td>
<td>College of Science and Engineering</td>
</tr>
<tr>
<td>BOT</td>
<td>Botany, Botany (Arts and Sciences)</td>
<td>Botany</td>
<td>College of Science and Engineering</td>
</tr>
<tr>
<td>B POL</td>
<td>Business Policy (Business Administration)</td>
<td>Business Policy</td>
<td>College of Business</td>
</tr>
<tr>
<td>B STR</td>
<td>Biological Structure (Medicine)</td>
<td>Biological Structure</td>
<td>College of Medicine</td>
</tr>
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<td>BULGR</td>
<td>Bulgarian, Slavic Languages and Literature (Arts and Sciences)</td>
<td>Bulgarian, Slavic Languages and Literatures</td>
<td>University of the Americas</td>
</tr>
<tr>
<td>CATA</td>
<td>Catalan, Romance Languages and Literature (Arts and Sciences)</td>
<td>Catalan, Romance Languages and Literatures</td>
<td>University of the Americas</td>
</tr>
<tr>
<td>CER E</td>
<td>Ceramic Engineering, Mining, Metallurgical, and Ceramic Engineering (Engineering)</td>
<td>Ceramic Engineering</td>
<td>College of Engineering</td>
</tr>
<tr>
<td>CESM</td>
<td>Structural Engineering and Engineering Mechanics, Civil Engineering (Engineering)</td>
<td>Structural Engineering and Engineering Mechanics</td>
<td>College of Engineering</td>
</tr>
<tr>
<td>CETC</td>
<td>Transportation, Construction, and Geometrics, Civil Engineering (Engineering)</td>
<td>Transportation, Construction, and Geometrics</td>
<td>College of Engineering</td>
</tr>
<tr>
<td>CEWA</td>
<td>Water and Air Resources, Civil Engineering (Engineering)</td>
<td>Water and Air Resources</td>
<td>College of Engineering</td>
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<tr>
<td>CHE E</td>
<td>Chemical Engineering (Engineering)</td>
<td>Chemical Engineering</td>
<td>College of Engineering</td>
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<tr>
<td>CHEM</td>
<td>Chemistry, Chemistry (Arts and Sciences)</td>
<td>Chemistry</td>
<td>College of Arts and Sciences</td>
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<tr>
<td>CHIN</td>
<td>Chinese, Asian Languages and Literature (Arts and Sciences)</td>
<td>Chinese</td>
<td>College of Arts and Sciences</td>
</tr>
<tr>
<td>CHISTU</td>
<td>Chicano Studies, Chicano Studies (Arts and Sciences)</td>
<td>Chicano Studies</td>
<td>College of Arts and Sciences</td>
</tr>
<tr>
<td>CINE</td>
<td>Cinema Studies, Cinema Studies (Arts and Sciences)</td>
<td>Cinema Studies</td>
<td>College of Arts and Sciences</td>
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<td>CIV E</td>
<td>Core Courses, Civil Engineering (Engineering)</td>
<td>Core Courses</td>
<td>College of Engineering</td>
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<td>CL AR</td>
<td>Classical Archaeology, Classics (Arts and Sciences)</td>
<td>Classical Archaeology</td>
<td>College of Arts and Sciences</td>
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<td>CLAS</td>
<td>Classics, Classics (Arts and Sciences)</td>
<td>Classics</td>
<td>College of Arts and Sciences</td>
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<tr>
<td>C LIT</td>
<td>Comparative Literature, Comparative Literature (Arts and Sciences, Interdisciplinary Graduate Degree Programs)</td>
<td>Comparative Literature</td>
<td>College of Arts and Sciences</td>
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<td>CL LI</td>
<td>Classical Linguistics, Classics (Arts and Sciences)</td>
<td>Classical Linguistics</td>
<td>College of Arts and Sciences</td>
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<td>CMU</td>
<td>Communication, Communications (Arts and Sciences)</td>
<td>Communication</td>
<td>College of Arts and Sciences</td>
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<td>COM D</td>
<td>Community Dentistry (Dentistry)</td>
<td>Community Dentistry</td>
<td>College of Dentistry</td>
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<tr>
<td>CON G</td>
<td>Conjoint (Medicine)</td>
<td>Conjoint (Medicine)</td>
<td>College of Medicine</td>
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<td>C SC C</td>
<td>Computer Science (Interschool or Intercollege Programs)</td>
<td>Computer Science</td>
<td>College of Computing</td>
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<td>CZECH</td>
<td>Czech, Slavic Languages and Literature (Arts and Sciences)</td>
<td>Czech, Slavic Languages and Literatures</td>
<td>University of the Americas</td>
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<td>DAN</td>
<td>Danish, Scandinavian Languages and Literature (Arts and Sciences)</td>
<td>Scandinavian Languages and Literatures</td>
<td>University of the Americas</td>
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<td>DANCE</td>
<td>Dance, Music (Arts and Sciences)</td>
<td>Dance</td>
<td>College of Music</td>
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<td>DENTY</td>
<td>Dentistry (Dentistry)</td>
<td>Dentistry</td>
<td>College of Dental Medicine</td>
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<td>D HYS</td>
<td>Dental Hygiene (Dentistry)</td>
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<td>College of Dental Medicine</td>
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<td>D O EN</td>
<td>Educational Administration (Education)</td>
<td>Educational Administration</td>
<td>College of Education</td>
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<td>D E D C I I</td>
<td>Educational Curriculum and Instruction (Education)</td>
<td>Educational Curriculum and Instruction</td>
<td>College of Education</td>
</tr>
<tr>
<td>D E D P S</td>
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