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SPRING QUARTER 1974

To assure consideration, completed admission applications must be received by the following closing dates:

- New graduate students: January 1
- All other new and former students: February 1*
- Classes begin: April 1
- Memorial Day holiday: May 30
- Last day of instruction: June 7
- Final examinations: June 10–14
- Commencement: June 15

SUMMER QUARTER 1974

To assure consideration, completed admission applications must be received by the following closing dates:

- New graduate students: April 1
- All other new and former students: May 15
- First-term classes begin: June 24
- Independence Day holiday: July 4 and 5
- First-term classes end: July 24
- Second-term classes begin: July 25
- Quarter ends: August 23

AUTUMN QUARTER 1974

To assure consideration, completed admission applications must be received by the following closing dates:

- New graduate students: April 1
- New students entering from high school: May 1*
- All other new and former students: July 1*
- Classes begin: September 30
- Veterans Day holiday: November 11
- Thanksgiving recess: November 28 and 29
- Last day of instruction: December 11
- Final examinations: December 12–19

WINTER QUARTER 1975

To assure consideration, completed admission applications must be received by the following closing dates:

- New graduate students: October 1
- All other new and former students: November 1*
- Classes begin: January 6
- Washington’s Birthday holiday: February 17
- Last day of instruction: March 14
- Final examinations: March 17–21

* Should University undergraduate enrollment quotas be filled prior to the application closing date, it may not be possible to offer you enrollment even though you are scholastically eligible for admission.
1975/76

Dates in this calendar are subject to change without notice; those appearing in admission and registration instructions take precedence over those in this catalog.

**SPRING QUARTER 1975**

To assure consideration, completed admission applications must be received by the following closing dates:

- New graduate students: January 1
- All other new and former students: February 1
- Classes begin: March 31
- Memorial Day holiday: May 30
- Last day of instruction: June 6
- Final examinations: June 9-13
- Commencement: June 14

**SUMMER QUARTER 1975**

To assure consideration, completed admission applications must be received by the following closing dates:

- New graduate students: April 1
- All other new and former students: May 1
- First-term classes begin: June 23
- Independence Day holiday: July 4
- First-term classes end: July 23
- Second-term classes begin: July 24
- Second-term final examinations: August 22

**AUTUMN QUARTER 1975**

To assure consideration, completed admission applications must be received by the following closing dates:

- New graduate students: April 1
- New students entering from high school: May 1
- All other new and former students: July 1
- Classes begin: September 29
- Veterans Day holiday: November 11
- Thanksgiving recess: November 27 and 28
- Last day of instruction: December 10
- Final examinations: December 11-18

**WINTER QUARTER 1976**

To assure consideration, completed admission applications must be received by the following closing dates:

- New graduate students: October 1
- All other new and former students: November 1
- Classes begin: January 5
- Washington’s Birthday holiday: February 16
- Last day of instruction: March 12
- Final examinations: March 15-19

* Should University undergraduate enrollment quotas be filled prior to the application closing date, it may not be possible to offer you enrollment even though you are scholastically eligible for admission.
The University, through its teaching and research programs and through its faculty, students, and staff, is a major force for change. And yet it must also remain a stabilizing force in our society—a preserver of many valuable aspects of our culture. It is at once radical and conservative. The University serves societal needs through all of its activities, although teaching and community service tend to serve more immediate goals while research may largely benefit future generations.

John R. Hogness
President
The University of Washington was founded in 1861 on a ten-acre knoll in what is now downtown Seattle and was moved in 1895 to its present 660-acre site on the shores of Lake Washington. Now offering instruction in more than two hundred academic disciplines, the “University of a Thousand Years” is now in its second century of service.

The University of Washington’s enrollment for Autumn Quarter 1972 exceeded 34,000.

Enrollment for Autumn Quarter 1973 was 34,524. Of this number 26,715 were undergraduates; 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. These students come from every county in Washington and represent the smallest as well as the largest communities. The remaining students enter from high schools, colleges, and universities from every state and territory of the United States and from foreign countries. During the year 1972/73, 1,550 noncitizens from approximately a hundred countries have enrolled, ranking the University eleventh in the nation in size of foreign student population.

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 freshman class entering in Autumn Quarter 1973 was 3.25.

In the belief that a state university should be just in meeting the educational needs of the young people of all racial groups within the state, special efforts are being made to encourage the application of minority students who are judged to show a reasonable likelihood of success.

Women constituted 39.9 percent of the student population in Autumn Quarter 1973. Married students numbered 5,121 in the undergraduate program and 3,959 in graduate and professional study.

The Faculty
The faculty of the University includes the President, vice presidents, provost, vice provosts, deans, professors, associate professors, assistant professors, instructors, research associates, and lecturers.

The University attracts faculty members from colleges and universities throughout the world. A survey for the years 1963–73 indicated that 48 percent of new faculty members, ranking as assistant professors or above, came from the Midwest and the eastern seaboard of the United States, 12 percent from the state of Washington, 20 percent from California, 12 percent from other areas of the United States; and 3 percent from foreign uni-
versities. In 1972/73, the full-time teaching faculty of the University numbered approximately twenty-three hundred.

Accreditation
The University of Washington is accredited by the Northwest Association of Secondary and Higher Schools 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.

PROGRAMS OF STUDY

At the undergraduate level, the freshman or transfer student generally enrolls in the college that offers his chosen major. If he has not selected a major, he may enroll in the College of Arts and Sciences as a premajor. Undergraduates preparing for professional study in such fields as architecture, business administration, dental hygiene, dentistry, education, medical technology, medicine, occupational therapy, physical therapy, prosthetics and orthotics, social welfare, and urban planning may complete preliminary work in the preprofessional programs offered within the College of Arts and Sciences. The baccalaureate degree is required for admission to the Graduate School and the School of Law.

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 of Washington 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
* American Studies
Anthropology
Art
* Asian American Studies
Asian Languages and Literature
Astronomy
Atmospheric Sciences
Biology
Black Studies
Botany
Chemistry
* Chicano Studies
Classics
Communications
Comparative Literature
Drama
Drama-Dance
Economics
English
General Studies
** Genetics
Geography
Geological Sciences
** Geophysics
Germanic Languages and Literature
History
Home Economics
Institute for Comparative and Foreign Area Studies
* Latin American Studies
** Linguistics
Mathematics
Microbiology
Music
Near Eastern Languages and Literature
Oceanography
Philosophy
Physical and Health Education
Physics
Political Science
Psychology
* Religious Studies
Romance Languages and Literature
Scandinavian Languages and Literature
Slavic Languages and Literature
Society and Justice
Sociology
Speech
* Women Studies
Zoology

School and Graduate School of Business Administration
Accounting
Business, Government, and Society

* Programs that may be taken for a degree under General Studies.
** Graduate degrees only. Certain courses open to undergraduates.
2 Consistent with section 1.12.050 Revised Code of Washington, unless the context has required otherwise, the following rules of construction are to be applied in construing provisions of the General Catalog, which was in preparation prior to 1974: All words used herein in the singular number shall extend to and include the plural; all words used in the plural number shall extend to and include the singular; all words used in any gender shall extend to and include all genders.
Finance, Business Economics, and Quantitative Methods
Marketing, Transportation, and International Business

Wildlife Science
Wood and Fiber

School of Law

**School of Librarianship

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

School of Nursing
Comparative Nursing Care Systems
Family and Community Nursing
Maternal and Child Nursing
Physiological Nursing
Psychosocial Nursing

School of Pharmacy
Pharmaceutical Sciences
Pharmacy Practice

**Graduate School of Public Affairs
Public Administration
Public Policy

** Graduate degrees only. Certain courses open to undergraduates.
School of Public Health and Community Medicine
Biostatistics
Environmental Health
Epidemiology and International Health
Health Services
Pathobiology

Reserve Officer Training Programs
Aerospace Studies
Military Science
Naval Science

School of Social Work
Social Welfare

Advanced degree subject matter fields in the Graduate School include the following:

† Aeronautics and Astronautics
† Anthropology
† Architecture
† Art
† Art History
† Asian Languages and Literature
† Astronomy
† Atmospheric Sciences
† Biochemistry
† Biological Structure
† Biology
† Biomathematics
† Biomedical History
† Botany
† Business Administration
† Ceramic Engineering
† Chemical Engineering
† Chemistry
† Civil Engineering
† Classics
† Communications
† Comparative Literature
† Computer Science
† Dentistry
† Drama
† Drama Arts
† East Asian Studies
† Economics
† Education
† Electrical Engineering
† English
† Epidemiology and International Health
† Fisheries
† Forest Resources
† Genetics
† Geography
† Geological Sciences
† Geophysics
† Germanic Languages and Literature
† Health Services Administration and Planning
† History
† Home Economics
† Inter-Engineering
† Law
† Librarianship
† Linguistics
† Mechanical Engineering
† Metallurgical Engineering
† Microbiology
† Mining, Metallurgical, and Ceramic Engineering
† Music
† Near Eastern Languages and Literature
† Nuclear Engineering
† Nursing
† Oceanography
† Oral Biology
† Pathology
† Pharmaceutical Sciences
† Pharmacology
† Pharmacy Practice
† Philosophy
† Physical and Health Education
† Physics
† Physiology and Biophysics
† Physiology Psychology
† Political Science
† Psychology
† Public Affairs
† Public Health and Community Medicine
† Radiological Sciences
† Rehabilitation Medicine
† Romance Languages and Literature
† Russian and East European Studies
† Scandinavian Languages and Literature
† Slavic Languages and Literature
† Social Work
† Sociology
† Special Individual Ph.D. Program
† Speech
† Urban Planning
† Zoology

**Graduate degrees only. Certain courses open to undergraduates.
† Doctoral program.
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.
Bachelor of Arts in Environmental Design  B.A.E.D.
Bachelor of Arts in Urban Planning  B.A.Urb.Plan.
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
Bachelor of Science in Prosthetics and Orthotics  B.S. in P.&O.

Graduate Degrees

Master of Arts ................................................................. M.A.
Master of Arts for Teachers .................................................. M.A.T.
Master of Science .............................................................. M.S.
Master of Science in Aeronautics and Astronautics  M.S.A.&A.
Master of Science in Ceramic Engineering  M.S.Cer.E.
Master of Science in Chemical Engineering  M.S.Ch.E.
Master of Science in Civil Engineering  M.S.C.E.
Master of Science in Dentistry .............................................. M.S.Den.
Master of Science in Electrical Engineering  M.S.E.E.
Master of Science in Engineering ........................................... M.S.E.
Master of Science in Mechanical Engineering  M.S.M.E.
Master of Science in Metallurgical Engineering  M.S.Met.E.
Master of Science in Nuclear Engineering  M.S.N.E.
Master of Science in Physical Education  M.S.Phys.Ed.
Master of Science in Public Health  M.S.P.H.
Master of Science in Radiological Sciences  M.S.Rad.Sci.
Master of Aeronautics and Astronautics  M.A.&A.
Master of Architecture ...................................................... M.Arch.
Master of Business Administration ........................................ M.B.A.
Master of Communications .................................................. M.C.
Master of Education .......................................................... M.Ed.
Master of Fine Arts ........................................................... M.F.A.
Master of Forest Resources ................................................ M.F.R.
Master of Health Administration ......................................... M.H.A.
Master of Laws ................................................................. M.L.
Master of Law Librarianship ................................................. M.L.Libr.
Master of Librarianship .................................................... M.Libr.
Master of Music ............................................................... M.M.
Master of Nursing ............................................................ M.N.
Master of Occupational Therapy .......................................... M.O.T.
Master of Physical Therapy ................................................ M.P.T.
Master of Public Administration ........................................... M.P.A.
Master of Public Health ..................................................... M.P.H.
Master of Social Work ....................................................... M.S.W.
Master of Speech Pathology and Audiology  M.Sp.Path.&Aud.
Master of Urban Planning .................................................... M.U.P.
Doctor of Arts ................................................................. D.A.
Doctor of Education .......................................................... Ed.D.
Doctor of Musical Arts ....................................................... D.M.A.
Doctor of Philosophy ......................................................... Ph.D.

Dental, Law, and Medical Degrees

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

Undergraduate programs and degree requirements are described in the “Undergraduate Education” section.

Graduate degree requirements are described in the section on “Graduate Study.” For detailed information about the programs of study and requirements in the colleges, schools, and departments, see the sections describing each.

SESSIONS

University instruction is offered during three quarters of approximately eleven weeks each during the Autumn, Winter, and Spring quarters, and for nine weeks during the Summer Quarter. 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 extends from mid-June to mid-August, with some courses being offered in either the first half (term a) or the second half (term b).

**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 University's Office of New Student Services, 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, and credits earned are evaluated as residence credits. Application closing dates should be carefully observed. Summer Quarter fees closely parallel those of a regular quarter; there is no additional fee for nonresidents during the summer. A separate fee schedule applies to medical and dental students.

Admitted 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. Part-time fees are charged in accordance with the number of credits for which the student is registered. A complete listing of both graduate and undergraduate courses available during Summer Quarter is published in the *Summer Quarter Bulletin*.

Additional information concerning the summer program, application closing dates, and fees appears in the *Summer Quarter Bulletin*, available about mid-March. Inquiries should be addressed to the University of Washington, Office of Summer Quarter, 303 Lewis, DW–40, Seattle, Washington 98195.

**THE CAMPUS**

The University of Washington's campus—680 acres of trees, landscape, and buildings in urban Seattle—is situated on the shore of Lake Washington and has long been considered one of the most attractive in the nation. Many different species of trees, shrubs, and flowers add beauty to the surroundings. The physical plant of more than a hundred permanent buildings includes a modern, fully equipped research and teaching hospital, which forms a portion of the health sciences complex, at the southern end of the campus.

The major buildings in which academic activities are centered form the central portion of the campus; student housing facilities are distributed around the periphery. An extensive athletic plant, playing fields, and recreational areas are situated on the campus, as are the botanical and drug-plant gardens. A two-hundred-acre arboretum, which contains thousands of varieties of trees, plants, and shrubs from all over the world, adjoins the campus proper.

**University Libraries**

The University of Washington has been fortunate in amassing a fine collection of library materials essential to high-quality education. The University Library system, consisting of the Suzzallo Library, the Charles E. Odegaard Undergraduate Library, and eighteen branch libraries, contains more than 2,012,000 volumes; 400,000 research reports; 36,110 current serial subscriptions, as well as numerous maps, newspapers, microfilms, manuscripts, and countless state, federal, foreign, and international government documents.

The largest aggregation of books and materials is housed in the Suzzallo Library. It is there that students concerned with investigation in the atmospheric sciences, biology, botany, geological sciences, humanities, and the social sciences find extensive library resources. Rare books, manuscripts, and a definitive collection of materials relating to the Pacific Northwest are also available in the Suzzallo Library.

Particularly important for all undergraduates is the undergraduate library. Its 120,000 volumes include commonly used reference works, books for assigned and collateral reading, and books and magazines for general reading. A media center provides audiovisual facilities for course-related and recreational programs. Except for specialized projects, an undergraduate in any academic field can find in the undergraduate library nearly every book he is likely to need.

Most books in the Suzzallo Library and in the branch libraries are in open-shelf collections, to which students have direct access. Librarians assigned to each collection or service unit assist students in the locating and using of materials.
The specialized collections in the branch libraries are useful for work in various disciplines and are situated near the classrooms and laboratories of each discipline. Branch libraries in the sciences include Chemistry-Pharmacy, Engineering, Fisheries-Oceanography, Forest Resources, Health Sciences, Mathematics Research, and Physics. Libraries in other disciplines include Architecture and Urban Planning, Art, Business Administration, Drama, Far Eastern Studies, Geography, Law, Music, Philosophy, Political Science, and Social Work.

The University of Washington Library 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 3,750,000 author entries from forty libraries in the Pacific Northwest. This catalog is an aid to locating uncommon books in other library collections that may be required by library users, both on and off campus.

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.

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 are presented during the academic year and range in type from classics to musicals.

Henry Art Gallery
The Henry Art Gallery brings to the campus and the community exhibitions of contemporary and historical work in all media of local, national, and international significance. The offerings also include films, lectures, music, multimedia performances, and an active publishing program. The Archives of Northwest Art is housed in the gallery, as is a small, but distinguished, collection of 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 the multifaceted program that has been traditionally funded by the state of Washington. The gallery is open without charge to the public every day except Monday.

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 theater, a tutorial center, and a study skills center. 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.

The Center for Asian Arts
The Center for Asian Arts, with administrative offices in 131 Art, initiates new programs concerned with the arts of Asia, which involve both teaching and research. As these programs become established, they are assigned to the appropriate departments or schools in the College of Architecture and Urban Planning and the College of Arts and Sciences. In cooperation with the appropriate departments and the Office of Lectures and Concerts, the center gives performances, arranges exhibits, and organizes symposia and workshops.

STUDENT HOUSING
Students are free to make their own housing arrangements, and they are urged to select the types that will best serve their academic and personal needs.

Residence Halls
Residence hall accommodations for men and women at the University of Washington 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 McMahon Hall is given to students who have at least junior standing and are at least twenty years old.

Approximately eighteen hundred rooms are planned for double occupancy, and eight hundred are designed for
single occupancy. Rooms are furnished with twin beds and individual desks and wardrobes. Attractive dining areas, study rooms, kitchenettes, and laundry rooms have been included for student comfort and convenience. Ample study and recreation areas, including lounges and game areas, are provided in all halls.

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 income criteria:

1. Students who are members of the University's Educational Opportunity Program (EOP).

2. (a) Women who are single parents and have dependent children, and (b) men who are single parents and have dependent children.

3. Students with special housing problems (i.e., physically handicapped students, foreign students, or others with extreme personal or financial hardship).

4. All other students.

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 rooms 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 granted a broad degree of self-government. However, the University makes available, through the Office of Student Affairs, 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 rush programs for their member fraternities and sororities.

For additional information write to: University of Washington, Panhellenic Association (or Interfraternity Council), Student Union Building, 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 of Washington. 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, Japanese, 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.
CAMPUS ACTIVITIES

Recreational Sports
The Department of Intramural Activities provides a broad, diverse program of both structured and unstructured recreational sports activities. The IMA department manages the Intramural Activities Building, golf range, and canoe house. It also utilizes other recreational facilities, such as the Clarence S. “Hec” Edmundson Pavilion, Hutchinson Hall and related facilities, the Student Union Building (HUB), and Conibear Crew House.

Intramural Activities Building
The Intramural Activities Building provides sports facilities for the use of students, faculty, and staff. It has four multipurpose gymnasiums, an indoor swimming pool with adjoining sundeck, an indoor archery range, handball/racketball and squash courts, weight training and exercise rooms, locker rooms and saunas, an equipment issue area, a lounge, and meeting rooms. Adjacent outdoor facilities include fifteen tennis courts, of which six are lighted, horseshoe pits, jogging trails, and twenty-two acres of field space.

Golf Range
A golf driving range with twenty covered automatic tees is available for students, faculty, staff and alumni use upon payment of fees. In addition, golf clubs and two putting greens are available for use without charge.

Canoe House
A canoe house, soon to be replaced by a new aquatic recreation facility, supports water-related activities of canoeing and sailing for students, faculty, staff, and alumni. Canoes and rowboats are available for rental, while membership in the UW Yacht Club provides access to sailing.

Student Union Building (HUB)
The University provides the student with opportunities for a well-rounded college experience, which includes participation in social, recreational, and athletic activities. The Student Union Building (HUB) is a cultural, social, recreational, and service center where all may hear many points of view and may learn more about fellow students. Activities are planned and coordinated by student committees, which are assisted by trained staff advisers. Regular dining facilities are provided by the Husky Den, the cafeteria, and special rooms, which are also available as private banquet rooms. Among the HUB’s many facilities are a ticket office, auditorium, lost-and-found service, post office, lounges, bowling alley, billiard room, table tennis room, ballroom, bookstore, offices of student government, and meeting rooms.

Hutchinson Hall
Hutchinson Hall, the center for physical education activities and instruction, is equipped for basketball, badminton, tennis, swimming, dancing, and fencing and has adjacent tennis courts and playing fields.

Edmundson Pavilion
The Edmundson Pavilion, which seats 9,200 persons, is used for basketball, handball, wrestling, volleyball, gymnastics, other sports, and student events. A large swimming pool for classes and events is adjacent.

Conibear Crew House
Conibear Crew House, on the shore of Lake Washington just north of Edmundson Pavilion, is one of the most modern college shellhouses in the country. It also provides living accommodations for seventy-five men. Because the University is located in a major recreational area, off-campus and public facilities for swimming, sailing, skiing, riding, camping, and fishing are plentiful. Mountain climbing also ranks high among Pacific Northwest sports.

Intramural Sports
A comprehensive organized program of intramural sports is available to students, faculty, and staff. Some seventy-four different co-recreational (men and women), women’s, and men’s activities and special events are available. Activities range from archery, basketball, and flag football to such events as tug-o-war and kite flying. The intramural sports office is located in the Intramural Activities Building.

Sports Clubs
An extensive sports club program includes the following clubs: aikido, archery, badminton, bicycling, boxing, canoe, climbing, fencing, handball, ice hockey, judo, karate, kendo, kung-fu, lacrosse, rugby, running, silverfish, skin and SCUBA, skydiving, soccer, squash, tae-kwondo, volleyball, weight lifting, and sailing. The sports club office is located in the Intramural Activities Building.

Intercollegiate Sports
Women
The intercollegiate athletic program for women offers nine sports for undergraduate students: basketball, crew, field hockey, gymnastics, golf, swimming, tennis, track, and volleyball. Competition is scheduled within the Northwest College Women’s Sports Association. Qualifying teams and individuals also compete in the national championships of the Association for Intercollegiate Athletics for Women.
Men
The intercollegiate athletic program for men offers competition in twelve varsity sports for undergraduate students. Some six hundred athletes participate annually in baseball, basketball, crew, cross-country, football, golf, gymnastics, soccer, swimming, tennis, track, and wrestling. Competition is scheduled with the other member schools of the Pacific-8 Conference, as well as with other institutions inside and outside the state. The well-rounded program emphasizes both scholarship and aggressive competition in athletics.

Lectures and Concerts
The new Meany Hall, completed in 1974, is a twelve-hundred-seat auditorium in which operas, concerts, and dance events are presented by the Office of Lectures and Concerts in cooperation with academic departments. The office, which is located in the hall, also obtains outstanding lecturers and performing artists throughout the year for the benefit of the campus and community.

Films, chosen to represent either the work and style of a single director or the output of a specific country or period, are presented in quarterly series, with both afternoon and evening showings.

Reduced rates for students are offered at all Office of Lectures and Concerts presentations.

Drama
The School of Drama schedules numerous productions during the year in its three theatres. These include productions directed by the faculty, master’s degree candidates, and visiting directors. With the exception of the productions of the Professional Actors’ Training Program, auditions for roles are open to the entire University community.

Music
In addition to the fine music available to students through the lecture-concert series, both undergraduates and graduates from all academic fields are invited to participate in a variety of musical groups.

Vocal and instrumental performing groups include: University Symphony Orchestra, University Sinfonietta, Concert Band, Wind Sinfonietta, Marching Band, University Singers, University Chorale, Madrigal Singers, Opera Workshop, Opera Theatre, Jazz Ensemble, Stage Band, Contemporary Group, and Collegium Musicum.

Readers Theatre
The Department of Speech presents Readers Theatre programs twice each quarter of the academic year. Directed by faculty and selected graduate students, these public programs feature outstanding works of literature performed by advanced oral interpretation students. Readers Theatre is open to all undergraduates interested in group oral interpretation performance. Permission to enroll in the course is obtained from the director of Readers Theatre.

Forensic Studies
The University Program of Forensic Studies, open to all undergraduates, provides qualified students an opportunity for concentrated study and practical experience in the processes of forensic deliberation, including debate, discussion, oratory, extemporaneous speaking, and oral interpretation of literature. Freshmen are especially urged to participate. Each year’s schedule includes numerous opportunities for beginners in college forensics.

Religious Activities
Various religious groups function within the University community. These groups offer educational, community action, counseling, worship, and social opportunities to persons in the University community.

Student Government
The Associated Students of the University of Washington (ASUW) is a corporation representing student governmental and service interests on campus. All full-time students automatically participate. Of each full-time student’s quarterly fees, $2.50 is allocated to the ASUW for support of its programs and services. The ASUW is headed by a president and three officers elected by the student body during Winter Quarter each year. The Board of Control, the legislative body governing the ASUW, consists of the four ASUW officers, seven students elected at large, and one appointed representative. The ASUW provides a broad range of services to students, through its commission structure. The commissions are briefly outlined below. For more detailed information on student services and activities, a University of Washington Student Handbook is prepared by the ASUW and is available in the HUB at the following offices: room 109, the information booth; room 2041, the Information Commission office; and room 207, the student activities office.

ASUW Commissions
Community Services: STAY Tutoring, Project Accomplish, and Social Tutoring place volunteers and tutors in community service agencies and Seattle public schools. Programs for volunteer community action and credit are offered under the auspices of the commission.

Women’s Commission: All areas of women’s rights, particularly within the University community, are the
focus of the Women's Commission. In the past, activities have focused on all aspects of discrimination against women among students, faculty, and staff. A primary task of the commission is educational activity involving lectures, symposia, publications, and consultative services for women students.

**Arts and Entertainment:** All major concerts and cultural events are sponsored under the auspices of the Program Panel. An annual fine arts festival is sponsored by the commission, as is Homecoming.

**Environmental Works:** The primary focus of this commission is on the University as an effective ecological community. The commission also serves as a clearing house on environmental issues, both within the campus community and in the broader Seattle community.

**Information Commission:** This commission serves as a liaison and informational link between the ASUW, its agencies, and the student body at large. The Information Commission operates the CAGE, an art center for student organizations, and coordinates an information booth in the Student Union Building. Under its auspices, the informational *Student Handbook* is published each year.

**Minorities Commission:** This commission is made up of representatives of the American ethnic and cultural minority groups on campus. Cultural events and speakers are sponsored under its auspices.

**Other ASUW Activities**

Regular services of the ASUW include Lecture Notes, the CAGE Poster Printing Service, and funding for student legal aid service. Board of Control meetings are held weekly and are open to the campus community. Students interested in becoming involved in governmental areas of the ASUW, including seats on University faculty-student-staff committees, or in any programming area are urged to talk with a representative of the Information Commission, an ASUW officer, or a staff adviser in 207 HUB.

**Graduate and Professional Student Senate**

The Graduate and Professional Student Senate consists of one elected senator from every academic unit granting a graduate or professional degree. The senate elects its own officers, and it has a system of standing committees and problem-centered subgroups to focus the interests and concerns of graduate students at the departmental level and within the University administration, particularly in standing committee appointments. The GPSS office is situated in 304G HUB.

**Student Activities Office**

A staff of advisers and office personnel are available in 207 HUB to facilitate student use of programs and services. In conjunction with the Adviser to Student Organizations, the Student Activities Office staff can serve as resource persons on University policy and procedures, as well as in areas of program content.

**Student Organizations**

Students are encouraged to become active in at least one of the approximately three hundred fifty voluntary student organizations on campus, which include honoraries, professional and social organizations, cooperative houses and residence clubs, service and coordinating clubs, activity groups, church and fraternal organizations, and geographical groups.

**Student Publications**

Student publications at the University of Washington 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.

**STUDENT SERVICES**

**Academic Advising**

Faculty members are available for personal discussions with students outside the classroom. However, because most professors at the University are engaged in a variety of teaching, research, and public service activities that occupy much of their time, students must take the initiative in establishing advisory relationships.

Academic advisers are available to consult with students on registration, curriculum development, academic standards, degree requirements, and other educational concerns. Advisers are usually located in a central advisory office within each college; however, the larger colleges often delegate certain advisory responsibilities to the individual departments.

The extent to which students should use advisory services becomes a matter of individual need. Many departments require students to have periodic reviews of their academic programs with advisers, but usually the use of such services depends upon individual interest and concern about one's educational development. Students find that advisory services, both formal and informal, are available, once sought.
Office of Student Affairs
The Office of Student Affairs is concerned with the general welfare of students in their extracurricular life and activities and provides various nonacademic services to assist them. It welcomes correspondence and conferences with both parents and students. The office works closely with the advisers of the colleges and schools, the Counseling Center, and other agencies to provide assistance with personal, social, and adjustment problems that may influence a student’s academic performance.

Students are invited to contact the Office of Student Affairs for information about fraternities, sororities, special programs of living groups, student organizations, or special services for physically handicapped students.

Office of International Services
Students from other countries may contact the Office of International Services for information or counsel about immigration regulations, housing, social relationships, personal problems, minimum course requirements, employment opportunities, finances, and applications for scholarship aid. The office also provides assistance in immigration matters to noncitizen faculty and staff.

The fifteen foreign student organizations recognized by the University provide a variety of programs designed to acquaint American students with the practices, customs, and traditions of other countries. The Foundation for International Understanding Through Students, a private community organization, provides host families for foreign students and sponsors numerous activities for the benefit of both foreign and American students.

Foreign Study
The University of Washington sponsors numerous foreign study programs. As a member of the Northwest Interinstitutional Council on Study Abroad, the University cooperates with other Pacific Northwest institutions in offering programs of liberal arts study in Europe and Mexico for undergraduates. Students enroll in an interdisciplinary program of study and may pursue a specialized area on an intensive basis. The School of Art offers special courses in studio art and art history during the spring session in Avignon. Excursions complement the formal course work, and “home stays” are arranged at each study locale. Students also may pursue language and area studies through the Cooperative International Program for Teacher Education in Nice, Rennes, and Seville. Although enrolled for direct credit at the University of Washington, students are in attendance at a European university.

The Department of Germanic Languages and Literature offers a program of summer language study in Berlin and Marburg, Germany. Excursions and attendance at musical and theatrical performances supplement the academic program, and home stays are provided.

Once every two years the Center for Asian Arts offers the Kansai program in Kyoto for two quarters of intensive study of Japanese theatre, art, and language. Each year the English Summer Theatre School offers several weeks of practical training in the dramatic arts at a site near London.

The Department of Slavic Languages and Literature joins with other institutions in offering summer semester Russian language programs in Leningrad. These are coordinated by the Council on International Educational Exchange in New York.

Many University departments have specialized programs for their advanced students. The departments of Classics and of Asian Languages and Literature recommend students who have passed competitive examinations for an academic year in Rome, Taipei, and Tokyo through interinstitutional programs administered by Stanford University. Selected art history students study in London during Spring Quarter with a School of Art faculty member. A small number of students from the Graduate School of Business Administration may undertake special research projects in Japan and Western Europe. The Department of Architecture selects students to carry out special projects during Spring Quarter in Rome. During Summer Quarter, students visit the cities and countryside of Great Britain to pursue their interests.

Information on the University’s foreign study programs is available through the Foreign Study Office, 102 Caledonian, 1416 Northeast Forty-first Street.

University of Washington programs in other academic fields and in other locations are announced as they develop.

Academic credit also may be awarded for satisfactory participation in many overseas study programs not directly sponsored by the University of Washington. Because study experience in another country can make a valuable contribution to the education of the serious student, the University maintains a counselor in the Foreign Study Office to assist students interested in these programs or in study at a foreign university.

Counseling Center
The services of the Counseling Center are directed toward assisting typical students to resolve the inevitable problems encountered at the University in an effort to
fulfill their potential for intellectual, social, and emotional growth. A staff of psychologists and vocations counselors offer to students vocational, educational, and personal counseling without fee. Students are assisted in perceiving themselves and their situations more fully so that they better know and accept the resources they have available for resolving their indecisions or concerns. Their attempts at self-appraisal may be facilitated by specially selected psychological tests that can help clarify the issues that have become identified as important to them. A library of occupational information also is provided for students' use.

The Counseling Center offers an eight-week Effective Study Program designed to assist students in improving their patterns of study and to equip them with effective study techniques: reading for answers, note taking in class and from textbooks, listening, and learning how to study for examinations, among other matters.

Educational Assessment Center
Formerly the Bureau of Testing, the Educational Assessment Center provides a variety of testing and evaluative services for University departments and individual students. Of particular interest to students and prospective students is the center’s sponsorship of admissions testing programs, including the Washington Pre-College Testing Program, and placement testing for English, foreign languages, and mathematics. For the University student approaching graduation, the center offers a number of tests that are required for admission to graduate, law, medical, or other professional schools or that are requested by prospective governmental or private employers. The center has its offices on the fourth floor of Schmitz Hall.

Health Services
The University operates the 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.

A thirty-five-bed hospital unit operates from about September 15 through June 15; night 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 certain fees: $2 per day for hospital confinement, $1 per injection for allergy shots, and $2 per immunization for personal travel shots. Students also must pay for outpatient prescriptions. Major surgery and the occasional illness of exceptional severity require treatment elsewhere, and the student should protect himself 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.

Placement Center
The University provides an extensive career development and placement program through its Placement Center to assist University students and alumni who have received degrees or certificates from the University in their efforts—

• to make a viable connection between their academic backgrounds and their career or long-range employment objectives.

• to develop effective job-seeking campaigns.

• to find suitable employment upon leaving the University or to change employment thereafter.

Job seeking can be exciting and rewarding, but it also can be frustrating. It is a process requiring time, effort, and a good deal of thought. If the task is approached casually or passively, the results may be discouraging. Consequently, students who have questions or problems concerning the kinds of employment opportunities that relate to their academic fields are welcome at the Placement Center at any time during their academic programs. Most students should contact the center no later than their junior year to make the most effective use of its placement programs during their last year in residence. Those students planning to use the center for job seeking upon completing their University programs should contact the center no later than the beginning of their last year at the University.

Despite its title, the Placement Center has no list of jobs in which to place students. It does, however, provide the student with information and assistance that can contribute to the success of his or her job seeking. The assistance made available by the center includes:

Placement Counseling: A staff of counselors is available to assist individual students and alumni in their employment search.

Placement Seminars: Seminars cover a variety of subjects, such as résumé preparation, employment outlook, employment search for liberal arts graduates, teacher placement in the public school system, and preparing for the interview.
Career Information: Students can learn about employment opportunities, trends, markets, employing organizations such as schools and universities, corporations and small businesses, and governmental and community service agencies.

Job Listings: The center maintains an open posting and listing of specific jobs from a broad spectrum of employers that are immediately available to students and alumni.

Campus Interviewing: Students have an opportunity to interview with governmental organizations, private companies, and schools that are actively seeking graduates from the University.

Placement and Graduate School File Service: Available to students and alumni on a fee basis, this service includes résumé information provided by the candidate and evaluative statements that the candidate requests on his or her behalf. Upon request, these files are duplicated and mailed to employers, graduate schools, or other placement offices.

Job Opportunity Mailing Service: Available to students and alumni on a fee basis, this service offers an announcement of job openings mailed periodically to students and alumni who are registered with the center and have paid the mailing list fee.

Career Oriented Work Experience: As a part of its career development program and within the limited number of employment opportunities available, the center assists students in obtaining part-time, temporary, and summer employment related to their major fields of study. The center also works closely with many campus internship programs.

Office of Student Financial Aid
University students faced with serious financial problems should inquire about assistance at the Office of Student Financial Aid, 105 Schmitz. The primary purpose of the financial aid program is to provide financial assistance to students who, without such assistance, 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.

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 Graduate School and the “Graduate Study” section of this catalog.

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. A student may make application only in person after he or she is enrolled, or in the process of enrolling, with matriculated standing at the University.

Parking
Coin-operated parking areas on the periphery of the campus are available to all students. A limited number of parking permits in areas adjacent to residence halls may be purchased by students living in the halls. Application for residence hall parking is made to the residence hall. A student parking committee determines priority of assignment. Physically handicapped students with a letter from Hall Health Center verifying their disabilities are considered for assignment to available parking spaces as close as possible to classroom assignments.

All parking assignments and payment of permit parking fees are made at the Parking Division Building, just inside the University entrance at Fifteenth Avenue Northeast and Northeast Fortieth Street.

University Book Store
The University Book Store, in operation since 1900, is situated at 4326 University Way Northeast. While not operated or financed by the University, the store is governed by a student-faculty board of trustees. It returns all income not needed for operation to the students, faculty, and staff through a patronage refund system.

The textbook department stocks all required and recommended texts for all University classes, plus technical and reference books and study aids. The general book department stocks a wide selection of books for supplementary and general reading, including thirty-five thousand titles in paperback editions. The student supplies department carries art, architecture, and engineering materials. The store also has camera, typesetter, sports, gift, and music shops.

For the convenience of students, the bookstore has two branches on campus. A store in the HUB stocks miscellaneous supply items and a selection of paperback books and study aids. A branch in the Health Sciences Center carries all texts and references for medical, dental, and nursing studies, plus a selection of supply items and books for general reading.
RULES AND REGULATIONS

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 to change any other regulations affecting the student. Changes go into force whenever the proper authorities so determine, and 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 regulations 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, will arrange for a hearing if appropriate, or will refer the student to the proper office for a decision.

DEFINITIONS OF GENERAL UNIVERSITY TERMS

College
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 many schools, departments, and divisions. For example, the College of Arts and Sciences includes six schools, twenty-four departments, and several divisions.

School
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, which offer semiprofessional training in single fields of study (e.g., Art, Communications, Drama, Home Economics, Music, and Physical and Health Education).

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.

Department
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.

Division
When a field of study includes work offered by several of the more specialized units of the University, the administrative result is sometimes called a division. In
such cases, a committee of departmental representatives plans and coordinates the program. In a few instances, “division” denotes a specialty within a department, which may have several divisions.

Institute
The primary functions of an institute are research and advanced study. The institute is usually associated closely with related departments, because its staff is largely composed of the departments’ faculty members, who divide their time between teaching and research.

Course
A course is a quarterly unit of study in a particular subject. Each course is listed by prefix, number, and title and included in the “Description of Courses” section of this catalog.

Hyphenated Course
Course numbers separated by hyphens, or short dashes, (e.g., BIOL 101–102) indicate courses for which no credit is given until both terms have been completed.

Prerequisites
Courses to be completed or conditions to be met before one is eligible to enroll in a more advanced course are called prerequisites (e.g., ART 109 is a prerequisite to ART 110).

Credit
A credit is a measurement of curricular work completed satisfactorily. Ordinarily, 1 credit is given at the University of Washington for one class attendance a week for a period of one quarter. However, in some courses, such as laboratory courses, two or three “clock hours” of attendance a week are required for the student to earn 1 credit. A specified number of credits must be earned for a degree.

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

There are three basic types of credit:

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

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

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

Curriculum
The pattern or sequence of courses a student takes in earning his degree is a curriculum. Curricula are outlined in this catalog.

Lower-Division Courses
Lower-division courses are those courses numbered in the 100 and 200 series.

Upper-Division Courses
Courses numbered in the 300 and 400 series are considered to be upper-division courses and are ordinarily taken by juniors and seniors.

Graduate Courses
Courses numbered 500 and above are open only to graduates, unless approval is obtained from the instructor.

Premajor
The premajor category is provided in certain colleges for those students in the first or second year who have not made a definite choice of major in the college. These students may select, in consultation with an advisor, a program of studies that meets the broad general requirements of the college and at the same time provides an experimentation and exploration in the subject areas of the college. Each program is planned according to the individual student needs. Students not admissible to certain programs may enroll as premajors while completing admission requirements to those programs.

Major
A major indicates the particular curriculum that a student has selected to follow toward a degree. The term
“nonmajor,” which frequently appears in descriptions of courses, indicates a course designed primarily for students who are not specializing in that subject.

Adviser
A member of the college faculty or staff who is appointed to assist students in both educational and personal plans is an adviser.

Bulletin
A bulletin is an official publication issued by the University giving detailed information about such subjects as admissions policy, academic personnel, courses, or fees.

Resident, Washington State Residency
A “resident” is a student whose domicile, as defined by state law, is in Washington, and who therefore is not subject to the additional fee required of nonresident students. The residency requirement section of this catalog contains regulations concerning residency.

DEFINITIONS OF STUDENT CLASSIFICATIONS

Classes
Class standing is computed on the basis of the 180 minimum credits required for graduation. A student is defined as being in a certain class (e.g., freshman), based on the total credits he has earned. Credits earned in lower-division ROTC courses are not counted. Physical education activity courses at the 100 level are included for determination of class standing, but do not always apply toward graduation.

Freshman: 1–44 quarter credits.

Sophomore: 45–89 quarter credits.

Junior: 90–134 quarter credits.

Senior: 135–180 or more quarter credits.

Fifth-year: A student with a baccalaureate degree who is enrolled as an undergraduate.

Graduate: A student with a baccalaureate degree who has been granted admission to the Graduate School.

Professional: A student admitted into a professional program in the schools of Dentistry, Law, or Medicine.

Nonmatriculated student: A student with no degree program or certification objectives.

Definitions
For the purpose of these regulations, the following additional definitions apply:

1. An “admissible person” is one who has applied for and has been offered an opportunity to enroll at the University of Washington for a given quarter.

2. An “enrolled student” is one who is admissible to the University for a given quarter and has given a firm commitment, usually by payment of a $50 enrollment service fee, of his or her intention to attend the University (payment of the enrollment service fee is not required for Summer Quarter).

3. A “registered student” is one who has enrolled and has been assigned by the University Registrar to one or more courses in a given quarter.

4. A “new student” is either one who has not previously registered for residence credit courses at the University or one who will be in his or her first quarter in a classification different from that in which he or she last attended.

5. A “returning student” is one who has formerly attended the University as a matriculated student but did not complete the degree or professional certificate program for which he or she was last registered, or as a nonmatriculated student, or as a graduate student who is in his or her first quarter of attendance following return from official on-leave status.

6. A “continuing student” is anyone who has registered in the same classification the preceding quarter or one who is registered Autumn Quarter in the same status he or she was registered the preceding Spring Quarter.

7. An “on-leave graduate student” is a graduate student in good standing who plans to be away from the University and who has applied for and been granted on-leave status.

8. A “matriculated student” is one who has been accepted into one of the University’s schools or colleges to pursue a program of study that normally leads to a degree or professional certificate.

9. A “nonmatriculated student” is one who will be admitted and permitted to register for courses on a space-available basis, but whose educational objectives do not include a University of Washington degree or professional certificate.

10. A full-time undergraduate student is one who is carrying at least 12 academic credits. A graduate stu-
student must carry 9 credits to be considered a full-time student. In practice, students carry more or fewer than the usual number of credits, depending on personal circumstances and chosen programs. The University does not generally require that students enroll for any given minimum number of credits, but certain other agencies (e.g., Veterans Administration, Social Security, etc.) may require full-time enrollment for the student to receive maximum benefits.

UNDERGRADUATE ADMISSION

Correspondence regarding either admission as an undergraduate to any division of the University or the transfer of credit from another collegiate institution should be addressed to the Office of Admissions (see sections on “Undergraduate Education” or “Graduate Study” for admission requirements and procedures).

The Board of Admissions, Scholastic Standards, and Graduation has been authorized to interpret and administer undergraduate admission regulations established by University faculties. In general, admisibility is determined according to the applicant's scholastic standing, admission test scores, and the 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.

In determining the adequacy of an applicant's preparation, 5 quarter credits of elementary course work at the college level are considered equivalent to 1 high school unit in a given subject. The student admitted to the University without having completed all the specified high school courses for admission is expected to complete college-level courses that provide an equivalent background.

For purposes of admission, an applicant's scholastic achievement in secondary or higher schools is determined by a grade-point average computed on a 4.00 system. This procedure is being reconsidered by the faculty and is subject to change before 1975 admission criteria become effective. In determining the acceptability of transfer students, the University considers grades earned in all college-level courses attempted that are appropriate for a baccalaureate degree. Applicants from schools using nonpunitive grading systems may be required to take tests or to provide other supplementary information for determining admissibility. Transfer students also must present the minimal high school preparation or college-level courses sufficient to remove any high school deficiencies.

The University recognizes diplomas awarded by high schools accredited by their respective regional accrediting associations, their state departments of public instruction, or their state universities. Recognition is given to degrees awarded by colleges and universities that are fully accredited by their regional accrediting associations.

An applicant who has not fulfilled the criteria specified for admission or whose education was received in an unaccredited school may request individual consideration by the Board of Admissions, Scholastic Standards, and Graduation. In such cases, the board may require scores on tests or other evidence of probable success in a University program. Students accepted by the board are expected to comply with any specifications outlined by the board at the time of admission.

Entrance Examinations

Scores on the Washington Pre-College Test (WPCT), the Scholastic Aptitude Test of the College Entrance Examination Board (CEEB), or the American College Test (ACT) are required of all freshman applicants. It is recommended that resident students submit scores on the WPCT. In making arrangements for a test, the applicant should request that the scores be sent to the University of Washington Office of Admissions. In addition, the Office of Admissions should be informed as to when the tests will be taken so that it may anticipate the arrival of the test scores.

Allowance of Transfer Credits

1. 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 the university-level courses appropriate to the student's degree curriculum at the University of Washington.

2. Transfer of credit from institutions accredited for two-year programs only (community and junior colleges) apply on the University freshman and sophomore years only. A student who has completed a portion of his freshman and/or sophomore years in a four-year college may not transfer junior college credit in excess of those necessary to complete the first two years in the
University. In no case can the transfer of junior college credit to the University exceed 90 quarter credits.

3. Courses from colleges that have been identified as equivalent to University numbered courses are so accepted and apply toward the baccalaureate degree exactly the same as do their counterparts taken at the University. Other courses that are also academic in nature, although not necessarily equivalent, but drawn from areas of instruction offered by the University are also accepted. Such courses are identified, not by specific number, but by department or area and are designated as “X” credits. “X” credits may satisfy department or college requirements or count as electives to the extent the degree program permits.

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

4. At the point of admission, students who have earned no more than 45 quarter credit hours of transferable college-level courses may submit test results from the College Level Examination Program (CLEP) for possible advance credit. The use of all CLEP test scores toward meeting specific degree requirements is at the discretion of the separate colleges. Some colleges do not allow CLEP credit. The Registrar's Office may be consulted for program details.

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

6. Course work completed in unaccredited institutions may be validated or certified for credit through examinations described under the “Earning Credit by Special Examination” section of this catalog. The Office of Admissions may be consulted about the appropriate procedure.

7. Credit acquired through procedures described in paragraphs 4, 5, and 6 is included in the 90 maximum extension credits allowed toward the baccalaureate degree.
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 class list or on an official class card from the Registrar's Office.

Preregistration
Preregistration is designed primarily 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, excluding Summer Quarter. To preregister, a student turns in a mark-sense registration form listing the classes he 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.

1. Students may deposit their mark-sense registration forms at any of the following locations: Schmitz Hall, second-floor lobby; Health Sciences Center, fourth-floor lounge; Arts and Sciences Advising Office, B10 Paddock. Engineering students go to 353 Loew.

2. Undergraduates are not scheduled for more than 19 credits during preregistration, so that all students have a chance to develop basic programs. Additional credits may be added during the change of registration period the first week of each quarter.

3. All programs are scheduled at one time, and students are scheduled in the following priority sequence: freshmen, seniors, graduates, fifth-years, juniors, and sophomores.

4. After the programs are scheduled, they are mailed to either the permanent address or the local address of the student, whichever has been indicated.

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. Students are provided appointment dates to register and may be scheduled either manually or on a computer in the same manner as that described for preregistration. Completed programs are not mailed, but must be picked up by the student.

Fee Payment
A tuition and fee obligation is incurred when a student is registered. Tuition and fee payment, except for Summer Quarter, is not generally required until the Friday of the fourth week of the quarter. Fee statements are mailed to the student's local address on file in the Registrar's Office. Tuition and fees not paid by the payment due date results in cancellation of registration. One-half tuition and fees must be paid when registration is canceled for nonpayment of fees.

Late Registration
Students who register after the official registration period are charged a $15 late registration fee.

Addresses of Students
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, second-floor lobby, Schmitz Hall. The mailing of notices to the last address on record constitutes official notification.

Change of Program to Drop or Add Classes
1. Preregistered students with appointments may change their programs during an early change period before the quarter begins. Information on dates and procedures appears on posters conspicuously placed throughout the campus.

2. Students who change their programs during the first week of school also need appointments and go to the Sections branch office, which is situated in the cafeteria area of the Odegaard Undergraduate Library. Undergraduate students who wish to register for more than 19 credits may add courses during this change period. Engineering students do not need appointments and go to 353 Loew.

3. Change of program appointments are available at Schmitz Hall, second-floor lobby, window 2.

4. The following procedures apply:
   a. The student obtains a Change of Program card at his or her advisory office and has it approved by his or her adviser, if required. The student obtains course entry cards, when required as indicated by the symbol >> > in Time Schedule, for any courses he or she plans to enter.

   b. A student who drops one or more courses may qualify for a lower level of fees, depending on the number of credits the student continues to carry. If the change is made during the official change period, fees are assessed at the lower rate. If the change is made after the official change period and through the thirtieth calendar day of the quarter, half the difference between the two categories is assessed in addition to the lower tuition rate. If the change is made after the thirtieth calendar day of the quarter, the amount of tuition and fees owed is not reduced.
c. After the official change period, a service charge of $5 is assessed for each change of program, change of section, drop from a course, or any number of changes that are made to a program at the same time.

d. An undergraduate student in the College of Arts and Sciences must have the adviser's permission to carry more than 20 credits. A student who has declared a major should see his or her department adviser for permission. A premajor student goes to B10 Padelford.

e. A student adding courses after the fifteenth calendar day must have the permission of both the Dean and the instructor. Approval is granted only in very unusual circumstances.

5. A course is dropped officially only when transacted in the Sections department of the Registrar's Office. A course dropped after the fifteenth calendar day is graded with either PW or EW.

6. A student who wishes to drop all the courses for which he or she is registered must withdraw from the University for that quarter.

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 "Fee" section for refund schedule).

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

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

3. A student who registers and then wishes to drop all classes from his or her program must withdraw from the University.

4. An official withdrawal is effective the day it is received in the Registrar's Office. The withdrawal is entered on the student's record as follows:

a. During the first fifteen calendar days of the quarter: date of withdrawal only; courses do not appear on the record.

b. After the first fifteen calendar days of the quarter: all courses are listed on the record and grades are assigned.

(1) If the student's work in a course is satisfactory at the time of withdrawal, a grade of PW is assigned.

(2) If the student's work in a course is not satisfactory at the time of withdrawal, a grade of EW is assigned.

5. A withdrawal accomplished by any other method is not official and may result in the entry of the grade E in each of the courses for which the student is registered for the quarter.

6. A recipient of veterans' benefits should notify the Office of Veteran Affairs immediately of withdrawal.

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

8. A refund schedule appears in the "Fee Refund" section of this volume.

Military Withdrawal

If a student enters the Armed Forces, he or she may take advantage of military withdrawal from the University under certain conditions, as defined in the University Handbook, volume 4, page 24. The privilege of military withdrawal is granted only to a student whose entry into the Armed Forces is for extended active duty, not for short-term National Guard or reserve duty nor for fulfillment of an annual active-duty requirement. Additional information may be obtained from the Withdrawal Office, 264 Schmitz.

FULL-TIME 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.

International Students

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, fifth-year, or nonmatriculated student must earn a minimum of 12 credits per quarter, excluding Summer Quarter.
2. A graduate student must earn a minimum of 9 credits per quarter, excluding Summer Quarter, during the time he or she is registered for graduate course work. 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 newly admitted international student may be advised by his or her academic adviser, because of inadequate skills or for similar academic reasons, not to register for a full course of study his or her first quarter in the United States. Such a student, therefore, is exempt from the 9- or 12-credit minimum the first quarter only, but must earn a minimum of 5 credits the first quarter. Such a student must provide the International Services Office with the written recommendation of the academic adviser before the end of the official change of registration period for his or her first quarter.

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

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.

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 need register for only those credits required for graduation. Additional information may be obtained at the Registrar's Office, 209 Schmitz.

Veterans' Benefits
Veterans and veterans' dependents who are eligible for Veterans Administration educational benefits must enroll in accordance with the general definition outlined above. Additional information may be obtained at the University's Office of Veteran Affairs, 180 Schmitz.

Change of College or Major
Students are admitted to the University in specific degree programs or majors within specific schools or colleges. Many undergraduates are also admitted into a premajor category within the College of Arts and Sciences. After a period of time, a student may choose to change major or college. Freedom to change to another major, school, or college is limited, and a student who wishes to enter a new program is subject to the admission requirements of the program and the space available in the program at the time the change of major is requested.

The procedure for changing a college, school, or major varies from area to area, and a student should contact his or her academic adviser for specific instructions.

GRADING SYSTEMS
The following grading system is in effect at the University, subject to certain exceptions in the schools of Dentistry, Law, and Medicine:

A Honor, 4 grade points per credit.
B Good, 3 grade points per credit.
C Medium/fair, 2 grade points per credit.
D Poor (low pass), 1 grade point per credit.
E Failure or unofficial withdrawal, 0 grade points per credit.
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, a student must convert an incomplete into a passing grade not later than the last day of the student's next quarter in residence. This rule may be waived by the Dean of the college in which the course is offered only if the nature of the uncompleted work is such as to make impossible the fulfillment of this requirement. In no case is an incomplete converted into a passing grade after a lapse of two years or more.
S Satisfactory grade for courses taken on a satisfactory/not satisfactory basis. S grade is automatically converted from a letter grade of A, B, or C in an undergraduate course and of A or B in a graduate course. An S grade may be awarded directly in a graduate course numbered 500 or above at the instructor's option.
NS Not satisfactory. A grade conversion for students registered on a satisfactory/not satisfactory basis. D or E is not satisfactory in undergraduate courses, and C. D, or E is not satisfactory in graduate courses. NS is not included in the grade-point average calculation. An EW grade is converted to NS if the course is taken on a satisfactory/not satisfactory basis.
**EXAMPLE 1: A TYPICAL GRADE REPORT**

**Autumn Quarter**

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits Attempted</th>
<th>Grade</th>
<th>Grade Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>English 171</td>
<td>3</td>
<td>CR (0)</td>
<td>0</td>
</tr>
<tr>
<td>Geology 101</td>
<td>5</td>
<td>B (3)</td>
<td>15</td>
</tr>
<tr>
<td>History 111</td>
<td>5</td>
<td>A (4)</td>
<td>20</td>
</tr>
<tr>
<td>Geography 258</td>
<td>2</td>
<td>B (3)</td>
<td>6</td>
</tr>
<tr>
<td>Total credits earned</td>
<td></td>
<td></td>
<td>41</td>
</tr>
<tr>
<td>Total graded credits attempted (TCA)</td>
<td>12</td>
<td></td>
<td>41</td>
</tr>
</tbody>
</table>

Grade-point average = $41 \div 12 = 3.41$

It should be noted that the total credits attempted, not the credits earned toward graduation, are used in computing the grade-point average.

**EXAMPLE 2: A FAILURE AND AN INCOMPLETE**

**Autumn Quarter**

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits Attempted</th>
<th>Grade</th>
<th>Grade Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>English 121</td>
<td>5</td>
<td>C (2)</td>
<td>10</td>
</tr>
<tr>
<td>Geology 101</td>
<td>5</td>
<td>E (0)</td>
<td>0</td>
</tr>
<tr>
<td>Speech 100</td>
<td>3</td>
<td>B (3)</td>
<td>9</td>
</tr>
<tr>
<td>Health Education 250</td>
<td>2</td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Total credits earned</td>
<td></td>
<td></td>
<td>13</td>
</tr>
<tr>
<td>Total graded credits attempted (TCA)</td>
<td>13</td>
<td></td>
<td>19</td>
</tr>
</tbody>
</table>

Grade-point average = $19 \div 13 = 1.46$

**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 omissions or possible errors in a grade report must make application to the Registrar for a review of the student's record not later than the last day of the student's next quarter in residence, but in no case after a lapse of two years. Time spent in military service is not counted as part of the two-year limitation.

**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 Chairman of the department, or in a nondepartmental college, to the Dean, with a copy of the appeal sent to the instructor. The Chairman, 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.
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 schools of Law and Medicine, at the close of the quarter. The grade reports are sent to the permanent mailing address supplied by the student at the time of registration. To assure delivery of grades, any changes in this permanent mailing address should be reported to the Registrar's Office. 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 traditional A, B, C, D, or E. A student should be aware that he or she may, and probably will, jeopardize his or her future educational opportunities, particularly for graduate or postbaccalaureate study, when other systems of performance evaluation (e.g., satisfactory/not satisfactory or credit/no credit) are used.

Credit/No Credit Program
The University offers an undergraduate option called credit/no credit, under which students automatically take all courses on a nontraditionally graded basis. Because some degree programs do not accept credits taken under the credit/no credit option, an interested student should see his or her adviser for information about restrictions before entering the program.

Admission: An undergraduate in good academic standing may register at any stage of his or her academic career in the University on a credit/no credit basis with the stipulation that all courses taken concurrently be taken on that basis. The student may enter the credit/no credit program only twice (i.e., a student may re-enter the credit/no credit program only once after a resignation from it). The student enters the program only by submitting an entrance form during the official registration and change period, and the student resigns from the program only by submitting an exit form during the registration and change period. The entrance and exit forms are available in the Registrar's Office, Schmitz Hall, second floor, window 3. All courses taken concurrently while the student is enrolled under the credit/no credit program must be taken for credit/no credit. A maximum of 20 credits may be taken in any one quarter, unless the student has the permission of his or her Dean.

Recording: Each instructor reports conventional letter grades (i.e., A, B, C, etc.) to the Registrar. For a student electing the credit/no credit option, the Registrar records CR on the transcript if the letter grade is A, B, or C. The actual letter grade is kept by the Registrar for purposes of evaluating the program. If the student requests in writing a waiver of letter grades, the instructor reports only CR for satisfactory work.

Transcripts: A student who has taken all classes credit/no credit receives a transcript showing only the courses for which credit has been received. Courses for which the student registered but did not receive credit do not appear on the transcript. A student who has taken some classes credit/no credit and some on the graded system receives a transcript showing CR for the courses taken while on credit/no credit and grades for the courses taken while on the graded system. A notation states that the student's grade-point average is calculated only on the basis of the courses taken while on grades.

Good Standing and Academic Probation: A student in the credit/no credit program is in good academic standing as long as an average of 12 credits per quarter is maintained. Except as noted below, any student who does not maintain a 12-credit-per-quarter average is placed on academic probation. Any student who fails to receive at least 12 credits in his or her first quarter at the University is warned that his or her scholarship is unsatisfactory and that if he or she fails to achieve a cumulative average of 12 credits per quarter by the end of the second quarter he or she will be placed on academic probation. Any student on academic probation is dropped: (1) If he or she fails to attain at least 12 credits for the following quarter's work, and/or (2) if he or she fails to attain a cumulative 12-credit-per-quarter average at the end of two subsequent quarters. Any student dropped under this rule is notified in writing of this action by the Registrar.

When first placed on academic probation, a student on credit/no credit may elect to return to the graded system, but the student does so with probationary status and must achieve a 2.00 grade-point average for at least 12 credits of work by the end of the first graded quarter or be dropped from the University. At the end of the second quarter, the student must have a 2.00 cumulative grade-point average or be dropped. A student on credit/no credit placed on probation for a second time may not elect to return to the graded system until good academic standing has been regained.

Satisfactory/Not Satisfactory: Participation in the credit/no credit program does not affect a student's eligibility
to take courses on a satisfactory/not satisfactory basis if he or she chooses to revert to the traditional grading system.

Granting of Degrees: When a student has completed requirements for his or her academic major under the credit/no credit system or any combination of the credit/no credit and graded systems, he or she is eligible to receive a baccalaureate degree, provided that the responsible department, committee, or division has agreed to accept the credit/no credit system for the major.

Credit/No Credit as a Course Option
With appropriate departmental review and approval, a faculty may offer a course or courses on a credit/no credit basis. The standard for granting credit in credit/no credit courses under this option is the demonstration of competence in the material of the course to the instructor's satisfaction. The course option would include the following provisions:

Participation: Registration in credit/no credit courses under the course option does not affect a graded student's right to take other courses for conventional grades concurrently.

Evaluation: Each student enrolled in such courses would be evaluated on the same basis whether or not he or she was working on the credit/no credit student option. A student on the traditional grading system has CR entered on his or her transcript if the student passes, but 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, but this grade is not used in the computation of the student's grade-point average.

Credit/No Credit as a Group Option
With the review and approval of the appropriate administrative body, a self-contained academic unit may adopt a credit/no credit system on an experimental basis. Continuation of the system would be contingent on the results of an evaluation.

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 A, B, C, D, E 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. 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 an 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.

Scholarship and Grades in the School of Dentistry
The School of Dentistry uses the University grade-point system: $A = 4, B = 3, C = 2, D = 1,$ 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 less than a 2.00 grade-point average in the courses of which he or she is registered during any given quarter is referred to the executive 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.

Scholarship and Grades in the School of Law
In lieu of the letters A, B, C, D, and E, a numerical scale is substituted for the letter grades, as follows: $A, 85–100; B, 77–84; C, 68–76; D, 60–67; E, 0–59$. No grade points are assigned to School of Law grades. A cumulative numerical average of 68 in law courses is required for graduation.

Scholarship and Grades in the School of Medicine
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, the executive committee of the School of Medicine evaluates the accomplishment of the student during that year and determines his or her fitness for promotion. When general academic achievement is unsatisfactory in any year, 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 schol-
REPEATING OF COURSES

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 PW, I, NS, NC, or N. 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. All grades earned in courses repeated prior to Winter Quarter 1971 are included in the average, unless the student again repeats the course Winter Quarter 1971 or after.

School of Dentistry

A student in the School of Dentistry who receives a grade of D on a course may not change this grade for purposes of graduation by repeating the course or taking a re-examination. 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 executive committee of the school, 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 executive committee that he or she has a reasonable knowledge of the subject in question, the grade of D may be substituted for the E originally given, and promotion can be allowed. A student in the School of Dentistry who receives a grade of E in two or more courses in a given year is denied the above opportunity to change the grades of E to D.

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 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. However, instead of a new grade being assigned, a notation is made on the record that the course was passed upon re-examination.

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.

The privilege of repeating a course or taking a second examination is not available to a student who fails LAW 416. A student who fails this course is required to take an equivalent number of hours in LAW 600, Independent Study or Research. The grade received in LAW 600 does not replace the grade in the failed course, but is entered separately.

School of Medicine

The faculty of the School of Medicine does not favor 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

Warning, Probation, and Drop

A regularly graded undergraduate student whose grade-point average for the first quarter at the University falls below 2.00 is warned that his or her scholarship is unsatisfactory and that if he or she fails to achieve a cumulative grade-point average of 2.00 by the end of his or her next quarter he or she will be placed on academic probation. Academic probation is essentially a warning that the student must show improvement to remain in the University. Any undergraduate student on academic probation is dropped if he or she fails to attain at least a 2.00 grade-point average for the following quarter’s work. A student who does attain at least a 2.00 grade-point average the first quarter after being placed on probation also must attain a 2.00 cumulative grade-point average by the end of the next quarter in residence or be dropped. Any student dropped under this rule is notified in writing of this action by the Registrar. Appropriate low-scholarship notations are entered on the student’s official academic record. An undergraduate is removed from academic probation when a cumulative grade-point average of 2.00 or better is reached.

Undergraduate students in the credit/no credit program should see “Credit/No Credit Program” for low-scholarship rules.
RULES AND REGULATIONS

Reinstatement

Only under exceptional circumstances is a student who has been dropped under low-scholarship rules readmitted to the University. Such a student is readmitted only at the discretion of the Dean of the school or college to which readmission is sought. A student readmitted after being dropped under these rules re-enters on academic probation. The student's grade-point average is the same as when dropped from the University, and the student may not use grades from other colleges or universities to raise his or her University of Washington grade-point average. A readmitted student is dropped if he or she fails to attain a 2.00 grade-point average for the following quarter's work. Also, such a student who does attain at least a 2.00 grade-point average the first quarter after returning on probation must attain a 2.00 cumulative grade-point average by the end of the next quarter in residence or be dropped. The student is removed from probation at the end of the quarter in which a cumulative grade-point average of 2.00 or better is reached.

Senior in Final Quarter

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

UNDERGRADUATE HIGH SCHOLARSHIP

Quarterly High Scholarship List

The quarterly high-scholarship list includes the names of matriculated undergraduate students who have attained a quarterly grade-point average of 3.50 in the final grades for at least 12 graded hours, exclusive of lower-division ROTC courses. Appropriate high-scholarship entries are made on the student's permanent academic record.

Yearly Undergraduate Honors

Undergraduates who have achieved a cumulative grade-point average of 3.50 or better for at least 36 graded hours of resident instruction in three quarters or 46 graded hours of resident instruction in four quarters at the University of Washington during the preceding academic year, exclusive of lower-division ROTC courses, will have a high-scholarship notation entered on their permanent academic records.

Certificates of High Scholarship

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

Sophomore Medal

Annually, the junior having the highest scholastic standing for the first two years of his or her program receives the sophomore medal from the President of the University.

Junior Medal

Annually, the senior having the highest scholastic standing for the first three years of his or her program receives the junior medal from the President of the University.

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, together with a record of distinction at institutions previously attended.

In order to qualify for a baccalaureate honor, a transfer student's grade-point average at the University of Washington must be equal to, or greater than, the minimum required for the specific honor, and his or her combined grade-point average must be equal to, or greater than, the required minimum.

The University's Honors Committee determines annually the requirements for each honor.

President's Medal

Conferred at commencement, the President's Medal 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.

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 course work completed after high school graduation through extended secondary programs approved by the Washington State Board of Education.

2. For work completed in institutions whose standing is unknown.

3. For independent study.

4. For work completed with private teachers.

Course work completed in unaccredited institutions may be validated for credit through the examinations described below or through an examination or other appropriate means determined by the Chairman of the University subject-matter department concerned. The fee for credit by examination and validation is $25 per course. The following restrictions apply:

1. No one may take a credit examination for a course in which he or she has received transfer credit or has been registered for credit at the University.

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

3. Within a given field of study, no student receives credit by examination in subject matter more elementary, as determined by the academic department, than that for which credit previously has been received.

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

5. No student receives credit by examination for lower-division courses in the student’s native language.

6. 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 Department of the Registrar’s Office for a certificate of eligibility no later than Friday of the second week of the quarter. Ordinarily, the student previously has spoken with an instructor responsible for the course to determine if an examination for credit is appropriate. After the certificate has been approved and signed by the Registrar, the student presents it for signed approval to an instructor responsible for the course in which the examination is to be taken, to the Chairman of the department concerned, and/or to the Dean of the college or school concerned. Approvals 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 on the fourth Saturday 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

Not all colleges and schools in the University award credit based upon the College Level Examination Program general examination; therefore, interested students should contact the Registrar’s Office for additional information.

ADVANCED PLACEMENT

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

The University of Washington 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.

REQUIREMENTS FOR A BACCALAUREATE DEGREE

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

In filling out an application form with the assistance of an academic adviser, the student lists the courses for which he or she is registered during the present quarter and those he or she plans to take during each successive quarter. If all requirements are not yet met, the specific courses must be listed on the application; elective courses may be entered as “electives, so many credits,” without each specific course being listed.

The signature of the department head or of an authorized adviser must appear on the application in the space provided for “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 Registrar’s Office after the student’s adviser has signed it. The application is first approved by the Registrar, then sent to the Dean of the college for signature and returned to the Registrar’s 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 third is retained in the Graduation Office. Any required course listed on the approved application cannot be changed without the submission of a written petition signed by the department head. The petition form may be obtained either at the Registrar’s Office or from the advisory office.

If the application is not approved, the Registrar’s Office notifies the student of the deficiency, so that the necessary adjustment may be made and the application re-submitted.

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 of Washington.

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.

First- and Second-Year Military Training Course Credit Exclusion

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.

Physical Education Activity Credits

Some physical education activity credits earned since Autumn Quarter 1970 may be applied toward the basic 180 required credits, subject to the limitation of the student’s college or school.

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
These credits usually must be earned in residence, with college credits to the University exceeding the number of academic credits earned must reach a minimum of 45 credits in excess of the number usually required for a 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 year of course work, at least 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.

**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 of Washington.

**Community College Credit**

Transfer of credit from institutions accredited for two-year programs (i.e., community and junior colleges) applies only in the University freshman and sophomore years. A student who attends first a four-year college and then a two-year college may not transfer two-year college credits in excess of the number that brings his total credits to 90. In no case can the transfer of junior college credits to the University exceed 90 quarter credits.

Transfer credits are accepted for upper-division credit only when earned at an accredited four-year-degree-granting institution.

**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.

**Duplication of Credit**

A student may not receive credit for courses taken at the University that duplicate courses taken previously and for which credit has been allowed. This rule applies whether the earlier course was taken in high school or college, and whether, in the latter case, course numbers are or are not duplicated. If continuation of previous study is involved (e.g., foreign language), proper placement for credit in University courses is determined by the department that offers the subject.

**Catalog for Graduation Requirements**

If a period of less than ten years has elapsed since the date of a student's last entry into the school or college in which he or she is to graduate, the student may choose to graduate under the requirements of either that catalog dated as of his or her last entry into the school or college, or that catalog covering his or her anticipated date of graduation. Catalog choice is subject to approval of the student's departmental Chairman and school or college Dean.

If a student wishes to obtain a degree after a lapse of more than ten years from the last date of entry into the school or college in which he or she is to graduate, the catalog in effect at the date of his or her graduation is used. These provisions do not apply to the requirements prescribed by the College of Education for Teaching Certificates.

**Waiver of Graduation Requirements**

Waiver of college or University graduation requirements is obtained only by petitioning 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. Because the University Graduation Committee meets only once each quarter, petitions involving University requirements should be filed early in the quarter. Directions for completing and obtaining the necessary signatures are provided at the time the petition form is handed to the student.

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 Study" section of this catalog.

REQUIREMENTS FOR TEACHING CERTIFICATION
A person who seeks teaching certification at the University of Washington must have been admitted either to a baccalaureate degree program or as a fifth-year or graduate student at the University of Washington. Requirements for teaching certification are those prescribed by the College of Education at the time certification is to be granted.

Provisional Certification
Questions concerning provisional teaching certification should be addressed to the advisory office of the College of Education, 207 Miller.

Applications for Provisional Certification
Application for certification should be made at the beginning of the senior year along with application for the baccalaureate degree. Application forms are available at 207 Miller.

Standard Certification
Petitions
All fifth-year students working toward the Standard Certificate, the Standard General Certificate, the Standard Elementary Certificate, or the Standard Secondary Certificate should contact an adviser at 207 Miller their first quarter and make the appropriate petition for this certificate.

Course Approval
Each candidate for the Standard General Certificate must consult an adviser at 207 Miller each quarter to obtain approval on all courses before completing registration.

COMMENCEMENT
Formal Commencement exercises are conducted only at the close of Spring Quarter. Diplomas are issued after the end of each quarter to candidates who have completed graduation requirements. During April of each year, a booklet of specific instructions is sent to each student entitled to participate in the Commencement exercises the following June.

Eligibility for Participation
Baccalaureate Degrees
All students who earned baccalaureate degrees the preceding 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.

Dental and Medical Degrees
All candidates for doctoral degrees in June in the schools of Dentistry or Medicine are required to be present in person unless excused by their respective Deans.

Graduation Announcements
The University Book Store handles official graduation announcements of the senior class.

Diploma Distribution
Diplomas are ready about six weeks after the end of the quarter in which they are earned. Recipients are notified as soon as the diplomas are ready for distribution at the Registrar's Office. Upon request, the diploma is mailed to the student.

TRANSCRIPTS
Official copies of student academic records at the University of Washington that bear the official seal of the University and the signature of the Registrar are known as transcripts.
Charges
A charge of $1, payable to the cashier in advance, is made for each transcript. Grade sheets cost 50 cents. Typewritten title transcripts for all records of students entering the University prior to Autumn Quarter 1929 cost $2 for each original copy.

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 cannot 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 of Washington does not issue or certify copies of transcripts from other institutions.

FEES AND CHARGES
Tuition, special fees, rentals, and service charges are payable in United States dollars upon demand.

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, fifth-year, graduate, or nonmatriculated) is required to confirm his or her intention to enroll by paying a nonrefundable $50 enrollment service fee. 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 former nonmatriculated student who cannot be scheduled for the courses requested during registration and who does not enroll or attend other courses is refunded the $50 enrollment service fee upon written request to the Registrar. Such a request for refund must be submitted by Friday of the second week of the quarter to which it is applicable.

2. A new or returning former matriculated student who is unable to obtain courses required for completion of his or her degree or certificate program or courses that are determined by an appropriate academic adviser to be acceptable alternate courses, and who does not enroll in or attend other courses, is refunded the $50 enrollment service fee upon written request to the Registrar. Such a request for refund must be submitted by Friday of the second week of the quarter.

3. A new or returning former student who applies by the prescribed deadline for financial aid administered by the University Financial Aid office and who cannot be awarded financial aid adequate to his or her needs as determined by that office and 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 former student who is unable to attend the University because of pregnancy, disability, or death or because he or she is called involuntarily into the military service of the United States or into civil duty is refunded the amount, if any, by which the enrollment service fee exceeds the amount of tuition and fees assessed at the time of withdrawal. A request for refund must be submitted on petition forms available in the Student Accounts 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.

QUARTERLY TUITION AND FEE RATES EFFECTIVE AUTUMN QUARTER 1974

<table>
<thead>
<tr>
<th>Undergraduate</th>
<th>Resident</th>
<th>Nonresident</th>
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<tbody>
<tr>
<td>Full fee (more than 6 credits)</td>
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<td>$527</td>
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<td>6 or fewer credits:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Minimum (first 2 credits)</td>
<td>53</td>
<td>147</td>
</tr>
<tr>
<td>Each additional credit</td>
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<td>76</td>
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<td>Full fee (more than 6 credits)</td>
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<td>6 or fewer credits:</td>
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<tr>
<td>Minimum (first 2 credits)</td>
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<td>167</td>
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<tr>
<td>Each additional credit</td>
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<td>76</td>
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<tr>
<td>Dentistry and Medicine</td>
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<td></td>
</tr>
<tr>
<td>Full fee (more than 12 credits)</td>
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<td>613</td>
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<tr>
<td>12 or fewer credits:</td>
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<td></td>
</tr>
<tr>
<td>Minimum (first 2 credits)</td>
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<td>250</td>
</tr>
<tr>
<td>Each additional credit</td>
<td>12</td>
<td>33</td>
</tr>
</tbody>
</table>

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*. No additional fee is charged nonresident students during the Summer Quarter, except for students in the schools of Dentistry or Medicine.
Vietnam 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 Veteran Affairs, 180 Schmitz.

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.

Miscellaneous Charges: 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 register as a result of a cancellation must also pay a $15 fee. Waiver or refund of this service charge is made only at the discretion of the Registration Appeal Board.

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 program period.

Additional Fees: The following courses require the payment of a fee in addition to tuition: physical education activity quarterly fees—bowling, $5; canoeing, $3; golf instruction, $5.

Athletic Admission Fee: A ticket that admits its owner to all athletic events during the quarter or quarters covered: Autumn Quarter, $10; Winter and/or Spring quarters, $5.

Publication Binding Fee: Each doctoral candidate pays a $25 publication fee, which covers the binding of manuscript copies for the University Library and the microfilmed publication of the doctoral dissertation in full.

Certificate Fee: 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.

Transcript Fee: A charge of $1, payable in advance, is made for each mechanically reproduced transcript. Grade sheets (unofficial) cost 50 cents per copy. Typewritten title transcripts for all records of students entering prior to Autumn Quarter 1929 cost $2 per copy.

Diploma Replacement Fee: Duplicate diploma, with paper folder, $5; teaching certificate (typed copy), $1; replacement photo-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.

Foreign Language Local Examinations Fee: For all languages, except French, German, and Spanish, the fee for the foreign-language examination is $10.

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.

Graduate Admission Application Fee: A fee of $10, payable in United States dollars, must accompany application for admission to the Graduate School as a regular graduate student or as a visiting graduate student. The fee is not refundable, and it may not be credited against any other fee charged by the University.

Placement Fees
File establishment fee $5
Registration fee (for alumni only; no registration fee for students) $5 annually
Employment opportunity notification mail service fee (for alumni) $10 annually
Confidential credential fee (sold in sets of five only) $5 per set

First set of five credentials free

Alumni
$10 per set of five credentials

Parking Fees
Student's Quarterly Permits
Residence hall lots $24.00
Evening classes 9.00
Motorcycles and scooters 5.00

Daily Rate
Urban Renewal lots .25
Montlake lots: E1 and E12 .25
Montlake lots: E5 and E4 .10

Laboratory Pre-School Fee: The fee for children in the Laboratory Pre-School is $110 per month. Half-day care costs $150 per quarter.

Deposits and Rentals
Breakage Ticket Deposit: In certain laboratory courses, a breakage ticket is required to pay for laboratory sup-
plies and breakage of equipment. Tickets may be purchased at the Cashier's Office for $1 and $5. Unused sections of breakage tickets may be returned to the cashier for refunds.

Military Uniform Deposit: A deposit of $25 is required of students in Army and Air Force ROTC.

Refund of ROTC Deposit
From the $25 deposit, $2.50 is deducted for the cleaning of returned uniforms. The balance, $22.50, is refunded in full to a student who has completed one year or more of either the basic or the advanced Army ROTC courses when the uniform, with the exception of the shoes, is returned complete and undamaged. The shoes may be retained. A student who does not complete the first year of either the basic or the advanced course may purchase the shoes at one-half the current sales price, or may return them together with the balance of the undamaged uniform for a refund of $22.50.

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 course drop during the time 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.

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.

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 determined 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.

Refunds
When a fee payment is made by check, a two-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.

Enrollment Service Fee
For information on refund of the enrollment service fee, see that section above.

RESIDENCE REQUIREMENTS

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

1. 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.

2. 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 18), 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.

3. 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.
4. 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.

5. The establishment of a domicile in the state of Washington by a parent or legal guardian entitles a minor (under age 18) 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, the minor is entitled to classification as a resident student if one of the parents has established a domicile in the state of Washington.

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

7. 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.

8. Any person not a citizen of the United States cannot establish a Washington domicile until he or she is eligible and has applied for an immigration visa, and has been physically present in the state of Washington for one full year prior to the quarter for which he or she is requesting a change of residence status.

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. A veteran who is a resident of the state of Washington and who served in the Southeast Asia theater of operations is entitled to pay no more than the full-time tuition and fees in effect Spring Quarter 1971. Form DD214 should be presented to the Residence Classification Office, 320 Schmitz.

An application to pay resident tuition and fees for any of the foregoing reasons must be filed with the Residence Classification Office, 320 Schmitz, prior to the first day of the quarter in which the applicant expects to qualify for resident tuition and fees. An application received after the first day of the quarter cannot become effective, if granted, until the following quarter.
EXEMPTION FROM NONRESIDENT PART OF TUITION AND FEES

The following categories of students may be exempted from the nonresident portion 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. 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. Any application for permanent change in residence classification must be filed prior to the first day of the quarter for which the student is requesting the change. Applications received after the first day of the quarter become effective, if granted, the following quarter.

<table>
<thead>
<tr>
<th>Category</th>
<th>Office to Contact</th>
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</thead>
<tbody>
<tr>
<td>Academic personnel.</td>
<td>Scholarship and Loan Fiscal Office, 170 Schmitz; questions regarding eligibility may be directed to the Academic Personnel Records Office, 316 Administration.</td>
</tr>
<tr>
<td>Spouses and children of academic personnel.</td>
<td>Academic Personnel Records Office, 316 Administration.</td>
</tr>
<tr>
<td>Staff personnel eligible for tuition-free course of 6 credits or less.</td>
<td>Scholarship and Loan Fiscal Office, 170 Schmitz; an information sheet explaining eligibility may be obtained from the Staff Personnel Office, 3903 Brooklyn Avenue Northeast.</td>
</tr>
<tr>
<td>Staff personnel (1) not eligible for tuition-free course or (2) taking more than 6 credits.</td>
<td>Office of Residence Classification, 320 Schmitz; information sheet explaining eligibility may be obtained from the Staff Personnel Office, 3903 Brooklyn Avenue Northeast.</td>
</tr>
<tr>
<td>Staff hourly employees whose employment commences on first day of the quarter and continues at least five weeks, working at least twenty hours per week.</td>
<td>Staff Personnel Office, 3903 Brooklyn Avenue Northeast, during the fifth week of the quarter. The student must pay nonresident fees for the quarter and, if a nonresident tuition exemption is granted, receives a refund after the fifth week of the quarter.</td>
</tr>
<tr>
<td>Spouses and children of staff personnel working at least twenty hours per week.</td>
<td>Staff Personnel Office, 3903 Brooklyn Avenue Northeast.</td>
</tr>
<tr>
<td>Student hourly employees, and their spouses and children, whose employment commences on the first day of the quarter and continues at least five weeks, working at least twenty hours per week.</td>
<td>Office of Residence Classification, 320 Schmitz, during the fifth week of the quarter. The student must pay nonresident fees for the quarter and, if a nonresident tuition exemption is granted, receives a refund after the fifth week of the quarter.</td>
</tr>
</tbody>
</table>

Form to Use

"Faculty/Staff Tuition Exemption Request," UW 100SLF; resident and nonresident portions of tuition and fees are exempted when this form is filed each quarter.

"Scholarship, Grant, or Exemption Authorization."

"Faculty/Staff Tuition Exemption Request," UW 100SLF; resident and nonresident portions of tuition and fees are exempted when this form is filed each quarter.

"Washington Institutions of Higher Education, Application for Change in Residence Status."


"Scholarship, Grant, or Exemption Authorization."

RULES AND REGULATIONS

Category
Graduate students with graduate service appointments.

Office to Contact
Payroll Office, 3903 Brooklyn Avenue Northeast, during the first week of the quarter; Scholarship and Loan Fiscal Office, 170 Schmitz, thereafter.

Form to Use
“Scholarship, Grant, or Exemption Authorization.”

Office of Residence Classification, 320 Schmitz.

“Washington Institutions of Higher Education, Application for Change in Residence Status.”

Employees, and their spouses and children, of another state of Washington institution of higher education, working at least twenty hours per week.

Military employees and their spouses and children.

Federal employees and their spouses and children.

Veterans whose final permanent duty station was in the state of Washington and who receive federal, vocational, or educational benefits conferred by virtue of military service.

Certain World War I or World War II veterans who are no longer entitled to federal educational benefits.

Spouses of graduate students with graduate service appointments.

Office of Veteran Affairs, 3945 Fifteenth Avenue Northeast. (This exemption is for half the nonresident portion of tuition.)


Scholarship and Loan Fiscal Office, 170 Schmitz.

“Dependent Tuition Exemption Request,” UW 101SLF.

Veterans and Children of Deceased or Totally Disabled Veterans
A student who qualifies under the applicable federal laws established for his or her education in institutions of higher learning should consult the Office of Veteran Affairs. A veteran holding the Vietnam Service Medal or the Expeditionary Medal for Service in Vietnam should present his or her DD214 form to the Residence Classification Office, 320 Schmitz, for complete information.

Veterans with disabilities may have available benefits. They should contact a training officer in the nearest Veterans Administration 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, and (3) denies registration for a subsequent quarter as well as graduation from the University.

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 except on the written release of the office that placed the hold.

**STUDENT IDENTIFICATION**

Each student may obtain, without cost, a photo-identification card at the time of first 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 photo-identification card may be required by any University agency offering services, activities, or facilities wherein a student priority is to be maintained.

Lost or destroyed photo-identification cards may be replaced by the student's making a request for replacement at the University Cashier's Office and paying a $5 fee. 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.

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.

**UNIVERSITY POLICY ON STUDENT RECORDS**

The objective of the policy on student records is to ensure that information contained in these records is treated in a responsible manner with due regard to the personal nature of the information.

**General Rule**

Except as otherwise indicated in this section or as may be required by law, the University does not provide information contained in student records in response to inquiries from either within or without the University unless the expressed consent of the student has been given. Inquiries from a spouse or relative, other students, faculty or staff acting as private persons, or from members of extra-University groups or organizations are treated as though coming from outside the University. Requests for information concerning the student as a University employee are treated the same as requests concerning any other University employee. Specific guidelines are as follows:

**Requests From Outside the University**

Unless the student requests otherwise in writing, the University routinely responds to an individual inquiry about a specific student in regard to name, place and date of birth, dates of attendance, curriculum, degrees, and employment status, if any, with the University.

1. Parents and legal guardians of unemancipated minors are provided, upon written request, information concerning the student’s academic record, academic status, misconduct in academic or other campus activities and financial information.

2. Specific questions regarding an emancipated minor are referred to the Attorney General's Division. Generally speaking, an emancipated minor is a person under eighteen years of age who is married or who is not in any way financially dependent upon his or her parents or legal guardian. A student who wishes to invoke his or her emancipation to withhold information must inform the Registrar in writing of this status.

3. Law enforcement agencies investigating specified law violations may, upon request, be provided recorded information that has been officially noted, including any disciplinary action, unless the information was obtained as the result of a privileged relationship. Representatives of such agencies are required to sign a written request form.

4. Standard test data regarding individual tests required to form a basis for a decision about an individual may be provided at the discretion of the custodian of the data in response to a written request from a recognized institution of higher learning.

5. A valid judicial or legislative subpoena of information concerning a student is, in each case, answered upon prior approval of the Attorney General's Division. Effort is made to notify the student of the subpoena.

6. Information obtained during professional, medical, or psychological treatment or counseling is released by the professional only in accordance with the ethics of his or her profession.
Requests From Inside the University

1. Faculty and staff may obtain the following kinds of information when it is required for the performance of their responsibilities to the University, with the understanding that its use is strictly limited to the performance of those responsibilities:

   a. Academic record and status.
   b. Reports of academic and other campus misconduct, including disciplinary action.
   c. Results of counseling other than professional, medical, or psychological.
   d. National origin and ethnic background.
   e. Standard test data regarding specific tests when needed for decisions about an individual.
   f. Student-produced course paper.
   g. Financial information, including delinquencies, etc.
   h. Student evaluative materials, with the consent of the author of the evaluation.

2. University disciplinary and investigating authorities, including student authorities, appointed in accordance with faculty regulations, may, if it is in accordance with their duties, have access to information with the exception of items d and e in items 1a through 1h above.

3. Recognized University student organizations, such as scholastic and service honoraries, may obtain information on a student’s academic record and status as these relate to eligibility for membership.

4. Qualified research personnel may, under special circumstances, be permitted access to information contained in a student’s records. Permission is granted only when it has proven impossible to request permission from the student himself, when information obtained will be properly safeguarded, and when the student will not be identified with released findings.

5. Except as provided by these guidelines, records and reference materials containing evaluations of students may be released only with the consent of both the student and the author of the evaluation.

UNIVERSITY RECORDS

Each of the principal record-keeping administrative units (i.e., the Comptroller, the Counseling Center, the Hall Health Center, the Registrar, the Office of Student Affairs, and the Student Financial Aids Office) develops its own procedures in accord with the general policy. Any supplementary regulations found necessary are filed with the Records Committee, which is responsible for periodic review of policy and procedures.

1. Disciplinary records are kept separate from academic records, and transcripts of a student’s academic record contain no notation of any such action. Special precautions are exercised to ensure that information from disciplinary or counseling files is not revealed to unauthorized persons. Provision is made for periodic review and routine destruction of noncurrent disciplinary records by the offices maintaining such records.

2. No records that reflect a student’s political or ideological beliefs or associations are kept.

Records Committee

The Registrar is the official custodian of academic records and, therefore, is the only official who may issue a transcript. The Registrar, together with a committee of six, including representation from faculty, graduate and undergraduate students, and the Attorney General’s Division, is responsible for reviewing unusual requests for information and for assisting in the interpretation of these rules.
Eligibility for admission is determined by the Board of Admissions, Scholastic Standards, and Graduation, according to criteria established by the University faculty. An admitted student is required to enter one of the University's colleges or schools, even though not yet prepared to choose an academic major. If the student chooses a major from among the more than one hundred curricula available, he or she is enrolled in the school or college offering the program and, if space is available, in the major department of his or her choice. A student who prefers to sample the rich variety of courses offered before commitment to a major, or who wishes to undertake a preprofessional curriculum (e.g., prelaw, premedicine, or predentistry) also is enrolled as a premajor in the College of Arts and Sciences. Admittance into the College of Arts and Sciences as a premajor, however, is contingent upon the availability of space for the quarter for which the student has applied. There is no commitment on the part of the University to accommodate a student into a specific academic program after accepting him or her as a premajor into the College of Arts and Sciences.

Premajor students have great freedom in the selection of courses that may enable them to explore new areas of interest or to complete the prerequisite courses necessary for admission to a professional or other particular degree program. Transferring from a premajor to a specific degree program is often competitive. Acceptance depends on the standards of selection established by the department offering the program and the availability of space in the department to which the student is seeking admission. Therefore, students entering the University as premajors are urged to contact the college or major department, or both, for transfer information as soon as their choices have been established.

Honors programs in the College of Arts and Sciences and College of Forest Resources, which allow opportunities for study in greater depth, are available to qualified students through special tests. Other tests are used for determining proficiency in language, mathematics, and other areas for the allowance of advanced credit; and for assignment to the appropriate class level. A complete list of programs of study, degrees offered, and the organization of the instructional departments within schools and colleges appears in the “General Information” section of this catalog.

ADMISSION POLICY

To be considered for admission to the University's undergraduate colleges, a student must satisfy the minimum admission criteria described below. Because there are more applicants than can be accommodated, however, satisfying these minimum standards does not guarantee admission to the University. Special consideration is given to academic qualifications, date of application, applicant's choice of curriculum, and availability of space at the proposed level of entrance. Students admitted to the University and as premajors into the Col-
lege of Arts and Sciences cannot be assured acceptance into the departmental or professional programs. Selection for entry into such curricula is academically competitive and is contingent on the availability of space and resources in a specific program for the quarter the student has applied.

Educational Opportunity Program
Minority students and others who have not received the usual educational advantages are urged, regardless of their previous academic records, to apply for admission to the University through its Educational Opportunity Program. Applicants are selected to the extent that funds and facilities permit and are given special help so that they may achieve their potential at the University.

Nonresident Students
In recognizing the educational benefits of a cosmopolitan student body, the University has traditionally welcomed out-of-state and foreign students. Because of the increasing numbers of applicants and a shortage of resources, the University has had to limit its enrollment to some extent.

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

Resident Status for Tuition Purposes
A resident student is one who has been domiciled in the state of Washington for the period of one year immediately prior to the time of commencement of the first day of the quarter for which he or she has registered and who has established a domicile for other than educational purposes. 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. If a student is a minor (under age 18), the domicile is normally determined by that of the parents or legal guardian. For factors important in determining the legal domicile of the student, see the “Rules and Regulations” section of this catalog.

Resident status may be cleared by mail and should be done at least 90 days prior to the quarter for which the applicant seeks admittance. Applications must be filed with the Office of Residence Classification prior to the first day of the quarter. Any change in residence status, if approved, takes effect on the first day of the quarter following the date the application was filed with the Office of Residence Classification. Application forms are available in the Office of Residence Classification or can be mailed on request. The foregoing are the general rules followed in determining resident status for tuition purposes in accordance with the laws of the state of Washington. The facts and circumstances involved in each case must be set forth on the application for change in residence applications.

Additional information appears in the “Rules and Regulations” section of this catalog.

Foreign Students
The University of Washington believes that its greatest contribution to international education can be made in fields of advanced study. Because its facilities are limited, virtually no unsponsored undergraduates are accepted directly from abroad.

The academic qualifications of students attending high schools or colleges in the United States on student or immigrant visas are determined according to resident standards if the school is in the state of Washington, and according to nonresident standards if located elsewhere (see also “Admission Criteria for Transfer Applicants”).

Board of Admissions
Because university work is demanding, the University’s Board of Admissions endeavors to give the best possible counseling to students through its admission decisions. Applicants who are dissatisfied with the original decision may appeal to the Board of Admissions with the assurance that any additional evidence in support of their application will be carefully reviewed.

Application Deadlines
Application deadlines* are as follows:

<table>
<thead>
<tr>
<th>Quarter</th>
<th>Deadline</th>
</tr>
</thead>
<tbody>
<tr>
<td>Autumn Freshmen</td>
<td>May 1</td>
</tr>
<tr>
<td></td>
<td>May 1</td>
</tr>
<tr>
<td>Transfers, fifth-year, and nonmatriculated students</td>
<td>July 1</td>
</tr>
<tr>
<td>Winter Freshmen</td>
<td>November 1</td>
</tr>
<tr>
<td></td>
<td>February 1</td>
</tr>
<tr>
<td>Summer Freshmen</td>
<td>May 15</td>
</tr>
</tbody>
</table>

Application forms, obtained from the Office of Admissions, should be returned as soon as possible, because quarterly quotas may be filled before arrival of the deadlines.

Transcripts should be sent in accordance with instructions on the back of the form. Credentials are reviewed soon after they are received, and applicants are notified of their admission status as soon as possible.

* These dates are subject to change by the University.
Admission Criteria for Freshman Applicants
Minimum preparation for freshman standing includes graduation from an accredited high school with a grade-point average of at least 2.50 (3.00 for nonresidents of Washington) and completion of the following core requirements: three years of English, two years of one foreign language, two years of college preparatory mathematics (usually algebra and geometry), two years of a social science, one year of a laboratory science (preferably biology, chemistry, or physics), and three years of electives chosen from the above areas.

Freshman applicants must present verbal and quantitative composite scores obtained from the Washington Pre-College Test, Scholastic Aptitude Test, or the American College Test. The grade-point average and test scores are combined to determine the applicant's admissibility. Final acceptance is contingent upon the availability of space and the acceptance by the school or college to which the student has applied.

Freshman students planning to enter the College of Arts and Sciences or the College of Education are urged to complete four years of English, three years of one foreign language, and three years of mathematics. With this background, a student will have fulfilled the proficiency requirements for graduation from the College of Arts and Sciences or the College of Education.

Admission Criteria for Transfer Applicants
Minimum qualifications for admission with advanced standing include completion of the specified high school units or equivalent introductory college courses, with 5 credits treated as the equivalent of one high school unit. A deficiency in mathematics may be removed by completion of elementary algebra and plane geometry or a college course in intermediate algebra with no credit. Transfer applicants showing a high school deficiency in mathematics are seldom approved for admittance to the University. It is therefore recommended that the mathematics deficiency be removed prior to entering the University. Deficiencies in foreign language and laboratory science may be removed by completion of 10 credits in foreign language and 5 college credits in a laboratory science with credit. Moreover, the academic record must show an overall college grade-point average of at least 2.00 for residents and 3.00 for out-of-state students.

Because the University's facilities are limited, preference is given to academically qualified transfer applicants who have completed all or most of the lower-division courses. Highest priority is given to those who have achieved the credit levels indicated below. Applicants who have not reached the specified credit levels indicated are considered for admission as space permits. Final acceptance of any transfer student is contingent on the availability of space and on acceptance by the University division concerned. Transfer admission policies will be reviewed by the University faculty during 1974. Students should be aware that some modifications of these policies may be introduced for 1975/76.

Assuming that the transfer applicant has three units in high school English or the college equivalent and no deficiencies in other areas of high school preparation, he or she is advised to consult the appropriate section of this catalog for information on the most desirable courses to take so that the following credit levels may be achieved:

<table>
<thead>
<tr>
<th>College and Program</th>
<th>Minimum Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>COLLEGE OF ARCHITECTURE AND URBAN PLANNING</td>
<td>90*</td>
</tr>
<tr>
<td>Architecture (Environmental Design)</td>
<td>90*</td>
</tr>
<tr>
<td>Landscape Architecture</td>
<td>45</td>
</tr>
<tr>
<td>Urban Planning (Environmental Design)</td>
<td>45</td>
</tr>
<tr>
<td>BUILDING CONSTRUCTION</td>
<td>75</td>
</tr>
<tr>
<td>COLLEGE OF ARTS AND SCIENCES</td>
<td>90*</td>
</tr>
<tr>
<td>SCHOOL OF BUSINESS ADMINISTRATION</td>
<td>45</td>
</tr>
<tr>
<td>SCHOOL OF DENTISTRY</td>
<td>75</td>
</tr>
<tr>
<td>Dental Hygiene</td>
<td>90*</td>
</tr>
<tr>
<td>COLLEGE OF EDUCATION</td>
<td>90*</td>
</tr>
<tr>
<td>COLLEGE OF ENGINEERING</td>
<td>45</td>
</tr>
<tr>
<td>COLLEGE OF FISHERIES</td>
<td>75</td>
</tr>
<tr>
<td>Fisheries Science, Food Science</td>
<td>75</td>
</tr>
<tr>
<td>COLLEGE OF FOREST RESOURCES</td>
<td>75</td>
</tr>
<tr>
<td>SCHOOL OF MEDICINE</td>
<td>90*</td>
</tr>
<tr>
<td>Physical Therapy, Occupational Therapy, Medical Technology, Prosthetics and Orthotics</td>
<td>90*</td>
</tr>
<tr>
<td>SCHOOL OF NURSING</td>
<td>45</td>
</tr>
<tr>
<td>Basic Program</td>
<td>45</td>
</tr>
<tr>
<td>SCHOOL OF PHARMACY</td>
<td>45</td>
</tr>
<tr>
<td>SCHOOL OF SOCIAL WORK</td>
<td>90*</td>
</tr>
<tr>
<td>Social Welfare</td>
<td>90*</td>
</tr>
</tbody>
</table>

* Students applying to this college or school with 75, but fewer than 90, credits are enrolled initially in the College of Arts and Sciences, if space permits. Such students are classified as premajors and, like all premajor students, are eligible to be considered for transfer from premajor according to their qualifications and the availability of space in the program of their choice.

Admission of Fifth-Year Students
Students holding baccalaureate degrees may be considered for admission to one of the undergraduate colleges to pursue programs leading to (1) a second baccalaureate degree or (2) a teaching credential.

New students and former students who have not attended the University since they received their baccalaureate degrees must make application through the Office of Undergraduate Admissions and must be accepted by one of the undergraduate colleges. In selecting students for this classification, careful consideration is given to their scholastic record during the junior and senior years of undergraduate study as an indication of probable success in achieving their educational objectives. Ordinarily, a resident of Washington is ex-
expected to present a grade-point average of at least 2.00. An out-of-state applicant must have a grade-point average of at least 2.50 in the junior and senior years of his or her baccalaureate degree program. Final acceptance is contingent on the availability of space and on acceptance by the University division concerned.

Fifth-year students are not in the Graduate School nor are they permitted to register for courses numbered 500 and above without special permission. Courses completed while in the fifth-year status may not ordinarily be applied later to an advanced degree in the Graduate School.

Nonmatriculated Standing
A nonmatriculated student is one whose educational goals are limited and who has been permitted by the Board of Admissions to enroll for credit in day or evening classes to the extent facilities are available. Applications for nonmatriculated standing are made through the Office of Undergraduate Admissions.

Students with nonmatriculated standing are not enrolled in a program of studies leading to a University of Washington degree or teaching credential. Permission to enroll under this status does not imply a commitment on the part of the University to extend admission to a degree program. If a student is later admitted as a matriculated undergraduate, the scholastic standing achieved and appropriate credits earned in the nonmatriculated status may apply toward the requirement for the baccalaureate degree. However, the final 45 credits must be earned in a matriculated status for the graduation requirements to be met.

Admission of Auditors
An individual who wishes only to audit courses should apply through the Office of Undergraduate Admissions for 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.

To receive credit for an audited course, the student must register for the class for credit in a subsequent quarter.

Admission of Veterans and Children of Totally Disabled Veterans and Personnel in the Armed Forces
All applicants must fulfill admission criteria described elsewhere in this catalog.

Personnel in the Armed Forces should consult their education officers. Veterans and children of deceased or totally disabled veterans should contact the nearest office of the Veterans Administration: in Seattle, the Sixth and Lenora Building, Seattle, Washington 98121, or the University of Washington's Office of Veteran Affairs, 180 Schmitz, PE-25, Seattle, Washington 98195.

ADMISSION PROCEDURE

Application
A request for an Application for Admission form and all correspondence regarding admission with undergraduate standing in any college or school at the University should be addressed to the University of Washington, Office of Undergraduate Admissions, 320 Schmitz, PC-30, 1400 Northeast Campus Parkway, Seattle, Washington 98195. The application form should be completed and the high school or college transcripts, or both, furnished according to instructions on the form.

Tentative admission decisions frequently can be made on preliminary records, with final acceptance contingent on satisfactory completion of work in progress. For this reason, the applicant for admission with freshman standing is advised to file an application form and a preliminary transcript showing his or her record through the junior year of high school. Washington students may substitute their Washington Pre-College Testing Program data report. Freshman applicants must submit verbal and quantitative composite scores obtained from the Washington Pre-College Test, Scholastic Aptitude Test, or American College Test. Washington students are urged to take the Washington Pre-College Test. Applicants for transfer from other colleges should file an application and preliminary transcripts no later than the beginning of their final term in the school in which they are currently enrolled. In any case, complete credentials must be filed prior to the dates indicated earlier in this section. Admittance of students from foreign countries for the school year begins in mid-September.

Notification of Admission Status
Each applicant is notified officially of his or her admission status after complete credentials have been reviewed. A student who accepts the offer of admission by submitting an enrollment service fee of $50 applicable toward tuition receives instructions regarding registration and the payment of fees. The University assumes no responsibility for a student who does not comply with the procedures or observe the instructions in the registration leaflet, or for an applicant who comes to the
campus before an official appointment for registration is received.

The Offer of Admission is valid only for the quarter indicated, and the qualifications of students whose enrollment is delayed are subject to re-evaluation. Applicants who wish to be considered for a subsequent quarter should request a renewal application form.

Retention of Records
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 only unless the applicant has notified the Office of Undergraduate Admissions of a continued interest in attending the University or of enrollment in independent study programs.

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

Campus Visitation
The University welcomes campus visitors either individually or in groups. However, resources for visitor services are limited, and visitors are asked to make arrangements in advance. Requests should be addressed to: University of Washington, Office of New-Student Services, 320 Schmitz, PC–40, Seattle, Washington 98195. Office telephone number is (206) 543–4873.

Housing Reservations
Admission to the University does not assure assignment to living quarters, and, therefore, housing arrangements must be made separately. Application for University residence halls may be made prior to acceptance for admission, but not before February 15 for Autumn Quarter. Early application is encouraged. Application for housing for married students also may be submitted prior to admission, but no earlier than nine months prior to actual enrollment. Additional information may be obtained by writing: University of Washington, Housing and Food Services Office, 301 Schmitz, PC–50, 1400 Northeast Campus Parkway, Seattle, Washington 98195.

EXAMINATIONS

All freshman applicants are required to submit scores from one of the following examinations: Washington Pre-College Test (WPCT), Scholastic Aptitude Test (SAT), and American College Test (ACT Assessment). Submitted scores should not be more than five years old.

Information concerning these examinations can be obtained from high school counselors or directly from the appropriate testing agency. The Washington Pre-College Testing Program Office, PB–20, 1400 Northeast Campus Parkway, Seattle, Washington 98195, telephone (206) 543–1170, coordinates a testing program in Washington high schools. Juniors and seniors should consult their counselors for testing information. Individuals who are not in high schools should contact the University of Washington, Educational Assessment Center, 453 Schmitz, PB–30, 1400 Northeast Campus Parkway, Seattle, Washington 98195, telephone (206) 543–1170. Because certain portions of the WPCT are used for placement purposes, Washington high school students may find it advantageous to participate in the WPCT program.

The Scholastic Aptitude Test is administered by the College Entrance Examination Board (CEEB). Residents of Montana, Wyoming, Colorado, Texas, Arkansas, and all states west of these should consult the College Board Admissions Testing Program, Post Office Box 1025, Berkeley, California 94701, telephone (415) 849–0950. Individuals who reside east of the above-listed states should direct their inquiries to the CEEB Office, Princeton, New Jersey 08540, telephone (609) 921–9000.

Information concerning the ACT Assessment may be obtained from the American College Testing Program, Post Office Box 414, Iowa City, Iowa 52240. Registration for both the ACT Assessment and SAT examinations usually must be made at least one month in advance with the appropriate office. Testing is restricted to five or six dates each year.

Mathematics Placement Tests
An entering freshman who plans to take mathematics courses at the University is assigned to the appropriate course on the basis of placement tests and high school mathematics background. A freshman who has taken the Washington Pre-College Test may be placed on the basis of the score on the Mathematics Achievement section of that test, unless additional mathematics has been taken since the WPCT was administered, in which case a retest should be taken at the Educational Assessment Center. A freshman who has not taken the Washington Pre-College Test should take a mathematics test in the Educational Assessment Center for proper placement before seeing an adviser. Placement tests include one in trigonometry, one in elementary functions, and two in calculus.

A transfer student who wishes to take mathematics courses at the University, but who has not yet taken...
any mathematics course in college, is assigned the appropriate course on the basis of placement tests. A transfer student who already has completed a college mathematics course, however, continues on to the next higher course without taking a placement test.

**Freshman English Qualifying Test**

The Washington Pre-College Test also evaluates the student's preparation in English. A student's English Composite score is used as a guide for placement in various writing courses available at the freshman level.

**Foreign Language Placement Examination**

A freshman who plans at any time during his or her first several quarters at the University to continue a foreign language studied in high school should take a language placement examination. No examination is required if a student wishes to begin study of a new language.

A transfer student who has not taken college-level language courses but who now plans to continue a language studied in high school should also take a language placement examination. A transfer student who has already taken college-level language courses, however, should consult his or her adviser about appropriate courses if he or she wishes to continue language study. The student need not take a placement test, because placement is based on previous college study.

A student who scores high enough on the test to place in the sixth quarter or beyond of a language may be awarded advanced placement credit when he or she completes the course in which placed.

**Credit Examinations**

Details about different programs offering advanced credit or placement, or both, appear in the "Rules and Regulations" section of this catalog.

**HONORS**

High scholastic achievement is encouraged and recognized in many ways at the University of Washington. A major effort is made to place the student at an academic level in keeping with the student's ability and preparation.

Honors programs are available to academically talented students in the College of Arts and Sciences and the College of Forest Resources (see appropriate sections for details).

**Special Honors Sections**

Some colleges provide special courses and special sections of other courses for the unusually talented.

Though primarily intended for those enrolled in formal honors programs, some sections are open to other qualified students.

Additional scholastic honors information appears in the "Rules and Regulations" section of this catalog.

**CHOOSING A MAJOR**

If the entering student is relatively sure of his or her objectives, and perhaps has taken advantage of high school career days or has received specialized vocational counseling, he or she enrolls in the college that offers the curriculum in which he or she intends to major.

If the student wishes to pursue a preprofessional program in such fields as architecture, business administration, dental hygiene, dentistry, education, medical technology, medicine, occupational therapy, physical therapy, prosthetics and orthotics, social welfare, or urban planning, he or she may complete preliminary work in the preprofessional programs offered within the College of Arts and Sciences. The baccalaureate degree is required for admission to the Graduate School and the School of Law.

The student who is undecided about a career and has not chosen a major will find special facilities available for use.

The Counseling Center provides career counseling in the areas of vocational and educational choice. This service is free to any registered University of Washington student. In addition, the University Placement Office maintains a library of career information, and staff counselors are available to provide first-hand information concerning hiring trends in business and industry.

Survey courses, for both majors and nonmajors in various academic departments, can acquaint the student with a particular subject or area.

University of Washington seniors who are within 6 credits of completing their undergraduate work and who otherwise meet the requirements for admission to the Graduate School may register the quarter just prior to admission to the Graduate School for as many as 6 credits in graduate courses in addition to their 6 credits of undergraduate work. These arrangements must receive prior approval by the Graduate School.

**Change of College or Major**

As the student matures and gains experience, he or she may shift his or her goal accordingly. Recognizing this,
the University imposes no conditions on a student who wishes to transfer from one college or major to another, other than the availability of space, provided the requirements of the major or college he or she wishes to enter are met.

The student who wishes to transfer from one college to another must obtain approval from the deans of the two colleges concerned. Forms for change of college can be obtained at the advisory office of the college the student is leaving.

To change majors within a college, the student should consult his or her academic adviser or the central advising office of his or her college.

Anyone considering a change of major or college is urged to discuss the matter thoroughly with his or her academic adviser and other knowledgeable persons.

ACADEMIC REQUIREMENTS

Credit Load
A full-time undergraduate student is one who is carrying at least 12 academic credits. A graduate student must carry 9 credits to be considered a full-time student. An undergraduate who carries and passes 15 academic credits for each of the twelve quarters will have the minimum 180 credits necessary for graduation. In practice, students carry more or less than the usual number of credits, depending on personal circumstances and chosen programs.

In order to be eligible for participation in intercollegiate athletics, freshmen must carry at least 12 academic credits (including physical education activity), and sophomores, juniors, and seniors must carry at least 12 academic credits (excluding physical education activity). In order to hold office in student governmental bodies, the student must carry a minimum of 10 credits each quarter.

Minimum Grade Points
The student is expected to maintain a reasonable level of academic performance consistent with University standards.
GRADUATE STUDY
THE GRADUATE SCHOOL
AND RESEARCH

Officers of the Graduate School
Joseph L. McCarthy, Ph.D.
Dean

Patricia Keller, Ph.D.
Associate Dean

R. W. Moulton, Ph.D.
Associate Dean

Morgan D. Thomas, Ph.D.
Associate Dean

Herman McKinney, M.S.W.
Assistant Dean

Henrietta Wilson, M.A.
Special Assistant

James D. Linse, B.A.
Administrator

Executive Committee of the Graduate School
Joseph L. McCarthy, Chairman

J. E. Augerot, Group I

R. Lorenzen, Group II

I. Namioka, Group III

A. Ferrill, Group IV

W. T. Burke, Group V

M. Robkin, Group VI

D. R. Morris, Group VII

R. C. Canfield, Group VIII

Graduate Faculty Council and
Group Operating Committees
(The combined membership of the eight Group Operating Committees comprises the Graduate Faculty Council—Joseph L. McCarthy, Chairman.)

Group I
J. Augerot (Chairman), E. Behler, C. Edmonson, J. D. McCracken, R. Stevick

Group II
D. Bennett, W. Bergsma, R. Lorenzen (Chairman), S. Moseley, G. B. Varey
Group III
N. H. Anderson, D. Bevan, A. Gorbman, I. Namioka (Chairman), J. Sabo

Group IV
A. Ferrill (Chairman), R. Flathman, R. Morrill, D. H. Pinkney, S. Ottenberg

Group V
C. Burgess, W. T. Burke (Chairman), J. E. Kittell, J. F. Trütt, J. Wickman

Group VI
R. Clark, R. I. Gara, A. Kobayashi, M. Robkin (Chairman), D. A. Russell

Group VII
C. Evans, J. Fox, A. Gordon, D. R. Morris (Chairman), C. Stevens

Group VIII
R. Canfield (Chairman), A. S. Farber, M. Johnson, L. Mansfield, W. L. Nelson

GRADUATE STUDY

Graduate study has been offered at the University of Washington for three-quarters of a century. Over the years it has grown steadily in quality, scope, and size.

The Graduate School, which was formally established in 1911, is administratively responsible for graduate study in whatever division of the University such study is undertaken. This involves supervision of student programs that go beyond formal undergraduate work or the work of the professional schools, into areas of advanced training, education, research, and scholarship.

Programs leading to master's and doctoral degrees are offered in seventy-eight departments or other organizational units within twelve schools and colleges of the University. Graduate instruction and the supervision of the research of graduate students are conducted by a Graduate Faculty of more than fourteen hundred senior professors. About seven thousand graduate students are now in residence, seeking their master's or doctoral degrees in the Graduate School at the University of Washington. There are, in addition, some three hundred postdoctoral students in residence.

In addition to its primary role in relation to graduate students, graduate faculty, and graduate study programs and degrees, the Graduate School is responsible for the administration of certain academic or research activities and facilities of general significance in all or many fields of knowledge throughout the University. The Graduate School is administered through the Office of the Dean, the Executive Committee of the Graduate School, Group Operating Committees, and the Graduate Faculty Council. The Graduate Faculty Council is composed of representatives elected to eight Group Operating Committees by the members of the graduate faculty, and it and the Executive Committee of the Graduate School serve as the legislative and policy-making bodies of the Graduate Faculty. The Executive Committee consists of the Dean of the Graduate School and the elected chairman of each of the eight Group Operating Committees; it, acts as an advisory group to the Dean and as an administrative committee for the Graduate Faculty Council.

The University of Washington Graduate School recognizes major responsibilities in three closely related fields: teaching, research, and public service.

Highly able students who have completed baccalaureate programs are offered the opportunity to further improve their knowledge, understanding, and ability to create and to practice in their chosen fields. Their achievements may be recognized by the award of the master's degree at the end of one or two years of study, or the doctoral degree at the end of three or more years of study. Students who have completed advanced degree programs usually serve as teachers, research or administrative leaders, or professional practitioners in their respective fields.

In contrast with undergraduate work, graduate study is ordinarily focused quite sharply on some specific field, and the student is expected to develop and demonstrate substantial initiative, mature judgment, and creativeness. Often the graduate student carries on a program in close association with his or her chosen professor in a tutor-style relationship.

Many diverse programs of graduate study are available. In nearly all of these, two objectives can be distinguished, although their relative importance may differ. In many programs, particular emphasis is placed on leading the student to excellence in ability to teach and to create new knowledge by research; the student's achievements are recognized by the award of the degrees of Master of Arts, Master of Arts for Teachers, Master of Science, Doctor of Philosophy, or Doctor of Arts. In other programs, emphasis is placed on leading the student to excellence in ability to practice the art of a field or profession; in these cases, achievements are recognized by the award of a more specifically designated degree, such as Master of Nursing, Master of
Science in Electrical Engineering, or Doctor of Edu­cation.

A program of graduate study normally includes ad­vanced classwork and lectures but is particularly char­acterized by the independent study and research that the graduate student is expected to conduct. The results of this independent study and research are set forth in a master's thesis or a doctoral dissertation. A master's thesis is a modest contribution to knowledge, or a design, or a compo­sition in the student's field. A doctoral dissertation should set forth a significant contribution to knowledge in the student's field, should be presented in scholarly form, and should demonstrate that the student is now competent to conduct reliable, important, and indepen­dent research.

The Graduate School is concerned basically with the fundamental and applied research activities conducted throughout the University and with endeavors to assist in the development of arrangements, funds, and facilities needed to encourage and support the research activ­ities of the professors, students, and other scholars and scientists engaged in investigational work. The Graduate School is also concerned with the maintenance and steady improvement of the public service provided by the University to the state, the region, and the nation. The Graduate School is especially interested in fur­thering research cooperation with other institutions and with business and industry.

The primary contributions from the University's Grad­uate School to the community are to be found in those students who have achieved high levels of competence as evidenced by their completion of programs of ad­vanced study, and in the significant research results ob­tained by these students, their professors, and other scholars and scientists associated with the University.

Graduate Programs and Degree Policies
Graduate programs leading to master's and/or doctoral degrees are offered in seventy-eight departments or other organizational units of the University and the names of these programs, the graduate degrees offered, and the names of the Graduate Program Advisers are given in this catalog.

On other pages of this catalog, information is given in some detail concerning policies and procedures relating to admission into, and completion of, specific graduate degree programs. These statements are simply illustra­tive of arrangements relating to admission into, and completion of, graduate degree programs; they are not to be taken as specific requirements of the respective programs. For individual students the specifications for completion of the graduate degree programs may be provided initially by the Graduate Program Adviser and then by the graduate student's 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. This adviser is a senior member of the faculty who provides, or arranges for the providing of, responsible advice, guidance, and assistance to students working for advanced degrees in the program or programs offered by the faculty in the department, school, or the Univer­sity unit. The Graduate Program Adviser maintains close familiarity with policies and procedures in the Graduate School and provides overall coordination for the activities within the department. In the absence of the Graduate Program Adviser, these responsibilities are carried by an alternate program adviser.

Courses for Graduate Students
Courses numbered 500 and above are intended for, and restricted to, graduate students. Some courses numbered in the 300s and 400s are open both to graduates and to upper-division undergraduates. Such courses, when ac­ceptable to the Supervisory Committee and the Dean of 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.

Undergraduate students of senior standing who wish to register for a 500-level course must obtain permission from both the instructor of the class and the Dean of the Graduate School.

Grading Practices in Graduate Courses
To provide for consistency in the reporting of grades in graduate courses, the following procedures should be used:

1. Grading in graduate courses should be compatible with the definition of satisfactory progress adopted by the academic unit (department, school, college, or group) responsible for offering the graduate degree program.

2. Grades awarded in graduate courses may be the fol­lowing: A, B, C, D, E, I (incomplete), PW (passing withdrawal), EW (failing withdrawal), S (satisfactory), CR (credit), NC (not satisfactory or no credit), and N (see 6. below). SI/NS is a grade conversion by the Registrar and may not be awarded by an instructor. An
Graduate Degree Programs Offered and Names of Graduate Program Advisers

<table>
<thead>
<tr>
<th>Field</th>
<th>Graduate Degrees</th>
<th>Graduate Program Advisor</th>
<th>Alternate Graduate Program Advisor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aeronautics and Astronautics</td>
<td>M.S.A.&amp;A., M.A.&amp;A., Ph.D.</td>
<td>J. Kevorkian</td>
<td>R. J. Bolland</td>
</tr>
<tr>
<td>Anthropology</td>
<td>M.A., Ph.D.</td>
<td>C. M. Eastman</td>
<td>E. V. Winans</td>
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<tr>
<td>Architecture</td>
<td>M.Arch.</td>
<td>W. Whapette</td>
<td>C. Kelley</td>
</tr>
<tr>
<td>Asian Languages and Literature</td>
<td>M.A., Ph.D.</td>
<td>M. Rogers</td>
<td>M. Kingsbury</td>
</tr>
<tr>
<td>Astronomy</td>
<td>M.S., Ph.D.</td>
<td>J. L. Norman</td>
<td>R. A. Miller</td>
</tr>
<tr>
<td>Atmospheric Sciences</td>
<td>M.S., Ph.D.</td>
<td>K. H. Bohn</td>
<td>G. Wellenstein</td>
</tr>
<tr>
<td>Biochemistry</td>
<td>M.S., Ph.D.</td>
<td>R. G. Flegle</td>
<td>P. V. Hobbs</td>
</tr>
<tr>
<td>Biological Structure</td>
<td>M.S., Ph.D.</td>
<td>K. A. Walsh</td>
<td>J. M. Keller</td>
</tr>
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<td>Biology</td>
<td>M.A., M.S.</td>
<td>C. Roise</td>
<td>F. Coules</td>
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<td>Biometrics</td>
<td>M.S., Ph.D.</td>
<td>I. D. Olsen</td>
<td>R. Olstad</td>
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<td>Biomedical History</td>
<td>M.A.</td>
<td>R. Krommal</td>
<td>B. Jayne</td>
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<tr>
<td>Botany</td>
<td>M.S., Ph.D.</td>
<td>C. Bodesmer</td>
<td>P. R. Sloan</td>
</tr>
<tr>
<td>Business Administration</td>
<td>M.A., M.B.A., Ph.D.</td>
<td>R. B. Walker</td>
<td>V. E. Buck</td>
</tr>
<tr>
<td>Chemical Engineering</td>
<td>M.S., Ph.D.</td>
<td>W. D. Scott</td>
<td>N. W. Gregory</td>
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<tr>
<td>Chemistry</td>
<td>M.S., M.A.T., Ph.D., D.A.</td>
<td>D. F. Eggers</td>
<td>E. P. Richey</td>
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<td>Civil Engineering</td>
<td>M.S., M.S.C.E., M.S.E., Ph.D.</td>
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<td>Classics</td>
<td>M.A., Ph.D.</td>
<td>W. C. Grummet</td>
<td>D. R. Penber</td>
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<td>Communications</td>
<td>M.S., M.C., Ph.D.</td>
<td>W. E. Ames</td>
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<td>Comparative Literature</td>
<td>M.A., Ph.D.</td>
<td>F. W. Jones</td>
<td>H. Golde</td>
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<td>Computer Science</td>
<td>M.S., Ph.D.</td>
<td>D. Dekker</td>
<td>A. W. Moore</td>
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<td>Dentistry</td>
<td>M.S.Den.</td>
<td>S. Schuler</td>
<td>J. D. Sydow</td>
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<td>Dance</td>
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<td>J. R. Crider</td>
<td>J. R. Wolcott</td>
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<td>Drama</td>
<td>M.A.</td>
<td>R. Loper</td>
<td>D. Hellmann</td>
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<td>East Asian Studies</td>
<td>M.A.</td>
<td>K. Yamamura</td>
<td>J. Thornton</td>
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<td>Economics</td>
<td>M.A., Ph.D.</td>
<td>G. M. Brown</td>
<td>F. T. Giles</td>
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<tr>
<td>Education</td>
<td>M.S., Ed.D., Ph.D.</td>
<td>R. G. Olstad</td>
<td>D. G. Dow</td>
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<td>A. R. Hilt</td>
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<td>J. D. McCracken</td>
<td>J. P. Fox</td>
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<td>Epidemiology and International Health</td>
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<td>E. R. Alexander</td>
<td>A. C. DeLacy</td>
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<td>Fisheries</td>
<td>M.S., Ph.D.</td>
<td>L. S. Smith</td>
<td>S. F. Gessel</td>
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<tr>
<td>Forest Resources</td>
<td>M.S., M.F.R., Ph.D.</td>
<td>R. I. Gara</td>
<td>H. L. Roman</td>
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<td>Genetics</td>
<td>M.S., Ph.D.</td>
<td>W. L. Fingman</td>
<td>J. C. Sherman</td>
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<tr>
<td>Geography</td>
<td>M.A., Ph.D.</td>
<td>J. Velikonja</td>
<td>R. L. Greens</td>
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<td>Geosciences</td>
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<td>J. M. Remsberger</td>
<td>R. T. M. Merrill</td>
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<tr>
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<td>C. F. Raymond</td>
<td>J. B. Voyles</td>
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<td>Germanic Languages and Literature</td>
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<td>S. McLean</td>
<td>A. Blackman</td>
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<td>Health Services Administration</td>
<td>HealthAdmin.</td>
<td>T. R. Seifert</td>
<td>J. I. Mueller</td>
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<tr>
<td>and Planning</td>
<td>M.A., Ph.D.</td>
<td>D. H. Pinkey</td>
<td>F. Ziaed</td>
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<tr>
<td>History</td>
<td>M.A., M.S.</td>
<td>M. L. Johnson</td>
<td>K. L. Garlid</td>
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<td>K. L. Garlid</td>
<td>E. Brandt</td>
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<td>Inter-Engineering</td>
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<td>J. C. Huston</td>
<td>R. Carpenter</td>
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<td>Law</td>
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<td>M. Rabinovich</td>
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<td>D. Key</td>
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<td>B. Matthews</td>
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<td>L. S. Brown</td>
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<td>Mining, Metallurgical, and Ceramic Engineering</td>
<td>M.S.</td>
<td>J. J. S. Schmieder</td>
<td>H. D. Patton</td>
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<tr>
<td>Near Eastern Languages and Literature</td>
<td>M.A.</td>
<td>J. M. Beale</td>
<td>J. F.胛考</td>
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<td>E. Brandt</td>
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<td>R. Carpenter</td>
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<td>M. Rabinovich</td>
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<td>A. Horita</td>
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<td>D. L. Sorby</td>
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<td>D. Bouware</td>
<td>D. Key</td>
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<td>M. H. Smith</td>
<td>L. S. Brown</td>
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<td>H. D. Patton</td>
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<td>E. S. Luschei</td>
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<td>M. E. Wolters</td>
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<td>Public Affairs</td>
<td>M.S.PH, M.PH.</td>
<td>J. L. Gale</td>
<td>B. S. Gilson</td>
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<td>Public Health and Community Medicine</td>
<td>M.S., M.S.Radiol.</td>
<td>K. Jackson</td>
<td>G. Christensen</td>
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<td>Radiological Sciences</td>
<td>M.S., M.Q.T., M.P.T.</td>
<td>J. F. Lehmann</td>
<td>W. C. Stolov</td>
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<td>Rehabilitation Medicine</td>
<td>M.A., Ph.D.</td>
<td>A. Pace</td>
<td>M. Fendrome</td>
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<td>Romance Languages and Literature</td>
<td>M.A., Ph.D.</td>
<td>P. F. Sugar</td>
<td>J. E. Augustus</td>
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<tr>
<td>Russian and East European Studies</td>
<td>M.A., Ph.D.</td>
<td>B. Steene</td>
<td>H. K. Sehmardorf</td>
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<td>Scandinavian Languages and Literature</td>
<td>M.A., Ph.D.</td>
<td>W. A. Konick</td>
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<td>Slavic Languages and Literature</td>
<td>M.S., Ph.D.</td>
<td>C. J. MacDonald</td>
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<td>Social Work</td>
<td>M.A., Ph.D.</td>
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<td>D. Schmitt</td>
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<td>Sociology</td>
<td>M.S., Ph.D.</td>
<td>M. Thomas</td>
<td>P. A. Yantis</td>
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<td>Special Individual Ph.D. Program</td>
<td>M.A., M.S.</td>
<td>B. Baskerville</td>
<td>R. D. Shinn</td>
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<td>Speech</td>
<td>M.A., M.S.</td>
<td>R. L. Ludwig</td>
<td>D. S. Farner</td>
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<td>Urban Planning</td>
<td>M.A., M.S.</td>
<td>A. W. Martin</td>
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<td>Zoology</td>
<td>M.S., Ph.D.</td>
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</table>
instructor may employ any of the above grades consistent with the policies of the faculty in his academic unit, except as provided for in 3. and 5. below.

3. In order to qualify for one or more graduate degrees granted by the University of Washington, each graduate student must show letter grades (i.e. A, B, C, etc.) for at least 18 quarter credits of course work taken at the University of Washington. Letter grades may be earned in 300-, 400-, or 500-level courses.

4. An instructor may designate any graduate course to be graded CR/NC if this action is consistent with the policies of the faculty in that academic unit and is noted on Time Schedule work sheets prior to the time of registration. The instructor then submits a grade of CR or NC to be recorded by the Registrar for each student in the class at the end of the quarter.

5. A graduate student, with the approval of his or her Graduate Program Adviser or Supervisory Committee Chairman, may elect to be graded S/NS in any letter-graded course for which he or she is eligible, and, if a student does not so elect, then he or she is graded on a letter basis. If approval is granted, the student must indicate his or her choice at the time of registration or during the official change period, because S/NS grades will not later be converted to letter grades (or vice versa). The identity of students taking a graduate course on the S/NS basis is made known to the instructor at the end of the quarter by designation on the student’s grade card, which the instructor fills out and returns to the Registrar. Graduate students taking undergraduate courses on the S/NS basis are not identified to the undergraduate instructor.

For those students who elected S/NS grading at the time of registration, the instructor submits a letter grade to the Registrar, who converts A and B to S, and C, D, and E to NS for students in graduate courses. For undergraduate courses, A, B, and C are converted to S, and D and E to NS.

6. The grade of N is appropriate for students enrolled from quarter to quarter for 600, Independent Study or Research; 700, Master's Thesis; and 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 Chairman should change the N grade or grades to one that is more appropriate to the final evaluation (normally CR/NC).

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

8. When an individual situation appears to warrant modification of these procedures, the student should transmit an appropriate petition addressed to the Dean of the Graduate School, with comments and recommendations from the Graduate Program Adviser or Supervisory Committee Chairman.

Scholarship

To be eligible for a degree in the Graduate School, a student must have an average of B (3.00) in all courses numbered 300 and above. Students whose work is not of approved quality may be asked by the Dean of the Graduate School to withdraw. On the quarterly grade report and on each student’s permanent transcript, all courses numbered 100 through 700, with the grades earned, are listed. However, grade points are not extended for 100- and 200-level courses, and such courses are not included in quarter or cumulative grade-point averages. In computing a student’s grade-point average, letter system grades are considered for 300-, 400-, and 500-level courses. However, S and N grades are not considered, nor are letter systems grades for 100- and 200-level courses, nor for 600 (Independent Study or Research), 700 (Master’s Thesis), or 800 (Doctoral Dissertation), enrollments.

Language Competence Requirements and Examinations

Communication by use of languages and in other ways is basically important in scholarly work and research. Thus it is expected that each student admitted to the Graduate School has achieved superior competence in the English language; for students coming from non-English-speaking countries, this competence is specially tested.

Competence in one or more languages other than English is generally desirable in relation to 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.

Faculty in a particular graduate academic unit have, for graduate programs in that unit, identified certain foreign languages other than English in which competence may be desirable or helpful (e.g., languages in which a substantial literature exists or which may have special significance in relation to the field) and have specified whether or not a reading competence in one or more of
that the student, has withdrawn and has re­

Each student should consult with his or her Graduate Program Adviser for information and advice about desirable or required competence in foreign languages.

To provide for satisfaction of language competence requirements for advanced degrees, the University uses the Educational Testing Service (ETS) standardized examinations in French, German, Russian, and Spanish, and these standardized examinations are given at the University and at other places throughout the United States on published dates. Students are urged to acquire and use foreign-language competence as undergraduates or as early as possible in their graduate careers. The ETS examination may be written and passed by undergraduates who are urged to establish foreign-language competence before entering the Graduate School.

For languages other than French, German, and Spanish, foreign-language examinations are given in Seattle at the University on the day prior to the 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.

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, and 600 can be applied to residence and 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 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 or doctoral degree requirements are completed.

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
Policy
Beginning with the time of first enrollment, every student in the Graduate School is required to be registered each quarter or be on-leave until the completion of all requirements for the graduate degree for which he or she 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. Failure to maintain continuous enrollment constitutes presumptive evidence that the student has withdrawn and has resigned from the Graduate School. During Summer Quarter only, on-leave enrollment is automatic for all students who are either registered or on-leave the prior Spring Quarter. A graduate student must be enrolled and registered on campus or in absentia as a full-time student or a part-time student or in on-leave student status.

Registration
A graduate student enrolled and registered as a full- or part-time student pays the usual fees and is engaged in course work or research work on the campus or in absentia as a regular student and is supervised by the Graduate Program Adviser or the Graduate Program Adviser's representative in the student's field or by the Chairman of the student's Supervisory Committee.

On-Leave Student Status
If a graduate student in good standing plans to be away from the University and out of contact with the University faculty and facilities for a period of time, usually not to exceed four successive quarters, he or she must obtain on-leave student status after the student's petition for on-leave status has been approved by the Graduate Program Adviser. The student must have registered for and completed at least one quarter of work in the University of Washington Graduate School to be eligible for on-leave status. This status maintains a place for the student as a member of the Graduate School and permits him or her to use the University Library and to sit for foreign-language competence examinations, but
does not entitle the student to any of the other University privileges of a regularly enrolled and registered full- or part-time student. The student pays a nonrefundable fee of $5 to obtain on-leave student status, and this fee covers four successive academic quarters or any single part thereof. An on-leave student returning to the University on or before the termination of the period of his or her leave must file a former student enrollment application before the application deadline and must in-person register in the usual way as a full- or part-time student; this registration cancels any remaining leave period. If circumstances require a later leave of absence, the student must petition and must proceed again in the same manner as for an initial leave of absence.

Readmission

A student previously registered in the Graduate School who has failed to maintain continuous enrollment but who wishes later to resume his or her 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 he or she was 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.

Military On-Leave Status

Military on-leave status is available to a student whose degree program is interrupted by compulsory military service after the completion of at least one quarter of graduate work at the University of Washington. An approved on-leave petition and the payment of a $5 fee gives continuous enrollment status for up to five years from the date the on-leave status is granted or for up to one year after discharge from the armed services. Enlistment in a branch of the armed services in lieu of induction into the Army entitles the student to military on-leave status. Presentation of an induction document or affirmation on the on-leave petition with specifics as to notices and dates of induction is necessary to support this type of request. On-leave status is also available for class I-A—O and class I-O applicants.

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 had a petition for in absentia work approved by the student's Graduate Program Adviser or Supervisory Committee Chairman. 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.

Graduate Student Classifications

The following system classifies graduate and postdoctorate students into four categories based upon the extent 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>1</td>
<td>Premaster</td>
<td>Admitted to the Graduate School, but has not completed a master's degree or the equivalent (i.e., 36 quarter credits or more of course or research work applicable to an advanced degree).</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Intermediate</td>
<td>Completed a master's degree or the equivalent, but has not yet been admitted as a Candidate for a doctoral degree (i.e., has not yet completed the General Examinations).</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Candidate</td>
<td>Admitted as a Candidate, but has not yet completed a doctoral degree.</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Postdoctorate</td>
<td>Has completed a doctoral degree.</td>
<td></td>
</tr>
</tbody>
</table>

When a graduate student is first admitted to the Graduate School, he or she is placed in the classification appropriate in recognition of the highest academic degree which the admittance then holds. When a graduate student officially completes the master's degree, or General Examinations, his or her classification is changed appropriately by actions in the offices of the Graduate School and the Registrar.

When a Premaster graduate student officially completes 36 quarter credits or more of course or research work applicable to an advanced degree, it is ordinarily considered that the student has completed graduate work equivalent to the master's degree. The student's classification is changed to Intermediate, usually after recommendation made by the Graduate Program Adviser, followed by actions in the offices of the Graduate School and the Registrar.
When an Intermediate graduate student satisfactorily completes the doctoral General Examinations, the student’s classification is changed to Candidate by actions in the offices of the Graduate School and the Registrar.

Master’s Degree
Summary of Requirements
Each aspirant for the master’s degree must meet the following requirements:

1. Under a thesis program, a minimum of 36 credits (27 course credits and ordinarily at least 9 credits of thesis) must be presented. Under a nonthesis program, a minimum of 36 credits of course work is required.

2. At least 18 of the minimum 36 credits for the master’s degree must be for work numbered 500 or above. (In a thesis program, 9 of the 18 must be course credits and 9 may be for 700, Master’s Thesis.)

3. Letter grades (i.e., A, B, C, etc.) must be received in at least 18 credits of course work taken at the University of Washington. Letter grades may be earned in 300-, 400-, and 500-level courses.

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 of proficiency in a foreign language if one is required for a particular degree.

6. A thesis, approved by the Supervisory Committee, must be prepared, unless specifically expected in a particular program. A student must register for thesis.

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 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 office 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 requirements for the degrees are completed (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 appropriately prepared for the graduate program into which he or she is admitted and should confer with the Graduate Program Adviser in his or her field, or with the Graduate Program Adviser’s representative, in planning a study program and frequently thereafter during the course of graduate study.

Transfer and Extension Credit
A student pursuing a graduate program leading to the master’s degree may transmit a written petition to the Dean of the Graduate School requesting permission to transfer up to 9 graduate quarter credits taken while a graduate student in another recognized Graduate School to be applied toward the master’s degree here. 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.

If approved, 9 credits of transfer work or 6 credits of University of Washington extension credit or a combination of transfer and extension credits not exceeding 9 credits may be applied to the master’s degree. The minimum residence requirement of three quarters at the University of Washington may not be reduced by transfer or extension credit.

Neither credit by Independent Study through correspondence nor by Advanced Credit Examinations is acceptable.
Examination
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 chairman 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 office 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.

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 office 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 office.

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 or more extensive examinations than are required in thesis programs, or they may include some approved research activity in lieu of a thesis.

Application for the Master's Degree
The student must make application for the master's degree at the Graduate School office 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 office. 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 as to whether or not the general requirements for the degree will be satisfied at the end of the quarter and, if approved, the application is forwarded to the departmental Graduate Program Adviser.

The master's 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 office 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 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 office 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 office 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 Adviser should be thoroughly acquainted with the requirements for the particular degree.

Master's Degrees for Teachers
It has become increasingly apparent that there is need by experienced teachers for master's degree programs that focus on the fields of knowledge normally taught in the common schools and in the community colleges, and that would provide alternatives to the Master of Arts or Master of Science degree programs emphasizing particular fields of knowledge and an introduction to research, and to the Master of Education degree program emphasizing some specialization in education.

In an effort to satisfy this need, two special opportunities for graduate study emphasizing school and community college subject matter fields are now available at the University—a second pattern for the Master of Education degree program and programs leading to the degree of Master of Arts for Teachers. (M.A.T. programs are now offered in art, biology, chemistry, English, mathematics, and music; see index under "Master of Arts for Teachers" for reference to program descriptions.)
The types of programs now available for teachers at the University of Washington may be described briefly as follows:

The Master of Arts and the Master of Science programs provide for a concentration upon a subject matter field and for an introductory experience in creative scholarship and research. Two patterns are now to be offered under the Master of Education program, one designed to provide for concentration on such subjects as elementary education, educational administration, and others within the field of education; the other designed for specialized study of a teaching field along with appropriate additional work within the field of education. Programs leading to the degree of Master of Arts for Teachers are intended to provide experienced teachers with additional avenues for broad, continuing study in, and related to, one of the fields of knowledge.

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 General Examinations 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 officially admitted to candidacy as described in a later section under the heading "Admission to Candidacy for the Doctor's 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 his 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 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 or above. Every student is expected to take some work outside the major field, and the Supervisory Committee determines the requirements for minors 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 normally is completed prior to the General Examination. Residence requirement for the doctoral degree cannot be met solely by part-time study.

3. Letter grades (i.e., A, B, C, etc.) must be received in at least 18 credits of course work taken at the University of Washington. Letter grades may be earned in 300-, 400-, and 500-level courses.

4. Demonstration of a reading knowledge of one or more foreign languages related to the major field of study, if such is required for the student's particular degree program. The student should consult with the Graduate Program Adviser or the Supervisory Committee Chairman for information and advice about the foreign-language competence required for his or her program.

5. Creditable passage of a General Examination in the major field and, when a part of the program, in the minor field with which it is concerned.

6. Preparation 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 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 and work transferred from other institutions.

9. Registration as a regular full- or part-time student at the University for the quarter in which the degree requirements are completed (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
Graduate students are expected to be appropriately prepared for the graduate programs into which they are admitted.

On initial admission to the Graduate School, a graduate student should confer immediately with the departmental Graduate Program Adviser or the Graduate Program Adviser’s representative in planning his or her program. Frequent conferences should be held thereafter during the course of graduate study.

Special Individual Ph.D. Programs
The University, through special individual Ph.D. programs in the Graduate School, makes provision for exceptionally able students whose objectives for study toward the Ph.D. degree do not fall within the offering of any one academic unit authorized to offer a Ph.D. program.

An unusually well-qualified graduate student who has already been admitted to an academic unit of the University, is enrolled therein, and takes the initiative to carefully plan an appropriate program of studies may request permission to pursue such an individual Ph.D. program.

An interested graduate student may approach a graduate faculty member qualified to provide guidance. The professor, if it is agreed that the program is feasible and desirable, gathers a Special Advisory Committee consisting of at least three and usually not more than five other members of the graduate faculty who represent the student’s various fields of interest. This committee must include professors from at least two academic units of the University. Before the student is permitted to embark on the program, he or she must obtain the approval of the Dean of the Graduate School.

The student addresses a special individual Ph.D. program proposal, accompanied by the endorsement of the Special Advisory Committee, to the Dean of the Graduate School. A proposal form and additional information may be obtained at the Graduate School office.

Doctor of Arts Degree
The Council of Graduate Schools in the United States has declared as a matter of policy 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. Thus, policy has been approved to record that the Doctor of Arts degree may be offered at the University by the faculty in specifically authorized graduate units, and general characteristics expected in graduate programs that may be offered leading to this degree have been established.

The faculties in Chemistry, Germanics, and Physics have been authorized to offer a program leading to the D.A. degree, and these programs are described in the respective program sections. Faculties in several other fields are considering or seeking authorization for D.A. programs.

Appointment of Doctoral Supervisory Committee
As soon as is appropriate, but not later than two quarters prior to the time the warrant for the General Examination is presented for approval to the Dean of the Graduate School, the Graduate Program Adviser requests the Dean of the Graduate School to appoint a Supervisory Committee, which includes a graduate faculty representative, to assume general sponsorship of the graduate student. All members of the Supervisory Committee are members of the University of Washington Graduate School faculty, except that one person who does not belong to the University of Washington Graduate School faculty may be appointed as a regular voting member. Establishment of a doctoral Supervisory Committee is taken to mean that, in the opinion of the faculty in the graduate student’s field, the graduate student’s background of study and preparation and achievement is sufficient to justify his or her entering into the program of doctoral study and research.

Admission to Candidacy for the Doctoral Degree
At the end of two years of graduate study, and after successful demonstration of foreign-language proficiency, if required, the Chairman of the Supervisory Committee may present to the Dean of the Graduate
School, for approval, a warrant permitting the student to take the General Examinations 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 examinations. The warrant should indicate time, place, and manner of examination, and must be received at least two weeks prior to the proposed examination date. The warrant is approved by the Dean of the Graduate School only after the prescribed requirements of residence and study have been met. If the examination is oral, a majority of the examining committee must be present during the entire examination.

If the student's performance in his General Examinations is judged by his Supervisory Committee to be satisfactory, a warrant certifying the successful completion of the General Examinations is filed in the Graduate School office by the Chairman of the student's Supervisory Committee.

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 for the dissertation and to preparation for the Final Examination.

A student usually must be registered at least two quarters at the University of Washington after passing the General Examinations 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, normally written in the English language, should reflect not only mastery of research techniques but also ability to select an important problem for investigation and to deal with it competently. Requirements for the preparation of the dissertation in acceptable form may be obtained from the Graduate School office.

When the Supervisory Committee believes that the doctoral Candidate is prepared to take the Final Examination, the Dean of the Graduate School is asked to designate a Reading Committee from among the members of the Supervisory Committee. Using forms provided by the Graduate School, the Reading Committee prepares a report briefly summarizing the distinctive achievement of the research, the methods used, and the results. If the report is favorable and is presented at the Graduate School office two weeks before the Final Examination date, and if the Candidate has met all other requirements, a warrant authorizing the Final Examination is issued by the Dean of the Graduate School.

The Reading Committee report is not binding on the Supervisory Committee, but is intended to ensure that, except for minor alterations, the dissertation is ready for final presentation. The Dean of the Graduate School returns the Reading Committee report to the Supervisory Committee, together with the warrant for the Final Examination, and, upon approval by the Supervisory Committee at the time of the Final Examination, it is bound with the dissertation.

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

All doctoral dissertations are published in full on microfilm. 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 office. Each copy is to be accompanied by a copy of the Reading Committee report and an abstract, not exceeding six hundred words in length, which has been approved by the Supervisory Committee at the time of the Final Examination. A receipt for the $25 publication charge must be shown when the dissertation is presented.

Abstracts are published in full in the publication Microfilm Abstracts, and the manuscript copies of the dissertations are kept on file in the University Library. A positive of each microfilmed dissertation is sent to the Library of Congress to be entered in its subject and author file, and the negative is retained by University Microfilm of Ann Arbor, Michigan, which provides additional microfilm copies on order.

The Candidate signs the necessary publication agreement at the time the dissertation is presented at the Graduate School office, and, if the student wishes application for a copyright, the copyright may be made at that time. Publication in microfilm does not preclude other forms of publication.

Admission to the Graduate School

Regular Graduate Student Status

In general, properly qualified students who are graduates of the University of Washington or of other col-
students or universities of recognized rank are eligible to apply to the Graduate School. However, all current and prospective students should realize that the University is now operating under a policy of restricted enrollment, and registration is contingent on available space and facilities.

The primary criterion for admission to the Graduate School is the applicant's apparent ability, as decided by the University, to progress satisfactorily in a graduate degree program. The applicant's scholastic record is of major importance and, ordinarily, the applicant should have at least a B, or 3.00 grade-point, average for the courses taken during the junior and senior years of undergraduate study. The applicant also should show completion of an undergraduate program appropriate as preparation for graduate study in his or her chosen field. Consideration is given to other evidence that may be available.

In some cases, an applicant may give promise of making satisfactory progress in graduate work, although his or her undergraduate grade average may be less than B or 3.00 or undergraduate preparation may be inadequate. In these and other unusual cases an applicant may be admitted to the Graduate School on the favorable recommendation of the appropriate Graduate Program Adviser with approval by the Dean of the Graduate School. Disadvantaged students who believe they may qualify under this provision are encouraged to apply.

In all cases, the University is able to grant admission only if sufficient faculty and facilities are available to provide for the applicant's program.

Admission to the Graduate School usually signifies admission into a particular 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. Acceptance of a graduate student into a program of study leading to a doctoral degree is not implied by admission to the Graduate School but is usually signified by the appointment of a doctoral Supervisory Committee for a graduate student who has been previously admitted to the Graduate School and has demonstrated the apparent ability, as decided by the University, to progress satisfactorily in a doctoral degree program.

Ordinarily, only students who have been admitted to the Graduate School are permitted to enroll in courses numbered 500 or above and to gain credits applicable to the fulfillment of advanced degree programs.

Students are urged to acquire foreign-language competence as undergraduates. The Educational Testing Service examination may be written and passed by undergraduates and used to establish their foreign-language competence before entering the Graduate School.

Admission to the Graduate School provides the opportunity for continuance of graduate study and research only for the period during which the graduate student maintains satisfactory performance and progress toward completion of his or her graduate degree program, along with a status of physical and mental health approved by the University. The Dean of the Graduate School may alter the status of a graduate student.

Visiting Graduate Student Status
A student who wishes to enroll for a single summer session or a single quarter 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 carrying forward his program of studies for 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. He or she need not submit a full transcript of credits, but must apply for admission, pay the $10 admission application fee, and ask the Dean of his or her graduate school to certify as to his or her status on a special form titled "Visiting Graduate Student—Certificate of Status," which may be obtained by writing to the University of Washington, Graduate Admissions Office, AD-10, Seattle, Washington 98195.

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.

For any student admitted on these bases, it is understood that his or her registration will terminate at the end of the single quarter or the single summer session for which he or she is enrolled. 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 enters upon 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 apply to the work for such a degree.

Admission Procedures

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. Other correspondence relative to admission procedures should be addressed to the University of Washington, Graduate Admissions Office, AD-10, Seattle, Washington 98195.

Each application 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 Student

The application for admission, the required transcripts in duplicate, and the $10 admission application fee must be filed, in accordance with instructions appearing on the application form, prior to the following dates for the applicant to be assured of consideration for admission to the quarter for which application is being made: April 1 for Autumn Quarter, October 1 for Winter Quarter, January 1 for Spring Quarter, April 1 for Summer Quarter. These dates are subject to change by the University, and an early application is advised.

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 fifth-year 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 the $10 admission 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 credentials is considered a serious breach of honor and 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 do not apply the information or observe the instructions or for applicants 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 Graduate Admissions Office 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 Graduate Admissions Office 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 admission application fee in advance of the application closing date for the quarter desired. Appropriate credentials from the prior 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 admission 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 otherwise meet the requirements for admission to the Graduate School may register the quarter just prior to admission to the Graduate School for as many as 6 credits in graduate courses in addition to their 6 credits of undergraduate work. This registration and these arrangements must receive prior approval by the Graduate School; however, students concerned are not reclassified as graduates until the baccalaureate degree has been granted and after their official admission to the Graduate School. 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.

Foreign Students

Students educated abroad are expected to meet the same general requirements as all other applicants educated in American schools. The admission application, official credentials, and the $10 admission application fee must be received in the Graduate Admissions Office 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 admission 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.

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.

Visiting Graduate Students
The "Application for Admission to the Graduate School" form, the "Visiting Graduate Student—Certificate of Status" form, appropriately completed and signed by the dean of the applicant's "home" graduate school, and the $10 admission application fee must be filed with the Graduate Admissions Office prior to the following dates: April 1 for Autumn Quarter, October 1 for Winter Quarter, January 1 for Spring Quarter. For Summer Quarter, the final date for filing applications for admission with nonmatriculated standing is announced in the Summer Quarter Bulletin.

University of Washington Seniors
University of Washington students who are within 6 credits of completing their undergraduate work and who otherwise meet the requirements for admission to the Graduate School may register the quarter just prior to admission to the Graduate School for as many as 6 credits in graduate courses in addition to their 6 credits of undergraduate work. These arrangements must receive prior approval by the Graduate School.

Second Bachelor's Degree or Standard Teaching Certificate
Students who wish to obtain a second bachelor's degree or Standard Teaching Certificate, or both, register as fifth-year students in the appropriate undergraduate college, not in the Graduate School.

Registration in the Graduate School
A regular graduate student is a student who fulfills the following requirements: (1) He or she has been granted regular admission to the Graduate School; (2) his or her current program of studies is satisfactory to the Graduate Program Adviser; (3) he or she has received medical clearance from the Student Health Service; and (4) he or she 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").

Registration Procedure
All students currently attending the University who wish to attend a succeeding quarter must participate in advance registration and pay fees by the stated deadline. This would include students registered for Spring Quarter who wish to attend Summer Quarter or Autumn Quarter or both. 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.

New students are given appointments and directions for registering when they are notified of admission.

Advising
After notification of admission and before registration, the student should confer with the departmental Graduate Program Adviser about the program for his or her current registration, which must be approved by the Graduate Program Adviser before it is presented at Sections.

As soon as the Supervisory Committee is appointed, the student should meet with this committee and work out plans for the entire graduate program. It is primarily to this committee, and especially to the Chairman of this Supervisory Committee and to the Graduate Program Adviser in the department, that the student must look for individual counsel, guidance, and instruction in the scholarly study and research that characterize graduate work. The programs of students employed in the University or elsewhere are limited. Students who are employed full time may not register for more than 6 credits.

Financial Aids: Assistantships, Associateships, Fellowships, Loans, and Employment
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 office.

The University also participates in the fellowship programs of the National Science Foundation, the National Institutes of Health, the National Institute of Mental Health, the Danforth Foundation, 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.

Foreign student scholarships are awarded by the University of Washington each academic year to one hundred qualified students from other countries who have been enrolled at the University of Washington for one academic year. These scholarships are not available for the Summer Quarter. The awards are made on the basis of the academic record of the student, recommendations from his or her professors, and the need for such assistance. These scholarships cover tuition only and are administered by the Foreign Exchange Scholarship Committee, International Services Office, University of Washington.

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. Nearly two thousand such appointments were made during the past year.

A detailed description of the arrangements in effect with respect to graduate student service appointments is given in Executive Order 28, a copy of which is available from the Graduate Program Adviser or the Office of the Dean of the Graduate School. Some information regarding these arrangements is given below.

Appointments are granted only to graduate students of high intellectual competence and attainment whose educational goals are clearly defined. An appointment is made only when it is reasonably certain that it will help the student toward the attainment of his goal. Succeding appointments may be made if the student's progress toward the degree is satisfactory. Maintenance of high scholarship also is a condition of reappointment.

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 such an appointment is contingent on the student's admission to graduate status prior to the beginning of tenure under the appointment.

The tabulation below sets forth a three-level appointment structure providing for specific correlation between the student's eligibility for the higher appointment categories and his or her progress toward an advanced degree. This structure also provides for a range of stipends for students at various levels of merit and achievement. A graduate student's classification, depending on his or her stage of progress at the University, is defined in the footnotes following the table.

Employment Opportunities

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

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

The University offers a number of full- and part-time employment opportunities in the secretarial, clerical, and technical fields for spouses of married students. These positions offer pay comparable to the prevailing salaries in the community and 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.

Graduate students appointed to the beginning level of graduate teaching appointments are not permitted to be in overall charge of a course, but are given an appropriate degree of responsibility and supervision of laboratory or classroom work so that they may be introduced to teaching activities gradually and effectively. Student appointees may also serve as assistants in research activities for which a faculty member is responsible.
Two special categories for teaching appointments and one for research appointments are provided above the predoctoral associate level: predoctoral instructor, for the graduate student who has achieved Candidate status and is ready for increased teaching responsibility; predoctoral lecturer, for a mature and competent graduate student who, though he need not be a Candidate, has had exceptional previous teaching or other professional experience; and predoctoral researcher, for the student who has special skills or qualities obtained outside of his or her experience as a graduate student or who carries major responsibilities in relation to research activities. For the 1974/75 academic year these appointments carry a minimum stipend of $503 per month (half time) with no designated maximum so that the stipend may be adjusted to a level appropriate to the appointee's experience and his or her teaching and research responsibilities.

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

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

Spouses of graduate students who hold assistantship or associapeship appointments as herein described, and which 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, 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 highly exceptional circumstances and with the prior approval of the Dean of the Graduate School, the above graduate appointments may be made on a 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.

**Loans**

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

The National Direct Student Loan Program 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 NDSL 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 date will be approximately February 1, 1975, for the 1975/76 academic year.

The Federally Insured Student Loan Program provides for a long-term commercial bank loan in which the graduate student can borrow up to a maximum of $2,500 per year, depending on individual lending institutions' policies. This loan bears a seven percent interest rate, which may be subsidized by the government during the duration of full-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 federally insured student loans. An early inquiry to the student's bank is advisable. 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 eighteen months.

**Financial Aid for Minority Graduate Students**

A number of fellowship and assistantship awards ranging up to $4,000 are open to men and women who are seniors or graduates of accredited colleges and universities in the United States and whose dominant ethnic origin is either American Indian, Asian American, Afro-American, or Chicano/Mexican American, other Spanish American, or Filipino American. In order to obtain one of the fellowship or assistantship awards, the student should contact a specific department of his or her choice and request to be nominated for one of the Recruitment of Minority Graduate Student Fellowships.
ships. Each application must be accompanied by a letter of support from the department Chairman or the Graduate Program Adviser.

Direct financial assistance from individual departments also may be available, and the prospective student should apply directly to the Chairman of the department in which he or she intends to do graduate work.

A limited number of tuition scholarships are available for minority resident graduate students, or a student may apply for a National Direct Student Loan of up to $2,500 per year. Additional information may be obtained from the Office for Recruitment of Minority Graduate Students, Graduate School, University of Washington.

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

1974/75 GRADUATE STUDENT SERVICE APPOINTMENTS
(Students holding these appointments pay resident tuition and fees.)

<table>
<thead>
<tr>
<th>Title of Appointment</th>
<th>One Month</th>
<th>Academic Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>Research Assistant</td>
<td>$441</td>
<td>$3,645</td>
</tr>
<tr>
<td>Graduate Staff Assistant</td>
<td>405</td>
<td>3,645</td>
</tr>
<tr>
<td>Predoctoral Teaching Associate I</td>
<td>472</td>
<td>4,248</td>
</tr>
<tr>
<td>Predoctoral Research Associate I</td>
<td>431</td>
<td>3,879</td>
</tr>
<tr>
<td>Predoctoral Staff Associate</td>
<td>431</td>
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<td>4,527</td>
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<tr>
<td>Predoctoral Research Associate II</td>
<td>462</td>
<td>4,158</td>
</tr>
<tr>
<td>Predoctoral Staff/Associate II</td>
<td>462</td>
<td>4,158</td>
</tr>
</tbody>
</table>

*Premaster: having been admitted to the Graduate School but not yet having completed the master's degree or the equivalent. Intermediate: having completed the master's degree or the equivalent but not yet having been designated as a Candidate. Candidate: having completed the General Examination successfully and having been designated as a Candidate for the doctoral degree but not yet having completed the doctoral degree.

UNIVERSITY RESEARCH

Research is of particular concern to the Graduate School, because the advanced instruction of graduate students is largely guidance in research and because the continuing effectiveness of professors in instruction of graduate students rests largely upon continuation of the scholarly research activities of these professors.

Statement on University Research Policy

The University of Washington is committed to a large and varied program of research. In common with all other institutions of higher learning, it recognizes that its mission of service to society in the modern age is not fulfilled unless its programs of teaching and research at all levels are fully integrated and vigorously executed. It believes that only through combined teaching and research does society maintain effective contact with the frontier of knowledge, add new knowledge from time to time to that which we already have, and train new students in the continuation of these processes. We find in research the common ingredient essential to the advancement of knowledge, the enrichment of teaching, and the rendering of services to the community.

The principle of indivisibility of teaching and research has been clearly enunciated on many occasions and in both scholarly and political documents. As an example of the latter, we have the statement in the report of the President's Science Advisory Committee of 19601 to the effect that research and the graduate education of young scientists are intimately related. On page 11 of that report one finds the specific conclusion "Basic research and graduate education, . . . are the very essence of the fundamental purposes of the American University." In a similar vein, a report of the National Academy of Sciences Committee on Science and Public Policy2 characterizes the central purpose of American universities by the statement that this purpose is "the advanced education of American youth integrated with the scholarly activities of teachers; in the natural sciences these activities take primarily the form of scientific research."

It is the aim of the University to adhere closely to these principles, thus executing programs of research and teaching in a large variety of fields of learning in the sciences, humanities, social studies, and engineering. Because it is not possible in any one institution to emphasize all of the vast field of learning uniformly, the emphasis on the different fields of learning must vary considerably, as is the case also in all other institutions of higher learning. Complete coverage is not a practical, nor would it perhaps be a desirable, objective. On the national scale there is confidence that such coverage is achieved. On the regional scale the University's aim is, and should be, the vigorous development of those areas of learning in which the University has special competence. These areas of special competence are the areas for which it has been most fully prepared by its history.


of development as a university. It is believed that these are also the areas best suited to its particular geography and the special interests, as well as the needs and potentials of the state of Washington.

Intra-University Scholarly and Research Support

The Graduate School Research Fund provides modest funds available through the University to aid in the support of research activities of the faculty and graduate students. These monies are allocated by the Dean of the Graduate School with the advice of the Graduate School Research Fund Committee, appointed by the Dean, which reviews proposals for research support, formulates regulations concerning personnel and use of funds, and stimulates interest in investigative activities. The committee is concerned with allocations of the Initiative 171 monies, which help to support research in medicine and biology, and of the other funds of the Graduate School.

The Agnes H. Anderson Research Fund for the support of research was formed from the proceeds of a very generous gift donated by two anonymous friends of the University. Accepted by the Board of Regents in 1943, the fund is named in memory of the donor of Alfred H. Anderson Hall and the Agnes Healy Anderson Forestry Trust Fund. The selection of research projects and allocation of funds for their support is the responsibility of the Dean of the Graduate School after consultation with the Graduate School Research Fund Committee:

The Graduate School Consultants Fund provides modest funds to assist in bringing distinguished scholars and scientists in the vicinity to the University for a day or for short periods for consultations and seminar discussions to assist members of the faculty and graduate students in carrying forward their research. Information about the Consultants Fund may be obtained from the Dean of the Graduate School.

Gift, Grant, and Contract Research Funds may provide assistance to University faculty, graduate students, and staff in carrying out significant research and other activities. Research requiring substantial amounts of faculty, graduate student, or other staff time, or significant use of University facilities may be undertaken by the University under arrangements specified in a gift, grant, or contract agreement between the research sponsor and the University.

Grants are often made by foundations, industries, and other agencies for basic research in designated fields without explicit definition of projects or goals. Grants of this kind contribute in an especially important way to the advancement of knowledge through basic research.

Special Lectureships and Professorships

The Walker-Ames Fund was founded in 1931 by Maud Walker Ames and her husband, Edwin Gardner Ames. Its purpose was 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 . . ." Since the first Walker-Ames visiting professor was appointed in 1936, well over a hundred notable scholars have come to the University as temporary members of the faculty, enriching the intellectual life of the University community.

The John Danz Fund was established in 1961 by a gift to the University from the late Mr. John Danz and Mrs. Jessie Danz. The funds, in part, are used to bring to the University 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 the rational universe." The first Jessie and John Danz Lecturer was Sir Julian Huxley, who came to the University from London during Spring Quarter 1962.

Communications relating to the Walker-Ames Fund and the John Danz Fund should be addressed to the Walker-Ames Fund and the John Danz Fund should be addressed to the University of Washington, Dean of the Graduate School, 1 Administration, AD-30, Seattle, Washington 98195.

Research and Special Facilities

Some academic or research activities and facilities are of general significance in all or many fields of knowledge through the University. These are listed below, with some of them being described in greater detail.

Alcoholism and Drug Abuse Institute
3935 Fifteenth Avenue Northeast

The institute's main functions are to fund appropriate research projects in the areas of alcoholism and drug abuse, to coordinate training in these areas at a university level, and to provide community consultation as requested.

Arboretum
Dale Cole, Ph.D., Director, Center for Ecosystem Studies
Joseph A. Witt, Curator of Plant Collections

The Arboretum is a living laboratory devoted primarily to the study of woody plants. Its extensive plantings of more than five thousand taxa, close proximity to the city and the University, and varied microenvironments make it an ideal tool for research in many disciplines, includ-
ing urban forestry, ornamental horticulture, environmental studies, plant genetics, and systematics.

Center for Asian Arts
Millard B. Rogers, Ph.D., Director
Richard McKinnon, Ph.D., Associate Director
131 Art

The center promotes the study and performance of Asian music, art, and drama.

Center for Research in Oral Biology
Leo M. Sreebny, D.D.S., Ph.D., Director
Dan G. Middaugh, D.D.S., Assistant Director
B528 Health Sciences

The central goal of the center is to assist in the national effort to reduce the toll of oral disease and to promote the general level of oral health.

Center for Studies in Demography and Ecology
Samuel H. Preston, Ph.D., Director

The center conducts basic research on population movements in the United States and other countries and serves as a training unit for graduate students in the social sciences.

Child Development and Mental Retardation Center
Irvin Emanuel, M.D., Director
CD303 Child Development and Mental Retardation

The Child Development and Mental Retardation Center provides facilities for teaching and research programs relating to mental retardation and child development. The center consists of four units: medical research, behavioral research, clinical training, and experimental education. The facilities include biological, medical, and behavioral research laboratories; a large multidisciplinary diagnostic clinic; and an experimental school containing twelve classrooms.

Laboratories and other facilities are staffed by the various participating departments, schools, and colleges of the University. The programs and activities of the center are coordinated by an executive committee. Research and training programs are closely related to the programs of the state departments of Public Instruction and of Social and Health Services. Degree programs are managed by the departments involved, and there are some interdisciplinary graduate training programs that are the function of the center.

Requests for information concerning specific research and training programs should be addressed to the appropriate academic department. Requests for information concerning the center should be addressed to: University of Washington, Director, CD303 Child Development and Mental Retardation Center, WJ–10, Seattle, Washington 98195.

Academic Computer Center
Robert G. Gillespie, B.A., Director
Monique Rona, Assistant Director

The Academic Computer Center, established in 1956, provides computer services for the University of Washington and the community for education, research, and administrative uses. The principal computers now installed include a Control Data Corporation 6400 and CYBER 72. Also available are keypunch and auxiliary card-handling equipment for self-service use; graphics equipment, including mechanical plotting equipment allowing automatic plotting of information and a digital recording system capable of reading coordinates from maps, graphs, film, etc., and recording them on magnetic tape; and terminals that provide remote job entry and time-sharing services to the CDC computers.

The center offers specialized training through noncredit classes in programming languages, advanced techniques, and the use of special software packages. Other services available are consultation; an information center that includes reference materials, computer manuals, and program descriptions; and professional programming.

Cost accounting and reporting is provided to the users for all computer services. The staff of the center, in liaison with campus users, plans for special hardware and software requirements and develops general-purpose computer programs satisfying major user requirements.

The center is administered through the Office of the Vice President for Research.

Requests for the Computer Center Newsletter or for information concerning the facilities should be addressed to: University of Washington, Director, Academic Computer Center, FC–10, Seattle, Washington 98195.

Computer Science Laboratory
Alan C. Shaw, Ph.D., Director
43 Roberts

The Computer Science Laboratory is the research and teaching laboratory for the Computer Science Group. It is used for studies of operating systems and other software and hardware, which, if done on Computer Center equipment, might impede the job flow; and for
studies that require specialized equipment (e.g., graphics terminals) not supported by the Computer Center.

The operation of the Computer Science Laboratory is integrated with the graduate training program of the Computer Science Group in order to provide practical experience for those Computer Science students interested in the engineering and applied aspects of computer science. A large amount of time is reserved for open-shop operation for experimental studies.

The laboratory contains a Xerox Data Systems Sigma 5 computer with a disk-oriented operating system. A second component is the remote terminal system for interactive computing. The laboratory also has an interactive graphics computer system that is connected to the Sigma 5 computer.

**Developmental Psychology Laboratory**

Halbert B. Robinson, Ph.D., Director
233 Guthrie

Graduate training in general developmental psychology and in child clinical psychology is provided by this laboratory. Emphasis is placed on an experimental approach to problems of behavioral development.

**Division of Marine Resources**

Stanley R. Murphy, Ph.D., Director
3716 Brooklyn Avenue Northeast
Norbert Untersteiner, Ph.D., Director, Polar Programs
4059 Roosevelt Way Northeast

The Division of Marine Resources promotes the University's interest in the exploration, development, and use of the resources of the seas and oceans. It coordinates and supplements the teaching, research, development, and advisory service programs in marine science and engineering and cooperates in similar activities with outside agencies and institutions. Interdisciplinary in nature, the division is concerned with the development and use of the physical, chemical, geological, and biological resources of the marine environment; marine commerce and engineering; and the economic, legal, biomedical, and sociological problems arising out of the management and utilization of marine resources.

The University is a Sea Grant College. The division is responsible for the coordination and administration of the interdisciplinary Sea Grant Program. It also administers interdisciplinary research efforts in the Arctic, including the interinstitutional Arctic Ice Dynamics Joint Experiment. The division cooperates with agencies of state and federal government that are concerned with marine matters.

Requests for information should be addressed to: University of Washington, Director, Division of Marine Resources, HG-30, 3716 Brooklyn Avenue Northeast, Seattle, Washington 98195.

**Drug Plant Gardens and Laboratories**

L. R. Brady, Ph.D., Director
Gerard C. Vreeburg, Supervisor

Viable seeds and plants of medicinal and pharmaceutical interest are maintained for experimental purposes by this resource facility.

**Fishes Research Institute**

Robert L. Burgner, Ph.D., Director
Roy E. Nakatani, Ph.D., Assistant Director
260 Fisheries

The institute conducts major research in fisheries biology and aquatic ecology in the Pacific Northwest and Alaska and provides thesis opportunities for graduate students in fisheries.

**Friday Harbor Laboratories**

A: O. Dennis Willows, Ph.D., Director
Richard R. Strathmann, Ph.D., Resident Associate Director
Friday Harbor, Washington
University Office: 208 Kincaid

Friday Harbor Laboratories, a component of the Office of the Vice President for Research, compose the principal marine science station of the University of Washington. The staff includes professors from various academic units of the University, including Botany, Fisheries, Oceanography, and Zoology, as well as visiting professors from other institutions.

Friday Harbor Laboratories are located approximately eighty miles north of Seattle near the town of Friday Harbor on San Juan Island, on 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.

The laboratories are close to seaways varying from oceanic to those highly diluted by streams, with depths to a thousand feet, bottoms varying from mud to rock, and water movements ranging from those of quiet bays and lagoons to those of swift tidalways. The waters about the San Juan Archipelago abound in varied marine flora and fauna.
During spring and summer, the laboratories offer an opportunity for independent and supervised research, as well as a varied program of instruction for graduate and undergraduate students. Throughout the year, use of the facilities of the laboratories for research in various areas of marine science is encouraged.

Requests for information concerning study and research, availability of facilities, and admission to the laboratories should be addressed to: University of Washington, Director, Friday Harbor Laboratories, Friday Harbor, Washington 98250.

Henry Art Gallery
Spencer Moseley, Acting Director
LaMar Harrington, Associate Director
Jan ver der Marck, Curator, Contemporary Art
Julie Anderson, Publicity Director
Jim Peterson, Preparator

Exhibitions of paintings, sculpture, prints, photographs, crafts, and films, supplemented with lectures and special events, are offered by the gallery. Collections include Pacific Northwest art, contemporary and nineteenth-century American and nineteenth-century French paintings, prints, crafts, and ethnic and folk arts. The Henry Gallery is responsible for the Archives of Northwest Art, the Index of Art in the Pacific Northwest, and other research programs.

Institute for Environmental Studies
Robert O. Sylvester, S.M., Director
Brian W. Mar, Research Coordinator
112 Sieg

The institute is a University-wide educational unit for intercollege-interdisciplinary program development in teaching in environmental studies at the undergraduate and graduate levels, in research, and in public service. Its research efforts are of three general types: assistance to, or stimulation of, individual researchers on environmental research needs; service as a linking function in bringing together individual researchers in different disciplines; and the development through the institute of multidisciplinary research teams for specific projects.

Institute for Marine Studies
Donald L. McKernan, B.S.
3731 University Way Northeast

The institute's purpose is to create and foster innovative interdisciplinary courses of study and new research approaches to ocean uses and the development of marine resources. The institute also is developing a postdoctoral research program that will relate to the development of alternative policies for ocean use. Development of a graduate curriculum for master's and doctoral degree programs is planned.

Institute for Sociological Research
David R. Schmitt, Ph.D., Director
119 Savery

The institute supports research activities of faculty and graduate students in sociology.

Institute of Forest Products
James S. Bethel, D.F., Director
115 Anderson

The institute is concerned with research and continuing education in forest and wildland resources and their management; utilization of forest resources, and environmental, economical, and sociological impacts of forestry practices.

Institute of Governmental Research
Robert H. Pealy, Ph.D., Director
Walter Williams, Ph.D., Director of Research
3935 University Way Northeast

The institute is an interdisciplinary University-wide institute responsible for research on a wide range of governmental policy problems, with particular emphasis on urban affairs. Faculty members and graduate students throughout the University campus participate in its programs. The research policies of the institute are developed in consultation with a faculty advisory committee representing a full range of University disciplines and professional schools. Policy advice is also sought from appropriate governmental organizations and citizen groups.

Joint Center for Graduate Study
R. Wells Moulton, Ph.D., Dean
104 Administration
Raymond Gold, Ph.D., Resident Director
Richland, Washington

The Joint Center for Graduate Study, located at Richland, Washington, is an off-campus facility operated by the University of Washington and Washington State University, with Oregon State University participating in the academic program. The facility is available for graduate study and research to students associated with these universities. Course work completed through the center and research performed in the laboratories of contractors to the Atomic Energy Commission, upon approval in advance, may be applied toward the fulfillment of the requirements for certain advanced degrees offered by the University of Washington.
Currently, graduate-level and upper-division courses are available in biology, business administration, chemistry, computer science, education, librarianship, mathematics, physics, radiological sciences, and in chemical, ceramic, electrical, mechanical, metallurgical, and nuclear engineering. Atomic Energy Commission–owned laboratory facilities, operated by various prime contractors to the Atomic Energy Commission, are available for research purposes on an individual basis and provide an exceptional opportunity to do research work requiring facilities not available at most colleges and universities. A limited amount of financial support is available through the Richland Graduate Fellowship program for students of advanced standing in support of Master of Science thesis or doctoral dissertation research to be performed at Richland. A limited amount of financial support is also available for faculty members desiring to do research at the center.

Most of the students and faculty of the center are employees of the Atomic Energy Commission or its contractors and have access to their laboratories. Employment with contractors to the Atomic Energy Commission is generally available only to citizens of the United States. Classes at the center are usually held in the evening or late afternoon.

All requests for information concerning the activities and programs of study and research at the center, availability of facilities, and admission to activities, and for copies of the Joint Center for Graduate Study Bulletin, which contains general information and course offerings, should be addressed to: Joint Center for Graduate Study, 100 Sprout Road, Richland, Washington 99352.

Laboratory of Radiation Ecology
Allyn H. Seymour, Ph.D., Director
104 Fisheries

Research contracts funded by the Atomic Energy Commission and the Environmental Protection Agency provide specialized equipment and facilities for the analyses of radionuclides in biological and environmental samples related to field and laboratory research programs.

Nuclear Physics Laboratory
William G. Weitkamp, Ph.D., Technical Director
Nuclear Physics Laboratory

The laboratory houses a Van de Graaff accelerator and a cyclotron for research in physics, chemistry, cancer therapy, nuclear medicine, radiation biology, and related fields. The laboratory also manufactures radioactive isotopes.

Nuclear Reactor and Neutron Generator
Gene L. Woodruff, Ph.D., Director
William S. Chalk, M.S., Acting Associate Director
Nuclear Reactor Building

Research in nuclear engineering and allied fields is undertaken.

Oceanographic Research Vessels
Maurice Rattray, Ph.D., Chairman
123 Oceanographic Teaching

These vessels are used for field studies in Puget Sound and the Pacific Ocean.

Office of Scholarly Journals
Emily Johnson, Director
Parrington Annex 7

The University maintains an Office of Scholarly Journals in association with the Graduate School. The function of the office is to provide assistance to members of the University faculty who have editorial responsibilities in relation to the publication of the many scholarly journals published by, or associated with, the University of Washington.

Requests for information concerning the activities and facilities of the office should be addressed to: University of Washington, Director, Office of Scholarly Journals, Parrington Annex 7, DE-05, Seattle, Washington 98195.

Organization for Tropical Studies
James S. Bethel, Ph.D., and Douglas G. Chapman, Ph.D.
University Representatives
107 Anderson and 204 Fisheries

The University of Washington is a member of this consortium of twenty-seven leading United States and Latin American educational and research institutions. Opportunities are offered for graduate education and student and faculty field research in the Central American tropics.

Pacific Northwest Bibliographical Center
Lura G. Currier, B.A., B.L.S., Director
253 Suzzallo

This center is a cooperative switching center through which libraries of all types in the Pacific Northwest share their resources via interlibrary loan. It performs this and other bibliographic services by means of its union catalog of more than four million main entry
cards representing the holdings of forty-five of the largest libraries in the region.

Quaternary Research Center
A. L. Washburn, Ph.D., Director
F. I. Badgley, Ph.D., Associate Director
158 Quaternary Research–Geophysics

Quaternary research focuses on the processes presently shaping the environment and those that have operated on it for the past several million years. We are now more aware than ever that our surroundings are the result of environmental history and that the key to the future may lie in the perspective provided by interdisciplinary studies of this history and of contemporary events as they have been influenced by it. This commitment to linking the past, present, and future through interdisciplinary study and research is making the University of Washington a major center for such work.

The structure of the Quaternary Research Center permits faculty and students to cooperate effectively across departmental boundaries and thus strengthens, interdisciplin­ary aspects of any particular Quaternary study. The organization does not presently offer degrees, although it functions in an advisory and supervisory capacity for some interdisciplinary projects. There are more than seventy cooperating faculty representing anthropology, atmospheric sciences, botany, chemistry, civil engineering, forest resources, geography, geological sciences, geophysics, oceanography, and zoology. As a result there is a broad spectrum of interdisciplinary study possibilities.

A new Quaternary Research–Geophysics Building was completed in 1972 and includes laboratories for palynology, potassium-argon dating, radiocarbon-dating research, oxygen-isotope research, and periglacial studies, in addition to various geophysical laboratories. The building also houses a scanning electron microscope and X-ray diffractometer for the Quaternary program and contains the administrative headquarters of the center, including a combination seminar room and reference library.

Students interested in graduate programs relating to Quaternary studies should apply to the director of graduate studies in the department of their choice.

Radio Station KUOW and KCTS–TV Station
Kenneth Kager, Manager, KUOW
325 Communications
Dr. Richard J. Meyer, General Manager, KCTS/9 Television
159 Drama-TV

Besides providing a public service, these stations train students in communications.

Regional Primate Research Center
Orville A. Smith, Jr., Ph.D., Director
I–421 Health Sciences

The Regional Primate Research Center, located in a wing of the Health Sciences Center, was established by the National Institutes of Health in 1961. Its activities are University-wide, regional, and national, with the University of Washington serving as the “host” institution.

The purpose of the center is to conduct biomedical and psychological research on nonhuman primates. At the center, one of seven throughout the nation, the emphasis is on cardiovascular, neurophysiological, behavioral, and dental research. The center maintains a large breeding facility near Spokane.

The center develops and uses advanced instrumentation (e.g., transducers, telemetry) and high-speed on-line data-acquisition systems.

A worldwide bibliographic and information service, based on analysis of primate research literature, is also maintained. It circulates a weekly list of current primate literature, prepares retrospective bibliographies on request, and compiles normative data.

Staff at the center includes research faculty from many different disciplines with the University, as well as visiting scientists. The center provides research training to graduate students and postdoctoral fellows.

Requests for information should be addressed to: University of Washington, Director, Regional Primate Research Center, I–421 Health Sciences, SJ–50, Seattle, Washington 98195.

Speech and Hearing Clinic
Phillip A. Yantis, Ph.D., Director
1320 Northeast Campus Parkway

The clinic serves as a teaching and research center for the training of students in speech science, speech and language pathology, and audiology.

Thomas Burke Memorial–Washington State Museum
George I. Quimby, M.A., Director
201 Museum

The 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 the field of anthropology with a specialization in museology.

University Hospital
R. S. Rambeck, Executive Director of Hospitals
James W. Varnum, Hospital Administrator
BB361 University Hospital

This 320-bed teaching hospital serves as a statewide referral resource providing highly specialized patient services. It is the main teaching institution for all of the professional schools in the University Health Sciences Center.

University of Washington Press
Donald R. Ellegood, M.A., Director
University of Washington Press Building
1416 Northeast Forty-first Street

The University of Washington Press is the book publishing division of the University. Like many of the older scholarly presses, it grew out of the tradition of University publishing and printing. The press imprint dates from 1909, when the University acquired typesetting equipment and a printing press for the campus newspaper. In 1911 the press began to issue the Washington Historical Quarterly, now called Pacific Northwest Quarterly, and between 1915 and 1920 several monograph series were inaugurated. The first full-length book to bear the press imprint appeared in 1920. In 1950 the press was separated from the printing department and established as the book publishing division of the University.

The press backlist now includes about five hundred fifty 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, both by members of the University faculty and by scholars outside the University. The press has a paperback reprint series called Washington Paperbacks; a continuing clothbound reprint program, including the Americana Library series, to make available again standard out-of-print works of scholarship; and an import program, the purpose of which is to make known to American scholarship important books in English published abroad. The press is also publisher of the American Ethnological Society Monographs, which now number more than fifty volumes. The press also publishes a variety of audiovisual educational materials, most of which grew out of original research on campus. These materials include film strips, disk recordings, and language tapes. All books published by the press are now also available in microfiche form.

The press staff manages all details of the editing, designing, and marketing of its books and buys its printing and binding on a contract basis. The press has sales representatives throughout the United States and maintains its own sales office and warehouse in Great Britain. It is also represented by an international distribution network covering Latin America, Africa, the Middle East, and Southeast Asia. The press is a member of the Association of American University Presses and the Association of American Publishers and is active in a variety of international scholarly book publishing activities.

Editorial control of the imprint of the press is vested in the Committee on the University Press, of which the Dean of the Graduate School is chairman. The committee formulates policy, reviews manuscripts, authorizes the use of the press imprint, and promotes the interests of the press.

The press invites members of the faculty to bring to it manuscripts and publishing proposals at an early stage in their development and welcomes suggestions of books to reprint in either cloth or paperback. The press also urges that, whenever possible, grants for research likely to result in publication in book form also include funds specifically earmarked for publication. The director and his staff advise members of the faculty concerning estimated publication costs at the time a research grant application is being prepared.

All inquiries and requests for information should be addressed to: University of Washington, Director, University of Washington Press, 1416 Northeast Forty-first Street, Seattle, Washington 98195.

Wind Tunnel
William H. Rae, Jr., M.S.A.A., Director
206 Guggenheim

This facility is a research tool for low-speed aerodynamics. It also provides a public service to industry and gives students a practical industrial experience.
Because learning is a lifelong activity rather than a terminal process, the University of Washington carries on a sustained continuing education program for adults. This program has three primary and interrelated objectives: (1) to encourage the personal development and self-realization of the individual; (2) to assist him or her in becoming a more effective citizen; and (3) to strengthen the economic, cultural, and political aspects of society through direct communication with the research and scholarship of the University world. Because the University seeks to be responsive to community needs for continuing higher education, it is concerned not only with already established programs but also with projects of an innovative nature that involve forms of nontraditional study.

It is continuously expanding and changing to accommodate these needs.

Continuing Education collaborates with all the continuing education units on campus, most of which are attached to the various schools and colleges, including the professional schools. Coordination of activities is facilitated through the Continuing Education Committee of the University and through the new Health Sciences Continuing Education Committee.

An increasingly prominent role of Continuing Education is to serve as an instrument facilitating the development of interdisciplinary programs designed to bring University knowledge and competence to bear on special community needs.

Three divisions compose Continuing Education at the University: Division of Evening and Extension Credit Programs, Division of Extension Services, and Division of Community and Organization Development. Each of them works closely with the various academic departments. Programs include both credit and noncredit classes and other educational services of direct interest to undergraduates, as well as to graduates and other adults.

Division of Evening and Extension Credit Programs
Acting Director
Barbara V. Williams
222 Lewis

University residence credit courses open to all regularly admitted students are offered during late afternoon and evening hours by the Division of Evening and Extension Credit Programs. Approximately two hundred such classes are offered each quarter of the academic year. A special effort is made in the evening program to provide courses and degree opportunities for persons who are unable to attend classes during the day.
In an experimental program begun Autumn Quarter 1972, the College of Arts and Sciences, through Continuing Education, offers an opportunity to earn a traditional University baccalaureate degree in the evening. At present, it is possible to earn a degree in communications, economics, history, mathematics, or psychology without attending any classes before 5:30 p.m. All evening credit courses may be applied toward a baccalaureate degree. A person interested in developing a major as a part-time student should plan a course of study with the assistance of an adviser.

Extension Credit Classes

The division also offers classes for extension credit, both on and off the campus. These classes are intended to serve adults who are able to pursue their educational goals on a part-time basis only. They are open to anyone of legal age who has a high school diploma or equivalency. Extension credits apply toward a baccalaureate degree consistent with University regulations. All extension classes are from approved University curricula.

Information concerning evening and extension programs may be obtained by telephoning (206) 543-2300. The Evening and Extension Credit Program Bulletin may be obtained by writing to: University of Washington, Division of Evening and Extension Credit Programs, 222 Lewis, DW–20, Seattle, Washington 98195.

Independent Study Through Correspondence

Extension credit also can be earned through independent study by correspondence. Anyone of legal age who has a high school diploma or equivalency is eligible to enroll. Because a student may enroll in a course at any time of the year and proceed at his or her own pace, independent study offers the individual an opportunity to obtain education at his or her convenience. Most courses are prepared by members of the faculty and parallel similarly numbered courses taught in the residence program. Extension credits earned by independent study may apply toward a baccalaureate degree consistent with University regulations. Certain noncredit courses required for University entrance are available to adults who wish to qualify for admission. Credit telecourses are also administered by this office.

A bulletin describing independent study courses and enrollment procedures may be obtained by writing to: University of Washington, Office of Independent Study, 222 Lewis, DW–20, Seattle, Washington 98195, or by telephoning (206) 543–2350.

Division of Extension Services

Director
Jerry L. Kelley
319 Lewis

This division offers a wide variety of educational programs, mostly of a noncredit nature, serving interests of adult learners. Undergraduate and graduate students, staff members, and faculty are often enrolled, as well as out-of-school adults. The division lends itself well to the development, in cooperation with academic departments, of innovative and nontraditional forms of instruction.

Noncredit Studies

Through this office, a quarterly program of lecture series, day and evening classes, physical education courses, and a limited number of programs for children are planned, implemented, and administered. Serving more than five thousand persons annually, this program’s purpose is to present University-level instruction to those for whom degree programs are neither appropriate nor essential.

Noncredit lecture-discussion series are designed to survey an issue or subject from a broad, often interdisciplinary, perspective, enlisting the capabilities of University faculty, visiting scholars, or authorities from the community. Some noncredit courses are identical to those in the credit program, while others are experimental or innovative; all are sponsored by academic departments and approved by the Curriculum Board. In each class, learning is the central consideration; the atmosphere is noncompetitive and informal.

Although aimed at out-of-school adults in the community, the noncredit studies program is open to members of the University community—faculty, staff, and students—with a number of courses offered on a reduced-fee or fee-exempt basis. The program is announced in Spectrum, available without charge by telephoning (206) 543–2590.

Short Courses and Conferences

Through this office, programs are specially tailored to meet the needs of specific learning groups. Often these are professional practitioners who wish to keep current their knowledge and skills. Some events are designed for particular segments of the general public on topics of major interest.

Programs of a variety of formats, length, and size are administered. There is special competence in the coordination of professional meetings, ranging from those
involving local members to full-scale international association conferences. Programs are often arranged to be offered at off-campus sites when appropriate or desirable. The staff of Short Courses and Conferences helps develop programming ideas, in addition to responding to the initiative of campus departments and public and private agencies. The staff works cooperatively with faculty to explore program feasibility and to assist in planning, developing, staffing, promoting, conducting, and evaluating programs.

Residential Seminars
Residential Seminars, a series of informal, weekend programs, brings together University faculty and interested adults for an intensive exchange of ideas on significant social and cultural topics. Utilizing an interdisciplinary approach, the program deals with a broad range of subjects, from traditional liberal arts to subjects having direct relevance to the contemporary social milieu.

Lectures and Concerts
Musical events and lectures are made available to both students and the general public through this office, offering many opportunities for the enrichment of the students' cultural background. In cooperation with the School of Music, operas and symphony concerts are presented, as well as concerts by the resident string quartet, the resident woodwind quintet, the Contemporary Group, the sinfonietta, and others.

Visiting artists and noted touring ensembles are also presented. A film series, thematically devoted to a director, genre, or country, is offered each quarter. The office is located in Meany Hall, the new performing arts building, and is charged with the responsibilities of the facility’s management and making reservations for its use.

Telecourses
Telecourses allow everyone with access to television to obtain college-level instruction. Two types of courses are offered: noncredit telecourses for information and enrichment and telecourses that offer University extension credit. Embracing a wide range of topics, a number of televised series are prepared each year by members of the University faculty and are presented on the educational station, KCTS-TV, and on commercial stations in Seattle. Videotape recordings and kinescopes are also released to stations throughout Washington, as well as to stations in other parts of the country. Cable systems also carry these programs. Study guides, prepared by the instructors, may be purchased.

Radio Broadcast Services and KUOW
Radio KUOW broadcasts programs of an educational, cultural, scientific, informational, or public affairs nature and communicates information concerning University affairs to students, alumni, and the public. The station also supplies students in the School of Communications with actual experience in preparation for careers in radio. In addition, the station 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 media or delivery systems. The SCA is currently in regular use to provide special services for the blind. Effective radiated power of eighty-six kilowatts carries the signal to most of western Washington on a frequency of 94.9 MHz.

Additional information about any of the activities described above may be obtained by writing to: University of Washington, Director, Division of Extension Services, 322 Lewis, DW-20, Seattle, Washington 98195, or telephoning (206) 543–5380.

Division of Community and Organization Development
Director
Daniel W. Shannon
316 Lewis

This division seeks to extend the educational and cultural resources of the University to communities throughout the state in response to local interests and needs. A primary purpose of the division, through community development, is to encourage a fuller utilization of local citizen resources to assist in the solution of public problems. The division also strives to assist civic bodies or other groups in their organizational development.

Continuing Arts Education
This office works regionally with the Office of Lectures and Concerts and the four fine arts departments of the University in setting up seminars and workshops dealing with the cultural arts and arranging for appearances of faculty and performing artists. The office often serves as a central resource center in an advisory or coordinating capacity and utilizes talent from different institutions and the local communities themselves.

Title I, Higher Education Act of 1965
This office serves as the University liaison for community service projects granted funding under this title.

Women's Programs
Through individual counseling and specialized group guidance, women 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 writing to: University of Washington, Women's Programs, JB-15, 1209 Northeast Forty-first Street, Seattle, Washington 98195, or by telephoning (206) 543-4262.

Lake Wilderness Continuing Education Center
The center, maintained by the University of Washington, has served for the past seven years as a remote retreat at Lake Wilderness in Maple Valley for the purpose of augmenting on-campus educational facilities. The center is operated under the supervision of Continuing Education and is used by faculty, staff, students, governmental agencies, and other educational institutions for seminars, short courses, conferences, and workshops. The center can accommodate forty persons for overnight conferences and more than one hundred for daytime meetings. Additional information can be obtained by telephoning (206) 543-5380.
PROGRAMS OF STUDY
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 man's physical environment: Architecture, Building Construction, Landscape Architecture, and Urban Planning. Their programs encompass a wide range of responsibilities that together comprise 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 our 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 worlds to build its curriculums and faculty with the objective of serving the needs of 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. Gould Hall houses the college's library, a branch of the University Library, 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 two honorary societies specifically formed to recognize scholastic achievement within the college's professional degree programs: 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 show financial need. These awards are announced in the Spring Quarter for the following academic year. Teaching assistantships are available for graduate students in architecture and in urban planning. Some additional fellowship and scholarship support is available for graduate students 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 enroll directly in the College of Architecture and Urban Planning. Entering freshmen planning on majoring in architecture, landscape architecture, or urban planning must 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.

Admission to the college is highly competitive, and enrollment preference is given to those applicants who, in the judgment of the University, 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 57.

Within the college, graduate degree programs lead to the degrees of Master of Architecture, Master of Urban Planning, or Doctor of Philosophy in the field of urban planning. The departments of Architecture and Urban Planning coordinate a master's program 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 Study” 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

208 Gould

The role of architecture is to improve the human condition through the development and application of design skills that modify the physical environment. By common consent, 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 his province and almost invariably bear on his task, the design of buildings and building complexes constitutes the distinct focus of that task.
The architectural profession has always included a certain number of relatively constant concerns: for logical planning, for technical soundness, for artistic aspects of the design, and for verbal elucidation of the theory and history of the field. These are general characteristics. In addition, the task at any particular time is distinct in certain ways. In the present, and very likely in the near future, architects are distinct in their possession of a sense of the detailed and complex interactions between man and his environment; a concern for service to all components of society; an interest in technical and technological innovation; a concern with the building's impact on ecological balance; and a desire to enlarge the applicability of new design tools.

Faculty
Gordon B. Varey, Chairman; Grant Hildebrand, Associate Chairman; Albrecht, Alden, Bonsteel, Bosworth, Chervenak, Curtis, Dietz, Donnette, Herrman (emeritus), Jacobson, Jensen (emeritus), Johnston, Kelley, Kolb, Lebert, Lewis, Lovett, MacGowan, Minah, Mithun, Nyberg, Onouye, Pundt, Radcliffe, Rohrer, Rosner, Sanders, Sasanoff, Schneider, Seligmann, Skirvin, Small, Sproule, Staub, Steinbrueck, Streissguth, Thiel, Wherrette, Zarina, Zuberbuhler. W. C. Wherrette, graduate program adviser.

Undergraduate Program
Bachelor of Arts in Environmental Design Degree
The undergraduate preprofessional program in architecture stresses the acquisition of core knowledge, skills, techniques, and awareness as a first step toward acquiring more specialized professional training or experience in architecture.

First and Second Years: Students take the first two years of the curriculum in the College of Arts and Sciences or its equivalent in a community or four-year college, satisfying the following distribution and elective requirements:

A minimum of 20 credits each in humanities and social sciences; 15 credits in natural sciences; 14 credits in MATH 105 and mathematics-related electives; and 21 credits in general electives.

Admission to the department is highly competitive, because the number of openings is limited by a departmental enrollment quota. Students should contact the department regarding admission procedures.

Third Year: ARCH 300, 301, 302, 310, 311, 312, 313, 314, 320, 321, 322, 350, 351, 352; and 9 credits in environmental awareness electives. Total: 51 credits.

Fourth Year: ARCH 400, 401, 402, 460; 3 credits in environmental history electives; 21 credits in preprofessional and general electives. Total: 45 credits.

For graduation, architecture majors in the preprofessional third and fourth years of the curriculum must demonstrate what the faculty considers to be promising performance in the design studio, as well as maintain a yearly cumulative grade-point average of 2.50.

Graduate Program
Master of Architecture Degree
The Master of Architecture degree is the basic professional degree offered by the department. Admission to the graduate program is highly competitive, and successful completion of the Bachelor of Arts in Environmental Design degree program does not confer automatic rights of admission.

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 that program. The applicant's scholastic record in courses taken during the junior and senior years is of major importance. Consideration also is given to other evidence that may be available.

Students accepted for graduate work in architecture are encouraged to select, with the guidance of the graduate program adviser, a study area of their interest within the resources represented by the college, the University, and the community. Their program includes basic curricular requirements in design, professional electives, and a thesis or terminal project for a total of 90 credits. In addition, entering students, on the advice of the graduate program adviser, may be required to take supplementary courses considered necessary for reinforcement of their undergraduate background.

The department also offers, in collaboration with the Department of Urban Planning, an urban design specialization at the master's degree level that focuses on urban design theory, policy, process, and implementation.

BUILDING CONSTRUCTION
208 Gould
The objective of the building construction program is to develop individuals for management or technical positions in the building industry or related businesses or for management of their own business operations. Many areas of activity—development, design, construction, government, and supporting industries—need individ-
uals with technical competence who have a basic knowledge of, and concern for, architecture and building. Developers must have skilled persons for project promotion, financing and design, and construction liaison. The design professions require business managers and construction supervisors. Construction companies use construction managers, supervisors, and business managers. Supporting industries, because of mass demand and revolution in building techniques, seek skilled individuals for materials and product research, for material distribution and sales, and for material and product production. Government at all levels, with its expanding role in the building revolution in building techniques, seek skilled individuals directly related to the increasing public concern in conservation, recreation, and open-space planning and design for cities and suburbs. This trend places great demand on schools of landscape architecture to train professionals who can deal with the range of landscape problems affecting environmental quality in and around the urbanizing centers. Landscape architecture is primarily concerned with the planning and design of the out-of-doors. The profession seeks to balance man's social, psychological, and physical out-of-door needs with the requirements of a properly functioning natural environment. Landscape architects are concerned with understanding and protecting the natural environment, and they seek methods to integrate human needs through an understanding of natural processes.

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. Tasks performed 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 are assuming a guiding role in the development and conservation of regional resources and in the protection of natural and man-made landscapes. They are becoming 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, and transportation corridor selection.

Faculty
Robert T. Buchanan, Chairman; Chittock, Haag, Lane, Mauck, Miller, Sakuma, Streatfield, Untermann.

Undergraduate Program
Bachelor of Landscape Architecture Degree
The five-year curriculum leading to the Bachelor of Landscape Architecture degree is the normal 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 community or four-year college, satisfying the following distribution and elective requirements:
A minimum of 20 credits each in social sciences, humanities (including 3 credits in art laboratory), and natural sciences (including GEOL 101; BIOL 101–102;
BOT 111, 112, 113; 3 credits plane surveying; ARCH 300, 301, 310, 311, 312; 9 credits in art laboratories. (plus those in humanities) selected from ART 105, 106, 107, 109, 110, 129, 259, 272. Total: 90 credits.

Admission to the department is highly competitive, because the number of openings is limited by a departmental enrollment quota. Students should contact the department early to learn admission procedures. Students at the premajor sophomore level at the University may be granted "selected premajor status," which permits registration in beginning studio work in the college prior to admission to the department. The departmental adviser may be consulted for additional information.

Students admitted as departmental majors must satisfy the following:

**Third Year:** L ARC 301, 302, 331, 332, 352, 361, 403; ARCH 352; BOT 331; GEOL 311; environmental legislation elective; other approved electives. Total: 48 credits.

**Fourth Year:** L ARC 303 (practicum to be substituted for 303), 401, 402, 411, 412, 421, 423, 433; URB P 400, 489; FOR R 311; geography elective. Total: 48 credits.

**Fifth Year:** L ARC 404, 405, 406 (with approval, credits from other University laboratories or studios may substitute for either of, but not both of, 404, 405), 473; URB P 479; forestry and sociology electives; other approved electives. Total: 47 credits.

During their fourth and fifth years, students may specialize in project design, regional landscape architecture, or urban landscape architecture.

Students admitted for a second undergraduate degree develop their program of study in consultation with the departmental adviser.

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.

**URBAN PLANNING**

**410 Gould**

Urban planning is concerned with the rational organization and use of man-made 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 man-made environment and change, 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**

Richard D. Shinn, Chairman; Amoss, Bell, Calkins, Carter, Fortine, Grey, Griffin, Hancock, Horwood, Hruza, Johnston, Ludwig, MArts, Miller, Norton, Prasanna, Rabinowitz, Schneider, Seyfried, Wolfe. R. L. Ludwig, graduate program adviser.

**Undergraduate Program**

**Bachelor of Arts in Urban Planning Degree**

The undergraduate curriculum is designed to give a general introduction to the urban planning field and to provide preprofessional emphasis for the student contemplating a career in urban planning.

Students take the first two years of the curriculum in the College of Arts and Sciences or its equivalent in a community or four-year college, satisfying the following distribution and elective requirements:

A minimum of 20 credits each in social sciences, humanities, and natural sciences, plus electives for a total of 90 credits. Eligibility for transferring as juniors to the Department of Urban Planning includes a minimum 2.00 grade-point average in each distribution area and an overall grade-point average of 2.50.

Admission to the department is highly competitive, because the number of openings is limited by a departmental enrollment quota. Students should contact the department early about selection procedures.

**Third and Fourth Years:** URB P 400, 410, 411, 460, 465, 479, 499; ARCH (8 credits in basic design and graphics courses at 300 and 400 levels); electives in areas of social structure, decision process, and environment (12 credits each); 6 credits of specialization sequence electives; and approved urban planning electives. Total: 90 credits.

Required for graduation is satisfactory completion of the 180-credit curriculum with maintenance of a yearly 2.30 grade-point average in the third and fourth years and a 2.50 grade-point average in departmental courses.
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.

Course requirements specify a core of knowledge embodied in required courses; two additional areas that may be satisfied prior to enrollment in the Master of Urban Planning degree curriculum; electives chosen with the advice and consent of an adviser in order to develop depth or breadth in planning; specialties within this and related fields appropriate to the background and interests of each student; and a master’s thesis project.

The department also offers, in collaboration with the Department of Architecture, an urban design specialization at the master’s degree level focusing on urban design theory, policy, process, and implementation.

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 the student may demonstrate that he has these qualities and is capable of independent work worthy of the attention of his 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 degree 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 may be 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.
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 bachelor's 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, or the schools of Business Administration, Dentistry, Law, Librarianship, Medicine, Public Affairs, 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 PROGRAMS

Admission to the College
For general University admission requirements, see "Undergraduate Education" section of this catalog.

Recommended High School Preparation
Students who expect to enter the College of Arts and Sciences should select subjects in English, languages, social
sciences, natural sciences, mathematics, and fine arts that provide a well-rounded preparation for college study.

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 as part of their first year in the college.

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 which no college credit is given. Students who expect to complete major programs in chemistry, geological sciences, mathematics, oceanography, or physics should examine the preparations for admission suggested by these departments.

**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.

**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 proficiencies in the use of English and one foreign language and ability in quantitative reasoning. These capabilities will make advanced study more efficient and meaningful for the student, and requiring competence in them from all students will enable 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.

A student who does not satisfy the basic proficiency requirement in this way will be expected during the first year in residence to complete 15 credits in the areas of verbal or mathematical skills, or both, that the student and the academic adviser consider most appropriate to the student's needs and interests. He may choose to emphasize one skill or refurbish more than one skill, as his assessment of his own capabilities may dictate. Ordinarily, 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 enter the College of Arts and Sciences with 85 or more acceptable transfer credits and students who have completed the general education requirements of other accredited colleges or universities are not required to take any additional proficiency courses. However, they may not count any proficiency courses already taken (up to 15 credits) toward the distribution requirement unless they are exempt from the proficiency requirement on the basis of their high school study.

**Distribution Requirement**

The college reserves approximately half of the student's four undergraduate years to develop in him a breadth of knowledge and appreciation and to enable him to explore subjects different in content and method from the one in which he will pursue a special competence. A distribution requirement has the effect of giving some structure to that exploration.

Most of the courses offered in the college, and certain courses offered in other units of the University as well, have been divided into three large fields of knowledge: the humanities, the social sciences, and the natural sciences. Each student must select, preferably with the approval of his adviser, at least 20 credits in courses from each of the three fields on the following distribution list. No course from the department in which the student is pursuing his major field of study 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 a
## DISTRIBUTION LIST

### HUMANITIES

- **Minimum of 20 credits required, all outside the major**
- **Anthropology:** ANTH 333, 334, 335, 403, 429, 411, 450, 455, 456, 457, 458, 459, 466, 467, 468, 469, 487, 488, 493
- **Architecture and Urban Planning:** ARCH 150, 151, 250, 450; L ARC 352, 361; URB P 340, 400, 460, 479
- **Art and Art History:** All undergraduate courses except ART 490
- **Asian Languages and Literature:** All undergraduate courses
- **Biomedical History:** BI HS 401, 419, 420, 430
- **Classics:** All undergraduate courses except LAT 475
- **Communications:** CMU 321, 324, 326, 373
- **Comparative Literature:** All undergraduate courses
- **Drama:** All undergraduate courses
- **Drama-Dance:** DRDNC 101, 102, 103, 201, 202, 203, 301, 302, 303, 401, 402, 403

#### East Asia: EASIA 240

- **English:** All undergraduate courses
- **General and Interdisciplinary Studies (GIS):** Courses as designated each quarter
- **Germanic Languages and Literature:** All undergraduate courses
- **History:** HST 307, 311, 312, 411, 412; HSTAA 402, 454; HSTAM 334, 452, 453; HSTAS 401, 402; HSTEU 401, 405, 406, 407, 421

#### Home Economics: H EC 240 or 347; 321, 322, 329, 429, 432, 433

#### Humanistic-Social Studies:** HSS 351, 352, 450, 451, 461, 471, 472, 480

### Humanities: HUM 103

- **Librarianship:** LIBR 451 or 453; 470
- **Linguistics:** LING 101–102–103, 200, 201, 333, 400, 401, 404, 405, 406, 443, 455
- **Music:** All undergraduate Music and Music Applied courses except MUSIC 136, 137, 138, 139, 220, 221, 222, 223, 224, 225, 226, 227, 228, 229, 230, 331, 232, 233, 236, 327, 460, 461, 462, 463, 466, 467, 472, 473, 474
- **Physical and Health Education:** DANCE 283, 364
- **Romance Languages and Literature:** All undergraduate courses
- **Russia and East Europe:** REEU 243, 403
- **Scandinavian Languages and Literature:** All undergraduate courses except SCAND 370, 380, 381
- **Slavic Languages and Literature:** All undergraduate courses
- **South Asia:** SASIA 291, 472, 473
- **Speech:** SPCH 100, 101, 102, 103, 140, 203, 220, 222, 240, 305, 320, 345, 347, 349, 400, 420, 421, 424, 440, 442, 444

### SOCIAL SCIENCES

- **Minimum of 20 credits required, all outside the major**
- **Anthropology:** All undergraduate Archaeology courses and all undergraduate Anthropology courses except ANTH 333, 334, 335, 435, 429, 431, 450, 455, 456, 457, 458, 459, 466, 467, 468, 487, 488, 493, and except Physical Anthropology courses
- **Architecture and Urban Planning:** URB P 482, 485
- **Biomedical History:** BI HS 414, 417, 418, 422, 424, 432, 433, 434
- **Business Administration:** A ORG 440, 460; BUS 101, 200, 333, 1 BUS 310
- **Communications:** CMU 150, 200, 201, 202, 203, 220, 226, 314, 320, 338, 400, 402, 406, 411, 443, 470, 480
- **East Asia:** All undergraduate courses except EASIA 240
- **Economics:** All undergraduate courses
- **Education:** EDEPS 479, 480
- **General and Interdisciplinary Studies (GIS):** Courses as designated each quarter

### SOCIAL SCIENCES

- **Geography:** All undergraduate courses
- **History:** All undergraduate courses except HST 311, 312, 411, 412, HSTAA 402, 454, HSTAM 334, 452, 453, HSTAS 401, 402, HSTEU 401, 405, 406, 407, 421
- **Home Economics:** H EC 350, 354, 356, 409, 454, 457
- **Humanistic-Social Studies:** HSS 310, 320, 410, 419, 420, 421, 422, 431
- **Inner Asia:** All undergraduate courses
- **Linguistics:** LING 333, 451, 452, 453, 461, 462, 463
- **Philosophy:** PHIL 110, 113, 230, 231, 260, 332, 301, 440, 469, 464, 465, 466
- **Physical and Health Education:** H ED 250
- **Political Science:** All undergraduate courses
- **Psychiatry and Behavioral Sciences:** PBSCI 267, 451, 452
- **Psychology:** All undergraduate courses except PSYCH 102, 200, 213, 217, 218, 222, 231, 232, 233, 406, 409, 416, 417, 421, 422, 423, 425, 475
- **Russia and East Europe:** All undergraduate courses except REEU 243, 403
- **Scandinavian Languages and Literature:** SCAND 370, 380, 381
- **Social Science:** SOC S 150
- **Sociology:** All undergraduate courses except SOC 223
- **South Asia:** All undergraduate courses except SASIA 291, 472, 473
- **Spanish:** SPAN 121
- **Speech:** SPCH 230, 235, 270, 329, 335, 339, 373, 425, 426, 428, 471, 472, 473
- **Women Studies:** WOMEN 310

### NATURAL SCIENCES

- **Minimum of 20 credits required, all outside the major**
- **Anthropology:** All undergraduate Physical Anthropology courses
- **Astronomy:** All undergraduate courses
- **Atmospheric Sciences:** All undergraduate courses
- **Biochemistry:** All undergraduate courses
- **Biological Structure:** B STR 301
- **Biology:** All undergraduate courses (and either BIOL 100 or 103, see course descriptions in volume 2 for details)
- **Biomedical History:** BI HS 415, 416, 431
- **Botany:** All undergraduate courses
- **Chemistry:** All undergraduate courses
- **Civil Engineering:** CEWA 450, 466
- **Engineering:** ENGR 305, 307, 308
- **Environmental Studies:** ENV S 210
- **Fisheries:** FISH 101
- **General and Interdisciplinary Studies (GIS):** Courses as designated each quarter
- **Genetics:** All undergraduate courses
- **Geological Sciences:** All undergraduate courses
- **Home Economics:** H EC 307, 407, 408, 415
- **Mathematics:** All undergraduate courses except MATH 101, 104, 497
- **Microbiology:** MICRO 101, 301, 302, 400
- **Oceanography:** All undergraduate courses except OCEAN 110, 111, 112
- **Philosophy:** PHIL 120, 370, 470, 472, 473, 474
- **Physical and Health Education:** PE 325, 331, 332, 480
- **Physics:** All undergraduate courses
- **Psychology:** PSYCH 102, 200, 213, 217, 218, 222, 231, 232, 233, 406, 409, 416, 417, 421, 422, 423, 425, 475
- **Quantitative Science:** Q SCI 281, 291, 292, 381
- **Speech:** SPCH 300, 301, 415
- **Zoology:** All undergraduate courses
method 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 a minimum of 50 prescribed credits in a department of the college or a closely related group of departments. Descriptions of major programs are printed under "Undergraduate and Graduate Major Programs."

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, music, oceanography, and zoology.

To be eligible to receive the bachelor's 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.

General Information About Graduation

Students should apply for the bachelor's 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 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 his graduation. All responsibility for fulfilling graduation requirements rests with the student concerned. A student graduating from another college of the University who wishes to receive a degree simultaneously from the College of Arts and Sciences must receive approval from the associate dean of the College of Arts and Sciences (B10 Padelford) at least three quarters before completing the requirements for the degree from this college. No student may graduate from the College of Arts and Sciences without a minimum of three quarters of attendance in the college.

A student graduating from the College of Arts and Sciences may count a maximum of three 1-credit 100-level physical education courses taken at the University of Washington, or their equivalents at other collegiate institutions, as elective credits toward graduation. Such credits may be counted, however, only if earned in Autumn Quarter 1970 or thereafter. 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.

Office for Undergraduate Studies

C14 Padelford
Aldon D. Bell, Director

The Office for Undergraduate Studies coordinates a variety of college-wide undergraduate programs that do not fall within existing academic departments. In creating the office, the college sought to encourage innovation and experimentation in curriculum development and to provide for the exploration of educational alternatives by faculty and undergraduates alike. The office is charged broadly with a responsibility for developing undergraduate opportunities in general education and, in particular, is responsible for the following programs.

Preprofessional and Preprofessional Programs

B10 Padelford

Those students in the first or second year who do not make a definite choice of major before entering the University are designated as premajor students. 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 is sometimes competitive.

For those students who would like to follow a basic course of study in preparation for training in professional schools, the college provides advising service in the following preprofessional programs: architecture, business, dental hygiene, dentistry, education, landscape architecture, medical technology, medicine, occupational therapy, physical therapy, prosthetics and orthotics, social welfare, urban planning, and veterinary medicine. For requirements and additional information, all preprofessional students should consult advisers in B10 Padelford.
Atypical Major

C14 Padelford

The college provides access to an individual degree program through the "atypical major," and to organized interdisciplinary degree programs under directing committees. (Additional information appears in the General Studies portion of "Undergraduate and Graduate Major Programs" section of this catalog.) Examples of interdisciplinary programs under committee direction that may lead to graduation with a major in General Studies include African studies, American Indian studies, American studies, Asian American studies, Chicano studies, Latin American studies, and Women studies.

General and Interdisciplinary Studies (GIS)

C14 Padelford

The Office for Undergraduate Studies sponsors interdisciplinary, innovative, and problem-oriented courses not available in other departments. It supervises independent study (G ST 391) and project-oriented study (G ST 250 and 350).

College Honors Program

C14 Padelford

The college offers a four-year program that features special counseling, honors courses, honors sections of regular courses, faculty-student colloquia, and opportunities for independent study. It is designed to make expanded opportunities for undergraduate education available to those students best prepared to utilize the University's intellectual resources.

To be considered for admission at entrance, students must submit during their final high school semester an application 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. A periodic reclassification based on academic performance at the University makes possible the later admission of students who were not permitted membership at entrance.

Honors students are counseled by honors advisers. During their freshman and sophomore years, they are expected to arrange approximately one-third of their schedules in honors courses. 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 the section on "Undergraduate and Graduate Major Programs." Students are graduated "With College Honors" in the appropriate discipline. Students who are not members of the college honors program but demonstrate superior abilities in a particular field of study may, with the approval of the appropriate major department, participate in a departmental honors curriculum and receive a departmental honors degree "With Distinction" in the major field.

Residential Program

Another alternative to the traditional curriculum at the freshman and sophomore level is provided by the Residential Program. Participants live together in Lander Hall, with resident advisers, and take approximately two-thirds of their work with associated on-site faculty and the additional one-third in the University as a whole. The complete two-year program is designed to satisfy the proficiency and humanities and social sciences distribution requirements of the College of Arts and Sciences. It also is accepted by the School of Business Administration in fulfillment of its general education requirements. Work in the program is divided among small seminars, joint courses, and independent study with supervising faculty. The aim of the program is to involve participants in a learning-living experience in small classes, with close student-faculty contact, as a small-scale learning community within the University. Information about content, structure, and admission to the program may be obtained from advisers in B10 Padelford or 250 Lander.

Certification for Teaching

Students following programs that lead to a bachelor's degree in the College of Arts and Sciences may qualify for provisional certification for public school teaching in the state of Washington by including in their degree programs the courses required for certification as determined by the faculty of the College of Education.

All students seeking provisional certification spend their first two years in the College of Arts and Sciences. The relative similarity of the bachelor's degree programs of the two colleges makes it possible for students, at the end of their second year, to select the programs best fitting their general educational interests and best preparing them for the level at which they seek to be qualified for teaching.

Students preparing for certification in elementary education must complete a major, an elementary education minor, and a professional education sequence of courses. Therefore, they ordinarily should seek admission to the College of Education in their junior year. Students preparing for teaching at the secondary level may seek admission to the College of Education as juniors, or they may continue in the College of Arts and Sciences, including as electives the courses listed in the
"Professional Education Sequence (Secondary Emphasis)" described in the "College of Education" section.

To be admitted to the Teacher Education (certification) Program, students in either college must make formal application through the College of Education Advisory Office, 207 Miller. Decisions on admission to the Teacher Education Program are based on general criteria common to all pre-education students, and specific criteria are determined by screening committees representing the eight field committees of the College of Education. Information on teacher certification appears in the "College of Education" section of this catalog.

Graduate Programs
Also see "Graduate Programs and Degree Policies," page 57.

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 Study" 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 in the "Undergraduate and Graduate Major Programs" section of this catalog and in the University of Washington Graduate Study and Research bulletin.

Undergraduate and Graduate Major Programs

AFRICAN STUDIES
102 Lewis Annex

African studies is an interdisciplinary program focusing on the African continent, with emphasis on the sub-Saharan regions. A variety of courses offered primarily in the humanities and social sciences provides students with the opportunity to develop broad scholarly interests in that part of the world. These courses include: ANTH 213, 401, 402, 513, 569; ART H 436, 437, 438, 439, 531; C LIT 261, 262, 263, 450; HUM 103; MUSIC 205, 206, 207, 427, 512; MUSAP 159, 459; PHY A 281; POL S 439, 539; ROM 590; SOC 459, 569; and other courses offered through the Office for Undergraduate Studies on a periodic basis. Students interested in a bachelor's degree program centering on African studies should consult a General Studies adviser in B10 Padelford.

Rene Bravmann, Chairman

AMERICAN INDIAN STUDIES
C130 Padelford

American Indian studies has as its goals an increased relevance of academic education for American Indian students; promotion of interest in American Indian communities and Indian cultures; and an increased awareness and education of non-Indians about these communities and cultures. To achieve these goals, the University 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 aesthetic aspects from the Indian viewpoint. Students interested in a bachelor's degree program centering on American Indian studies should consult a General Studies adviser in B10 Padelford.

Marilyn Bentz, Acting Director

AMERICAN STUDIES
C14 Padelford

American studies provides for interdisciplinary study of American civilization (1) to explore the origins and consequences of American myths, institutions, and behavior; (2) to view American issues in a cultural context; and (3) to approach American historical and contemporary problems from an integrative perspective. Students interested in a bachelor's degree program centering on American studies should consult a General Studies adviser in B10 Padelford.

ANTHROPOLOGY
345 Savery

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, Chairman; Amoss, Atkins, Casteel,
Dunnell, Eastman, Garfield (emeritus), Greengo, Hiebert, Hunn, Keyes, Krieger, Kunstadter, Leininger, Lieber, Miller, Nason, Newell, Newman, Nute, Osborne, Ottenberg, Quimby, Read, Spain, Swindler, Watson, Williams, Winans. C. M. Eastman, graduate program adviser.

Undergraduate Programs

Bachelor of Arts Degree

Admission Requirements: Completion of the College of Arts and Sciences proficiency requirement; a minimum of 90 credits; at least two of the following three courses, of which one must be with a grade of B or better: PHY A 201, ANTH 202, ARCHY 205.

Major Requirements: PHY A 201, ANTH 202, ARCHY 205, plus 35 additional credits in anthropology selected from both upper- and lower-division courses. At least 25 credits of the required 50 must be with the grade of B or above. Courses in which a D or an E is received may not be counted toward the 50 required credits. Students who plan graduate work should elect one foreign language and one statistics course.

Honors Program: Bachelor's degree “With College Honors in Anthropology” or “With Distinction in Anthropology.” The honors adviser must be consulted 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: 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. Students are admitted only to the Doctor of Philosophy degree program, for which the Master of Arts degree program is a preparatory stage. Admission to pursue a Master of Arts degree program with specialization in museology does not constitute acceptance to proceed to a Doctor of Philosophy degree in anthropology.

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 degree and does not confer acceptance to the Doctor of Philosophy degree program in anthropology. Separate application for such admission is required. Without Thesis—Substitution of written examinations for thesis is permitted, except for the Master of Arts degree with specialization in museology.

Doctor of Philosophy Degree

Admission Requirements: Same as for the Master of Arts degree.

Graduation Requirements: Acquisition of a master's degree in anthropology or its equivalent; comprehensive written examinations; dissertation; teaching experience. An additional foreign language may be necessary. Requirements vary according to specialization in archaeology, physical anthropology, or sociocultural anthropology. Adviser must be consulted for information on programs.

ART

104 Art

The School of Art is concerned with the practice, history, and teaching of the graphic and plastic arts.

Faculty

Spencer A. Moseley, Director; Alps, Anderson, Bauer, Bravmann, Brazeau, Carraher, Celentano, Dahn, Dailey, Del Giudice, DuPen, Dunthorne, Erickson, Foote (emeritus), Fuller, Gonzales, Grossman (emeritus), Hafermehl, R. Hill (emeritus), W. Hill, Hixson, Holm, Jenkins, Johnson, Jones, Kehl, Kington, Kottler, Lawrence, Lew, Lundin, Marshall, Mason, Miller, Moseley, Opperman, Patterson (emeritus), Pawula, Penington (emeritus), Pizzuto, Praczykowski, Proctor, Raven, Reed; Ritchie, Rogers, Smith, Solberg, Spafford, Sperry, Taylor, Tsutakawa, van der Marck, Wadden, Webb, Welman, Weston, Wilson. W. Brazeau, graduate program adviser.

Undergraduate Programs

Admission Requirements: Other than for freshmen entering directly from high school, the acceptance of all undergraduate studio majors to the School of Art and their placement in the program is determined by a School of Art review of studio work. Work must be submitted in slide or photograph form, or both, to the School of Art advisory office by the following dates: for Autumn Quarter, July 1; Winter Quarter, November 1; Spring Quarter, February 1; Summer Quarter, May 1. At the end of the sophomore level in the program, the
work and record of art majors are reviewed to determine continuation in the program.

Freshmen entering the University of Washington directly from high school are classified as premajors, but they may transfer to art at the time of their initial advising appointment with the School of Art advisory office. Such students are not subject to the review of studio work.

**Bachelor of Arts Degree**

**MAJOR REQUIREMENTS**

**General Art:** ART 105, 106, 107, 109, 110, 129; ART H 201, 202, 203; 41 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: ART 301, 302, 303, 304, 305; all undergraduate art history courses except ART H 201, 202, 203; ART 201, 202, 203, 353; 250, 255, 258, 259, 340; 265, 325; 205, 357, 358, 359, 457, 458, 459; 339; 256, 257, 259, 307, 360, 350, 351, 450; 272, 274, 332.

**Art Education:** ART 105, 106, 107, 109, 110, 129; ART H 201, 202, 203; ART 210, 211, 212; 3 credits from ART 250, 253, 254, 255; 256, 259; 305 or 201; 3 credits from 301, 302, 303, 304; 3 credits from 272, 350, 358; 14 credits of approved art electives. The “College of Education” section of this catalog outlines requirements for the Teacher Education Program.

**Art History:** ART 105, 106, 107, 109, 110, 129; ART H 201; 44 credits selected from art history, architectural history, and classical archaeology. For students intending to enter graduate work in art history, ART H 301, 305, 306, 307, 308, 331 must be taken. In addition, a reading knowledge of French or German is essential. Those planning to do graduate work in oriental art also should begin work in an oriental language.

**Bachelor of Fine Arts Degree**

A maximum of 225 credits is required for graduation with a Bachelor of Fine Arts degree.

**MAJOR REQUIREMENTS**

**Ceramic Art:** ART 105, 106, 107, 109, 110, 129; ART H 201, 202, 203, 6 elective art history credits; ART 201, 202, 203, 353 (15 credits), 485 (15 credits); 41 elective art credits.

**Graphic Design:** ART 105, 106, 107, 109, 110, 129; ART H 201, 202, 203; ART 203, 206, 207, 313, 314, 366, 367, 368, 410, 466, 467, 468, 479, 480; 30 elective art credits.

**Industrial Design:** ART 105, 106, 107, 109, 110, 129; ART H 201, 202, 203; ARCH 300, 301, 302, 310, 311, 312; ART 316, 317, 318, 445, 446, 447; 205, 253, 272, 313, 314, 321; M E 301, 302, 303, 342; ENGR 123, 351; ECON 200; MKTG 300; PHYS 110, 111; SPCH 103.

**Interior Design:** ART 105, 106, 107, 109, 110, 129; ART H 201, 202, 203, 478, 479; ARCH 150, 151, 300, 301; ENGR 123, ART 259, 263, 265, 310, 311, 312, 319, 320, 321, 472, 473, 474; 18 elective art or humanities credits; H EC 125, 329 or ART 250.

**Metal Design:** ART 105, 106, 107, 109, 110, 129; ART H 201, 202, 203, 6 elective art history credits; ART 254, 357, 358, 359, 457, 458, 459, 460 (15 credits); 42 elective art credits.

**Painting:** ART 105, 106, 107, 109, 110, 129; ART H 201, 202, 203, 381, 3 elective art history credits; ART 265 (9 credits); 256, 257 (6 credits), 259, 307 (6 credits), 309, 360 (9 credits), 463 (18 credits) or 325 (9 credits for 9 credits of 463); 18 studio art elective credits; 21 elective credits from art or art history, or both.

**Printmaking:** ART 105, 106, 107, 109, 110, 129; ART H 201, 202, 203, 392; ART 350, 351 (6 credits), 450 (15 credits), 451 (15 credits); 256, 257 (6 credits), 265 (9 credits), 272 (6 credits), 307 (6 credits), 360 (9 credits); 20 elective art credits.

**Sculpture:** ART 105, 106, 107, 109, 110, 129; ART H 201, 202, 203, 2 elective art history credits; ART 272 (6 credits), 274, 332 (15 credits), 335, 337, 436 (15 credits); 253, 256, 257, 265 (6 credits); 27 elective art credits.

**Graduate Programs**

Also see “Graduate Programs and Degree Policies,” page 57.

**Master of Arts Degree (Art History)**

**Admission Requirements:** Credentials from a university art history department whose standards are recognized by the School of Art; three letters of recommendation; demonstration of competence in French or German; submission of written work in the history of art.

**Graduation Requirements:** 36 credits in the history of art in 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); 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 the extension of a seminar paper that demonstrates a familiarity with sources and a capacity for synthesis and critical evaluation.

**Master of Fine Arts Degree (Studio Arts)**

**Admission Requirements:** Same as the undergraduate degree requirements in art in the School of Art, with a 3.00 or better grade-point average in the undergraduate art major; presentation of samples of work completed during undergraduate study; three letters of recommendation.

**Graduation Requirements:** A minimum of 36 credits of scheduled class work and 9 credits of thesis. The thesis is in the nature of a project, such as a series of paintings, prints, 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 thesis exhibition. Undergraduate work beyond the basic minimum may be required to make up deficiencies. There is no foreign-language requirement.

**Master of Arts for Teachers Degree**

**Admission Requirements:** Bachelor of Arts degree in the field of art education or equivalent, with a 3.00 or better grade-point average in the undergraduate major; completion of at least one year of successful teaching on the elementary, secondary, or college level prior to initial entry; presentation of samples of the applicant's work and that of his or her students; three letters of recommendation.

**Graduation Requirements:** A minimum of 36 credits, composed of a core of art education seminars and studio courses, of which 9 may be a thesis related to the field. Additional course work, including a research study, may be taken in lieu of the thesis. Undergraduate work beyond the basic minimum may be required to make up deficiencies. There is no foreign-language requirement.

Graduate students in the studio fields and in art history may participate in the School of Art's study abroad programs.

**ASIAN AMERICAN STUDIES**

**A517 Padelford**

Asian American studies is an interdisciplinary program intended to transmit the history and culture of people of Asian descent in the United States. As currently structured, the program has courses in general and interdisciplinary studies, Asian languages and literature, and psychology. The “College of Education” section of this catalog has information for students with teaching majors or minors in Asian American studies. In addition, students interested in a bachelor's degree program centering on Asian American studies should consult a General Studies adviser in B10 Padelford.

James K. Morishima, Director

**ASIAN LANGUAGES AND LITERATURE**

**300 Thomson**

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 Chinese (Mandarin and Cantonese), Indian, Japanese, Korean, Manchu, Sanskrit, Tagalog, Tamil, Thai, Tibetan, and Uzbek (Turkic).

**Faculty**

Roy Andrew Miller, Chairman; Brandauer, Cirtautas, Cooke, Hiraga, Knechtges, Lukoff, McKinnon, Miller, Niwa, Norman, Niwara, Poppe (emeritus), Potter, Ruegg, Schiffman, Serruys, Shapiro, Shih (emeritus), Suh, Takaya, Thrasher, C-h. Wang, C-n. Wang, Wilhelm (emeritus), Wylie, Yen. J. L. Norman, graduate program adviser.

**Undergraduate Programs**

**Bachelor of Arts Degree**

**Major Requirements:** East Asian languages (Chinese, Japanese, Korean, Thai, Tibetan, Turkic)—55 credits in the language, 25 beyond the second-year level; 20 credits in literature and culture of the major language, excluding 499. Literature courses in English may not be counted toward language credit requirements. South Asian languages (Hindi-Urdu, Sanskrit, Tamil)—57 credits in the language, including 39 credits in the major language, 15 credits in the minor language, and INDN 100; 13 area credits in HSTAS 201, 202 and senior seminar; 10 credits in a humanistic discipline with a South Asian focus (e.g., philosophy, comparative literature, history, political science). Ordinarily, majors in Tamil and Hindi-Urdu study Sanskrit as the minor language; with approval, majors in Sanskrit may substi-
Tamil may substitute a second Dravidian language if concentrating in linguistics; majors in Urdu may substitute Persian as a minor language. Literature courses in English do not count toward language credit requirements.

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

Also see “Graduate Programs and Degree Policies,” page 57.

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 literature.

Admission Requirement: Bachelor of Arts degree in relevant Asian language or equivalent background.

Graduation Requirements: 45 course credits, of which 18 must be in courses numbered 500 and above, plus 9 thesis credits; proficiency examination in major language; graduate reading examination in one language other than major language; successful completion and defense of thesis. The graduate adviser must be consulted about specific course requirements in the various language areas.

Doctor of Philosophy Degree

The Doctor of Philosophy degree is offered with specialization in Buddhist studies, Chinese, Japanese, Korean, Tibetan, and Turkic languages and literature.

Admission Requirement: Master of Arts degree in relevant Asian language.

Graduation Requirements: Proficiency examination in language of specialization; graduate reading examinations in one Asian language other than major language and in one European language; field examinations; successful completion and defense of dissertation. The graduate 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, Chairman; K. H. Böhm, E. Böhm-Vitense, Boynton, Hodge, Jacobsen (emeritus), Sullivan, Wallerstein. K. H. Böhm, graduate program adviser.

Undergraduate Program

Bachelor of Science Degree

Major Requirements: ASTR 321, 322, 323; 431, 432, 433 or 9 units of other astronomy 400- or 500-level courses; PHYS 121, 122, 123; 131, 132, 133; 221, 222, 223; 321, 322; MATH 124, 125, 126, 205, 238; 224, 327, 328; 12 additional credits in courses at 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. No grade lower than C 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.

Graduate Programs

Also see “Graduate Programs and Degree Policies,” page 57.

Master of Science Degree

Admission Requirement: Passage of the departmental preliminary examination with a grade of A or B.

Graduation Requirements: With Thesis—36 approved credits, of which 12 must be in astronomy courses at the 500 level or above and 9 will be 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 preliminary and qualifying examinations with a grade of A. Entering students are expected to have a strong background in physics and mathematics.
**Atmospheric Sciences**

Atmospheric Sciences is concerned with the physical state of the atmosphere, with processes and changes occurring in the atmosphere, and especially with application of the fundamental principles of physics to atmospheric phenomena.

**Faculty**

Robert G. Fleagle, Chairman; Arya, Badgley, Businger, Church (emeritus), Fleagle, Harrison, Hobbs, Holton, Houze, Leovy, Liou, Radke, Reed, Untersteiner, Wallace. R. G. Fleagle, graduate program adviser.

**Undergraduate Programs**

**Bachelor of Science Degree**

**Major Requirements:** 38 credits in atmospheric sciences courses numbered above 300, of which 20 must be in courses above 400; ENGR 141; MATH 124, 125, 126; PHYS 121, 122, 123, 131, 132, or equivalents; and two courses from the following: MATH 327, 328, A A 370, PHYS 221, 222, 223; a grade of C 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:** Bachelor’s degree “With College Honors in Atmospheric Sciences” or “With Distinction in Atmospheric Sciences.” The honors adviser must be consulted about requirements.

**Graduate Programs**

Also see “Graduate Programs and Degree Policies,” page 57.

**Master of Science Degree**

**Admission Requirements:** Bachelor’s degree in a physical science, mathematics, or engineering and the Graduate Record Examination.

**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. Qualifying examination must be taken at the end of first year of graduate study.

**Doctor of Philosophy Degree**

**Admission Requirement:** Passing the qualifying examination with distinction.

**Graduation Requirements:** At least half of the credits earned prior to the General Examination should be in courses numbered above 500, and at least 21 credits should be in approved mathematics and physics courses numbered above 400. General Examination and preparation of a dissertation are required.

**Biochemistry**

**Bachelor of Science Degree**

Biochemistry is the study of the chemistry of life processes.

Hans Neurath, Chairman

**Undergraduate Programs**

No curriculum leads to an undergraduate degree in biochemistry, but students following the Bachelor of Science degree curriculum in biology or chemistry may include in their degree program courses offered by the Department of Biochemistry in the School of Medicine. Courses in biochemistry are of particular interest to undergraduate students in botany, chemistry, genetics, microbiology, or zoology.

**Graduate Programs**

Also see “Graduate Programs and Degree Policies,” page 57.

Students who intend to work toward the Master of Science degree or the Doctor of Philosophy degree in biochemistry should consult the “Graduate Study” and “School of Medicine” sections of this catalog.

**Biology**

**Master of Science Degree**

Admission Requirements: Bachelor's degree in the appropriate department are offered by the de-
portments of Botany, Microbiology, 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). 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 Neal Groman is chairman.

Undergraduate Programs
Bachelor of Science Degree

Major Requirements: The program leading to a Bachelor of Science degree is in cellular and molecular biology, 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, and molecular biology. The following courses are required: MATH 124, 125, and either MATH 126, 281, or Q SCI 281; CHEM 140, 150; 231, 235, 236 or 335H, 336H, 337H and one chemistry laboratory; PHYS 114, 115, 116 or 121, 122, 123; BIOL 210, 211, 212; BIOC 440, 441, 442; GENET 451; and 15 credits in advanced biology chosen from a broad list of electives. 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
C122 Padelford

Black studies is an interdisciplinary program drawing together courses in a variety of academic disciplines and designed to broaden the student's knowledge about the Black experience. Students are offered the opportunity to understand and appreciate the social, eco-

tomic, historical, and aesthetic aspects of Afro-American culture.

Affiliated Faculty
Trevor L. Chandler, Director; Banks, Barth, Black, Bodden, Bravmann, Brazil, Canon, Chandler, Eastman, Flint, Jones, Holifield, McElroy, Moberly, Spain, Sue, Wagner.

Courses with content of interest to the student of Afro-American culture and history include ANTH 111, 212, 213, 401, 402, 456, 457, 458, 466, 467, 468; ART H 230, 331, 432, 436, 437, 438, 439; CMU 328, 329; C LIT 261, 262, 263, 450; DRAMA 201, 202, 203; EDC&I 269, 469; ENGL 211, 212, 251, 355, 358, 399, 444; GEOG 227; HST 351, 352, 361, 362, 450, 451, 495; HSTAA 443, 444; HUM 103; MUSIC 319, 331, 427; PHIL 113; PHY A 281, 282; POL S 210, 211, 439; PSYCH 250, 260, 443; SOC S 150; SOC 105, 362, 459, 463; SPAN 311, 312.

Undergraduate Programs
Bachelor of Arts Degree

Major Requirements: 65 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; 30 credits in a single department relevant to Black studies curriculum. Academic units relevant to Black studies include Anthropology, Art, Communications, Comparative Literature, English, Geography, History, Philosophy, Political Science, Psychology, Romance Languages and Literature, Sociology, and Speech.

Teaching Program: Teaching major or minor in Black studies. Information on requirements appears in the "College of Education" section of this catalog.

BOTANY
240 Johnson

The Department of Botany is concerned with the structure, physiology, evolution, and classification of plants with emphasis on both organismal and cellular biology. Special opportunities in botany of the Pacific Northwest are shared with related departments in courses and programs.

Faculty
A. R. Kruckeberg, Chairman; Bendich, Blaser, Cleland, del Moral, Denton, Halperin, Haskins, Hitchcock (emeritus), Kruckeberg, Meeuse, Muhlick (emeritus), Norris, Stuntz, Tsukada, Waaland, Walker, Whisler. R. B. Walker, graduate program adviser.
Undergraduate Program
Bachelor of Science Degree

Major Requirements: BIOL 210, 211, 212 (or BIOL 101–102 and GENET 451); BOT 113, 320, and 15 credits in upper-division botany, including BOT 371 or 472, and one course in lower plants, one course in higher plants; two upper-division courses in related sciences. Minimum of 10 credits in chemistry (CHEM 140, 150, 151 or 101, 102). In addition, CHEM 231, 232 are recommended.

Graduate Programs
Also see “Graduate Programs and Degree Policies,” page 57.

Master of Science Degree

Admission Requirements: Equivalent of a bachelor’s 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 is required.

Doctor of Philosophy Degree

Admission Requirements: Same as for the Master of Science degree.

Graduation Requirements: Departmental examinations or courses in two areas other than research area. Committees may require additional foreign-language reading in specialty. Most programs include study in related science departments.

CHEMISTRY
200 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

Undergraduate Programs
Bachelor of Science Degree

Admission Requirements: Suggested high school curriculum to include three units of German; at least three units of mathematics, including 1½ units of algebra and ½ unit of trigonometry; one unit of physics; and one unit of chemistry.

Major Requirements: CHEM 145 (or 140), 155 (or 150), (students with inadequate backgrounds in laboratory work or descriptive chemistry should include CHEM 151 or 160, or both; in their freshman program; CHEM 147H and 157H may replace 151 and 221); CHEM 221; 335H, 336H, 337H, 346H, 347H (or 231, 235, 236, 241, 242 and a passing score on 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, 132 recommended); MATH 124, 125, 126, and two additional courses numbered 200 or above (MATH 238 and 327 recommended); one year of German, French, or Russian or placement into second year on the language examination; 21 credits of upper-division science electives. Grade-point average of 2.80 in major courses, with C or better in each course, and a total grade-point average of 2.80 or better.

Bachelor of Arts Degree

Admission Requirements: Same as for the Bachelor of Science degree.

Major Requirements: Chemistry requirements through 221 are the same as those listed for the Bachelor of Science degree, except that CHEM 160 or 414 or 416 is required; CHEM 231, 235, 236, 241, 242 (or 335H, 336H, 337H, 346H, 347H); 350, 351, 455 (or 455, 456, 457); 6 credits from 460, 461, 462, 463; 5 credits in English composition; one year of physics, including one credit of laboratory; MATH 124, 125, 126. A grade of C or better must be obtained in each of the required chemistry courses.

Honors Program: Bachelor of Science degree or Bachelor of Arts degree "With College Honors in Chemistry" or "With Distinction in Chemistry." The honors adviser must be consulted 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

Also see "Graduate Programs and Degree Policies," page 57.

Master of Science Degree

Admission Requirements: Bachelor's 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 letter 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 level or above and below 600, with A or B 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 Requirements: Completion of requirements for Master of Science degree with thesis.

Graduation Requirements: 39 credits (A or B 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 (A or B grades) in approved electives outside chemistry; 9 credits (may be S grade) selected from CHEM 510, 520, 540, and 560; cumulative examinations in one or more areas of specialization; teaching internship; dissertation.

CHICANO STUDIES

B503 Padelford

El Centro de Estudios Chicanos was developed to create academic atmosphere on campus that is familiar to the Chicano student and to provide academic support and instructional resources to the community in order to facilitate problem solving and program implementation in the barrio. El Centro de Estudios Chicanos assists in the recruitment and hiring of Chicano faculty, develops courses, and supports community programs relevant to Chicanos. Students interested in a bachelor's degree program centering on Chicano studies should consult a General Studies adviser in B10 Padelford.

CLASSICS

218 Denny

Classics encompasses the study of ancient Greek and Roman civilizations in all their aspects, from prehistoric times to the Middle Ages, including the Greek and Latin languages, the many kinds of literature written in them (such as poetry, drama, history, philosophy, rhetoric, political theory), and ancient art and archaeology.

Faculty

Colin N. Edmonson, Chairman; Bliquez, Densmore (emeritus), Edmonson, Grummel, Harmon, MacKay, McDiarmid, Pascal, Read (emeritus), Roth, Vignoli. W. C. Grummel, graduate program adviser.

Undergraduate Programs

Bachelor of Arts Degree

MAJOR REQUIREMENTS

Classical Studies: Greek or Latin through 203 and 208; 36 credits chosen with department approval from courses in upper-division Greek, upper-division Latin, classics in English, classical art and archaeology, ancient history, the history of ancient philosophy, and the history of ancient science. CLAS 101 and HST 111 are not acceptable.

Classics: 18 approved credits in upper-division Greek courses; 18 approved credits in upper-division Latin courses.

Greek: 27 approved credits in upper-division Greek courses and 9 credits chosen with department approval from courses in Latin, upper-division Greek, classics in English, classical art and archaeology, ancient history, the history of ancient philosophy, and the history of ancient science.

Latin: 27 approved credits in upper-division Latin courses and 9 credits chosen with department approval from courses in Greek, upper-division Latin, classics in English, classical art and archaeology, ancient history, the history of ancient philosophy, and the history of ancient science.

Honors Programs: Bachelor's degree "With College Honors" or "With Distinction" in Latin, in Greek, or in classics. The honors adviser must be consulted 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**
Also see “Graduate Programs and Degree Policies,” page 57.

**Master of Arts Degree**

*Admission Requirements*: Two years of upper-division study 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 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 27 credits of graduate study, the reading knowledge examination in French or German, and examinations in the translation of Greek and Latin at sight, to be taken not later than the second quarter after the completion of 27 credits of graduate work.

*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 practicum in their fields. The undergraduate program is interdisciplinary, with emphasis on the social sciences and humanities.

**Faculty**
Alex S. Edelstein, Director; Ames, Bowen, Broughton, Carter, Cranston, Dervin, Edelstein, Fitchen, Godfrey, Holifield, Johnston, Parker, Pember, Ris, Roller, Samuelson, Shadel, Stamm, Wike, Yerxa. W. E. Ames, graduate program adviser.

**Undergraduate Programs**

**Bachelor of Arts Degree**

*Admission Requirements*: 90 credits completed with no more than 20 credits in School of Communications courses; CMU 150 and 200, completed (or equivalents) with grades acceptable to school faculty; a University of Washington grade-point average at least equal to the all-University cumulative average last reported (or, if transferring from another institution, a grade-point average of at least 3.00); letters and test scores as required by faculty. Satisfaction of these minimum requirements assures 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 CMU 150, 200, 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, or 325. Broadcast Journalism—CMU 321, 353, 354, 355, 356, and 357. Advertising—CMU 340, 341, 345, 346, 348, and MKTG 300. Radio-Television—CMU 349, 360, and at least 6 additional credits in radio-television courses. Communication—CMU 400, 406, 411, 414, 480 or 481, 348 or 402 or 470; and HSTAA 454, POL S 452, PSYCH 345, and SOC 443.

*Honors Program*: Bachelor's degree “With College Honors in Communications” or “With Distinction in Communications.” The honors adviser must be consulted 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**
Also see “Graduate Programs and Degree Policies,” page 57.

**Master of Communications Degree**

*Admission Requirements*: Above-average undergraduate record, Graduate Record Examination, and letter of intent.
Graduation Requirements: Option A—15 credits (at least two courses at the 500 level) from each of two communication fields and 9 credits from research work. Option B—25-27 credits in a single area outside communications; 18-20 credits of general communications studies, seminar, and practicum.

Master of Arts Degree
Admission Requirements: Same as for the Master of Communications degree, plus the Miller Analogies Test.

Graduation Requirements: Same as Option A, except that a thesis, rather than a research paper, is required. Information on the language requirements 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 acquisition of the Master of Arts degree; preliminary written and oral examination; dissertation; teaching experience. Information on the language requirement can be obtained from the student’s adviser.

Comparative and Foreign Area Studies
406 Thomson

The Institute for Comparative and Foreign Area Studies coordinates undergraduate and graduate instructional and research programs on East Asia, Russia and Eastern Europe, South Asia, Africa, Latin America, and the Near East. The institute also sponsors a program in religious studies and topical seminars and courses in other fields that are especially suited to comparative international study.

Faculty

Undergraduate Programs

Bachelor of Arts Degree
Regional studies core programs, combining language instruction with history and interdisciplinary area training, are offered for the following areas: China, Japan, Korea, Russia, East Europe, and South Asia. An Inner Asian studies program also is offered.

Major Requirements: All programs require language training through the second year (30 credits or equivalent); additional language training is recommended. Additional requirements for individual programs are as follows:

China Regional Studies: HSTAS 211, 212, 213; 25 credits in 300- and 400-level courses on East Asia, of which 15 must deal with China; EASIA 455.

Japan Regional Studies: HSTAS 211, 212, 213; 25 credits in 300- and 400-level courses on East Asia, of which 15 must deal with Japan; EASIA 451.

Korean Regional Studies: HSTAS 211, 212, 213, 469, 470; 25 credits in 300- and 400-level courses on East Asia.

Russian Regional Studies: REEU 243, 457; 15 credits in a selected discipline; 20 credits in 300- and 400-level courses on Russia.

East European Regional Studies: REEU 220 (or its equivalent), 458; 15 credits in a selected discipline; 20 credits in 300- and 400-level courses on East Europe.
South Asia Regional Studies: HSTAS 201, 202; 30 credits in one discipline (anthropology, economics, history, political science, or linguistics); 15 credits, oriented to South Asia, in social-sciences disciplines other than that of concentration; SASIA 498.

Inner Asian Studies: Language requirement (30 credits) plus a minimum of 15 credits in a selected discipline. No formal degree program is currently offered, but a student may plan an atypical major centering on Inner Asian studies leading to the baccalaureate degree in the field of general studies.

African Studies: No formal degree program is currently offered, but a student may plan an atypical major centering on African studies leading to the bachelor's degree in the field of general studies.

Latin American Studies: Requirements are two years of Spanish and one year of Portuguese or two years of Portuguese and one year of Spanish; 48–50 credits, including ANTH 322 or 418 plus one elective; GST 492, 493; HSTAA 381, 382, 383 (two of three); POL S 323, 342; 9 credits in Spanish American or Luso-Brazilian literature; one elective and senior thesis. No formal degree program is currently offered, but students may plan a major centering on Latin American studies leading to the baccalaureate degree in the field of general studies.

Religious Studies: No formal degree program is currently offered, but a student may plan an atypical major in comparative religion leading to the bachelor's degree in the field of general studies. Courses providing opportunity for historical and comparative study of religious thought and expression include ANTH 404, 412, 436; ART H 417, 418, 421, 521; CLAS 430, 445; HST 261, 307, 461, 462, 463, 561, 562, 563; HSTAM 441; HSTAS 201, 421; HSTEU 401, 402; EASIA 240, 443; IASIA 431, 464; SASIA 291, 472, 473; N E 210, 220, 420, 422, 430, 432, 434, 450, 451; PHIL 267, 286, 321, 412, 415, 416, 467, 469, 586; POL S 430, 538; SCAND 230; SOC 457; scriptural languages, such as Akkadian, Arabic, Aramaic, Chinese, Greek, Hebrew, Hindi, Japanese, Persian, Sanskrit, Tamil, Tibetan, and Urdu.

Honors Program: Bachelor's degree "With College Honors in (area)" or "With Distinction in (area)." The honors adviser may be consulted about requirements.

Teaching Program: Teaching major and minor in comparative and foreign area studies. Information on requirements appears in the "College of Education" section of this catalog.

Graduate Program
Also see "Graduate Programs and Degree Policies," page 57.

Master of Arts Degree
Programs on East Asia (China, Japan, Korea), Russia, and East Europe, which are offered in cooperation with various departments concerned with these areas, are described in the "Interdisciplinary Graduate Degree Programs" section of this catalog.

COMPARATIVE LITERATURE
B434 Padelford

Comparative literature offers the study of literature in its essential nature, unrestricted by national or linguistic differences. The undergraduate program provides a survey of classics that have formed literary taste over the centuries. It includes courses examining literary works under the generic aspects of narrative, drama, and lyric, as well as a variety of courses dealing with diverse aspects of literature viewed internationally. In the graduate program, the comparative task proceeds by means of concentration on two or more national literatures, studied in their original languages.

Faculty

Undergraduate Programs
Bachelor of Arts Degree
Major Requirements: 50 credits, including the following courses: CLAS 210 or any upper-division course in classics; C LIT 300, 301, 302, and two additional courses in comparative literature; and at least one course in a literature other than English, studied in the original tongue. Remaining credits are to be earned, with few exceptions, in 300- and 400-level courses from among the offerings from Comparative Literature and the eight participating departments: Asian Languages and Literature, Classics, English, Germanic 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.

Teaching Program: Teaching major or minor in comparative literature. Information on requirements ap-
pears in the "College of Education" section of this cat-
galog.

**Graduate Programs**
Also see "Graduate Programs and Degree Policies," page 57.

**Master of Arts Degree**
Information on this degree appears in the "Interdisci-
plinary Graduate Degree Programs" section of this cat-
galog.

**Doctor of Philosophy Degree**
Information on this degree appears in the "Interdisci-
plinary Graduate Degree Programs" section of this cat-
galog.

**DRAMA**

113 Drama-TV

The School of Drama is concerned with the whole con-
tinuum of acting, directing, designing, theatre history, dance, and dramatic forms through which the human, dramatic imagination finds expression, from the spon-
taneous, imaginative play of children to the theatre arts of criticism.

**Faculty**
James R. Crider, Acting Executive Director; Boris, Carr, Conway, Corzatte, Crider, Dahlstrom, Davis (emeritus), Falls, Forrester, Galstaun, Gray, Green, Haaga, Harrington (emeritus), Loper, Lorenzen, Lounsbury, Mobley, Roberts, Rolfe, Ross, Siks, Sydow, Valentinetti, West, White, Wolcott. J. R. Crider, grad-
uate program adviser.

**Undergraduate Programs**

**Bachelor of Arts Degree**

**Admission Requirements:** Complete a minimum of two drama-dance-prefix courses at the 100–200 level (DRAMA 298 or 498, DRDNC 470 not acceptable); earn a minimum of six production participation points; complete, or be in the process of final completion of, 45 credits of college-level work (three quarters). Pro-
duction participation points may be earned as follows: auditions for directing class project or theatre produc-
tion, one point; acting as a super, one point; acting, speaking role (twenty to forty hours rehearsal/perform-
ance), two points; acting, speaking role (forty to sixty hours rehearsal/performance), three points; technical crew: first experience, one point—second experience, two points—third experience, three points. With the exception of audition, academic credit may be granted upon student request under DRAMA 298 or 498 or DRDNC 470 for production participation. For the transfer student, drama course work taken at any ac-
credited two- or four-year institution and evidence of production participation are accepted to meet these premajor requirements. However, credit under DRAMA 298 or 498 or DRDNC 470 may not be granted for production work performed at another institution. Each eligible applicant for major is screened by the chair-
man in whose emphasis area the student wishes to study. The screening uses the following instruments: Acting/Directing: acting audition plus written analysis of play as if preparing a production (for directors). Ad-
mission to major with an acting emphasis is made early in Spring Quarter or immediately before Autumn Quarter after the auditions for placement in DRAMA 251 are held. *Children's Drama:* interview plus résumé and written statement of professional/educational objectives. Dance: audition plus interview. Design/Technical: interview plus examples of graphic work. *Theatre History/Drama:* interview plus acting audition and sample of written work.

**Major Requirements:** Completion of all premajor require-
ments; completion of balance of a minimum of 60 credits in drama-prefix courses, of which 20 must be earned at the 300–400 level.

Dance emphasis students must complete 20 credits in drama-prefix courses and 40 in drama-dance-prefix courses, including 30 in Dance Techniques courses, 3 in Structure of Music in Relation to Dance courses, and 1 in Introduction to Dance History.

*Teaching Program:* Teaching major or minor in drama. Information on requirements appears in the "College of Education" section of this catalog.

**Bachelor of Fine Arts Degree**

**Admission Requirements:** Complete, or be in the proc-
ess of final completion of, two years of general college study (90 credits). Entrance determined solely by audi-
tion with previous grade-point average of only inci-
dental concern. Students may enter only in Autumn Quarter. Application deadline is February 15 for audi-
tions 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 re-
Graduate Programs
Also see “Graduate Programs and Degree Policies,” page 57.

Master of Arts Degree

Admission Requirements: Directing—Directorial analysis, not to exceed ten pages of double-spaced typing, of a play as if preparing a production, and two letters of recommendation. Design (Costume and Scenery) or Technical Direction—Portfolio of designs, technical plots, or working drawings, plus two letters of recommendation and a brief statement of purpose in acquiring a graduate degree. Children's Drama—Two letters of recommendation and a statement of purpose; if the applicant wishes to study children's theatre directing, a directorial analysis should be submitted.

Graduation Requirements—Directing: DRAMA 463, 561 (three quarters), 562, 563 (six quarters), 700 (9 credits). Design (Costume and Scenery)—DRAMA 419, 517, 518, 519; three quarters each of 510, 511; two quarters of 599 (5 credits each); 700 (9 credits); 413, 417, 410, 411, 412, 491, 496 can be varied to shape the program toward more specific emphasis in costume or scenery. Technical Direction—DRAMA 413, 419, 517, 518, 519; three quarters each of 410 or 412; 510, 513; two quarters of 599 (5 credits each) and 600 (6 credits). Children's Drama—DRAMA 460, 461, 462, 530, 551-552-553, 700 (9 credits) and combinations of 431, 432, 436, 437, 438, 463, 492, 561, 562. Theatre History—Covered under Drama Arts in the “Interdisciplinary Graduate Degree Programs” section of this catalog. There is no foreign-language requirement.

Doctor of Philosophy Degree
Covered under Drama Arts in the “Interdisciplinary Graduate Degree Programs” section of this catalog.

ECONOMICS
301 Savery

The Department of Economics is concerned with the analysis of the ways societies organize the production of goods and services and the distribution of these among groups and individuals. Applied fields 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.

Faculty

Undergraduate Programs

Bachelor of Arts Degree

Major Requirements: ECON 200, 201, 281, 300, 301 plus 25 additional credits in courses numbered 300 or above to be 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 requirement: elementary functions (MATH 105), one calculus course (MATH 124 or 157) plus two courses chosen from the following list: calculus (MATH 125, 126), logic (MATH 305, PHIL 120, 370), accounting fundamentals (ACCTG 210).

Honors Program: Bachelor's degree “With College Honors in Economics” or “With Distinction in Economics.” The honors adviser must be consulted 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
Also see “Graduate Programs and Degree Policies,” page 57.

Master of Arts Degree

Admission Requirements: Undergraduate major in economics is not required. Admission applicants are judged on performance in courses in which analytical skills are required and on Graduate Record Examination aptitude scores. Students with little training in economics may be required to do preliminary work in undergraduate courses.

Graduation Requirements: ECON 411, 500, 501, 502, 503 plus two additional courses at the 500 level and five additional courses at the 400 level or above. A thesis may be substituted for any three courses. There is no foreign-language requirement.

Doctor of Philosophy Degree

Admission Requirements: Same as for the Master of Arts degree.

Graduation Requirements: Theory (ECON 500, 501, 502, 503); mathematics (ECON 410, 411, 412); statis-
tics and econometrics (ECON 481, 482). Eight additional courses are required (four at the 500 level, four at the 400 level or above) as well as three courses in the student's major field. Core examinations in microeconomics andmacroeconomics and a major field examination. General Examinations, dissertation, and Final Examination. There is no foreign-language requirement.

Fields of specialization include: comparative economic development; economic history; mathematical economics; government regulation, industrial organization; natural resources; international trade; labor economics; public finance; and statistics and econometrics.

Formal interdisciplinary study and research can be arranged through the cooperation of the Institute for Comparative and Foreign Area Studies, the Institute for Environmental Studies, and other University areas.

**ENGLISH**

*A101 Padelford*

The Department of English offers instruction in elementary composition, advanced composition of various kinds, English literature, American literature, and, in the comparative literature courses, some of the literature of other countries.

**Faculty**

Robert D. Stevick, Chairman; Abrams, Adams, Alexander, Allen, Anderson (emeritus), Baldwin, Banta, Bentley, Blake, Blessing, Bowie, Brenner, Brown, H. Burns (emeritus), W. Burns, Butwin, Clemens, Coldewey, Cox, Culbert, Duckett (emeritus), Dunlop, Dunn, Eby (emeritus), Emery (emeritus), Ethel (emeritus), Fisher, Fowler, Frank, Frey, Gerstenberger, Gould (emeritus), J. Griffith, M. Griffith, Guberlet (emeritus), Harris, Hatfield, Heilman, Hilen, Hudson, Irmscher, Jones, Kaplan, Kartiganer, Kaufman (emeritus), Kolpacoff, Korg, LaGuardia, Lockwood, Longyear, Magie, Matchett, McCracken, McGuire, Moleby, Modiano, Nix (emeritus), Oberg, Palomo, Pellegrini (emeritus), Person (emeritus), Phillips, Reinhart, Requa, Rivenburgh (emeritus), Sale, Shulman, Siegmund, Simonson, Smith, Stanton, Stevick, Stirling (emeritus), Streitberger, Vaughan, Wagoner, Walters (emeritus), Warnke, Webb, Webber, Webster, Willeford, Willis (emeritus), Winther (emeritus), Yaggi, Zillman (emeritus). T. Lockwood, graduate program adviser.

**Undergraduate Programs**

**Bachelor of Arts Degree**

**MAJOR REQUIREMENTS**

*Language and Literature:* 50 credits, which 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 391, 393, one advanced writing course.

*Composition and Advanced Writing:* 50 credits, which must include the courses required for the curriculum in language and literature and, in addition, 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:* Bachelor's degree "With College Honors in English" or "With Distinction in English." The honors adviser must be consulted 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**

Also see "Graduate Programs and Degree Policies," page 57.

**Master of Arts Degree**

**Admission Requirements:** Bachelor of Arts degree with major in English equivalent to that at the University of Washington. Reading knowledge of an approved foreign language. Graduate Record Examination aptitude and advanced literature in English tests. Two letters of recommendation.

**Graduation Requirements:** Literature—35 credits, of which 25 must be in courses numbered 500 or above. Of these, 10 credits may be in courses in other departments. A maximum of 5 quarter transfer graduate credits may be accepted if taken while a graduate student in another recognized graduate school. Written examination on four fields chosen in consultation with the chairman of graduate programs. *Advanced Creative Writing*—35 credits, of which not more than 15 may be in advanced writing courses. Written examination in one genre on a list of titles proposed by the student and approved by the Graduate Studies Committee. A piece of original imaginative writing (thesis, 10 credits).

**Master of Arts for Teachers Degree**

**Admission Requirements:** Same as for the Master of Arts degree, plus prior teaching experience.
Graduation Requirements: 39 or 40 credits, of which 24 or 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 outside the department, subject to approval and not to exceed 15 credits). A maximum of 5 quarter credits may be transferred from an accredited institution.

Doctor of Philosophy Degree
Admission Requirements: Petition to Graduate Studies Committee after completion of 30 credits of graduate course work and acquisition of the Master of Arts degree or passing of qualifying examination. Reading knowledge of two foreign languages, usually Latin or French, and German.

Graduation Requirements: 60 credits, of which 50 must be in courses at the 500 or 600 level. As many as 15 credits may be in approved courses in other departments. ENGL 505, 530, and 531. Preliminary examination consisting of written examinations in three of the six historical surveys in two other fields, and a General Examination (oral) in the field of the student's specialization. A student electing a major, or minor, in English language may substitute this field for one of the literary periods. Dissertation. Oral Final Examination.

ENVIRONMENTAL STUDIES
112 Sieg

The Institute for Environmental Studies was established in September, 1972, for the purposes of developing interdisciplinary environmental programs at both the undergraduate and graduate levels, facilitating the design and implementation of interdisciplinary research projects, and serving the public. The institute is administered by an Environmental Studies Board, comprising eleven deans representing a broad spectrum of environmental concerns.

Robert O. Sylvester, Director

Undergraduate Programs
Although the institute does not yet have a degree program of its own, students at the undergraduate level may design a program in environmental studies through General Studies, utilizing institute courses and courses from other departments. Advising services are provided by the institute.

GENERAL STUDIES
C14 Padelford

General Studies provides access to an individual degree program through the atypical major and to organized interdisciplinary degree programs.

Undergraduate Programs
Bachelor of Arts and Bachelor of Science Degrees
Admission Requirements: Ordinarily, a 2.50 grade-point average, an interdisciplinary program planned with several faculty members and a General Studies adviser, and agreed-upon faculty sponsorship for the senior thesis.

Major Requirements: Ordinarily, from 50 to 70 credits in courses related to major, and no fewer than three quarters in the program. Completion of required senior thesis. Precise curriculum to be determined in consultation with General Studies adviser and an appointed faculty advisory committee. Examples of interdisciplinary programs appear in the "Office for Undergraduate Studies" section of this catalog. The awarding of Bachelor of Arts or Bachelor of Science degrees is based on each student's degree program.

Honors Program: Bachelor's degree "With College Honors in General Studies." The honors adviser must be consulted 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, Chairman; Byers, Bendich, Doerrmann, Douglas, Falkow, Fangman, Felsenstein, Fialkow, Gallant, Gartler, Hall, Hartwell, Hawthorne, Laird, Motulsky, Nester, Roman, Sandler, Stadler, Stettler, Young. W. L. Fangman, 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, or mathematics.

Graduate Programs
Also see "Graduate Programs and Degree Policies," page 57.

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
406 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 environmental, economic, social, political, and other phenomena are structured spatially or regionally.

Faculty
Richard Morrill, Chairman; Beyers, Boyce, Chang, Eichenbaum, Fleming, Jackson, Kakiuchi, Krumme, Marts, Morrill, Romanowski, Sherman, Thomas, Ullman, Velikonja, Youngmann. J. Velikonja, graduate program adviser.

Undergraduate Programs
Bachelor of Arts Degree
Major Requirements: Ordinarily, GEOG 100; three of GEOG 200, 205, 207, 258, 277; two of GEOG 300, 350, 360, 370; one additional course at the 300 level; at least three courses at the 400 level (two systematic and one regional). Maintenance of a 2.50 grade-point average within geography. Options include the following: General Geography—60 credits in geography, including a broad range of systematic, regional, and technical courses. Urban and Regional Analysis—45 credits in geography and 30 in closely related fields. Possible concentrations in regional development; urban analysis; transportation; location theory; regional political structure and regional political structure. Cartography/Spatial Analysis—45 credits in geography, 30 in related fields. Environmental Studies (environmental perception, resource management, and conservation)—45 credits in geography, 30 in related fields (in cooperation with the Institute for Environmental Studies). Eurasian Studies (USSR, Europe, China, and Japan)—45 credits in geography, 30 in related fields (in cooperation with the Institute for Comparative and Foreign Area Studies).

Teaching Program: Teaching major or minor in geography. Information on requirements appears in the "College of Education" section of this catalog.

Graduate Programs
Also see "Graduate Programs and Degree Policies," page 57.

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 and Regional Analysis—including regional planning and development, urban structure, transportation, location theory, regional political structure, and regional social structure. Cartography/Spatial Analysis. Environmental Studies—environmental perception, resource management and conservation (in cooperation with the Institute for Environmental Studies). Eurasian Studies—USSR, China, Japan, Europe. (in cooperation with the Institute for Comparative and Foreign Area Studies).

Doctor of Philosophy Degree
Graduation Requirements: At least two years of post-Master of Arts degree credit, after assurance of general competence in geography; departmental written diagnostic examination; General Examination; dissertation and Final Examination; reading knowledge of one foreign language... Programs are as outlined under Master of Arts degree. Interdisciplinary studies are encouraged or required as appropriate to these specializations (e.g., a working knowledge of a language for Eurasian studies; economic theory for regional analysis; data processing for spatial analysis).
GEOLOGICAL SCIENCES
57 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 T. Whetten, Chairman; Barksdale (emeritus), Bostrom, Cheney, Chrisitensen, Coombs, Dunne, Evans, Ghose, Goodspeed (emeritus), Gresens, Hanson, Mallory, McCallum, Misch, Porter, Rensberger, Stewart, Stuiver, Vance, Washburn, Wheeler, Whetten, Whitney. J. M. Rensberger, graduate program adviser.

Undergraduate Program
Bachelor of Science Degree
Admission Requirements: Suggested high school curriculum to include at least three units of mathematics, one unit of physics, and one unit of chemistry.

Major Requirements: GEOL 205, 301, 320, 321, 340, 361, plus 20 credits at the 400 level; MATH 124, 125, 126; CHEM 145 or 140, 155 or 150, 160; PHYS 121 or 114, 122 or 115, 123 or 116. Recommended: MATH 238, 327, 328, and PHYS 221, 222, 223, or BIOL 101-102.

Graduate Programs
Also see "Graduate Programs and Degree Policies," page 57.

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). 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). A maximum of 9 credits of field geology may be applied. All students must present approved field course or other approved field experience. Oral examination by Master of Science Supervisory Committee; final examination consists of oral presentation and defense of thesis.

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 letter grade in courses numbered 300, 400, and 500. Passage of preliminary examination before Doctor of Philosophy Supervisory Committee or ad hoc Supervisory Committee and completion of two years of graduate study, passage of General Examination, 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 study of complex phenomena and the enormous energy resources of the geophysical system.

Faculty
Stewart W. Smith, Chairman; Blacic, Booker, Bostrom, Businger, Charlson, Christensen, Clark, Criminale, Crosson, Fairhall, Helms, Hodge, LaChapelle, Leovy, Lewis, Lister, Merrill, Parks, Raymond, J. D. Smith, S. W. Smith, Swarz, Untersteiner. C. F. Raymond, graduate program adviser.

Undergraduate Programs
An undergraduate degree is not offered.

Graduate Programs
Also see "Graduate Programs and Degree Policies," page 57.

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.

Admission Requirements: Undergraduate degree in a physical science and a strong background in physics and mathematics. Graduate Record Examination or equivalent. Written qualifying examination.
Graduation Requirements: With Thesis—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 can be obtained from the student's adviser.

GERMANIC LANGUAGES AND LITERATURE

340 Denny

The Department of Germanic Languages and Literature 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, designed especially for the nonmajor.

Faculty
George Buck, Chairman; Allard, Ammerlahn, Ankele (emeritus), Barrack, D. Behler, E. Behler, Buck, Dünnhaupt, Galt, Hertling, Hruby, McLean, Meyer (emeritus), Rabura, Rey, Sauerlander (emeritus), Sherwin (emeritus), South, Voyles, Wesner (emeritus), Ziemann. S. McLean, graduate program adviser.

Undergraduate Programs

Bachelor of Arts Degree

Major Requirements: 34 credits in core courses: GERM 301, 302, 303; 401, 402; 310, 311, 312; 413, 414; 18 credits of electives in upper-division German courses. At least a C must be earned in every upper-division German course; a 2.50 grade-point average must be maintained in these courses.

Honors Program: Bachelor's degree "With College Honors in German" or "With Distinction in German." The honors adviser must be consulted 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

Also see "Graduate Programs and Degree Policies," page 57.

Master of Arts Degree

Admission Requirements: Bachelor of Arts degree with major in German or equivalent background.

Graduation Requirements: Two programs: Conventional Master of Arts I, with specialization in either literature or philology leading to Doctor of Philosophy degree; and alternate Master of Arts II, providing a broader background in German literature and civilization and stressing teaching rather than research. Each program requires that 36 credits be completed in one year, two term papers in lieu of thesis, comprehensive written examination, passing reading knowledge examination in German. Master of Arts I program students may minor in another field, in which case 24 credits must be earned within the Department of Germanic Languages and Literature; remaining credits to be determined by minor department. Students may fulfill a Master of Arts II program by taking courses during three consecutive summers rather than through the regular one-year program.

Doctor of Philosophy and Doctor of Arts Degrees

Admission Requirements: Master of Arts I program prerequisite for Doctor of Philosophy degree; Master of Arts II program prerequisite for Doctor of Arts degree.

Graduation Requirements: 54 post-Master of Arts degree credits, of which 36 must be earned in graduate courses in Germanic languages and literature. Comprehensive written examinations. Passing a reading knowledge examination in a foreign language other than German. Participants in the Doctor of Philosophy degree program have three options: (1) to gain the remaining 18 credits by minoring in another department; (2) to take 36 credits in German literature since the fifteenth century and 18 credits in Germanic literature before the fifteenth century and in Germanic linguistics; (3) to reverse the credit requirements in (2) above; participants in the Doctor of Arts degree program may acquire the remaining 18 credits in the fields of education, history, philosophy, or anthropology and must serve two quarters of internship at another institution of higher learning.

HISTORY

315 Smith

History undertakes the study of human affairs in a manner that seeks to understand change and develop-
ment 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, Chairman; Alden, Bacharach, Bell, Bestor, Bobs, Bridgman, Burke, Butow, Carstensen, Conlon, Costigan, Dobie (emeritus), Dull, Ellison, Emerson, Ferrill, Flint, Fowler, Griffiths, Hankins, Holl, Holt (emeritus), Johnson, Kaminsky, Kapp, Katz, Kilcup, Levy, Lytle, Mosher, Pease, Pinkney, Pressly, Pyle, Saum, Savelle (emeritus), Solberg, Sugar, Szeftel (emeritus), Thomas, 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 at least 2.00. At least 5 credits each of ancient, medieval, modern European, and American history (i.e., HST 111, 112, 113 and HSTAA 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.

Honors Program: Bachelor's degree "With College Honors in History" or "With Distinction in History." The honors adviser must be consulted 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
Also see "Graduate Programs and Degree Policies," page 57.

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; General Record Examination verbal aptitude score in the eightieth 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, plus completion of at least one year of graduate study in history with distinction.

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.

HOME ECONOMICS
203 Raitt
The field of home economics synthesizes knowledge drawn from its own research, from the physical, biological, and social sciences, and the arts, and applies this knowledge to improve the lives of families and individuals.

Faculty
Mary Louise Johnson, Director; Bovy, Brockway, Buergel, Childs, Fontana, Granberg, Hall, Johnson, Katz, Martinsen, McAdams (emeritus), Monsen, Murdock, Pipes, Rowntree (emeritus), Schroeder, Shigaya, Stone, Stuart, Terrell (emeritus), Wilson, Worthington, Yerina. M. L. Johnson, graduate program adviser.

Undergraduate Programs
Bachelor of Science Degree
CURRICULUM IN NUTRITIONAL SCIENCE
AND EXPERIMENTAL FOODS
Major Requirements: HEC 307, 314, 407, 409, 415, 457; BIOC 405; CHEM 140, 150, 151, 231, 232, 241, 242; MICRO 301, 302; PC BS 472 or EDPSY 490; Q SCI 281; ZOOL 208 or CONJ 317–318.

Bachelor of Arts Degree
CURRICULUM IN TEXTILES, CLOTHING, AND ART
Information about this curriculum can be obtained from the School of Home Economics.
CURRICULUM IN GENERAL, HOME ECONOMICS

**Major Requirements**: 18 credits in dietetics, food, and/or nutrition, or textiles, with 12 credits in natural science. Thesis required.

Students interested in a baccalaureate degree program centering on Latin American studies should consult a General Studies adviser in B10 Padelford.

Dauril Alden, Chairman

**LINGUISTICS**

**B5A 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**

Sol Saporta, Chairman; Brame, Contreras, Newmeyer, Pope, Saporta, Selinker. S. Saporta, graduate program adviser.

**Undergraduate Programs**

An undergraduate degree is not offered. However, introductory courses in the nature of language and language learning and in linguistic method and theory are offered for those who wish to acquire a basic knowledge of the field. Undergraduates planning to work for an advanced degree in general linguistics are especially encouraged to complete this training prior to graduation. For students wishing to take a full complement of work, the following schedule is recommended: junior year, LING 200 or 400, 201, 451; 452, 453, 461, 462; senior year, LING 333, 404, 445, 454, 455, 463.

**Graduate Programs**

Also see “Graduate Programs and Degree Policies,” page 57.

**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 as many languages as possible; 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 American 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. The department, however, 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; 36 additional credits, including 3 credits in LING 599 and 9 credits in LING 800; supervised teaching in phonology, syntax, historical linguistics; General Examination; dissertation; Final Examination.

MATHEMATICS

138 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, 224, and 205 or 302.

TEACHER PREPARATION OPTION
Major Requirements: 50 approved credits in mathematics, including MATH 114, 124, 125, 126, 205, or 302, 327, 391, 392, 411, 412, 444, 445. The College of Education also has programs with major or minor in mathematics. In both options, C 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: 54 approved credits in mathematics, including MATH 124, 125, 126, 224, 302, 324 or 327, and 9 credits in courses numbered 400 or above in each of two of the following four categories: algebra, analysis, geometry, and statistics.

MATHEMATICAL STATISTICS OPTION

Major Requirements: 54 approved credits in mathematics, including MATH 124, 125, 126, 224, 302, 303, 327, 328, 394, 395, 482, 483, and two of the following three courses: MATH 396, 484, 485.

NUMERICAL ANALYSIS OPTION

Major Requirements: 54 approved credits in mathematics, including MATH 114, 124, 125, 126, 224, 302, 303, 324 or 327, 374, 438, 464, 465, 466. In all options, C 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.

Honors Program: Bachelor of Science degree only "With College Honors in Mathematics" or "With Distinction in Mathematics." The honors adviser must be consulted about requirements.

Graduate Programs

Also see "Graduate Programs and Degree Policies," page 57.

Master of Arts Degree

Admission Requirement: Bachelor of Arts degree with major in mathematics or equivalent background.

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 French, German, or Russian. Thesis is largely expository. Without Thesis—9 credits for thesis can be replaced by 9 credits of courses at the 500 level or above in mathematics.
Master of Arts for Teachers Degree

Admission Requirement: Bachelor's 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 may be thesis. There is no foreign-language requirement.

Master of Science Degree

Admission Requirement: Same as for the Master of Arts degree.


Master of Science in Mathematical Statistics Degree

Admission Requirements: Bachelor of Arts degree with major in mathematics or equivalent background. Must include courses equivalent to MATH 394, 395, 482, and 483.

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. Demonstration of proficiency in French, German, or Russian.

Doctor of Philosophy Degree

Admission Requirement: Mathematical training equivalent to a master's degree in mathematics.

Graduation Requirements: General Examination of basic graduate-level knowledge of three fields of mathematics; demonstration of proficiency in two of French, German, or Russian; dissertation; and Final Examination.

MICROBIOLOGY

G305 Health Sciences

The Department of Microbiology 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: Advanced sophomore or upper-division standing with overall grade-point average of 2.00 and, unless specifically waived, a grade-point average of 2.50 in chemistry and biology courses. Ordinarily, 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 or 15 credits in botany or zoology, or both; minimum of 30 credits in microbiology courses, including MICRO 400, 401, 430, 431, 441, 442, 443, and 496 (MICRO 101, 301, 302, 351 cannot be used); 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 221; MATH 124 or 157 or Q SCI 281 or 291; a grade-point average of 2.00 in microbiology courses.

Double Degree Program in Medical Technology: A five-year program is offered by the departments of Microbiology and Laboratory Medicine to a limited number of students. The Microbiology Academic Affairs office, G313A Health Sciences, can be consulted for information on admission requirements.

Honors Program: Bachelor's degree "With College Honors in Microbiology" or "With Distinction in Microbiology." The honors adviser may be consulted about requirements.

Graduate Programs

Students who plan to pursue a graduate degree program
in microbiology should consult the "School of Medicine, Microbiology" 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.

Faculty

John T. Moore, Director; Babb, Beale, Benshoof, Bergsma, Bissell, Brazil, Brennand, Carlsen, Chapple (emeritus), Clarke, Cooper, Curtis-Verna, Dempster, Dorsey, Eichenberger, Eichinger, Eisenberg, Garfias, Geissmar, Grossman, Harman, Harris, Heinitz, Hokanson, Iglitzin, Irvine, Jacobson (emeritus), Kauffman, Kechley, Kind, Knight, Krachmalnick, Leuba, Lishner, Lundquist, McColl, McInnes, Mesler, Moore, Munro (emeritus), O'Doan. Reynolds, Rosinlitz, Siki, Skowronek, Smith, Sokol, Storch, Suderburg, Terry, Troy, Tufts, Verrall (emeritus), Welke, Werner (emeritus), Woodcock (emeritus), Zetlin (emeritus), Zsigmondy. J. M. Beale, graduate program adviser.

Undergraduate Programs

Admission Requirements: All music majors must qualify for private instruction in their major performance areas by audition 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.

Major 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>First-Year Theory (3,3,3)</td>
</tr>
<tr>
<td>MUSIC 113, 114, 115</td>
<td>Ear Training (1,1,1)</td>
</tr>
<tr>
<td>MUSIC 210, 211, 212</td>
<td>Second-Year Theory (3,3,3)</td>
</tr>
<tr>
<td>MUSIC 213, 214, 215</td>
<td>Music After 1750 (3,3,3)</td>
</tr>
<tr>
<td>MUSIC 310</td>
<td>Modal Counterpoint (3)</td>
</tr>
<tr>
<td>MUSIC 311</td>
<td>Tonal Counterpoint (2)</td>
</tr>
<tr>
<td>MUSIC 312</td>
<td>Contemporary Idioms (3)</td>
</tr>
<tr>
<td>MUSIC 313, 314</td>
<td>Music Before 1750 (3,3)</td>
</tr>
<tr>
<td>Theory or history electives</td>
<td>10</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>54</strong></td>
</tr>
</tbody>
</table>

Bachelor of Arts Degree

MUSIC THEORY-HISTORY OPTION

Major Requirements: Music theory-history core, plus 9 credits upper-division vocal or instrumental instruction, and 6 credits ensembles, for a total 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; a 2.50 grade-point average in music is required for graduation.

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 8 credits in ensembles, for a total of 70 credits; a 2.50 grade-point average in music is required for graduation.

Bachelor of Arts and Bachelor of Music Degree (Concurrent)

Major Requirement: A 2.50 grade-point average in music courses is required for graduation in the combined five-year Bachelor of Arts and Bachelor of Music degree programs.

COMPOSITION MAJOR

<table>
<thead>
<tr>
<th>Courses</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Music theory-history core</td>
<td>54</td>
</tr>
<tr>
<td>MUSIC 191, 291, 391, 491 Composition</td>
<td>24</td>
</tr>
<tr>
<td>MUSIC 487 Tonal Counterpoint</td>
<td>3</td>
</tr>
<tr>
<td>MUSIC 280, 380, 381, 382 Conducting (1,1,1,1)</td>
<td>4</td>
</tr>
<tr>
<td>Vocal or instrumental instruction</td>
<td>24</td>
</tr>
<tr>
<td>Ensembles</td>
<td>12</td>
</tr>
<tr>
<td>Music electives</td>
<td>6</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>127</td>
</tr>
</tbody>
</table>

MUSIC HISTORICAL MAJOR

<table>
<thead>
<tr>
<th>Courses</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Music history-core</td>
<td>54</td>
</tr>
<tr>
<td>5 credits from MUSIC 316, 317, 318</td>
<td>Music Cultures of the World</td>
</tr>
<tr>
<td>3 credits from MUSIC 400, 401, 402, 403</td>
<td>3</td>
</tr>
<tr>
<td>3 credits from MUSIC 404, 413, 416, 420</td>
<td>3</td>
</tr>
<tr>
<td>3 credits from MUSIC 408, 411, 414, 421</td>
<td>3</td>
</tr>
<tr>
<td>3 credits from MUSIC 409, 412, 415, 419, 422, 423</td>
<td>3</td>
</tr>
<tr>
<td>Music history-literature electives</td>
<td>9</td>
</tr>
<tr>
<td>Music electives</td>
<td>9</td>
</tr>
<tr>
<td>Vocal or instrumental instruction</td>
<td>24</td>
</tr>
<tr>
<td>Ensembles</td>
<td>12</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>125</td>
</tr>
</tbody>
</table>

Students who intend to pursue graduate studies are strongly advised to establish proficiency in German or French to acquire some acquaintance with one or two additional foreign languages. For emphasis in ethnomusicology, the music adviser should be consulted regarding suitable area studies other than music.

PIANO MAJOR

<table>
<thead>
<tr>
<th>Courses</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Music theory-history core</td>
<td>54</td>
</tr>
<tr>
<td>MUSAP 160, 260, 360 Private Instruction: Piano</td>
<td>27</td>
</tr>
<tr>
<td>MUSAP 460 (two years) Private Instruction: Piano</td>
<td>18</td>
</tr>
<tr>
<td>MUSAP 479 Senior Recital</td>
<td>1</td>
</tr>
<tr>
<td>MUSIC 323, 324, 325 Accompaniment (2,2,2)</td>
<td>6</td>
</tr>
<tr>
<td>MUSIC 326, 327, 328 Repertoire (1,1,1)</td>
<td>3</td>
</tr>
<tr>
<td>MUSIC 434, 435, 436 Pedagogy (2,2,2)</td>
<td>6</td>
</tr>
<tr>
<td>Ensembles</td>
<td>15</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>190</td>
</tr>
</tbody>
</table>
VIOLIN OR VIOLONCELLO MAJOR

Courses Credits
Music theory-history core, to include 54
MUSIC 487 Tonal Counterpoint
MUSAP 161, 163, 261, 263, 361, 363 Private Instruction: Violin-Viola, Violoncello 27
MUSAP 461, 463 (two years) Private Instruction: Violin-Viola, Violoncello 18
MUSIC 479 Senior Recital 1
MUSIC 434, 435, 436 Pedagogy (2,2,2) 6
MUSIC 140 Private Instruction: Piano or Viola, Violoncello 4
MUSIC 236 Secondary Piano 6
MUSIC 280 Basic Principles of Conducting 1
Ensembles (minimum of one year of choral ensemble required) 12

VIOLINISTs should complete one quarter of viola.

VOICE MAJOR

Courses Credits
Music theory-history core 54
MUSAP 162, 262, 362 Private Instruction: Voice 27
MUSIC 462 (two years) Private Instruction: Voice 18
MUSIC 479 Senior Recital 1
MUSIC 140 Private Instruction: Piano or Viola, Violoncello 4
MUSIC 236 Secondary Piano 6
MUSIC 233 Music Theatre Technique 1
MUSIC 309 Advanced Music Theatre Technique 2
MUSIC 323 Accompanying 2
MUSIC 326, 327, 328 Repertoire (1,1,1) 3
MUSIC 434, 435, 436 Pedagogy (2,2,2) 6
MUSIC 280, 380, 381, 382 Conducting (1,1,1,1) 4
Ensembles 21

134

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 SPCH 300 (Speech Science).

ORGAN MAJOR

Courses Credits
Music theory-history core, to include 54
MUSIC 487 Tonal Counterpoint 27
MUSAP 165, 265, 365 Private Instruction: Organ 27
MUSAP 465 (two years) Private Instruction: Organ 18
MUSIC 479 Senior Recital 1
MUSIC 323, 324 Accompanying (2,2) 4
MUSIC 326, 327, 328 Repertoire (1,1,1) 3
MUSIC 280, 380, 381, 382 Conducting (1,1,1,1) 4
Ensembles 21

123

ORCHESTRAL INSTRUMENT MAJOR

Courses Credits
Music theory-history core 54
MUSAP 166 through 176, 266 through 276, 366 through 376 Private Instruction 27
MUSIC 466 through 476 (two years) Private Instruction 18
MUSIC 479 Senior Recital 1
MUSIC 140 Private Instruction: Piano or Viola, Violoncello 4
MUSIC 236 Secondary Piano 6
MUSIC 280, 380, 381, 382 Conducting (1,1,1,1) 4
Ensembles 21

131

MUSIC EDUCATION MAJOR

Courses Credits
Music theory-history core (see special inclusions below) 54
MUSIC 340 Music in General Education 6
MUSIC 432 The General Music Class (3) 4
MUSIC 440 Music in Early Childhood (3) 4
MUSIC 441 Music in Later Childhood (3) 4
MUSIC 442 Instrumental Curriculum: Methods and Materials (3) 4
MUSIC 443 Choral Curriculum: Methods and Materials (3) 4
MUSIC 280, 380, 381, 382 Conducting (1,1,1,1) 4

Major performance medium 18-24
Secondary performance medium 12-18
Performance electives 6
Ensembles (minimum of one year of choral ensemble required) 12

GENERAL MUSIC OPTIONS (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), 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); MUSIC 236 (Secondary Piano); MUSIC 237 (Class Instruction: Voice); MUSIC 240 (Guitar Techniques); and MUSIC 241 (Recorder Techniques).

INSTRUMENTAL OPTION

Music theory-history core to include:
MUSIC 334 (Band Arranging) or 490 (Orchestration)
Music education methods to include:
MUSIC 442 (Instrumental Curriculum: Methods and Materials)
Major performance medium should be an orchestral or band instrument.
The secondary or elective performance media, or both, must include the following or equivalent proficiency:
MUSIC 126 (Basic Keyboard); 137, 138, 139 (Class Instruction: Voice); MUSIC 220, 221, 222, 223, 224, 225 (String Techniques I, II); MUSIC 226, 227, 228 (Woodwind Techniques); MUSIC 229, 230, 231 (Brass Techniques); and MUSIC 232 (Percussion Techniques).
Major performance medium must total 24 credits.

CHORAL OPTION

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.
Major performance medium must total 24 credits.

Bachelor of Music Degree

The Bachelor of Music degree is intended for a limited number of specially qualified students who wish to emphasize professional training in performance within a four-year program. Required is a minimum of 180 credits, of which 60 must be taken in departments other than the School of Music. The 60 credits should include the basic proficiency requirement of the College of Arts and Sciences and (as a distribution requirement from the distribution list in this catalog) no less than 20 credits in each of two fields (humanities, social sciences, or natural sciences).

A grade-point average of 3.20 in music courses is required for graduation. All majors in this program must complete 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

Major Requirements: Music theory-history core; 50 credits in MUSAP 160, 260, 360, 460; MUSIC 379,
479; 12 credits in ensembles; 6 credits in approved music electives. Total music credits: 122.

ORGAN MAJOR

Major Requirements: Music theory-history core; 50 credits in MUSAP 165, 265, 365, 465; MUSIC 379, 479; 12 credits in ensembles; 7 credits in approved music electives. Total music credits: 123.

VIOLIN OR VIOLONCELLO MAJOR

Major Requirements: Music theory-history core; 50 credits in MUSAP 161 or 163, 261 or 263, 361 or 363, 461 or 463; MUSIC 379, 479; 12 credits in ensembles; 8 credits in approved music electives. Total music credits: 124.

VOICE MAJOR


ORCHESTRAL INSTRUMENT MAJOR

Major Requirements: Music theory-history core; 43 credits in MUSAP 166 through 176, 266 through 276, 366 through 376, 466 through 476; MUSIC 479; 21 credits in ensembles; 7 credits in approved music electives. Total music credits: 125.

COMPOSITION MAJOR

Major Requirements: Music theory-history core; 24 credits in MUSIC 191, 291, 391, 491; 12 credits in ensembles; 16 credits in vocal or instrumental instruction; 16 credits in approved music electives. Total music credits: 122.

TEACHING PROGRAMS

Information on four-year programs leading to the bachelor's degree and teacher certification at the secondary or elementary level appears in the "College of Education" section of this catalog.

HONORS PROGRAM

Bachelor's degree "With College Honors in Music" or "With Distinction in Music." The honors adviser must be consulted about requirements.

Graduate Programs

Also see "Graduate Programs and Degree Policies," page 57.

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, instrumental conducting, or 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, or 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 history, music theory, ethnomusicology, systematic musicology, music education.

Admission Requirements: Examination required for entrance to music history or music theory. 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 French, German, Italian, or 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 required for performance, instrumental conducting, and composition. Entrance to other areas by permission. Demonstration of proficiency in one language from French, German, Italian, or 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 or systematic musicology; ethnomusicology; music theory.

*Admission Requirements:* Examination required for entrance to historical musicology. Entrance to other areas by permission. Demonstration of proficiency in German and a second language from French, Italian, Latin, or other such language as is necessary for research.

*Graduation Requirements:* Three academic years of study; dissertation.

Near Eastern Languages and Literature
229B Denny

Languages presently offered are Arabic, the intellectual and literary medium of medieval Islamic culture; Hebrew, the chief language of the Old Testament; Persian, the medium for an interesting and attractive literature of great influence on Islam as a whole; Turkish, the language of the original Central Asian people who built the last great Islamic empire, the Ottoman; and the Semitic languages of Akkadian, Aramaic, and Ugaritic, important for their cultural and linguistic connections with other Near Eastern languages. Emphasis is on the ancient and medieval Near Eastern languages and literature, with some attention being paid to more recent cultural developments.

**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

Also see "Graduate Programs and Degree Policies," page 57.

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.

*Graduation Requirements:* Graduate School requirements; a written examination consisting of three papers: (1) on the general culture of the Near East; (2) in the student's field of specialization; and (3) in the student's major language, together with a reading examination in a second Near Eastern language; research paper (a seminar paper representing the student's best work); reading knowledge of French or German.

Oceanography

108 Oceanography Teaching

Oceanography is the environmental science that explains 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.

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 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**

**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 labora-
ory if in physical option; choose a principal option and two supporting options in oceanography, of which one option 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 in physical option; choose one principal option and two supporting options in oceanography, of which one option must be physical oceanography.

**Principal Options**

- Biological
  - BIOL 210, 211, 212, 472; CHEM 231, 232, or 231, 235, 236; GENET 451; OCEAN 434, 435 and at least 13 credits in upper-division biology.

- Chemical
  - CHEM 221, 231, 235, 236, 241, 242, 455, 456, 457, 460, 463; 3 credits above CHEM 402; OCEAN 421, 422, 423, 424, 444; and Q SCI 281.

- Geological (Geology)
  - CHEM 350; GEOL 205, 301, 320, 321, 340, 361; ENGR 141; OCEAN 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, 324, 325; OCEAN 450, 451, 452 or 457, and 453; PHYS 221, 222, 223, 321, 322, 323.

- Physical
  - ATM S 301; MATH 238, 327, 328, 427, 428; AA 370, 470; OCEAN 417, 418, 419; PHYS 221, 222, 223, 321, 322, 323.

**Supporting Options**

- Biological
  - BIOL 101–102; OCEAN 433, 435.

- Chemical
  - CHEM 221; OCEAN 421, 423.

- Geological
  - GEOL 205; OCEAN 405.

- Physical
  - OCEAN 401, 402 or 417, 418, 419.

**Honors Program:** Bachelor of Arts or Bachelor of Science degree "With College Honors in Oceanography" or "With Distinction in Oceanography." The honors adviser must be consulted about requirements.

**Graduate Programs**

Also see "Graduate Programs and Degree Policies," page 57.

**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 advisory committee, including one principal option, three supporting options, and other courses in science and mathematics. Departmental comprehensive written examination. The advisory committee must be consulted about language requirements. *With Thesis*—Thesis approved by the advisory committee must be presented at a seminar. *Without Thesis*—Requires an approved research activity; written or oral reports are decided upon by the advisory 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**

*301 Parrington*

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, aesthetics, political philosophy, the philosophy of religion, and the history of philosophy.

**Faculty**

David Keyt, Chairman; Boler, Burke, Clatterbaugh, Coburn, Cohen, Crocker, Dietrichson, Keyt, Kirk, Lu-
Undergraduate Programs
Bachelor of Arts Degree
Major Requirements: 50 credits in philosophy, of which at least 25 have been earned at the University of Washington. These 50 credits must include 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: Bachelor's degree “With College Honors in Philosophy” or “With Distinction in Philosophy.” The undergraduate adviser must be consulted about requirements.

Graduate Programs
Also see “Graduate Programs and Degree Policies,” page 57.

Master of Arts Degree
Admission Requirements: An undergraduate major in philosophy 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.

Graduation Requirements: Twelve courses in philosophy. 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. Instead of a thesis, the student must submit four papers distributed over three areas. The graduate program adviser must be consulted for information.

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.

PHYSICAL AND HEALTH EDUCATION
101 Hutchinson

Physical and health education involves the study of human movement, with special emphasis on the biophysical and psychosocial parameters that affect and effect movement in the realm of sport, work, play, dance, and exercise.

Faculty
W. R. Morford, Director; Abernathy (emeritus), Broer (emeritus), Buckley, Cooley, Doolittle, Fox, Horne (emeritus), Hovis, Hughes, Hutton, Ingham, Kidwell (emeritus), Landers, Lawson, MacLean (emeritus), Mathews, Miller, Mills, Morford, Peak, Purdy, Reeves (emeritus), Renick, Skinner, Smoll, Torney (emeritus), Waltz, Wilson, Woods. T. L. Doolittle, graduate program adviser.

Undergraduate Programs
Bachelor of Arts Degree
PHYSICAL EDUCATION
Human Movement Studies
For students who wish to pursue careers in research and who plan to attend graduate school. Areas of concentration are biodynamics; movement development, control and learning; sociocultural correlates of sport and human movement.

Admission Requirements: A 3.00 grade-point average at time of entry or after one year in residence after having enrolled in a minimum of three courses in the 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: PE 250, 301, 302, 325, 331, 332, and 350; ZOOL 118 and 119 or 208; B STR 301; PSYCH 100; SOC 110; area of specialization, 20 approved credits beyond the courses listed above, including at least five departmental courses at the 400 level or above in, or related to, area of specialization.

Liberal Arts Emphasis
For students who wish to pursue a broadly conceived major that is nonprofessional by design.

Major Requirements: Same specified courses as for Human Movement Studies major; 20 credits beyond the specified courses at the 300 level or above (no fewer than four courses at the 400 level or above to be in-
cluded in these credits); achievement of advanced skill level in one movement activity.

Teaching Program: Teaching major or minor in physical education. Information on requirements appears in the “College of Education” section of this catalog.

HEALTH EDUCATION
School Health Education
Major Requirements: H ED 250, 292 or current advanced first-aid certification, H ED 350, 351, 352, 353; 26 additional approved credits in health education, nutrition, public health, psychology, sociology, communications, or related cognate courses.

Community Health Education
Major Requirements: H ED 250, 292 or current advanced first-aid certification, H ED 350, 351, 353; PC EP 420, PC EH 411, PC HS 323 or 424, PC BS 472, a field experience requirement; 15 additional approved credits in health education, nutrition, psychology, sociology, communications, or related cognate courses. B STR 301, MICRO 101 or 301, PSYCH 100, SOC 110, ZOOL 118 and 119 or 208.

Teaching Program: Teaching major or minor in health education. Information on requirements appears in the “College of Education” section of this catalog.

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; background in the biological and social sciences; an undergraduate concentration in an appropriate field.

Graduation Requirements: The student, in consultation with a graduate program adviser, selects one or more of several emphases around which to design a program. Some programs may be completed in a year of full-time study by students who hold a baccalaureate degree and have a strong background, depending on the area of specialization. Two full years of study may be necessary for the students who enter with less undergraduate preparation or who hold appointments as teaching assistants. A thesis is required for the Master of Science degree.

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
Ernest M. Henley, Chairman; Adelberger, Arons, Baker, Bali, Blair, Bodansky, Boullware, Brakel (emeritus), Brown, Cahn, Clark, Cook, Cramer, Dash, Davisson, Dehmelt, Fain, Farwell, Fortson, Geballe, Gerhart, Halpern, Henderson (emeritus), Henley, Higgs (emeritus), Ingalls, Kenworthy (emeritus), Kirkpatrick, Lee, Lord, Lubatti, L. McDermott, M. McDermott, Moriyasu, Neddermeyer (emeritus), Peters, Puff, Rothenberg, Sabo, Sanderman (emeritus), Schick, Schmidt, Stern, Streib, Uehling (emeritus), Vilches, Weis, Weitkamp, Wilets, Williams, Young. D. Boulware, graduate program adviser.

Undergraduate Programs
Bachelor of Science Degree
Admission: Recommended preparation includes four units of college preparatory mathematics, one unit of physics, and one unit of chemistry.

Major Requirements: (1) Core courses. PHYS 121, 122, 123, 131, 132, 221, 222, 223, 231, 322; (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 elected from other upper-division physics courses or approved courses in cognate subjects; (5) MATH 124, 125, 126, 238, 327, 328 or MATH 134H, 135H, 136H, 234H, 235H, 236H; (6) MATH 205 or 302; (7) 9 credits selected from natural sciences other than physics and mathematics, or from history or philosophy of science, in addition to any courses in these fields taken to fulfill requirement (4). Courses taken on a CR/NC or S/NS basis are not acceptable in fulfillment of requirements (1) through (6). Grades of C 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 requirements (1) through (6), the following: PHYS 323, 324, 325, 331, 421, 422, 423, 424, 425, 426, 431, 432, 433 and MATH 427, 428, 429.

Honors Program: Bachelor’s degree “With College Honors in Physics” or “With Distinction in Physics.” The honors adviser must be consulted 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
Also see “Graduate Programs and Degree Policies,” page 57.
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 should include vector analysis, complex variables, ordinary differential equations, Fourier analysis, boundary value problems, and special functions. Advanced physics part of the Graduate Record Examination. In some cases in which the student has inadequate preparation but shows other evidence of ability in physics, admission is granted without a strong Graduate Record Examination score. In such cases, the student must pass a preliminary examination, usually during the first quarter of graduate study. Students who pass the preliminary examination with distinction (grade of A), along with those with a strong Graduate Record Examination score at admission, may proceed in a program leading to any graduate degree. Students who receive a grade of B may proceed only to the degree of Master of Science. A student who receives a grade of B or who fails the examination may repeat it only once, except by special departmental approval.

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. No thesis is required. There is no foreign-language requirement. Final examination, usually oral.

Doctor of Philosophy Degree

Graduation Requirements: Background in physics equivalent to that provided by the following sequences of basic graduate courses: PHYS 505, 506; 513, 514, 515; 517, 518, 519; 524, 525; 527, 528, 529; and 566; specialized courses appropriate to each student's interests; at least B level in all courses; no foreign-language requirement; written qualifying examination (in second year), an oral General Examination for admission to candidacy (usually in the third year), and an oral Final Examination; teaching experience is required of all Candidates.

Doctor of Arts in Teaching Degree

Graduation Requirements: The same knowledge of basic physics required for the Doctor of Philosophy degree; a broad knowledge of physics, either by work within the Department of Physics or by work at the graduate level in a related field, such as astronomy, atmospheric sciences, biophysics, chemistry, geology, or oceanography; suitable courses from history of science, philosophy of science, educational psychology, and education to develop a broad view of physics, its history and its role in society, and to gain awareness of developments in education and the theory of learning; written qualifying examination (in second year), oral General Examination for admission to candidacy in which a student is required to present a talk on a physics topic, at a level suitable for an undergraduate audience, and oral Final Examination; teaching and organization of an upper-division undergraduate laboratory course; at least two quarters of teaching internship, involving participation in organizing a course and in giving a substantial number of lectures; a dissertation, which may be based on an education project such as working up a course or developing laboratory experiments, an analysis and critique of some basic idea in physics, a review article, or the results of a modest research project.

POLITICAL SCIENCE

201 Engineering Annex

Political science is the branch of the social sciences that deals with governmental and other political institutions, relationships, and belief systems, with the significance of the latter in the operation of societies, and with efforts to think systematically and normatively concerning governmental and other political phenomena.

Faculty
Richard E. Flathman, Chairman; Bone, Brass, Calhoun, Campbell, Cassinelli, Chandler, Cole (emeritus), Dolbeare, Flathman, Gore, Gottfried, Hellman, Hill, Hitchner, Horowitz, Kroll, Lamare, Lev, Martin (emeritus), Meranto, Modelski, Mosher, Myhr, Pelowski, Reshetar, Riley, Rohn, Scheingold, Schuman, Shepro, Shipman, Townsend, Webster (emeritus); D. Hellman, graduate program adviser.

Undergraduate Programs

Bachelor of Arts Degree

Major Requirements: A minimum of 50 credits in political science, including 101 or 102. 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.

Honors Program: Bachelor's degree "With College Honors in Political Science" or "With Distinction in
Political Science. The honors adviser must be consulted about requirements.

Teaching Program: Teaching major or minor in political science. Information on requirements appears in the "College of Education" section of this catalog.

Graduate Programs
Also see "Graduate Programs and Degree Policies," page 57.

Master of Arts Degree
Admission Requirement: Completion of an undergraduate major in political science or its equivalent.

Graduation Requirements: 36 credits, of which 18 must be at the 500 level or above; an essay of distinction to be submitted and a comprehensive examination to be passed in any three of the following areas: political theory and methodology; public law; comparative government; special area studies; public administration; international relations; American government and politics; urban, state, and regional government.

Doctor of Philosophy Degree
Admission Requirement: Same as for the Master of Arts degree.

Graduation Requirements: 108 credits, of which at least 48 must be at the 500 level or above; 36 credits allowed for the dissertation; comprehensive examination, after completion of 72 credits, covering four fields. The student may choose from among the following seven areas, or, with the approval of the Supervisory Committee, prepare in one of the four fields in a related discipline: political theory and methodology; public law; comparative government and special area studies; public administration and comparative administration; international politics, international law, international organization, and foreign policy; American government, politics, and public policy; regional, state, metropolitan, and urban government. With Supervisory Committee approval, one of these areas may be used to satisfy two field requirements.

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 the 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, 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), career counseling, engineering psychology, or philosophic foundations of psychology.

Faculty

Undergraduate Programs
Bachelor of Science Degree
Intended primarily to prepare students for graduate study.

Major Requirements: 50 credits in psychology courses—PSYCH 102 (or 100 or 101), 231, 232 (or 233), 217, 218, 499, plus 10 credits each in social science psychology and in natural science psychology (listed below), and electives to total 50 credits; 35 additional credits in other disciplines, to include MATH 105, 106, 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 of Washington 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 the University of Washington. Social science psychology courses—PSYCH 205; 210, 250, 260, 305, 306, 320, 345, 361, 405, 410, 414, 442, 443, 444, 445, 446, 447, 449, 457, and 489. Natural science psychology courses—PSYCH 105, 200, 222, 355, 400, 403, 406, 407, 409, 416, 417, 418, 421,
422, 423, 424, 425, 427, 429, 430, 434, 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 distribution list in the "College of Arts and Sciences" section of this catalog.)

**Bachelor of Arts Degree**

**Major Requirements:** 50 credits in psychology courses—PSYCH 101 (or 100 or 102), 231 (or 232 or 233), 213 (or 217, 218), and electives to total 50 credits (497 recommended); MATH 106 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 the University of Washington.

**Honors Program:** Bachelor of Science or Bachelor of Arts degree "With College Honors in Psychology" or "With Distinction in Psychology." The honors adviser must be consulted 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**
Also see "Graduate Programs and Degree Policies," page 57.

**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 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. 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 experimental design (514–515); complete two of the area minimal competency requirements; complete at least 3 credits in independent predoctoral research.

**ROMANCE LANGUAGES AND LITERATURE**

_C104 Padelford_

In Romance languages and literature, students study French, Spanish, Italian, Portuguese, Catalan, Provençal, or Romanian.

**Faculty**
Marcelino C. Penuelas, Chairman; Algeo, Anderson, Bodden, Christofides, Contreras, Creore, Dale, Daniels, David, Ellrich, Field, Friedman, Friedrich, Hanzeli, Jones, Keller, Klausenburger, J. Leiner, W. Leiner, Nostrand, Pace, Penuelas, Petersen, Predmore, Saliner, Saporta, Shipley, Vargas-Baron, C. Wilson, W. Wilson (emeritus). Wortley. A. Pace, graduate program adviser.

**Undergraduate Programs**

**Bachelor of Arts Degree**

**MAJOR REQUIREMENTS**

**French:** 51 credits in courses beyond FREN 203 or 222, including 301, 302, 303; 304, 305, 306; 350, 351, 352; 403 or ROM 401; FREN 409; 12 credits in approved courses in literature or civilization, or both, at the 400 level, including at least 6 in literature (none of these 12 credits may be transfer credits or courses in translation).

**Spanish:** 45 credits in courses at the 300 and 400 levels, including SPAN 301, 302, 303; 304, 305, 306; two
courses in the 350 group; 409 or ROM 401; 15 credits, none of which may be transfer credits, of literature courses numbered 400 or higher. The undergraduate adviser for Spanish must be consulted to determine alternate ways of satisfying the 400-level requirement.

Italian: 39 credits in courses at the 300 and 400 levels, including ITAL 301, 302, 303; 6 credits of 327; 401, 404, 405, 406; 12 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; 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's degree "With College Honors in French/(Spanish),” or "With Distinction in French/(Spanish).” The honors adviser for French or Spanish may be consulted 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

Also see “Graduate Programs and Degree Policies,” page 57.

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: 36 credits, of which at least half must be in courses at the 500 level; reading knowledge of a second foreign language other than the major one; comprehensive written final examination. Master of Arts with thesis permitted upon prior approval by the departmental Graduate Studies Committee. Spanish offers option of nine additional course credits in lieu of written final examination.

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 graduate advising and admission board.

Graduation Requirements: 90 applicable course credits, of which at least 50 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.

SCANDINAVIAN LANGUAGES AND LITERATURE

C8B Padelford

The Department of Scandinavian Languages and Literature offers training in the skills of reading, speaking, and writing in Danish, Norwegian, and Swedish; study of respective literatures and cultures; linguistic study of the Scandinavian languages; courses given in English in such areas as Scandinavian culture, mythology, folklore, history, novel, drama, and film.

Faculty

Birgitta Steene, Chairman; Arestad (emeritus), Beijbom, Conroy, Flatin, Hildeman, Jarvi, Johnson (emeritus), Rossel, Sehmsdorf. 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, 381, 382, 461; DAN 101–102, 103, 220, 221, 222, 300, 301, 302, 350, 450, and 490. Norwegian major: SCAND 380, 381, 382, 461; NORW 101–102, 103, 220, 221, 222, 300, 301, 302, 450, and 490. Swedish major: SCAND 380, 381, 382, 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's degree “With College Honors in Danish/(Norwegian, Swedish)” or “With Distinction in Danish/(Norwegian, Swedish).” The honors adviser must be consulted about requirements.

Teaching Program: Teaching major or minor in Norwegian or Swedish. Information on requirements appears in the "College of Education" section of this catalog.

Graduate Programs

Also see “Graduate Programs and Degree Policies,” page 57.
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; 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 Examinations for admission to candidacy; an acceptable dissertation; a Final Examination on the dissertation.

SLAVIC LANGUAGES AND LITERATURE

111 Thomson

The Department of Slavic Languages and Literature offers instruction in the principal East European languages and literatures and in Slavic linguistics, working closely with the Institute for Comparative and Foreign Area Studies. Languages include Bulgarian, Czech, Hungarian, Polish, Romanian, Russian, and Serbo-Croatian.

Faculty

Jack V. Haney, Chairman; Augerot, Coats, Gribanovsky, Gross, Hagglund, Holdsworth, Kapetanik, Konick, Kramer, Micklesen, Novikow (emeritus), Pahn, Scherr, Swayne, Trnka, West. W. Konick, graduate program adviser.

Undergraduate Programs

Bachelor of Arts Degree

RUSSIAN OPTION

Major Requirements: RUSS 301, 302, 303, or the equivalent; RUSS 401, 402, 403, or the equivalent; RUSS 321, 322, 323; 15 credits from courses approved electives within the department; 10 credits from courses approved by the departmental adviser.

EAST EUROPEAN LANGUAGES OPTION

Major Requirements: Three years of Russian and two years of a second East European language; course work in the literatures, history, and geography of the cultures involved, and in Slavic philology; senior research project.

Honors Program: Bachelor's degree "With College Honors in Slavic Languages and Literature" or "With Distinction in Slavic Languages and Literature." The honors advisor must be consulted 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

Also see "Graduate Programs and Degree Policies," page 57.

Master of Arts Degree

Admission Requirement: Bachelor of Arts degree with major in Russian or East European languages and literatures, or equivalent background.

Graduation Requirements: Programs in Russian literature or Slavic linguistics arranged by the student with a faculty adviser. Proficiency examination in Russian and reading examination in either French or German. Thesis not required

Doctor of Philosophy Degree

Admission Requirement: Master of Arts degree with major in Russian literature or Slavic 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

B102 Padelford

The criminal justice system in our society is studied from a multidisciplinary, liberal arts, research-oriented point of view.

Ezra Stotland, Director
Undergraduate Program
Bachelor of Arts Degree

Major Requirements: Courses in the context of the criminal justice system, to include one course from each of seven lists, covering the following: anthropological and historical; philosophical, personality development, and functioning; group processes; minority groups and discrimination; public administration and politics; constitutional and legal. Core courses: five courses selected from eleven lists of courses concerned with deviance, crime, criminology, juvenile delinquency, system of justice, law, corrections, law enforcement, drugs, etc. Research courses: 15 credits in methodology and research courses or individual projects of a quantitative or non-quantitative nature. Field courses: field experience in the system of justice; and following a felony case through the system of justice. Seminar on society and justice.

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
Herbert L. Costner, Chairman; Barth, Black, Blalock, Blumstein, Bose, Burgess, Campbell, Cohen, Cook, Costner, Dodd (emeritus); Emerson, Faris (emeritus), Gross, Guest, Hargens, Haynek (emeritus), Hechter, Larsen, McCann, Miyamoto, Preston, Roberts, Roth, Schmid (emeritus), Schmitt, Schrag, Schwartz, Stark, van den Bergh, Wager. H. L. Costner, graduate program adviser.

Undergraduate Programs
Bachelor of Arts Degree

Admission Requirement: Junior standing (90 credits or more), including 10 graded credits in sociology courses taken at the University of Washington, with a grade-point average for those courses of at least 2.50.

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 of Washington.

Honors Program: Bachelor's degree "With College Honors in Sociology" or "With Distinction in Sociology." The honors adviser must be consulted about requirements.

Teaching Program: Teaching major or minor in sociology. Information on requirements appears in the "College of Education" section of this catalog.

Graduate Programs
Also see "Graduate Programs and Degree Policies," page 57.

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; and letter of recommendation.

Graduation Requirements: SOC 428–429, an advanced two-quarter statistics course, either 410 or 411, 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 (thesis), and sufficient additional credits to bring the total graduate credits to 45. In addition, the student must take the Master of Arts degree examination and present an acceptable thesis.

Doctor of Philosophy Degree

Admission Requirements: Master of Arts degree in sociology, or special permission; applicants judged on performance in relevant courses; Graduate Record Examination scores; letters of recommendation; for applicants who complete a Master of Arts degree in this department, general evaluation of graduate work including Master of Arts examination and Master of Arts thesis; and, for applicants with a Master of Arts degree from another department, applicant's statement of educational goals and plans.

Graduation Requirements: A minimum of 9 credits in approved courses in a related or supporting field. Successful completion of examinations in research methodology, in two substantive divisions, and in an analytic specialty. Additional information about examinations may be obtained from the graduate program adviser. Successful completion of a dissertation and Final Examination.

Speech
107 Parrington

The study of speech focuses upon the human communication process, especially upon the use of speech, hear-
ing, and language. A variety of teaching, research, and laboratory perspectives are applied to communication concepts within the subject areas of rhetoric and public address, speech communication science, oral interpretation of literature, speech pedagogy, speech pathology and audiology, and speech science.

Faculty
Thomas Nilsen, Chairman; Abbs, Arundale, Baskerville, Bennett, Bird (emeritus), Booth, Bosmajian, Campbell, Carlse, Carpenter, Carrell, Crowell (emeritus), D’Angelo, Douglas, Espinola, Franzke (emeritus), Hedrick, Hogan (emeritus), Klyn, Meador, Miner, Minifie, Nelson (emeritus), Nilsen, Nyquist, Palmer, Post, Prather, Prins, Rahskopf (emeritus). Reeves, Sparks, Stephenson, Stewart, Tiffany, G. Thompson, Weber, Weybright, Wilson, Yantis. B. Baskerville, graduate program adviser.

Undergraduate Programs
Bachelor of Arts Degree
Admission Requirements: Students transferring to a major in speech after entrance to the University must have a cumulative grade-point average of 2.50 in all University courses unless otherwise authorized by the department.

Major Requirements: Majors in general speech—55 approved credits, including SPCH 102, 140 (or 220), 270 (or 373), 300 (or 301 or 302), and 400, and an additional required 5 credits in area of concentration; of the 27 remaining speech elective credits, 18 must be at the 400 level; 25 of the remaining credits in upper-division speech courses, of which 15 must be at the 400 level; 2.50 grade-point average in all speech courses. Preprofessional majors in speech pathology and audiology—55 credits, including SPCH 103 (or 220), 250, 301, 302, 303, 304, 306, 330, 331, 332, 350, 371, 390, 454, and 5 credits in 351 and 391; 2.50 grade-point average in all speech courses; professional preparation for clinical work in the area of communication disorders requires completion of at least 45 credits in approved courses acceptable for a graduate degree (400 level and above).

Teaching Programs: Majors in speech education seeking state certification at the elementary or secondary teaching level and those wishing state certification as communication disorders specialists should see the program listings in the “College of Education” section of this catalog.

Graduate Programs
Also see “Graduate Programs and Degree Policies,” page 57.

Master of Arts Degree
Graduation Requirements: With Thesis—45 approved credits, including SPCH 501 (or 504 or equivalent), of which 18 must be at the 500 level or above and 9 in thesis. Without Thesis—45 approved credits, including SPCH 501 (or 504 or equivalent), including one seminar in area of specialization and 10 credits in supporting courses from closely related areas; two major seminar papers. Nonthesis program not available to majors in speech pathology and audiology.

Master of Speech Pathology and Audiology Degree
Graduation Requirements: 45 approved credits in courses at the 400 level or above, of which 23 must be at the 500 level or above; satisfaction of academic and practicum requirements for certification by the American Speech and Hearing Association; satisfactory demonstration of clinical competence in area of specialization. This is a professional degree program that is not designed to prepare the student for doctoral study.

Doctor of Philosophy Degree
The following major areas of specialization are available: rhetoric and public address, including speech communication science, oral interpretation of literature, and speech pedagogy; speech science, including phonetics, speech physiology, and speech perception; and speech pathology or audiology, including hearing science and language disorders.

WOMEN STUDIES
C14 Padelford

Women studies is an interdisciplinary program drawing on the academic resources of many departments. Students in the women studies program are asked to ground themselves in a single department offering courses relevant to women studies, and to prepare a senior thesis integrating their educational objectives and subject matter. The women studies courses are planned to foster open, rigorous 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 in which “men and women are the measure of human experience.” Students interested in a bachelor’s degree program centering on women studies should consult an adviser in C14 Padelford.

Mary Rothschild, Acting Director
ZOOLOGY
106 Kincaid

Zoology is that branch of natural science concerned primarily with the characteristics of animals, their development, structure, and function, and their relationships with their animate and inanimate environments.

Faculty

Undergraduate Programs
Bachelor of Science Degree
Major Requirements: A minimum of 50 credits, with a grade-point average of 2.00, to include BIOL 210, 211, 212, ZOOL 433, 434 (or 453–454), 456; plus 400-level lecture and laboratory courses in physiology or cell biology, or both, to total 8 credits; GENET 451, 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; 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 French, German, Japanese, Russian, Chinese, or Spanish acceptable. Approved lists of biology courses and alternatives to courses specified are available from a zoology adviser.

Bachelor of Arts Degree
Major Requirements: A minimum of 50 credits, with a grade-point average of 2.00, to include BIOL 210, 211, 212, or 101–102 with a grade of A or B, GENET 451, plus a program of upper-division courses in the major areas of biology to be selected in consultation with the zoology adviser. Additional requirements: CHEM 140, 150, 151, 231, 232; MATH 105; PHYS 114, 115, 116 recommended.

Honors Program: Bachelor of Science or Bachelor of Arts degree “With College Honors in Zoology” or “With Distinction in Zoology.” The honors adviser must be consulted about requirements.

Graduate Programs
Also see “Graduate Programs and Degree Policies,” page 57.

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 requirement; General Examination; dissertation; Final Examination. Descriptions of the current graduate programs in zoology are available 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 Arts, or Doctor of Philosophy.

Business administration became an independent unit within the University of Washington 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 certified.

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 of Washington 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, and faculty 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 executive development program, designed for upper-management personnel, focuses on self-renewal in a society that is experiencing an accelerating pace of change. The management program is designed for middle-to-upper management. 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 Annual Business Outlook Conference, the Tax Clinic for Small Business, the Entrepreneurship Symposium, Pacific Coast Banking School, and the Savings and Loan School for Executive Development. Information on the continuing education program may be obtained from the management conference coordinator, 543−4987, or the Office of Short Courses and Conferences, 543−5280.

Student Organizations
Chapters of Alpha Kappa Psi, Beta Alpha Psi, Beta Gamma Sigma, as well as the Business Student Association, Finance Club, Graduate 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 Graduate Association of Black Business Students, 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 2.00 cumulative grade-point average, including the following (or equivalents): 19 credits in natural sciences, including 5 credits in college-level mathematics and 4 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; 11 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. 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; OPSYS 301; BG&S 333; FIN 350; A ORG 440, 460; B POL 470 or 471 or 480; and a minimum of 19 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 57.) 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 2.00 in all business administration credits earned at the University of Washington.

Information on credits by examination or credits granted through the College Level Examination Program, Armed Forces Training School, or independent study may be obtained from the undergraduate office, School of Business Administration.

Double Bachelor's Degrees and Second Bachelor's 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 bachelor's degree should apply at the University of Washington Undergraduate Admissions Office. To be considered, applicants must complete by quarter of entry MATH 157 or 124, ECON 200, 201, and ACCTG 210, 220, 230, BG&S 200; Q METH 200, 201, or their equivalents. 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.

Areas of Study
Course work in various areas of study 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, 411, 421, and 6 elective credits in 400-level accounting courses, except 475, 490, and 499.

Faculty

BUSINESS, GOVERNMENT, AND SOCIETY
365 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
Joseph Monsen, Chairman; S. Brown (emeritus), Goldberg, Hart, Jamieson (emeritus), Lessinger, Marcus, Robinson, Seyfried, Strong, Teachout, Wheeler (emeritus), Wickman.

FINANCE, BUSINESS ECONOMICS, AND QUANTITATIVE METHODS
270 Mackenzie

Finance, Business Economics, and Quantitative Methods facilitates 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 economics environment within which business operates. The Finance curriculum focuses on understanding the environment of the financial manager, money and capital markets of the economy, problems and decision structure allocation of capital within the firm, and viewpoints of capital suppliers. Courses in Quantitative Methods concentrate on the mathematical and statistical tools 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
Borge O. Saxberg, Chairman; Bell, E. Brown (emeritus), Buck, Fenn, Fiedler, French, Gross, D. Henning, R. Johnson, Kast, Kienast, Knowles, Knudson, LeBreton, Meier, Mitchell, Newell, Peterson, Piehl, Rosenzweig, Schreiber, Scott, Summer, Sutermeister, Vesper, Woodworth.
MARKETING, INTERNATIONAL BUSINESS, TRANSPORTATION, AND BUSINESS COMMUNICATIONS

156 Mackenzie

Marketing provides knowledge of concepts and relationships in the areas of consumer behavior, channels of distribution, determination and measurement of markets, pricing, physical movement of goods, product development and mix, promotions, and sales administration. International Business includes trade, payments, and multinational corporate systems and activities. The area prepares students for international responsibilities in domestic business firms, governmental agencies, and overseas business. Courses in Business Communications stress the writing dimension as it relates to business; also included are theory and techniques of effective communication in interpersonal relationships. The transportation curriculum offers a carrier orientation through examination of the transportation industry, or a logistics orientation through concentration on managerial aspects of the buying of physical distribution services.

Faculty
John C. Narver, Chairman; Denman, Engle (emeritus), Etcheson, Gordon, Grathwohl, Harder, Kolde, R. Little, W. Little, MacLachlan, Miller (emeritus), Moinpour, Moxon, Murphy, Oshikawa, Spence, Spratlen, Truitt, Wagner, Wheatley.

Graduate Programs
Also see “Graduate Programs and Degree Policies,” page 57.

Associate Dean and Graduate Program Adviser
Wendell L. French
109 Mackenzie

Admission
Qualified students who are graduates of the University of Washington or of other colleges or universities of recognized rank may be admitted Summer Quarter or Autumn Quarter to graduate degree programs. Grade-point average, as well as other factors, is considered in the admission process. Students who do not meet the grade-point average requirements may be considered for admission if they can be properly accommodated, have achieved a high score on the Admission Test for Graduate Study in Business, or submit letters of recommendation or other evidence that they could succeed in graduate study. 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 early March, the Admissions Committee reviews applications for Summer Quarter and Autumn Quarter. Decisions are made at that time, and applicants receive notice of the decision soon thereafter. Those applying between March 1 and April 1 are given consideration for any remaining spaces.

Programs of Study
The Graduate School of Business Administration offers courses leading to the degrees of Master of Business Administration, Master of Arts, 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; 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 Arts, Master of Business Administration, or Doctor of Philosophy.

Two options are offered in the master's degree programs: the Master of Business Administration and the Master of Arts in the business field.

Master of Business Administration
The M.B.A. program is designed for students who have earned undergraduate degrees from accredited colleges. The nature of the 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.

Students are advised to prepare themselves in basic mathematics and in introductory computer programming, both needed for problem analysis in 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 thirty-five students starts Summer Quarter.

The master's degree programs require two years, or six quarters, of study for most students. Much of the first
year is taken up with courses that introduce students to the broad range of disciplines relevant to administration and provide them with the necessary background for more specialized study. The second year is devoted largely to elective courses selected by the student to meet particular career interests and objectives.

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.

The first-year requirements include courses in accounting, administrative theory and organizational behavior, economics, finance, marketing, operations and systems analysis, public policy, and quantitative methods. Second-year requirements include a research report; a course in business policy; and a course in business, government, and society. In addition, 24 credits in electives are required.

A variation of the first-year requirements is being introduced in 1973/74 for a two-year experimental period. Under this plan, a student may complete the first-year requirements in two quarters.

Master of Arts Degree
The M.A. program is designed for students who desire greater specialization than is possible under the M.B.A. program.

Students in the M.A. program must also complete these first-year requirements; at least 15 credits, exclusive of thesis credit, in a major field of business; 9 credits in a minor that may be taken in another department or another college or school. In addition, they must complete a thesis (9 credits).

Minor in Business Administration
Students working for a master’s degree in other colleges who elect a minor in the Graduate School of Business Administration must have as a background 15 credits in acceptable courses in business administration. The student must earn a minimum of 15 credits in approved upper-division and graduate courses in one field of business administration.

Doctor of Philosophy Degree
A requirement for consideration for admission to the doctoral program is a grade-point average of at least 3.25 during the preceding year of graduate study and submission of a score for the Admission Test for Graduate Study in Business. An applicant is required to have completed a master's degree prior to study toward the doctoral degree. 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 provide advanced study in business administration for 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. In addition, the student must show evidence of competency in business research and computer technology and a knowledge of economics and mathematics pertinent to his area.

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. Remaining requirements are completion of the doctoral dissertation and the Final Examination. 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.
Dean
Sheldon Rovin
C301 Health Sciences

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 enable him to implement that knowledge. To the School of Dentistry, the future development of the student is as critical as his professional training, and the program of instruction is designed to equip him, 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 his community and his professional obligations in responding to the oral needs of the total population. The four-year program encompasses these objectives.

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 School of Dentistry offers a four-year program of courses leading to the degree of Doctor of Dental Surgery (D.D.S.) and programs leading to the degree of Master of Science in Dentistry (M.S.D.) for students in the Graduate School. The faculty in oral biology offers a graduate program leading to the degrees of Doctor of Philosophy and Master of Science.

Also see "Graduate Programs and Degree Policies," page 57.

The four-year 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, Biochemistry, Microbiology, 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.
Admission
The School of Dentistry maintains as much flexibility as possible in predental requirements. It would be unrealistic, however, to assume that the student will be able to master the courses in the dental school curriculum without adequate preliminary preparation in predental study.

For this reason, the applicant is strongly urged to enroll in courses in general chemistry, organic chemistry, physics, zoology, and embryology. BIOC 405 (Introduction to Biochemistry) and MICRO 351 (General Microbiology) are firm predental requirements. All other requirements may be challenged by the applicant with equivalent and adequate background.

Equally important for the professional student is a background in the social sciences and the humanities. English literature, economics, sociology, psychology, physical or cultural anthropology, and philosophy are excellent scientific and humanistic studies for the predental student. The requirements in these last subjects are far more flexible than those mentioned above and may range over a practically unlimited area, because professional persons should be informed and possess a wide cultural background.

The personal attributes of applicants most sought by the admission committee are maturity, social awareness, and initiative.

Neither a prior degree nor a minimal number of predental credits is required for admission. Currently, however, students who are being accepted into the School of Dentistry have, on the average, completed more than 180 credits.

Application Procedure
Application is to be made to the American Association of Dental Schools Application Service (AADSAS) on a form obtainable in the Office of Dental Admissions. This is a central application service designed to facilitate and expedite the processing of materials for the applicant. Application materials and instructions are furnished by AADSAS. The deadline for application is November 1 of the year prior to that for which the applicant is applying.

After formal application has been made and the Committee on Dental Admissions determines that the applicant is eligible for further evaluation, the applicant receives from the Office of Dental Admissions a card acknowledging receipt of the application and a request for the following supplementary materials:

1. At least four letters of recommendation, two of which must contain personal evaluation by science instructors (one letter if forwarded by the preprofessional committee of the school), and two from business or professional persons. The School of Dentistry does not provide a form for recommendations.

2. Physician’s statement of physical examination taken within the previous twelve months.

3. Predental grade-point-average computation.

4. Autobiographical résumé.

5. A list by title and credit of those courses presently being taken and those planned for the future.

All supplementary materials should be sent to the Office of Dental Admissions, University of Washington School of Dentistry. It is the applicant’s responsibility to ensure that the transcripts are forwarded to this office at the end of each quarter or semester. Without these records it is impossible for the office to evaluate academic preparation, and scholastic achievement or to advise applicants concerning their course of study.

Processing of Applications
The dental admissions committee attempts to enroll enough qualified students from the state of Washington to comprise eighty percent of the freshman class. The remaining twenty percent of the students are enrolled mainly from other areas of the United States, with some consideration given to those states that are joined with the state of Washington in the Western Interstate Commission for Higher Education and that have no dental schools. These states are Alaska, Arizona, Hawaii, Idaho, Montana, Nevada, New Mexico, Utah, and Wyoming. To be eligible for this program, the student must be certified by his or her home state. State eligibility requirements vary, and the number of students that can be included in the program each year depends on appropriations by the legislature of each state. A student interested in this program must apply to the certifying officer in his or her home state, whose address may be obtained by writing to the Western Interstate Commission for Higher Education, P.O. Drawer P, Boulder, Colorado 80302.

After acceptance of applications ceases (November 1), each applicant is notified by mail regarding the exact status of his or her application (i.e., what material has been received and what material still must be submitted to the committee).

When the applicant’s file is completed, members of the Committee on Dental Admissions examine the credentials of the applicant and base the applicant’s acceptability on evaluation of the applicant’s preprofessional
training, evidence of scholarship, dental admission test rating, recommendations from predental instructors and character references, maturity, social awareness, motivation, initiative, goal orientation, and health. An interview is held with one or more members of the committee if the committee, as a result of reviewing the applicant's record, deems it necessary. When the entire committee meets, it reviews the completed records and makes one of three decisions. The application is accepted, rejected, or held for additional study.

The Committee on Dental Admissions prefers that all predental requirements be met before the student enters the School of Dentistry. A provisional acceptance may be given with the understanding that the predental requirements will be completed within a reasonable period. Those students taking predental education at institutions other than the University of Washington should consult with the predental committee of their schools to determine the equivalent course requirements.

The committee places strong emphasis on the applicant's predental academic performance. Included in the evaluation is the applicant's overall grade-point average, the grade-point average on the required courses, and, particularly, the courses taken and the grades earned during the most recent quarters of study.

The dental admission test is given strong consideration if the applicant scores well. The committee realizes, however, the stressful conditions under which this test is sometimes conducted, and some allowance is made for this factor.

Recommendations and suggestions by predental instructors and predental advisers are given serious consideration.

Dental Admission Test
Each predental student who applies for admission to the School of Dentistry is required to take the dental admission test given under the auspices of the Council on Dental Education of the American Dental Association. This test is given in October, January, and April at the University of Washington and other schools throughout the country. Full information about the test is sent to each applicant for admission. It is desirable that the applicant participate no later than the October testing period just prior to the November 1 application deadline date.

Personal Interview
After all material pertinent to the application has been received and reviewed, the candidates may be requested to appear for a personal interview.

Notification of Acceptance or Rejection
Each applicant is given written notice of the acceptance or rejection of the application as soon as possible after the Committee on Dental Admissions has reached a decision. Each applicant generally is informed of the committee's decision sometime prior to July 1.

Honor Code
Each student accepted by the School of Dentistry is expected to indicate his willingness to participate in the school's honor code.

Tuition Fee Deposit
When an applicant has been notified that he is accepted by the School of Dentistry, he must deposit $50 with the Comptroller of the University. This deposit is applied to the first quarter's tuition. It is refundable only in cases of withdrawal for bonne fide illness, failure to complete basic predental requirements, or induction into military service.

Promotion
At the end of each academic year the evaluation committees for each of the years of the curriculum of the School of Dentistry evaluates the accomplishments of each student during the year and determines fitness for promotion. When promotion is not recommended, the student is subject to dismissal from the school. The School of Dentistry reserves the right to dismiss any student from the school for any reason it deems sufficient. Scholastic standing is not the only requirement for promotion. Students are advanced only when their general attitude, scholastic progress, and personal attributes are considered satisfactory.

Awards and Honors
Department of Prosthodontics Award: Certificates are presented to two senior students for academic and clinical excellence in prosthodontics.

Seattle Pedodontic Society David B. Law Award: A plaque and a one-year subscription to the Journal of Dentistry for Children are presented to a senior student who has shown excellence in the management of child patients, as well as in clinical proficiency.

American Society of Dentistry for Children Award: 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 a senior student who has shown outstanding interest and achievement in clinical pedodontics.

American Academy of Oral Pathology Award: A plaque and a one-year subscription to Oral Surgery,
Oral Medicine, and Oral Pathology are awarded to a senior student who has shown the most interest, accomplishment, and promise in the field of oral pathology.

American Academy of Gold Foil Operators Award: A certificate of merit and a one-year subscription to the *Journal of the American Academy of Gold Foil Operators* are presented to a senior student who has shown outstanding qualities as a scholar and clinician in operative dentistry, with proficiency in accomplishing direct gold restorations.

American Academy of Periodontology Award: A certificate of merit and a one-year subscription to the *Journal of Periodontology* are presented to a senior student who has excelled in the field of periodontics.

American Academy of Oral Medicine Award: A certificate of merit and a copy of the *Journal of Oral Medicine* are presented to the senior student who is outstanding in the field of oral medicine.

American Student Dental Association Preventive Dentistry Award: A plaque is awarded by the American Student Dental Association to an outstanding junior dental student for his contribution to preventive dentistry.

Mosby Book Awards: These scholarship book awards are presented to five senior students who have made significant contribution to dentistry. These certificates of award will permit selection of any one Mosby Book with a catalog list price not exceeding $30.

American College of Dentists Award: The Washington–British Columbia Section of the American College of Dentists presents an award to a student selected on the basis of scholarship, a conscientious effort in achieving the goals of his dental school program, and potential for future growth in the profession.

Alpha Omega Fraternity Award: This plaque is presented by the Alpha Omega national fraternity to the senior dental student with the highest scholastic average for his or her four years of dental studies.

Omicron Kappa Upsilon Membership: Omicron Kappa Upsilon is the national dental honor society, which was established to honor students of dentistry who have distinguished themselves in terms of both scholarship and character and who possess outstanding qualifications for future professional growth. No more than twelve percent of any graduating class may be elected to membership by the faculty.

Washington State Dental Association Award: This plaque is presented to a senior student who has demonstrated character and leadership, together with high scholastic achievement, during the four-year course.

Dennis P. Duskin Inspirational Award: This award is given to a senior who has shown outstanding character, personality, and integrity throughout his or her dental education. The winner is selected by a majority of the class.

Sigma Phi Alpha Membership: Sigma Phi Alpha is a national honor society that was established to promote scholarship and to honor character among students of dental hygiene. No more than ten percent of any graduating class may be elected to membership by the faculty.

Washington State Dental Hygienist's Association Award: A plaque is presented to the 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.

Scholarships

Annual Scholarship Award: This annual gift of $250 is awarded by the Oral-B Toothbrush Division of Cooper Laboratories to a student who has completed the junior year and who is felt to be the most worthy to receive the award.

Ben and Betty Zukor Scholarships: Three awards of $225 each are presented to needy and worthy students from the undergraduate classes of the School of Dentistry.

Group Health Dental Cooperative Harry and Naomi Levine Scholarship: An award in the amount of $200 is presented to a freshman student felt to be the most deserving, based on scholastic achievement.

Washington Dental Education Foundation Scholarship: An award of $150 is presented to a sophomore student, based upon scholarship and need as well as a dedication to dentistry.

Berton E. Anderson Scholarship: An award of $100 is given to the junior student possessing the highest ideals of leadership, enthusiasm, and scholarship by the Delta Sigma Delta dental fraternity.

Randy Carr Memorial Scholarship: An award of $200 is presented to a junior student, based upon need, with emphasis on the recipient's sincerity, reliability, and enthusiasm.
Alpha Omega Scholarship: An award of $100 is presented by the Seattle Alumni Chapter of Alpha Omega national dental fraternity to a freshman dental student showing both scholarship and need.

Omicron Kappa Upsilon Scholarships: Awards of $100 each are presented by Sigma Sigma Chapter to undergraduate dental students with the highest academic standing in their respective classes.

Group Health Dental Cooperative Harry and Naomi Levine Scholarship for Dental Hygiene: An award of $100 is presented to a deserving junior student in dental hygiene.

Washington State Dental Hygienists' Association Scholarship: An award is presented to a junior dental hygiene student, based on need, academic achievement, and initiative.

Research Grants
Grants-in-aid for sponsored research and special projects in the School of Dentistry totaled approximately $974,000 during the past year. About $664,000 was received from government agencies, and $230,000 was received for training grants and contracts.

Financial Aid to Students
Additional loan fund information may be obtained through the Office of Student Financial Aid, 170 Schmitz.

Fees
Undergraduate dental students, 1973/74: residents, $280; nonresidents, $613; Summer Quarter part-time dental students, $117-$260. Graduate dental students (according to number of credits): residents, $73-$208; nonresidents, $167-$547. Summer Quarter graduate dental students, $53-$188.

Departmental 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, orthodontics, pedodontics, periodontics, and restorative dentistry. The faculty of the Department of Oral Biology offers programs leading to the degrees of Master of Science and Doctor of Philosophy.

Doctor of Dental Surgery Degree
Upon their completion of the four-year 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 with a grade-point average of at least 2.00; (4) have fulfilled all special requirements; and (5) have discharged all indebtedness to the University.

Work leading to the degrees listed below also is offered in the School of Dentistry.

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 curriculums 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 curriculum leading to the degree of Master of Science in Dentistry are given by the various clinical departments of the School of Dentistry through the Graduate School.

Certificates in Clinical Divisions of Dentistry
Programs are not administered by the Graduate School; a thesis is not required.

The school also provides professional training in the areas of basic science, for which the Bachelor of Science degree may be awarded by the College of Arts and Sciences, upon completion of the requirements for a major and approval of the department concerned.

Licensure
Admission to the practice of dentistry in any state is conditional upon the applicant's meeting the requirements of its state board of dental examiners. In the state of Washington, admission to practice is dependent upon the applicant's having a D.D.S. or a D.M.D. degree and passing the examination conducted semiannually by the State Board of Dental Examiners. The basic science examination may be waived if the candidate presents credentials showing he or she has passed parts 1 and 2 of the National Board Dental Examination.

Additional information about licensure requirements and time of examinations may be obtained from the Division of Professional Licensing, Olympia, Washington 98501.

Programs in Clinical Dental Sciences
Basic sciences in dentistry are listed in the "School of Medicine" section of this catalog under the departments...
of Biochemistry, Biological Structure, Microbiology, Pathology, Pharmacology, and Physiology and Biophysics.

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, Chairman; Anderson, Guild, Hall, Sharp, Weinstein.

ENDODONTICS

The Department of Endodontics provides training in the diagnosis and treatment of disease of the pulps of teeth. In addition to the courses for undergraduate dental students, the department offers graduate study for students in the Graduate School working toward the degree of Master of Science in Dentistry. The department also offers a course of study leading to a Certificate of Specialty Training in Endodontics.

Faculty
Eugene Natkin, Chairman; Harrington, Mandel, Standifer, 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.

Faculty
Murray Robinovitch, Acting Chairman; Enwonwu, Gordon, Izutsu, Keller, Middaugh, Morgan, Ross, Siegel, Sreebny, Stiefel, 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 graduate study for students in the Graduate School working toward the degree of Master of Science in Dentistry with a specialization in oral medicine.

Faculty
Edmond L. True Love, Chairman; Patten, Rovin, Severson, Soltero, Sommers.

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. The department also gives graduate and undergraduate dental students instruction and experience in all phases of dental pain control. This 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 of Dentistry. In addition to the courses for undergraduate dental students, the department offers graduate study for students in the Graduate School working toward the degree of Master of Science in Dentistry with a specialization in oral surgery.

Faculty
James R. Hooley, Chairman; Bloomquist, Gehrig, Gordon, Pederson, Tolas, Topping, West.

PAIN CONTROL

The Division of Pain Control is concerned with providing graduate and undergraduate dental students with instruction and experience in all phases of dental pain control. This 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 of Dentistry.

Director
Dale S. Bloomquist

ORTHODONTICS

The objective of orthodontics is the prevention and correction of malocclusion of the teeth. In addition to the courses for undergraduate dental students, the De-
DEPARTMENT OF ORTHODONTICS offers graduate study for students in the Graduate School working toward the degree of Master of Science in Dentistry with a specialization in orthodontics.

Faculty
Richard A. Riedel, Chairman; Cohen, D'Anna, Joon-deph, Keller, McNeill, Moffett, Moore, Newell.

PEDODONTICS

The objective of the Department of Pedodontics is to provide the student with a broad understanding of the growth and development of the child and the principles of preventive dentistry, plus a working knowledge of the skills necessary for the maintenance of optimal dental health. In addition to the courses for undergraduate dental students, the Department of Pedodontics offers graduate study for students in the Graduate School working toward the degree of Master of Science in Dentistry with a specialization in pedodontics.

Faculty
John Peterson, Chairman; Davis, Domoto, 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 and training in periodontics at the certificate and advanced degree levels.

Faculty
William Ammons, Chairman; Campbell, Dale, Decker, Drennan, Erickson, Goldman, Haghund, Heins, Levine, Ogilvie, Page, Schluger, Selipsky, Stern.

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 undergraduate dental students, the Department of Prosthodontics offers a twenty-one-month specialization program for students in the Graduate School working toward the degree of Master of Science in Dentistry. The department also offers a course of study leading to a Certificate of Achievement.

Faculty
Charles L. Bolender, Chairman; Beder, Frank, Hill, Lord, Lowe, Lukens, Palmer, Smith, Swoope, Toolson.

RESTORATIVE DENTISTRY

The Department of Restorative Dentistry is concerned with the restoration or replacement of tooth structure lost through disease or trauma and, consequently, it is involved in the study of the form and function of the masticatory structures.

Faculty
Kenneth Morrison, Chairman; Canfield, Halpin, Hamilton, Hodson, Jacobson, Johnson, Moller, Murdock, Nicholls, Ostlund, Powell, Robson, Smith, Stibbs, Strand, Teel, Warnick, Weaver, Willey, Wilts, Yuodelis.

CONJOINT COURSES

Conjoint courses are offered cooperatively by departments in the School of Dentistry. They are designed to integrate clinical training in two or more fields.

DENTAL HYGIENE

The curriculum of the Department of Dental Hygiene offers a professional program leading to the baccalaureate degree. The Bachelor of Science degree, with a major in dental hygiene, requires two academic years of pre-dental hygiene courses followed by two additional years of enrollment in the dental hygiene program.

The undergraduate 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 undergraduates the opportunity to gain experience in assuming positions as clinical dental hygienists, auxiliary program educators, community services program administrators, or research assistants. A ladder approach for admission to dental school is provided.

The preventive, educational, and clinical skills include plaque control; patient education and communication.
techniques; techniques for prevention of dental caries; removal of soft and hard deposits from root surfaces in association with 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 hygiene student will understand the role of dentistry in the health care of society and that the profession's first obligation is to the public.

Faculty

Basic Curriculum
The College of Arts and Sciences offers a pre—dental hygiene program, particulars of which may be found in the section of this catalog dealing with the College of Arts and Sciences. Students transferring into this program from other institutions should consult the "Description of Courses" section of this catalog, compare the courses listed with those given in their schools, and seek the advice of the Director of Admissions for course equivalents. Because the number of students admitted to the program is restricted, early communication with the department is urged.

Pre—Dental Hygiene Education
Admission to the two-year dental hygiene program requires the completion of the courses listed below. Because many courses are taken with dental students, the same prerequisites are stipulated.

MATH 105 or equivalent, 5 credits; CHEM 140, 150, 151, 160 (general), 14 credits; CHEM 231, 232 (organic), 6 credits; BIOL 101—102, 211 or BIOL 210, 211, 212, 15 credits; PSYCH 100 or 101, 5 credits; SOC 110, 5 credits; SPCH 103, 5 credits; ZOOL 456, 5 credits; plus electives to complete 90 quarter credits.

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. Formal application form, as provided by the Department of Dental Hygiene.
2. Official transcripts of high school and college records (provided directly from the registrar's office at each institution in which the pre—dental hygiene education was obtained).
3. A plan for completion of the requirements. (The applicant must provide additional transcripts to show courses completed during each quarter subsequent to the submission of the application.)
4. Two letters of recommendation.

The Committee of Dental Hygiene Admissions examines the credentials of each applicant and bases its decision on an objective evaluation of preprofessional education and scholastic records and residential status, as well as an evaluation of personal characteristics as determined by interview. Candidates are given written notice of the status of their applications.

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. A total of 180 credits is required for graduation.

Baccalaureate Curriculum for Certificate Dental Hygienists
The baccalaureate curriculum for certificate dental hygienists provides certified dental hygienists the opportunity to complete the baccalaureate program and to broaden clinical education with courses in liberal arts, humanities, and basic sciences. A minimum of 10 credits in the Department of Dental Hygiene and the completion of one advanced course in clinical techniques also are required. Persons who enter the curriculum must have a valid license to practice dental hygiene.

Master of Education Degree
A master's degree program in education in the field of higher education is available in the Graduate School. This program allows for specialization in dental hygiene teaching. Additional information may be obtained from the University of Washington, College of Education, Department of Higher Education. Some W. K. Kellogg Foundation traineeships are available.

CONTINUING DENTAL EDUCATION
Continuing dental education is offered to provide dentists, auxiliary personnel, and others involved in health care with current scientific knowledge and methodology
of patient treatment. A number of short, intensive courses are available. These courses originate from local, national, and international sources to provide this service. A broad spectrum of interests is represented, and curriculum is dictated by current needs of the health professions. A list of forthcoming courses may be obtained from the office of the Director.

Director
Thompson M. Lewis

GRADUATE PROGRAMS

Also see "Graduate Programs and Degree Policies," page 57.

Associate Dean and Graduate Program Adviser
Saul Schluger

Master of Science in Dentistry Degree

The School of Dentistry offers programs leading to the degree of Master of Science in Dentistry with specialization in endodontics, oral medicine, oral surgery, orthodontics, pedodontics, periodontics, prosthodontics, or restorative dentistry. The Department of Oral Biology also offers programs leading to the degrees of Master of Science and Doctor of Philosophy.

Application Procedure

Applications are received and processed throughout the school year from applicants desiring to work for a Master of Science in Dentistry degree with a specialization in any one of the fields previously listed. Applications for admission to the graduate dental curriculum must be submitted with all necessary credentials to Graduate Dental Education on or before December 1 for consideration for entrance in the following Autumn Quarter. This application deadline is not consistent with other University application deadlines, and it applies to all students seeking admission to graduate study in dentistry. Applicants must observe this deadline in order to ensure prompt attention to credentials and prompt replies to correspondence.

Admission

An applicant may be admitted to the Graduate School to undertake work leading to a Master of Science in Dentistry degree, provided that he or she meets the admission requirements of the University of Washington Graduate School and is a graduate of a dental school approved by the Council on Dental Education of the American Dental Association or of a university dental school located outside of the North American continent whose curriculum and admission requirements are similar to those of the University of Washington School of Dentistry.

An applicant's acceptance as a student must be approved by the Graduate Admissions Committee of the School of Dentistry. Such approval is based upon the availability of places in the various classes. The capacity number of students for each specialization commencing Autumn Quarter is as follows: four in endodontics, two in oral biology, three in oral medicine, three in oral surgery, eleven in orthodontics, three in pedodontics, eight in periodontics, two in prosthodontics, and two in restorative dentistry. Applicants selected by the Graduate Admissions Committee in Dentistry are recommended to the Dean of the Graduate School for admission to the Graduate School.

Residence

A minimum of seven consecutive quarters, or twenty-one months, of residence is required for the Master of Science in Dentistry degree in the fields of oral biology, orthodontics, pedodontics, prosthodontics; eight quarters, or twenty-four months, in endodontics, oral medicine, periodontics, or restorative dentistry; and four quarters, or twelve months, of residence for oral surgery, plus a two-year hospital residence. A foreign language is not required. New students for graduate training in periodontics are accepted on the basis of a dual program consisting of certificate (residency) training in the clinical disciplines, with progression parallel to the standard master's or doctoral program in the basic science choice of the student. Such students must be admitted to the Graduate School and must meet the requirements for the master's or doctoral degree in the basic science field.

Programs of Study

The programs of study 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 that permits the successful practice of their chosen specialty. Emphasis is placed upon the basic principles of diagnosis and treatment, knowledge of which represents 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 basic science research in the specialties on a graduate level in preparation for possible careers in either teaching or research. The research may be undertaken in the field of specialization or in cooperation with other departments. The opportunity for collaborative research is excellent, due to the proximity of the other colleges and departments to the University.
Class Schedules

The graduate programs of the School of Dentistry operate on the quarter system of the University. The academic school year has three eleven-week quarters.

In order for the graduate dental programs to be continuous, the Summer Quarter also has been made an eleven-week quarter, equivalent in length to the other quarters of the school year.

Postdoctoral Training

Requirements for admission to the postdoctoral training programs of study for certificates in the various major clinical fields are similar to those for admission to graduate study for the master's degree. The postdoctoral student is required to maintain the same academic standards as the graduate student.

These programs are not administered by the Graduate School, and a thesis is not required. The course content may vary somewhat from the graduate program, depending upon the department in which the program is taken.

Following the successful completion of the prescribed courses by the postdoctoral student during the required residency, a certificate in endodontics, oral medicine, orthodontics, pedodontics, periodontics, or restorative dentistry is granted by the School of Dentistry. The fees each quarter are the same as for graduate training, and the residency requirements remain the same. Additional information may be obtained from the University of Washington School of Dentistry, Associate Dean, Graduate Dental Education.

Master of Science Degree

A program leading to the Master of Science degree is offered by the faculty in oral biology. The admission requirements for this degree program are a Bachelor of Science or higher academic degree and a minimum of seven quarters in residence. The purpose of this program is to train qualified teachers and investigators in the clinical and basic science disciplines. The program is designed to accommodate the interests and abilities of individual students.

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, in research institutes, in hospitals, and in 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 conducting of biomedical investigations from a number of approaches, including morphological, ultrastructural, biochemical, and physiological. Students who intend to work toward a Doctor of Philosophy degree must meet the requirements of the Graduate School as outlined in the "Graduate Study" section of this catalog.
Dean
Frederic T. Giles
210 Miller

Associate Dean
Roger G. Olstad
210 Miller

Assistant Dean
Homer Boroughs, Jr.
200 Miller

Faculty

Faculty From Affiliate Departments and Schools
Dunnell, Spain (Anthropology); Koenig, Moseley (Art); Miller, Shapiro (Asian Languages and Literature); Halperin, Kruckeberg (Botany); Farner, Olsen (Zoology); Gregory, Ritter (Chemistry); Edmondson, Grummel (Classics); Edelstein, Godfrey (Communications); Crider, Siks (Drama); Parks, Worcester (Economics); Irmscher, Stevick (English); Kakiuchi, Morrill (Geography); Coombs, Whetten (Geology); Galt, Rey (Germanic Languages and Literature); Pressly, Treadgold (History); Granberg, Johnson (Home Economics); Ellison, Legters (Institute for Comparative and Foreign Area Studies); Ahlers, Benne (Librarianship); Cooper, Moore (Music); Fox, Morford (Physical and Health Education); Henley, McDermott (Physics); Flathman, Gottfried (Political Science); Hunt, Lumsdaine (Psychology); Friedrich, Penuelas (Romance Languages and Literature); Augerot, Haney (Slavic Languages and Literature); Burgess, Costner (Sociology); Nilsen (Speech).

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 the understanding of growth and development in children, youth,
and adults; (4) to develop the 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 promote and foster research and advanced study in the several branches of the field of education for which postbaccalaureate work is appropriate; (6) 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 arrangement with the public schools in the greater Seattle area.

The College of Education maintains a close liaison with public schools, both in the Seattle area and throughout the state. In cooperation with the State Department of Public Instruction and school districts in all parts of the state, the college carries out the training program for the Standard Certificate.

The College also maintains special programs for observation, research, and practice in the schools of the Seattle area and other districts. The teaching practicum provides every person who seeks a teaching certificate with an opportunity to develop and demonstrate competence by working with master teachers.

Bureau of School Service
Through the Bureau of School Service, the college and the University provide a wide variety of professional services to the schools and communities of the state of Washington.

Robert A. Anderson, Director

Accreditation
The Teacher Education 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.

College Facilities and Services
The College of Education Record is published four times a year. In addition to book reviews, education news notes, and occasional college announcements, the journal contains articles on a variety of subjects for teachers and administrators. Bulletins on the graduate degree programs and the training of teachers keep students and educators acquainted with changes in these areas.

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 a necessity in educational job seeking, may be established and permanently maintained. Information concerning job openings, writing 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 $5 fee is charged for creation of a permanent placement file.

Student Activities
Any college student who is preparing to teach may become a member of the Student Education Association by joining the college chapter. Campus meetings are held on a regular schedule. In addition, the association has four regional meetings a year and a state convention in the spring.

Phi Delta Kappa, for men, and Pi Lambda Theta, for women, are national professional organizations for education students. Upper-division and graduate students who maintain high scholarship and show outstanding professional promise may be invited to join one of these organizations.

UNDERGRADUATE PROGRAMS

Advisory Office
207 Miller

Rufus C. Salyer
Director
Advisory Services

Jane Watt
Assistant to the Director

Admission to the College of Education
Admission to the College of Education is dependent upon eligibility for admission, enrollment, and registration at the University of Washington.

A minimum of 90 approved credits is required of applicants for admission to the College of Education. Admission to the college does not guarantee admission to the Teacher Education Program (see section on "Admission to the Teacher Education Program").

Students transferring from other colleges and schools within the University must already have been admitted to the Teacher Education Program (see section on "Admission to the Teacher Education Program").
Bachelor of Arts
Students working toward the Bachelor of Arts degree in the College of Education must meet certain general requirements of the University and the college as well as the particular requirements of their major and minor departments.

To qualify for the Bachelor of Arts degree, students in the College of Education, in addition to meeting University requirements, must fulfill basic proficiency requirements, a distribution requirement, a major and minor requirement, and a certification requirement.

Basic Proficiencies
All incoming students whose high school program included three units (years) of college preparatory mathematics, three units (years) of a single foreign language, and four units (years) of English will be considered to have satisfied the basic proficiency requirements. Students who do not satisfy the requirements in this way are required during the first year in residence to complete 15 credits normally selected from the most appropriate courses in English composition, foreign language, or mathematics. Incoming students with 90 or more acceptable transfer credits, and students who have fulfilled the general education requirements of other accredited colleges or universities, will be considered to have satisfied the basic proficiency requirements. Courses taken to satisfy the basic proficiency requirements normally will not be accepted in satisfaction of the distribution requirement.

Distribution Requirement
For the purposes of general education, a listing of appropriate courses has been divided into three large fields of knowledge: the humanities, the social sciences, and the natural sciences. Each student must select courses to total at least 60 credits, distributed so that no fewer than 20 credits are in any one of the three basic areas. In meeting the distribution requirement, no more than 20 credits of the total shall be taken from any one department.

For courses available, refer to the distribution list at the beginning of the "College of Arts and Sciences" section of this catalog.

Major and Minor Requirements
For graduation, the College of Education requires the satisfactory completion of an approved major and minor. Students electing an elementary school teaching emphasis will complete a minor in elementary education. In certain instances, a major and a minor may be taken in different aspects of the same field, but only where such a procedure is clearly appropriate to preparation for teaching. Major and minor departmental requirements are indicated under "Major and Minor Programs in Education."

TEACHER CERTIFICATION
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 pattern established by the board. The Provisional Certificate, the initial teaching certificate, and the Standard Certificate are available through the University of Washington.

The Provisional Certificate is a temporary teaching certificate that is valid for a three-year period and is renewable once for an additional three-year period. Completion of 12 approved quarter credits and a minimum of one year of successful teaching are necessary for renewal of the certificate for the second three-year period. For those who have not taught during the first three-year period, the Provisional Certificate may be renewed upon application to the State Department of Public Instruction in Olympia. The certificate will show the subject areas of competence, as well as the level(s) on which the holder is prepared to teach. Beginning teachers are assigned in accordance with their stipulated competencies. Noncitizens should consult with an education adviser concerning State Board of Education regulations relating to the certification of noncitizens.

The Standard Certificate requirements must be completed during the six-year period of the Provisional Certificate. The Standard Certificate is valid as long as the holder teaches and for five years thereafter.

All persons seeking certification at the University of Washington must be admitted to the Teacher Education Program. Requirements for teaching certificates shall be those prescribed by the College of Education at the time the certificate is to be granted.

Information on out-of-state transfers and emergency and special certificates can be obtained from the State Department of Public Instruction in Olympia.

Each of the following certificate patterns provides the student a program that is consonant with the requirements of the State Board of Education. Students who can demonstrate equivalent competence in any of the stipulated areas, as indicated by previous course work or by the successful completion of advanced credit examinations, may petition through the advisory office in the College of Education for appropriate waivers. Courses in professional education completed eleven or
more years before admission or readmission are not applicable. Such courses may be re-established by examination.

Field practicums required of all students include introductory classroom observation, participation, and directed classroom teaching. In addition, elective field experiences in classroom teaching and in community service are available. To provide sufficient time for arranging individual practicum assignments, students must pre-enroll in all field experience courses. Complete information about these courses and their application deadlines may be obtained from the Director of Field Experiences, 200 Miller.

Students are urged to participate in a “September Experience” program. Complete information also is available from the Director of Field Experiences, 200 Miller.

Admission to the Teacher Education Program (Provisional Certification)

Decisions on admission to the Teacher Education Program will be based upon general criteria common to all pre-education students and specific criteria determined by screening committees representing the eight field committees of the College of Education.

General Criteria
Good standing in the University.

Physical and mental health giving promise of success in teaching.

Availability of faculty and physical resources and space in existing teacher education patterns.

Specific Criteria
These criteria are determined by the following field committees of the College of Education: natural sciences and mathematics, social sciences, foreign languages, language arts, the arts, applied arts, primary education, and upper elementary and middle school.

Provisional Certificate
The College of Education offers six patterns at the elementary school level, leading to the Provisional Certificate. (1) Early Childhood (prekindergarten and primary levels); (2) General (standard) Elementary (kindergarten, primary, intermediate, middle school levels); (3) Communication Disorders; (4) Indian Education; (5) Inner City (Seattle); (6) Special Education. Also offered are elementary specialist programs in art and music.

In addition, the general (standard) elementary pattern is available in a field-oriented, three-quarter block in the Northshore, Seattle, and Shoreline school districts. The college also offers at the secondary level one general (standard) pattern, which is available in a field-oriented two-quarter block in the same districts. Complete information is available at the advisory office, 207 Miller, or the Office of Field Experiences, 200 Miller.

The Provisional Certificate is awarded upon demonstration of such general scholarship and such evidence of physical and mental health as give promise of success, and upon completion of (1) a bachelor's degree program; (2) an authorized major; (3) an authorized minor, on elementary level only or, where required, on secondary level; (4) an appropriate professional education sequence; and (5) an approved teaching practicum. Formal admission to any phase of the Teacher Education Program is required.

Professional Education Sequence (A)
Designed for the General (Standard) Elementary Education Minor, Elementary School Communication Disorders Minor, Elementary School Indian Education Minor, Elementary School or Middle School Inner City Minor, Special Education Minor (Elementary Emphasis).

Admission to any professional course in this sequence requires prior admission to the Teacher Education Program.

<table>
<thead>
<tr>
<th>Courses</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPCH 103*</td>
<td>Basic Principles of Oral Communication (5) or</td>
</tr>
<tr>
<td>SPCH 203*</td>
<td>Principles of Oral Communication (3)</td>
</tr>
<tr>
<td>EDPSY 304</td>
<td>Educational Psychology</td>
</tr>
<tr>
<td>EDPSY 308</td>
<td>Evaluation in Education</td>
</tr>
<tr>
<td>EDUC 402 or 403</td>
<td>Practicum in Classroom Teaching and</td>
</tr>
<tr>
<td></td>
<td>Management: Early Childhood, Kindergarten,</td>
</tr>
<tr>
<td></td>
<td>Primary, or Practicum in Classroom Teaching</td>
</tr>
<tr>
<td></td>
<td>and Management: Intermediate Grades, Middle</td>
</tr>
<tr>
<td></td>
<td>School. Prerequisites, EDPSY 304, EDPSY 308,</td>
</tr>
<tr>
<td></td>
<td>School: Prerequisites, EDPSY 304, EDPSY 308,</td>
</tr>
<tr>
<td></td>
<td>the speech requirement, completion of</td>
</tr>
<tr>
<td></td>
<td>required portion of the elementary education</td>
</tr>
<tr>
<td></td>
<td>minor, 2.00 minimum grade-point average in</td>
</tr>
<tr>
<td></td>
<td>professional education, 120 credits, and</td>
</tr>
<tr>
<td></td>
<td>permission.</td>
</tr>
<tr>
<td>EDEPS 479</td>
<td>Crucial Issues in Education (graduate students</td>
</tr>
<tr>
<td></td>
<td>should, and, by permission of the instructor</td>
</tr>
<tr>
<td></td>
<td>post-baccalaureate students may elect one of</td>
</tr>
<tr>
<td></td>
<td>the following: EDEPS 501, 502, 503, 504)</td>
</tr>
<tr>
<td>HSTAA 432***</td>
<td>History of Washington and the Pacific</td>
</tr>
<tr>
<td></td>
<td>Northwest</td>
</tr>
</tbody>
</table>

29-39

* Students who have completed one or more semesters of speech (principles, theory, and proficiency) in high school may petition for an examination that, if passed, may be substituted for the speech requirement without academic credit. Address all questions to the College of Education advisory office.

** 24 credits for the Inner City Minor.

*** Required of intermediate grade teachers only. May be taken during the fifth year but must be completed before standard certification.
Professional Education Sequence (B)

Designed for the Early Childhood Education Minor (prekindergarten and primary grades).

Admission to any professional education course in this sequence requires prior admission to the Teacher Education Program

TRACK I EMPHASIS: PRE-KINDERGARTEN LEVEL

<table>
<thead>
<tr>
<th>Courses</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPCH 103*</td>
<td></td>
</tr>
<tr>
<td>SPCH 203*</td>
<td></td>
</tr>
<tr>
<td>EDUC 304</td>
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</tr>
<tr>
<td>EDPSY 308</td>
<td></td>
</tr>
<tr>
<td>EDUC 402</td>
<td></td>
</tr>
<tr>
<td>EDPSY 479</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Courses</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Basic Principles of Oral Communication (5) or Principles of Oral Communication (3)</td>
<td>3 or 5</td>
</tr>
<tr>
<td>Educational Psychology</td>
<td>5</td>
</tr>
<tr>
<td>Evaluation in Education</td>
<td>3</td>
</tr>
<tr>
<td>Practicum in Classroom Teaching and Management: Early Childhood, Kindergarten, or Primary</td>
<td>9</td>
</tr>
<tr>
<td>Crucial Issues in Education (graduate students should, and, by permission of the instructor post-baccalaureate students may, elect one of the following: EDPSY 501, 502, 503, 504)</td>
<td>3</td>
</tr>
</tbody>
</table>

29-34

TRACK II EMPHASIS: PRIMARY LEVEL, K–3

<table>
<thead>
<tr>
<th>Courses</th>
<th>Credits</th>
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</thead>
<tbody>
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<td>SPCH 103*</td>
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<tr>
<td>SPCH 203*</td>
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<td>EDUC 304</td>
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<td>EDPSY 308</td>
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<tr>
<td>EDUC 302</td>
<td></td>
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<tr>
<td>EDUC 402</td>
<td></td>
</tr>
<tr>
<td>EDPSY 479</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Courses</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Basic Principles of Oral Communication (5) or Principles of Oral Communication (3)</td>
<td>3 or 5</td>
</tr>
<tr>
<td>Educational Psychology</td>
<td>5</td>
</tr>
<tr>
<td>Evaluation in Education</td>
<td>3</td>
</tr>
<tr>
<td>Practicum in Classroom Teaching and Management: Early Childhood, Kindergarten, or Primary</td>
<td>9</td>
</tr>
<tr>
<td>Crucial Issues in Education (graduate students should, and, by permission of the instructor post-baccalaureate students may, elect one of the following: EDPSY 501, 502, 503, 504)</td>
<td>3</td>
</tr>
</tbody>
</table>

32-37

* Students having completed one or more semesters of speech (principles, theory, and proficiency) in high school may petition for an examination that, if passed, may be substituted for the speech requirement without academic credit. Address all questions to the College of Education advisory office.

PROFESSIONAL MINOR PROGRAMS IN EDUCATION

Early Childhood Education Minor

(Requirements are 36–50 credits for Track I and 33–47 credits for Track II for Provisional Certificate.)

<table>
<thead>
<tr>
<th>Courses</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>EDPSY 400</td>
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</table>

<table>
<thead>
<tr>
<th>Courses</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Developmental Foundations of Early Learning</td>
<td>3</td>
</tr>
</tbody>
</table>

EDC&I 347 Modern Theories and Practices in Early Childhood Education

GEOG 100 Introduction to Geography

EDC&I 348 Language Arts and Social Studies in Early Education

MATH 170 Theory of Arithmetic

EDC&I 349 Mathematics and Science in Early Childhood Education

Prerequisites, EDPSY 304 and MATH 170

EDC&I 350** Program Planning in Early Childhood Education

Applicable to Track I students only. To be taken concurrently with EDC&I 402, 9 credits.

Prerequisites, EDPSY 304, EDPSY 308, the speech requirement, completion of required portion of the Early Childhood Education Minor, 2.00 minimum grade-point average in professional education, 120 credits, and permission

EDC&I 360 Reading in the Elementary School. Prerequisite, EDPSY 304

EDUC 301 Introduction to the Elementary School. Activity. Prerequisite, EDPSY 304

ART 100* Introduction to Art

EDC&I 342* Art in the Elementary School.

MUSIC 119* Music Fundamentals

EDC&I 346* Music in Preschool and Primary Grade Classrooms. Prerequisites, EDPSY 304 and MUSIC 119

EDC&I 321* Health in the Elementary School. Prerequisite, EDPSY 304

EDC&I 324* Physical Education in the Elementary School. Prerequisite, EDPSY 304

* Students are normally expected to complete all of the requirements for the Early Childhood Education Minor prior to receiving the Provisional Certificate. One of the starred courses must be included prior to the teaching practicum and for the Provisional Certificate. With the approval of the College of Education advisory office, the others may be deferred until the fifth year (Standard Certificate Program).

EDC&I 350** Program Planning in Early Childhood Education (a fifth-year [Standard Certificate] requirement for Track II students).

General Elementary Education Minor

(Requirements are 30–44 credits for Provisional Certificate.)

<table>
<thead>
<tr>
<th>Courses</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>EDC&amp;I 355</td>
<td></td>
</tr>
<tr>
<td>EDC&amp;I 360</td>
<td></td>
</tr>
<tr>
<td>GEOG 100</td>
<td></td>
</tr>
<tr>
<td>EDC&amp;I 365</td>
<td></td>
</tr>
<tr>
<td>EDC&amp;I 370</td>
<td></td>
</tr>
<tr>
<td>MATH 170</td>
<td></td>
</tr>
<tr>
<td>EDC&amp;I 375</td>
<td></td>
</tr>
<tr>
<td>ART 100*</td>
<td></td>
</tr>
<tr>
<td>EDC&amp;I 342*</td>
<td></td>
</tr>
<tr>
<td>MUSIC 119*</td>
<td></td>
</tr>
<tr>
<td>EDC&amp;I 343*</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Courses</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Language Arts in the Elementary School</td>
<td>3</td>
</tr>
<tr>
<td>Prerequisite, EDPSY 304</td>
<td>3</td>
</tr>
<tr>
<td>Reading in the Elementary School. Prerequisite, EDPSY 304</td>
<td>3</td>
</tr>
<tr>
<td>Introduction to Geography</td>
<td>5</td>
</tr>
<tr>
<td>Social Studies in the Elementary School. Prerequisites, EDPSY 304 and GEOG 100</td>
<td>3</td>
</tr>
<tr>
<td>Science in the Elementary School. Prerequisite, EDPSY 304. In addition, a minimum of 5 credits is required in a science course to be selected from the following list (select one): ATM S 101; BIOL 101-102 (10 credits), or 104; BOT 113, 220; CHEM 100, 101; GEOL 101; OCEAN 101; PHYS 101-102, 110, 111; ZOOL 118</td>
<td>3</td>
</tr>
<tr>
<td>Theory of Arithmetic</td>
<td>3</td>
</tr>
<tr>
<td>Mathematics in the Elementary School. Prerequisites, EDPSY 304 and MATH 170</td>
<td>3</td>
</tr>
<tr>
<td>Art in the Elementary School. Prerequisites, EDPSY 304 and ART 100</td>
<td>3</td>
</tr>
<tr>
<td>Music Fundamentals</td>
<td>2</td>
</tr>
<tr>
<td>Music in the Elementary School. Intermediate Grades (3)</td>
<td>2</td>
</tr>
</tbody>
</table>
**EDC&I 346**  Music in Preschool and Primary Grade Classrooms (3). Prerequisites, EDPSY 304 and MUSIC 119 .................................................. 3

**EDC&I 321**  Health in the Elementary School. Prerequisite, EDPSY 304 .................................. 2

**EDC&I 324**  Physical Education in the Elementary School. Prerequisite, EDPSY 304 ......................... 3

*Students are normally expected to complete all of the requirements for the Elementary Education Minor prior to provisional certification. One of the starred courses must be included prior to the teaching practicum and for the Provisional Certificate. With the approval of the College of Education advisory office, the others may be deferred until the fifth year (Standard Certificate Program).

**SPCH 432**  Introduction to Speech and Language Disorders. Prerequisite, SPCH 250 ..... 5

---

**EDC&I 360**  Reading in the Elementary School .................................................. 3

**EDC&I 355**  Language Arts in the Elementary School .................................................. 3

**EDC&I 370**  Science in the Elementary School .................................................. 3

**EDC&I 375**  Mathematics in the Elementary School .................................................. 3

**GEOG 100**  Introduction to Geography .................................................. 2

**EDC&I 464**  The Indian Child and His Education .................................................. 5

**EDPSY 447**  Principles of Guidance .................................................. 3

---

**EDC&I 321**  Health in the Elementary School .................................................. 2

**EDC&I 365**  Social Studies in the Elementary School .................................................. 2

---

**SPCH 451**  Speech Pathology—Audiology Practicum in the Schools. Prerequisites, SPCH 350 and permission 1-2

---

**Elementary School Communication Disorders Minor**

(Requirements are 30 credits for Provisional Certificate.)

**Courses**

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>EDC&amp;I 360</td>
<td>Reading in the Elementary School</td>
</tr>
<tr>
<td>EDC&amp;I 355</td>
<td>Language Arts in the Elementary School</td>
</tr>
<tr>
<td>EDC&amp;I 370</td>
<td>Science in the Elementary School</td>
</tr>
<tr>
<td>EDC&amp;I 375</td>
<td>Mathematics in the Elementary School</td>
</tr>
<tr>
<td>GEOG 100</td>
<td>Introduction to Geography</td>
</tr>
<tr>
<td>EDC&amp;I 464</td>
<td>The Indian Child and His Education</td>
</tr>
<tr>
<td>EDPSY 447</td>
<td>Principles of Guidance</td>
</tr>
</tbody>
</table>

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**Elementary School or Middle School Inner City Minor**

(Requirements are 24 credits for Provisional Certificate.)

**Courses**

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>EDC&amp;I 355</td>
<td>Language Arts in the Elementary School</td>
</tr>
<tr>
<td>EDC&amp;I 360</td>
<td>Reading in the Elementary School</td>
</tr>
<tr>
<td>EDC&amp;I 375</td>
<td>Mathematics in the Elementary School</td>
</tr>
<tr>
<td>Special Methods</td>
<td>6</td>
</tr>
<tr>
<td>Socioethnic Education (courses will be recommended to the intern)</td>
<td>9</td>
</tr>
</tbody>
</table>

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**Special Education Minor: Undergraduate (Elementary Emphasis)**

30 credits required. Admission based upon selection by the Special Education Area faculty. Prerequisites, GEOG 100, 5 approved credits in science.

---

**Courses**

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>EDC&amp;I 355</td>
<td>Language Arts in the Elementary School</td>
</tr>
<tr>
<td>EDC&amp;I 360</td>
<td>Reading in the Elementary School</td>
</tr>
<tr>
<td>EDC&amp;I 365</td>
<td>Social Studies in the Elementary School</td>
</tr>
<tr>
<td>EDC&amp;I 370</td>
<td>Science in the Elementary School</td>
</tr>
<tr>
<td>EDC&amp;I 375</td>
<td>Mathematics in the Elementary School</td>
</tr>
<tr>
<td>MATH 170</td>
<td>Theory of Arithmetic</td>
</tr>
<tr>
<td>EDPSY 404</td>
<td>Exceptional Children</td>
</tr>
<tr>
<td>EDPSY 403</td>
<td>Educating the Emotionally Disturbed</td>
</tr>
<tr>
<td>EDPSY 409</td>
<td>Mental Retardation</td>
</tr>
<tr>
<td>EDPSY 411</td>
<td>Learning Disabilities</td>
</tr>
<tr>
<td>EDPSY 412</td>
<td>Education of the Exceptional Individual in the Inner City</td>
</tr>
<tr>
<td>EDPSY 416</td>
<td>Evaluation of Instructional Material for Exceptional Children</td>
</tr>
<tr>
<td>EDPSY 418</td>
<td>Vocational Development of Handicapped Children and Youth</td>
</tr>
</tbody>
</table>

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**Elementary School Indian Education Minor**

(Requirements are 44 credits for Provisional Certificate.)

**Courses**

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>EDUC 302</td>
<td>Introductory Practicum in Classroom Teaching and Management</td>
</tr>
</tbody>
</table>
Special Education Minor: Undergraduate (Secondary Emphasis)

30 credits required. Admission based upon selection by the Special Education Area faculty. Prerequisites, GEOG 100, 5 approved credits in science.

Courses

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>EDSPE 404</td>
<td>Exceptional Children</td>
<td>3</td>
</tr>
<tr>
<td>EDSPE 418</td>
<td>Vocational Development of Handicapped Children and Youth</td>
<td>3</td>
</tr>
<tr>
<td>EDSPE 403</td>
<td>Educating the Emotionally Disturbed or Addicted</td>
<td>3</td>
</tr>
<tr>
<td>EDSPE 409</td>
<td>Mental Retardation or</td>
<td></td>
</tr>
<tr>
<td>EDSPE 411</td>
<td>Learning Disabilities</td>
<td>3</td>
</tr>
<tr>
<td>EDSPE 412</td>
<td>Behavioral Measurement and Management in the Classroom</td>
<td>3</td>
</tr>
<tr>
<td>EDSPE 499</td>
<td>Undergraduate Research</td>
<td></td>
</tr>
<tr>
<td>EDC&amp;I 462</td>
<td>Reading in the Secondary School</td>
<td>3</td>
</tr>
</tbody>
</table>

Electives consistent with vocational goals as approved by Special Education faculty advisor

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Elementary School Specialist: Art
Elementary School Specialist: Music

The programs leading to the Provisional Certificate in these specializations will be found under “Art” and “Music” in the section following, “Major and Minor Programs in Education.”

Provisional Certificate (Secondary Emphasis)

Admission to any professional education course in this sequence requires prior admission to the Teacher Education Program.

Courses

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPCH 203*</td>
<td>Principles of Oral Communication (3)</td>
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</tr>
<tr>
<td>SPCH 103*</td>
<td>Basic Principles of Oral Communication (5) or 3 or 5</td>
<td></td>
</tr>
<tr>
<td>EDPSY 304</td>
<td>Educational Psychology</td>
<td>3</td>
</tr>
<tr>
<td>EDPSY 308</td>
<td>Evaluation in Education</td>
<td></td>
</tr>
<tr>
<td>EDC&amp;I**</td>
<td>Special Methods (as required) Prerequisite, EDPSY 304</td>
<td>3-6</td>
</tr>
<tr>
<td>EDUC 404</td>
<td>Practicum in Classroom Teaching and Management</td>
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</tr>
<tr>
<td>EDEPS 479</td>
<td>Crucial Issues in Education (graduate students should, and, by permission of the instructor postbaccalaureate students may, elect one of the following: EDEPS 501, 502, 503, 504)</td>
<td>3</td>
</tr>
</tbody>
</table>

35-43

* Students who have completed one or more semesters of speech (principles, theory, and proficiency) in high school may petition for an examination that, if passed, may be substituted for the speech requirement without academic credit. Address all questions to the College of Education advisory office.

** For most secondary teaching fields, one or more special methods courses are required. For specific information, contact the advisory office, 207 Miller. Students are reminded that this is a professional requirement not usually shown within the major course listing.

MAJOR AND MINOR PROGRAMS IN EDUCATION

Listed below are the major and minor academic fields for elementary and secondary teachers. It is the responsibility of the student to consult the selected department to verify requirements and to obtain course approval where requested.

American Indian Studies
Teaching Major: Secondary School Emphasis

65 approved credits required.

INDIAN STUDIES BASIC CORE (30 CREDITS)

SOCIAL STUDIES CORE (30 CREDITS)
HST AA 201, 432; HST 113; GEOG 100; ECON 200; POL S 210.

ELECTIVE SUPPORT COURSES (5 CREDITS MINIMUM)
ANTH 202; ARCHY 304, 472; ART H 331; EDUC 401; GEOG 342; GIS 222, 223, 224, 310, 340; PHY A 285; POL S 211; PSYCH 250, 443; SOC 362.

Anthropology
Teaching Major: Secondary or Elementary School Emphasis

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 90 credits; and two of the following three courses, with a minimum grade of B in 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 a minimum of 25 credits of the required 50 with a grade of B or above (courses in which a student receives a D or E may not be counted toward the required 50 credits for the major).

Teaching Minor: Secondary School Emphasis

All entrance and graduation requirements noted above for the student majoring in anthropology apply to the student who is minoring in anthropology, except that 30 credits in courses at the 200 level or above are required, and that a minimum of 15 credits must show a grade of B or higher.
Art
Teaching Major: Secondary School Emphasis; Elementary School Specialization; Elementary and Secondary School Specialization (K–12)
70 approved credits required. Courses: ART 105, 106, 107, 109, 110, 129; ART H 201; 202, 203; ART 210, 211, 212; 3 credits from ART 250, 253, 254, 255, 256, 259; 305 or 201; 3 credits from ART 300, 301, 302, 303, 304; 3 credits from ART 272, 350, 358; 14 credits of approved art electives; EDC & I 340 (options 1, 2, and 3), EDC & I 341 (options 1 and 3).

Teaching Major: Elementary School Emphasis
50 approved art credits required. Courses: ART 105, 106, 107, 109, 110, 129; ART H 201, 6 credits of approved art history electives; ART.250 or 255; 9 credits from ART 300, 302, 303, 304, 305; 9 credits of approved art electives; EDC & I 342.

Teaching Minor: Secondary School Emphasis
15 approved art credits required. Offered only in combination with art major.

Asian American Studies
Teaching Major: Secondary School Emphasis
62–71 approved credits required.

TRACK A: SOCIAL STUDIES
Courses: HSTAA 201, 432; HST 113; GEOG 100, 313; ECON 200; POL S 210; GIS 305; EASIA 210; PSYCH 448.

Plus a minimum of 14–22 approved credits from the following list of Asian American core courses. Before taking any of the core courses, the student must have his or her Program of Studies approved by the Asian American Studies adviser in the College of Education. Courses: GIS 410, 411, 360, 443; G ST 391; PSYCH 250; EDUC 301, 401; ART H 301; C LIT 302; HSTAS 422, 470, 453, 423, 454.

Biology
Teaching Major: Secondary School Emphasis
47–54 approved credits required. Courses: BIOL 101–102; BOT 220, 113 or BIOL 210, 211, 212; CHEM 102 or 231, 232, 241; GENET 451; MICRO 301, 302; and four out of the five following categories (three must have laboratories): BOT 371 or 472; ZOO L 208 or 301; ZOOL 362 or 456; ZOOL 330 or 331; ZOOL 409 or BIOL 472.

Teaching Major: Elementary School Emphasis
45–50 approved credits required. Courses: BIOL 101–102; BOT 220, 113; or BIOL 210, 211, 212; CHEM 102 or 231, 232, 241; 25 credits of upper-division courses (must include 5 credits in botany and 10 credits in zoology). (Also see natural sciences teaching major.)

Teaching Minor: Secondary School Emphasis
30 approved credits required. Courses: approved electives in biology, botany, and zoology and at least one 5-credit course in upper-division biological sciences.

Black Studies
Teaching Major: Secondary School Emphasis
62–65 approved credits required.

TRACK A: SOCIAL STUDIES
Courses: SOC S 150; HSTAA 201, 432; HST 113; GEOG 100; ECON 200; HST 495; POL S 210; SOC 105; plus 25 approved credits from the following Black Studies core courses: ANTH 111, 212; PSYCH A 281, 282; GEOG 227; HST 361, 362, 421; HSTAA 443, 444; PSYCH 250, 260, 443; SOC 362, 463; ENGL 358.

TRACK B: LANGUAGE ARTS
Courses: ENGL 358, 444, 212*, 271, 277, 391 or 393, 351 or 352 or 353; SOC S 150. In addition, 30 approved credits from the following Black Studies core courses: DRAMA 490; C LIT 261, 262, 263; ENGL 251*, 211*, 355*, 399*; SPCH 100, 140, 329.

* Sections in which Black literature is given special emphasis. Consult with an adviser regarding appropriate selection of sections.

Teaching Major: Elementary School Emphasis
62–64 approved credits required. Courses: the same courses as for "Teaching Major: Secondary School Emphasis," Track A or Track B.

Teaching Minor: Secondary School Emphasis
35 approved credits required. Courses: 35 approved credits from Track A or Track B required.

Business Education
Teaching Major: Secondary School Emphasis
54 approved credits required. Courses: ACCTG 210, 220; Q METH 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 Emphasis
37 approved credits required. Courses: ACCTG 210, 220; Q METH 200; BG & S 101, 200; ECON 200; A ORG 460 or ECON 201; B CMU 301; EDC & I 314.

Teaching Minor: Secondary School Emphasis
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.
Chemistry
A grade of C or higher must be obtained in each required chemistry course or approved equivalent.

Teaching Major: Secondary or Elementary School Emphasis

Teaching Minor: Secondary School Emphasis
37 approved credits required. Courses: CHEM 140, 150, 151, 160, 170, 221, 231, 232*, 241*; PHYS 110, 111, 112 (or approved equivalent).

*CHEM 350 may be substituted for CHEM 232, and CHEM 351 may be substituted for CHEM 241.

Chinese
Teaching Minor: Secondary School Emphasis
37 approved credits required. Also required is a proficiency in oral and written Chinese and training in teaching methods of Chinese. Proficiency in the language must be demonstrated by examination. Courses: CHIN 311, 312, 313, 441, 442, 443; methods course in Chinese language; and 10 credits from the following courses: CHIN 362; GEOG 336; ECON 493; HSTAS 454; PHIL 414; POL S 414 or 442.

Classical Studies
Teaching Major: Elementary School Emphasis
64–66 approved credits required. Courses: GRK 101, 102, 103, 201, 202, 203, 207, 208; or LAT 101, 102, 103, 201, 202, 203, 206, 207, 208; plus 36 credits chosen with the approval of the department from courses in upper-division Greek, upper-division Latin, classics in English, classical art and archaeology, ancient history, the history of ancient philosophy, and the history of ancient science. CLAS 101 and HST 111 are not acceptable.

Comparative and Foreign Area Studies, Institute for
Teaching Major: Secondary School Emphasis
45 approved credits required. Courses: as listed under “Comparative and Foreign Area Studies” in the “College of Arts and Sciences” section of this catalog. Students shall 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 Emphasis
30 approved credits required. Courses: as listed under “Foreign and Comparative Area Studies” in the “College of Arts and Sciences” section of this catalog. Students shall complete 30 credits of approved courses within the regional program elected. Credits must include all specified program requirements with the exception of the language requirement.

Certification students may make elections from the following institute regional studies programs: China, Japan, Korea, South Asia, Russia, East Europe, and Latin America, Africa, and Near East Studies.

The program elected should be pursued only after consultation with the appropriate program undergraduate adviser.

Comparative Literature
Teaching Major: Secondary School Emphasis
45–55 approved credits required.* Courses: C LIT 300, 301, 302; CLAS 210 or any upper-division course in Latin or Greek literature; at least two additional upper-division courses in comparative literature; at least one course in a literature other than English, studied in the original language; EDC&I 356 or 331 or 336 or 338 or 334 or 335 or 339.

Teaching Major: Elementary School Emphasis
45–55 approved credits required.* Courses: C LIT 300, 301, 302; CLAS 210 or any upper-division course in Latin or Greek literature; at least two additional upper-division courses in comparative literature; at least one course in a literature other than English, studied in the original language; LIBR 451 or 453; EDC&I 330 or 336 or 338 or 333 or 339.

Teaching Minor: Secondary School Emphasis
32–40 approved credits required.* Courses: C LIT 300, 301, 302; CLAS 210 or any upper-division course in Latin or Greek literature; at least one course in a literature other than English, studied in the original language; EDC&I 356 or 331 or 332 or 336 or 338 or 334 or 335 or 339.

* Ordinarily, only 300- and 400-level literature courses may be applied toward the degree.

Drama
Teaching Major: Secondary School Emphasis
45 or 51 approved credits required. Courses: DRAMA 210, 211, 212 or 325, and either 210 or 212; 151, 152, 153 or 251, 252, 253 with DRDNC 101, 102, 103; DRAMA 316, 274, and one of 374, 375, 376, 377, 378, 379, 472, 473, 475, 476, 477, 478, 479; 460, 461, 462, 463.
Teaching Major: Elementary School Emphasis
45 approved credits required. Courses: DRAMA 151, 152 or 251, 252 with DRDNC 101, 102; DRAMA 230, 316; 325 or 210, 211, 212; 331, 336, 338, 436, 438 plus approved drama electives to bring total to required number of credits.

Teaching Minor: Secondary School Emphasis
28 approved credits required. Courses: DRAMA 274, 230, 316, 326; 146, 151, 152 or 251, 252, 253 with DRDNC 101, 102, 103; DRAMA 325 or 210, 211, 212.

Earth Science
GEOLOGICAL SCIENCES EMPHASIS
Administered by the Department of Geological Sciences.

Teaching Major: Secondary School Emphasis
63 approved credits required. Courses: GEOL 205, 301, 320, 321, 361; CHEM 140, 150, 160; PHYS 114, 115, 116, 117, 118, 119 or 121, 122, 123, 131, 132, 133; ATM S 101 or 201; ASTR 101 or 301; OCEAN 101 or 203.

OCEANOGRAPHY EMPHASIS
Administered by the Department of Oceanography.

Teaching Major: Secondary School Emphasis
60 approved credits required. Courses: OCEAN 401, 402, 403, 406, 421; MATH 124, 125, 126; CHEM 140, 150, 151, 160; PHYS 121, 122, 123, 131, 132, 133; ASTR 101 or 301; ATM S 101 or 201; GEOL 101 or 205.

ASTRONOMY EMPHASIS
Administered by the Department of Astronomy.

Teaching Major: Secondary School Emphasis
60 approved credits required. Courses: 15 approved credits in astronomy; MATH 124, 125, 126; PHYS 114, 115, 116, 117, 118, 119 or 121, 122, 123, 131, 132, 133; ATM S 101 or 201; GEOL 101 or 205; OCEAN 101 or 203.

ATMOSPHERIC SCIENCES EMPHASIS
Administered by the Department of Atmospheric Sciences.

Courses: ATM S 101 or 201, 321, 351; PHYS 114, 115, 116, 117, 118, 119 or 121, 122, 123, 131, 132, 133; ASTR 101 or 301; GEOL 101 or 205; OCEAN 101 or 203; 10 to 14 elective credits in astronomy, atmospheric sciences, chemistry, geological sciences, mathematics, or oceanography.

GENERAL EMPHASIS
Administered by the College of Education.

Teaching Major: Secondary School Emphasis
60 approved credits required. Courses: ASTR 101 or 301; ATM S 101 or 201; GEOL 101 or 205, 103; OCEAN 101 or 203; elective in one of the above departments, 5 credits; BIOL 101–102 or 210, 211, 212 or equivalent; PHYS 114, 115, 116, 117, 118, 119 or 121, 122, 123, 131, 132, 133; CHEM 101, 102 or 140, 150, 151, 160.

Teaching Minor: Secondary School Emphasis
Administered by the Department of Geological Sciences.

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 Emphasis
57–60 approved credits required. Courses: ECON 200, 201, 300, 301, 281; four electives in economics chosen from a minimum of three fields of specialization other than theory (20 credits); MATH 157 or 124; 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 Emphasis
44 or 45 approved credits required. Courses: ECON 200, 201, 281, 300, 301; three electives in economics chosen from a minimum of two different fields of specialization (15 credits); MATH 157 or 124.

Teaching Minor: Secondary School Emphasis
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).

English
Teaching Major: Secondary School Emphasis
54–58 approved credits required. Courses: ENGL 271 or 272; 5 additional credits in advanced writing or ENGL 441 or 444*; ENGL 391, 392 or 393 or 442 or 444*; ENGL 211 or 5 credits in fiction, ENGL 212 or 5 credits in poetry, ENGL 213 or 411 or 412; 5 credits from ENGL 221, 222, 223, 231, 241, 251, 261, or 413, 414, 415, 416; 5 credits from ENGL 351 through
358, 395, or 397; 5 credits from ENGL 311, 314, 315, 322, or 396; 5 credits from ENGL 371, 372, 375, 376, 417, 444* or LIBR 451 or 453; HSS 480 or 5 credits of literature in translation (e.g., CLAS 430); EDC&I 356.

Teaching Minor: Secondary School Emphasis
36–38 approved credits required. Courses: ENGL 271 or 272; 5 additional credits in advanced writing or ENGL 441 or 444*; ENGL 391 or 392 or 393 or 442; ENGL 211 or 5 credits in fiction, ENGL 212 or 5 credits in poetry, ENGL 213 or 5 credits in drama; 5 elective credits in literature (e.g., CLAS 430).

English Major: Elementary School Emphasis
43–45 approved credits required. Courses: at least 18 credits in writing and language as follows: ENGL 271 or 272; 5 additional credits in advanced writing or ENGL 441 or 444*; ENGL 391, 392 or 393 or 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; group 2—ENGL 351 through 358, 395, or 397; group 3—ENGL 311, 314, 315, 322, or 396; group 4—ENGL 371, 372, 375, 376, 417, 444* or LIBR 451 or 453, HSS 480, or 5 credits of literature in translation (e.g., CLAS 430).

* Variable topics in ENGL 444 in writing, language, and literature.

French (Romance Languages and Literature)
Teaching Major: Secondary School Emphasis
51 approved credits beyond FREN 222 required, as are a proficiency in oral and written French, knowledge of French literature and culture, and training in the application of modern principles, materials, and methods of foreign-language teaching. Satisfaction of the requirements is to be certified by the adviser in the Department of Romance Languages and Literature before the student begins teaching practicum (EDUC 403 or 404). The Program of Study, supervised by the departmental adviser, normally should include the following courses: FREN 301, 302, 303, 304, 305, 306, 350, 351, 352, 409; 403 or ROM 401; 9 credits of approved literature and/or civilization courses at the 400 level, including at least 6 in literature; EDC&I 329; 330, 331 or 332.

Credit may be arranged for study abroad, preferably during the junior year, subject to the regulations governing transfer credit and provided the student's plan is approved in advance by the departments in which he is studying.

Teaching Major: Elementary School Emphasis
42 approved credits required. Courses: same as for "Teaching Major: Secondary School Emphasis" with one exception: the 9 credits of literature and/or civilization are not required.

Teaching Minor: Secondary School Emphasis
42 approved credits required. Courses: same as for "Teaching Major: Elementary School Emphasis."

Geography
Teaching Major: Secondary School Emphasis
50 approved credits required. Courses: GEOG 100, 205, 200 or 207, 258, 235 or 277, 315 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 Emphasis
45 approved credits required. Courses: GEOG 100, 205, 200 or 207, 258, 235 or 277, 300 or 370, 302 or 402; one systematic and two regional geography upper-division elective courses approved by geography adviser (15 credits).

Teaching Minor: Secondary School Emphasis
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 Emphasis
Courses: see "Earth Science, Geological Sciences Emphasis."

Teaching Major: Elementary School Emphasis
54 approved credits required. 10 credits of electives may be taken during the fifth year. Courses: CHEM 140, 150, 151, 160; BIOL 101–102; GEOL 101 or 205, 103 or 361, 320, 430; 10 credits of approved upper-division geological sciences electives or approved courses in related fields.

German (Germanic Languages and Literature)
Grade-point average of 2.50 must be maintained in all German courses in the programs.

Teaching Major: Secondary School Emphasis
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 Emphasis
24 approved credits above the second-year level required. Courses: GERM 301, 302, 303, 310, 311, 312, 405; EDC&I 337.

Teaching Minor: Secondary School Emphasis
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 Emphasis
40 approved credits in core and area courses and 22–25 credits in foundation courses required. Core requirements: H ED 250, 297, 350, 352, 353. Area requirements: one course from each of the following groups: group A—H EC 300, 409; group B—PC EH 411, PC EP 420, PC HS 323, 424; group C—EDPSY 408, PBSCI 451, PSYCH 305. Two courses from the following: group D—H ED 481, H EC 356, PSYCH 250, 260, 403, SOC 240, 330, 331, 352, 362, 365, 452, 453, SPCH 472. Foundation requirements: B STR 301; MICRO 101, 301; PSYCH 100; SOC 110; ZOOL 118, 119, 208.

Teaching Major: Elementary School Emphasis
45 approved credits required. Courses: elementary school emphasis is established with the guidance of the health education adviser.

Teaching Minor: Secondary School Emphasis
25 30 approved credits in core and area courses and 15 credits in foundation courses required. Core requirements: same as for “Teaching Major: Secondary School Emphasis.” Area requirements: one course from each of the following groups: group A—H EC 300, 409; group B—EDPSY 408, PSYCH 451, 305; group C—PC HS 323, 424. Foundation requirements: human biology or human physiology; PSYCH 100; SOC 110.

History Education
Teaching Major: Secondary School Emphasis
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, three upper-division United States history courses, one upper-division modern European course; EDC&I 366; and two electives.

Teaching Major: Elementary School Emphasis
53 approved credits required. Courses: same as for “Teaching Major: Secondary School Emphasis,” except that an elective may be substituted for the upper-division modern European course.

Teaching Minor: Secondary School Emphasis
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.

Home Economics Education
Teaching Major and Minor: Secondary School Emphasis
71 approved credits required in home economics courses and education courses, and 38 credits required in prerequisite courses. Home economics courses: H C 125, 134, 148, 307, 314, 347, 354, 356, either 456 or 483, 457 and eleven electives. Education courses: EDUC 301 or equivalent, 302, and 401; EDC&I 327 and 404. Prerequisite courses: ART 109 or 129, CHEM 101 and 102 or equivalents, ECON 200, MICRO 101 or 301 or 302, PSYCH 100 and 306, and ZOOL 118 or equivalent.

Teaching Major: Elementary School Emphasis
45 approved credits required in home economics courses and 23 credits required in prerequisite courses. Home economics courses: H EC 125, 134, 148, either 300 or 307, 314, 347, 354, 356, 457 and eight to eleven electives. Prerequisite courses: ART 109 or 129, CHEM 101 and 102 or equivalents, ECON 200, ZOOL 118 or equivalent.

Teaching Minor: Secondary School Emphasis
34 approved credits required in home economics courses and 23 credits required in prerequisite courses. Home economics courses: H EC 125, 134, 148, 307, 314, 347, 354, and 356. Prerequisite courses: ART 109 or 129, CHEM 101 and 102 or equivalents, ECON 200, ZOOL 118 or equivalent.

Industrial Education
Teaching Major: Secondary School Emphasis
57 approved credits required. Courses: EDC&I 300, 301, 302, 303, 304 305, 306, 307, 309, 400, 401; M E 301, 302, 303, 312; H ED 292 or approved substitute; fourteen approved electives.

Teaching Major: Elementary School Emphasis

Teaching Minor: Secondary School Emphasis
38 approved credits required. Courses: EDC&I 300,
301, 303, 306, 309, 400, 401; M E 301, 302, 303, 312; H ED 292 or approved substitute; four approved electives.

Japanese
Teaching Minor: Secondary School Emphasis
37 approved credits required, as are a proficiency in oral and written Japanese and training in teaching methods of Japanese. Proficiency in the language must be demonstrated by examination. Courses: JAPAN 311, 312, 313 or 333; 411, 412, 413. Electives: HSTAS 213; GEOG 437; POL S 435; HSTAS 423; JAPAN 441, 421.

Journalism
Teaching Major: Secondary School Emphasis
47 50 approved credits required. Courses: CMU 150, 200, 320, 321, 324, 406, 414, 480 or 481; EDC&I 358 or 458; and 6 9 credits taken from the following electives: CMU 220, 291, 314, 325, 353, 400, 402, 411, 443, 450, 474, 480, 481, 483; SOC 443.

Journalism Major: Elementary School Emphasis
47 50 approved credits required. Courses: same as for "Teaching Major: Secondary School Emphasis."

Teaching Minor: Secondary School Emphasis
27 approved credits required. Courses: CMU 150, 200, 321; EDC&I 358; and at least 10 credits from the following electives: CMU 400, 402, 406, 411, 414, 443, 450, 474, 480, 481, 483.

Latin (Classics)
Teaching Major: Secondary School Emphasis
36 approved credits required. Courses: 27 credits in upper-division Latin courses, and 9 credits chosen with the approval of the Department of Classics from courses in Greek, upper-division Latin, classics in English, classical art and archaeology, ancient history, the history of ancient philosophy, and the history of ancient science.

Teaching Major: Elementary School Emphasis
36 approved credits required. Courses: same as for "Teaching Major: Secondary School Emphasis."

Teaching Minor: Secondary School Emphasis
18 approved credits required. Courses: any approved upper-division Latin courses.

Librarianship
Teaching Minor: Secondary School Emphasis
24 approved credits required. Courses: LIBR 440, 441, 442, 443, 453, 454; EDC&I 480, 481.

Teaching Minor: Elementary School Emphasis
24 approved credits required. Courses: LIBR 440, 441, 442, 443, 451, 454; EDC&I 480, 481.

Elementary and secondary school librarians must have preparation according to Programs for the Learning Resources Center; Standards for Integrating School Library and Media Services, approved by the State Board of Education.

<table>
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<tr>
<th>Level</th>
<th>Minimum</th>
<th>Good</th>
<th>Excellent</th>
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<tbody>
<tr>
<td>Elementary</td>
<td>18 credits</td>
<td>24 credits</td>
<td>Master's degree</td>
</tr>
<tr>
<td>Secondary</td>
<td>24 credits</td>
<td>36 credits</td>
<td>Master's degree</td>
</tr>
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</table>

Every applicant for a school library position must hold a teaching certificate for the appropriate level and must meet the standards recommended to the State Board of Education.

Courses listed above meet (1) recommendations for elementary, junior high, and senior high school librarians in compliance with the Standards of 1968, and/or (2) requirements for the librarianship teaching minor: secondary or elementary school emphasis, undergraduate teacher preparation.

A class entry card must be obtained in 133 Suzzallo.

Mathematics
Teaching Major: Secondary School Emphasis
45 approved credits required beyond Elementary Functions.* Courses: MATH 114, 124, 125, 126, 205 or 302, 327, 391, 392, 411, 412, 444, 445 and 3 credits in approved mathematics electives.

Teaching Major: Elementary School Emphasis
36 approved credits required beyond Elementary Functions.* Courses: MATH 124, 125, 126, 170, 171, 205 or 302, 411, 412 and two courses from 106, 301, or 305.

Teaching Minor: Secondary School Emphasis
30 approved credits required beyond Elementary Functions.* Courses: MATH 124, 125, 126, 205, 411, 412, 444, 445.

* The student must obtain grades of C or higher in all mathematics courses offered to satisfy the requirement and a grade-point average of at least 2.00 in all mathematics courses taken. EDC&I 378 is required for both the teaching major and minor with secondary school emphasis.

Music Education
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 (prerequisite, EDUC 302 [music section] and admission to Teacher Education 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 (12 credits, 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 (prerequisite, EDUC 302 [music section] and admission to Teacher Education Program); MUSIC 316 or 317 or 318; 432; 440 or 441 or 442 or 443; 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 (12 credits, minimum of one year choral ensemble required).

ELEMENTARY-GENERAL MUSIC EMPHASIS

Courses: MUSIC 110, 111, 112, 113, 114, 115, 210, 211, 212, 213, 214, 215, 313, 314, 340 (prerequisite, EDUC 302 [music section] and admission to Teacher Education Program); MUSIC 316 or 317 or 318; 440, 441, 180, 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 (12 credits, minimum of one year choral ensemble required).

Music Major: General Elementary School Emphasis

50 approved credits required. Courses: MUSIC 110, 111, 112, 113, 114, 115, 213, 214, 215, 330; EDC&I 343 or 346; music applied (18 credits to include not less than 3 credits in voice and 3 credits in piano); ensemble (6 credits).

Natural Sciences

Teaching Major: Elementary School Emphasis

65-72 approved credits required. The natural sciences major for elementary school emphasis students is offered jointly by the departments of Botany, Chemistry, Geophysical Sciences, Physics, and Zoology. Approval of the major may be obtained by the student from one of the following: Chemistry advisory office, Geophysical Sciences advisory office, Physics advisory office, or Biology teacher preparation office. The office giving original authorization shall continue to supervise until the approved program is completed.

Courses: CHEM 101, 102 or 140, 150, 151, 160, 170; PHYS 101, 102, 103, or 114, 115, 116, 117, 118, 119, or 121, 122, 123, 131, 132, 133; BIOL 101-102; BOT 220; ZOOL 118 or 208 or BIOL 210, 211, 212; BOT 371 or ZOOL 330 or 362; ASTR 101; ATM'S 101; GEOL 101; OCEAN 101.

Norwegian (Scandinavian Languages and Literature)

A grade-point average of 2.50 must be maintained.

Teaching Major: Elementary School Emphasis

36 approved credits required. Courses: NORW 220, 221, 222, 223, 224, 225; 300, 301, 302 or 350, 351, 352; 303, 304, 305, 490; SCAND 455 or NORW 450; EDC&I 339.

Teaching Minor: Secondary School Emphasis

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.

Physical Education

Teaching Major: Secondary School Emphasis

55 approved credits required and 19–22 related field courses required. The student is required to demonstrate proficiency through the advanced level in at least two approved physical education activities commonly taught in schools and through the intermediate level in at least eight other activities. Satisfaction of activity proficiencies must be certified by an adviser in the School of Physical and Health Education before the student begins teaching practicum.


Teaching Minor: Secondary School Emphasis

38–40 approved credits required and 19–22 related field courses required. The student must demonstrate competency in physical education activities as described in "Teaching Major: Secondary School Emphasis."

Teaching Major: Elementary School Emphasis
55 approved credits required and 19–22 related field courses required. The student must demonstrate competence in physical education activities as described in “Teaching Major: Secondary School Emphasis.”


Physics
Teaching Major: Secondary School Emphasis
64 approved credits required. Courses: MATH 124, 125, 126 or 134H, 135H, 136H; PHYS 121, 122, 123, 131, 132, 133, 221, 222, 231, 232, 407, 408; approved electives in mathematics, physics, or other natural sciences (minimum of 12 credits). Grades of B or better in PHYS 407, 408. Grade-point average of 2.50 or better at certification.

Teaching Minor: Secondary School Emphasis
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; track B (with physical science or mathematics major)—PHYS 121, 122, 123, 131, 132, 133, 221, 222, 407, 408. Grades of B or better in PHYS 407, 408. Grade-point average of 2.50 or better at certification.

Political Science
Teaching Major: Secondary School Emphasis
50 approved credits required. Courses: POL S 101, 102; 5 approved credits from upper-division political science electives; and the remaining 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.

* The Department of Political Science maintains a current list of approved courses for the three broad fields.

Psychology
Teaching Major: Secondary School Emphasis
50 approved psychology credits required. Courses: PSYCH 100 or 101 or 102; 231 or 232 or 233; 213 or 217 and 218; psychology electives (MATH 106 is prerequisite for PSYCH 213; MATH 157 is prerequisite for PSYCH 217).

Teaching Minor: Elementary School Emphasis
50 approved psychology credits required. Courses: same as those for “Teaching Major: Secondary School Emphasis.”

Teaching Minor: Secondary School Emphasis
30 approved psychology credits required. Courses: same as those for “Teaching Major: Secondary School Emphasis.”

Russian (Slavic Languages and Literature)
Teaching Major: Secondary School Emphasis
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: REEU 243; RUSS 420, 421, 422; 451, 452, 453; 461, 462, 463; HSTEU 442 or 444, 423 or 445; SLAV 351.

Teaching Major: Elementary School Emphasis

Teaching Minor: Secondary School Emphasis
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 School Emphasis
Teaching Major: Elementary School Emphasis
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 Emphasis
24–28 credits required. Courses: one of the following—
BG&S 200; HSTAA 353; POL S 362; one of the fol­
lowing—HSTAA 429; SOC 371, 472, 473; one of the fol­
lowing—PSYCH 305; SOC 270, 271; one of the fol­
lowing—PHARM 310, NURS 489; and 10 ap­
proved credits in the social sciences or humanities
related to the criminal justice system.

Sociology
Teaching Major: Secondary School Emphasis
50 approved sociology credits required. To be admitted
as a major, a student must have junior standing (90
accumulated credits as recorded by the Registrar) and
have earned as part of these 90 credits at least 10
graded credits in sociology courses, with a grade-point
average of at least 2.50 in sociology courses taken pre­
viously.

To graduate with a teaching major in sociology, a stu­
dent must take 50 credits in sociology as stated below
and have a cumulative 2.50 grade-point average in soci­
ology courses taken at the University of Washington.

Courses: SOC 110, 223, and 40 credits in sociology
 electives.

Sociology Major: Elementary School Emphasis
50 approved sociology credits required. Requirements
are the same as those for “Teaching Major: Secondary
School Emphasis.”

Teaching Minor: Secondary School Emphasis
30 approved sociology credits required, with a 2.50
grade-point average in sociology courses taken.
Courses: SOC 110 and 25 credits in sociology elec­
tives.

Spanish (Romance Languages and Literature)
Teaching Major: Secondary School Emphasis
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 or three
literature courses and ROM 401; EDC&I 329; 333 or
334 or 335.

Teaching Major: Elementary School Emphasis
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 Emphasis
36 approved credits required. Courses: same as those
for “Teaching Major: Elementary School Emphasis.”

EDC&I 333, 334, 335 may be given only during Au­
tumn Quarter; students should inquire at the depart­
ment 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.

Speech Education
Teaching Major: Secondary School Emphasis
59 approved credits required. Courses: SPCH 102; plus
100 or 203 or 103 (only 3 credits of 103 applicable to
major requirements); 140, 220, 270, 300, 334, 348;
EDC&I 357; SPCH 373; 10 18 credits in approved elec­
tives, including 6 credits at the 400 level.

Teaching Major: Elementary School Emphasis
48 approved credits required. Courses: SPCH 102; plus
203 or 100 or 103 (only 3 credits of 103 applicable to
major requirements); 140, 300, 303, 348, 373; 455;
15 19 credits in approved electives, including 6 credits
at the 400 level.

Teaching Minor: Secondary School Emphasis
33 approved credits required. Courses: SPCH 102; plus
100 or 203 or 103 (only 3 credits of 103 applicable to
minor requirements); 270; 373; 456; or EDC&I 357;
7 15 credits in approved electives including 6 credits
at the 400 level.

Swedish (Scandinavian Languages and Literature)
A grade-point average of 2.50 must be maintained.

Teaching Major: Elementary School Emphasis
35 approved credits required. Courses: SWED 220,
221, 222, 223, 224, 225; 300, 301, 302 or 350, 351,

Teaching Minor: Secondary School Emphasis
42 approved credits required. Courses: SWED 220,
221, 222, 223, 224, 225; 300, 301, 302 or 350, 351,
352; 303, 304, 305, 306, 307, 308, 450, 490; EDC&I
339.

THE STANDARD CERTIFICATE
Admission to the College of Education or to any of the
programs within the college assumes and is depen­
dent upon the student’s eligibility for admission, enroll­
ment, and registration at the University of Washing­
ton.

The Standard Certificate is issued by the State De­
partment of Public Instruction upon recommendation from
an approved institution of higher learning in the state of
Washington. The requirements of the University of
Washington College of Education, combined with the
requirements of the State Board of Education, for the Standard Certificate are as follows:

**Basic Provisions, General**

(1) possession of a valid Provisional Certificate; (2) at least two years of successful teaching on the Provisional Certificate or equivalent at the elementary or secondary level, or both; (3) completion of 45 quarter credits of approved course work, including completion of deferred courses from the Provisional Certificate pattern and compliance with any appropriate suggestions from the field. Such work must represent study in both professional and academic fields.

**Specific Requirements, State Board of Education**

1. At least half of the 45 quarter credits in the fifth year must be in upper-division or graduate courses, or both.

2. A maximum of 12 quarter credits may be taken by independent study or extension study, or both.

3. A minimum of 22½ quarter credits approved by the attesting institution must be completed in residence at one institution.

4. A maximum of 30 quarter credits in excess of degree requirements may be taken before or during the first year of teaching.

5. A minimum of 15 quarter credits must be taken after one year of successful teaching experience.

6. A college-level course in Washington State history must be completed by intermediate (grades 4, 5, and 6) and all secondary social studies teachers.

7. An average grade of C or higher must be attained in all course work required for the fifth year.

A plan for the acquisition of the Standard Certificate must be filed in the College of Education advisory office when the conversion program is started.

All course work completed at other institutions is subject to review before acceptance. Approval prior to enrollment is urged.

**EDUCATION GRADUATE PROGRAMS**

Also see “Graduate Programs and Degree Policies,” page 57.

Graduate Program Adviser
Roger G. Olstad
Office of Graduate Studies
210 Miller
tion, language arts education, learning resources, mathematics education, music education, physical education, reading, science education, secondary education, social studies education, vocational education); Educational Administration; Educational Policy Studies (Foundations of Education, includes history of education, philosophy of education, and sociology of education); Educational Psychology (includes psychological services, educational psychology, reading, reading disability, counseling, vocational rehabilitation); Higher Education; Special Education (includes general curriculum and deaf education).

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 in full-time residency, including 27 quarter credits for dissertation in addition to the course work specialization; 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 his studies and research with emphasis on one of a particular set of topics, such as elementary education, general curriculum, language arts education, learning resources, mathematics education, science education, secondary education, social studies education, educational counseling and school psychology, learning and thinking, measurement and evaluation, 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 in full-time residency, including 27 quarter credits for dissertation* in addition to the course work specialization; 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 his studies and research with emphasis on one of a particular set of topics, such as elementary curriculum, general curriculum development, language arts education, learning resources, mathematics education, science education, secondary curriculum, educational administration, higher education, or special education including exceptional children.

Administrators' Credentials
The revised requirements for administrators' credentials were adopted by the State Board of Education on March 24, 1956, and became effective June 1, 1957. All applications are to be made to the State Superintendent of Public Instruction, Olympia, through the intermediate school district in which the applicant's school is located.

I. Provisional Principal's Credential (Elementary, Secondary, and General)
1. Applications for the Provisional Principal's Credential may be filed by students with full graduate standing in the Graduate School after one year of successful teaching and prior to completion of requirements, preferably before the applicant has begun study for the credential.

2. A total of 54 quarter credits beyond the bachelor's degree in an approved institution is the required minimum. Of these 54 credits, 24 must be in an approved program that will make a maximum contribution to the individual's responsibilities as a principal.

3. At least 9 credits of the 54 quarter credits must have been earned after completion of the Standard Certificate. These 9 quarter credits shall be in courses in administration, curriculum, and supervision on the elementary or secondary level, or both. These 9 credits must be earned in residence at the University of Washington.

4. A total of 12 credits toward the 24 may be transferred from an approved institution. Not more than 6 of the 24 credits may be transferred from an approved institution. Not more than 6 of the 24 credits may be earned by extension, and no credits earned in independent study may be applied. The combination of transfer and extension work may not exceed 12 credits.

5. Laboratory and internship type experiences shall be a part of the program. These shall take the form of supervised administration experiences in school situations.

6. Proof of three years of successful teaching experi-
ence on the appropriate level or levels is one of the require-ments for a Provisional Principal’s Credential.

7. Granting of the credential is dependent upon proof that the applicant possesses the qualities of leadership necessary for school administration and upon an evaluation of the applicant’s success in positions already held.

8. After admission of the applicant to graduate standing in the Graduate School and admission to the area of Educational Administration, an official program plan must be arranged in consultation with a faculty supervisor in Educational Administration.

9. The Provisional Principal’s initial is valid for not more than four years of experience as a principal in elementary schools of six or more teachers or in accredited middle, junior, senior, four-year, or six-year high schools.

II. Standard Principal’s Credential (Elementary, Secondary, and General)

1. An application for the Standard Principal’s Credential may be filed during the applicant’s second year of experience as a principal and prior to completion of requirements.

2. After completion of requirements for the Provisional Principal’s Credential, 12 credits must be earned in residence at the University of Washington for a Standard Principal’s Credential. These credits shall be in approved courses in administration, supervision, and curriculum on the elementary or secondary level, or both.

3. Possession of a master’s degree is required for the Standard Principal’s Credential. Requirements for this degree may be completed in the College of Education or in an academic department.

4. Three years of successful teaching experience, of which two must be as a full-time classroom teacher, and three years of experience as a principal on the appropriate level or levels are requirements for a Standard Principal’s Credential.

5. Granting of the credential is dependent upon proof that the applicant possesses the qualities of leadership necessary for school administration and upon an evaluation of the applicant’s success in positions already held.

6. An official program plan must be arranged in consultation with a faculty supervisor in Educational Administration.

7. The Standard Principal’s Credential is valid as long as the holder’s teaching certificate is valid.

III. Provisional Superintendent’s Credential

1. An application for the Provisional Superintendent’s Credential may be filed after the applicant has completed preparation for a Standard Principal’s Credential and prior to completion of requirements.

2. After completion of requirements for the Standard Principal’s Credential, 12 credits must be earned in residence at the University of Washington for a Provisional Superintendent’s Credential. These credits shall be in approved courses in administration, supervision, and curriculum on the elementary or secondary level, or both.

3. Possession of a master’s or higher degree is required for the Provisional Superintendent’s Credential. Requirements for this degree may be completed in an academic department or in the College of Education.

4. Candidates with experience as principals at only one level are to have laboratory experience at the opposite level. These experiences are to be planned with the applicant, the teacher education institution, and school administrators.

5. Three years of successful teaching experience, of which two must be as a full-time classroom teacher, and four years of administrative experience on the appropriate level or levels are requirements for a Provisional Superintendent’s Credential.

6. Granting of the credential is dependent upon proof that the applicant possesses the qualities of leadership necessary for school administration and upon an evaluation of the applicant’s success in positions already held.

7. An official program plan must be arranged in consultation with a faculty supervisor in Educational Administration.

8. The Provisional Superintendent’s Credential is valid for three years of administrative experience.

IV. Standard Superintendent’s Credential

1. Application for the Standard Superintendent’s Credential may be filed by the candidate after one year’s service as a superintendent and prior to completion of requirements.

2. After completion of the Provisional Superintendent’s Credential requirements, 12 credits must be earned in residence at the University of Washington for a Standard Superintendent’s Credential. These credits shall be
in approved courses in the areas of administration, supervision, and curriculum.

3. Three years of successful superintendent's experience are required for granting of a Standard Superintendent's Credential.

4. An official program must be arranged in consultation with a faculty supervisor in Educational Administration.

5. The Standard Superintendent's Credential is valid as long as the holder's teaching certificate is valid.
Living and working in a technological world, which their profession did much to create, 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. And now, more than ever, they must strive to ensure that their work benefits mankind. 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. In this effort, engineers cannot work alone. They must cooperate with government and industry; with economists, urban planners, lawyers, and sociologists; and with citizens and statesmen.

An engineer with the bachelor's 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, and the first engineering degree awarded was in mining engineering in 1900. Progressively added were degrees in civil engineering (1901), electrical engineering (1902), mechanical engineering (1906), chemical engineering (1907), aeronautical engineering (1929), and nuclear engineering (1955). In 1972, 1,740 undergraduates and 708 graduate students were enrolled in engineering programs taught by a faculty of about two hundred members.

College Facilities and Services
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 col-
lege's offices, classrooms, and numerous research and teaching laboratories. A new central engineering library that serves the college supplements the nearby chemistry, mathematics, and physics libraries in providing outstanding collections of books, periodicals, technical reports, and patents of interest to engineers. The University's Computer Center, located within the College of Engineering complex, is 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, and a laboratory for heat-transfer studies.

Aerospace Research Laboratory
Director
Abraham Hertzberg
120 Aerospace Research Laboratory

The Aerospace Research Laboratory is an interdepartmental and interdisciplinary facility of the College of Engineering operated for the conduct of fundamental and applied engineering research. Faculty and students from throughout the college undertake research that is often complementary to that being conducted within the other departments and divisions of the college. Much of the research is related to the interests of the National Aeronautics and Space Administration, which provided funding for the laboratory building. Present research areas include gas flow at high Reynolds numbers, high-energy lasers, controlled thermonuclear reactions, and flight and structural mechanics.

Ocean Engineering Laboratory
Director
Gordon M. Gray
Applied Physics Laboratory

Housed in both the University of Washington Applied Physics Laboratory and the Harris Hydraulics Laboratory, the Ocean Engineering Laboratory serves as a focus for faculty and graduate student research in the field of ocean engineering. The University of Washington has one of the largest and most varied marine programs in the United States, and the Ocean Engineering Laboratory reflects the activities of the College of Engineering in the marine field. Research in the development of floating breakwaters, marine acoustics, new techniques for modular ship construction, and the removal of flotsam from Puget Sound are among the types of activities undertaken by the laboratory.

Office of Engineering Research
Director
H. Myron Swarm
376 Loew

The Office of Engineering Research performs two main functions. First, it stimulates, promotes, and coordinates investigations and research in all fields of engineering. The actual research, however, is carried on either in the departments of the college or in the interdepartmental laboratories.

As its second function, the office provides graduate students with opportunities to extend their professional education in courses of study leading to the master's or doctoral degree. It does this by offering a number of research assistantships to highly qualified graduate students who are assigned to the academic departments.

College Publication

Current research findings appear in the quarterly journal, *The Trend in Engineering*, which has a circulation of five thousand, including two hundred international institutions. *The Trend in Engineering* is published in newsletter format twice a year and is sent to twenty thousand alumni, professional engineers, educators, and members of industry throughout the United States.

Student Organizations and Services

Various student activities are supervised by an Engineering Student Council, which comprises representatives elected from student organizations in the departments of the college, as well as from Tau Beta Pi, the engineering honorary fraternity.

Students also serve with faculty on engineering policy committees, which make recommendations concerning teacher evaluation, curriculum revisions, advising, grading systems, and other matters of interest to students and faculty.

Professional and Honorary Societies

All of the major professional engineering societies, such as the American Society of Civil Engineers, the Institute of Electrical and Electronic Engineers, and the American Society of Mechanical Engineers, 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 a student chapter of the Society of Women Engineers. Honor societies open to engineering students are Tau Beta Pi and Sigma Xi.
Financial Aid
The college offers financial assistance to undergraduates through industrial scholarships and limited 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; National Science Foundation, National Aeronautics and Space administration, and Public Health Service traineeships; research assistantships; or teaching assistantships. A student seeking such aid should apply at the office of his or her major department.

UNDERGRADUATE PROGRAMS

In 1971, the College of Engineering inaugurated new, flexible engineering curricula that extended the variety of educational experiences available to its students. The new curricula also facilitated transfer from community colleges, as well as to and from other four-year programs of study.

Admission
Students who wish to enter the College of Engineering as freshmen are eligible to do so if they are eligible for admission to the University. In addition, students may apply for admission to the college with advanced standing, provided they are qualified students in good standing at an accredited institution. Details of admission qualifications for both freshmen and transfer applicants can be found in the "Undergraduate Education" section of this catalog. The section also contains information about the qualifying mathematics tests in the precollege testing program.

Students who intend to pursue an engineering career should choose high school electives that provide the background essential to engineering studies. Elementary functions, algebra, trigonometry, physics, and chemistry are prerequisites for the first-year courses in engineering. Those who do not take these subjects in high school must take equivalent courses at the University in addition to the regularly required program, although this usually increases the time needed for earning a degree. The college also recommends electing a fourth year of mathematics and senior composition.

Advising Center
Executive Director
Donald C. McNeese
111 Sieg

Until a student enters a departmental program of study, the Engineering Advising Center will help in curriculum planning and will maintain his or her records. Some students who already have chosen a field of engineering can enter a particular degree program as soon as they wish. Most, however, will want to spend several quarters investigating the different fields of engineering and will stay in the college program until the junior year. Therefore, an adviser in the center usually will assist new students in their initial registration and their early planning of a Program of Study.

In deciding on a major, a student can use the resources of the center, elect to take one or more career planning courses, and seek out advisers and faculty members in the departments. Once a student has made a decision, records will be sent to the appropriate department and he or she will work with an adviser there. A student choosing one of the nondepartmental programs (B.S.E. or B.S.) will work with an adviser for this program, and his or her records will remain in the advising center.

Graduation Requirements
Students working toward bachelor's degrees in engineering must meet the general requirements of the University and the college, as well as the particular course requirements of their major departments. College and departmental requirements appear below.

College Requirements
Selecting courses that fulfill the college's general requirements, as well as those specified by each department, is the responsibility of each student. Each student is urged to check carefully in ascertaining the course and credit requirements for the type of program in which he or she is enrolled.

Types of Programs
The College of Engineering offers three basic types of undergraduate programs leading to Bachelor of Science degrees:

Departmental Program: This program leads to a Bachelor of Science degree in a designated field of engineering and is tailored for the student who wishes to practice professional engineering in a standard branch of engineering or who may wish to continue to graduate school. The curriculum for this degree carries professional accreditation by the Engineers Council for Professional Development, principal engineering accrediting agency in the United States. Four-year curricula leading to bachelor's degrees are offered in the departments of Aeronautics and Astronautics, Chemical, Civil, Electrical, and Mechanical Engineering, and in the Department of Mining, Metallurgical, and Ceramic Engineering.
Nondepartmental Program: Leading to a Bachelor of Science in Engineering degree, this program is designed for the student who has some well-directed, special educational objectives that a departmental program does not satisfy. This curriculum might be in bioengineering, computer science, environmental engineering, mineral resources, ocean engineering, nuclear engineering, or some other interdisciplinary or specially approved area and could serve as preparation for graduate work in these or allied fields (see the "Interdisciplinary Engineering Studies" section of this catalog).

Nonprofessional Program: Leading to the Bachelor of Science degree, this program is intended for the student who wishes to have a significant exposure to science and engineering courses, but who does not plan to engage in professional engineering practice. This program provides opportunity for work in such specific areas as environmental studies and scientific and technical communication. It also permits an excellent preparation for the study of business, law, or medicine (see the "Interdisciplinary Engineering Studies" section of this catalog).

General Requirements
Each type of program has the following requirements:

Mathematics (21 credits): MATH 124, 125, 126, plus 6 credits at 200 level or higher (MATH 205, 238, and 327 are suggestions).

Natural science (21 credits): PHYS 121, 122 (8 credits), general chemistry (4 credits); plus 9 credits. Sciences, especially chemistry and physics, are important to all engineering studies. Students may satisfy the total requirements by taking CHEM 140 (4 credits), 150 (4 credits), 151 (2 credits), and PHYS 121 (4 credits), 122 (4 credits), 123 (4 credits). A student with well-defined objectives, however, may elect advanced courses from chemistry, physics, atmospheric sciences, geological sciences, geophysics, oceano­graphy, astronomy, or biology (elementary survey courses are not acceptable).

Engineering college courses or alternates (28 credits) in two groups: (1) functional techniques (12 credits in at least three of the following areas)—visual presentation, written and oral communication, computational techniques, design and synthesis, and laboratory techniques (see "College Courses" section). (2) engineering science (16 credits in the following)—materials, discrete mechanics, continuum mechanics, linear systems, 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; see "College Courses" section).

Technical preparation (0–8 credits): See individual departmental requirements.

Humanities and social sciences: 30 credits required, with a minimum of 10 in both.

Engineering course of studies (60–65 credits): See requirements of major departments or "Interdisciplinary Engineering Studies" section.

Free electives: 12–20 credits to make the total of 180–185 credits required for graduation.

Upper-division military courses can be applied to meet the free elective requirement up to a maximum of 9 credits. Physical education activity courses at the 100 level cannot be used for free elective credit.

Courses taken to satisfy minimum University entrance requirements or courses of a lower level than minimum engineering requirements cannot be used to meet graduation requirements.

Special Programs
Cooperative Work-Study
The Cooperative Work-Study Program of the College of Engineering permits engineering undergraduate students to combine practical engineering experience with their studies. Starting with the sophomore year and continuing through the junior year, selected students alternate six-month periods of work with six-month periods of study. The freshman and senior years do not include work periods. Completion of the program requires time equivalent to an additional academic year, because the alternating periods of work and study require three, instead of two, calendar years to finish the middle academic years of study. Cooperating organizations include aerospace firms, electric and electronic equipment manufacturers, power companies, manufacturers of machinery and mechanical equipment, construction and engineering firms, and state and federal agencies.

Enrollment in the Cooperative Work-Study Program presently is limited to undergraduates in civil, electrical, or mechanical engineering. Additional information and a detailed publication on this program may be obtained from the University of Washington College of Engineering, Coordinator of the Cooperative Work-Study Program, 371 Loew, FH–10, Seattle, Washington 98195.
Industrial Engineering

In addition to the four-year curricula, the college offers a course of study in industrial engineering for which a second bachelor's degree is awarded at the end of five years. The first four years provide the standard four-year curriculum of any branch of engineering in which the college grants a bachelor's degree, and the fifth includes courses in industrial management and related subjects.

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.

The growth of knowledge and the accompanying changes in the engineering practices have placed higher and higher demands on the analytical ability and fundamental preparation of practicing engineers. Some analytical tools that were available only in graduate school a decade or two ago are now required material in the undergraduate engineering programs. As a result, older engineers find it increasingly difficult to communicate with their younger counterparts. They also find it more difficult to read current engineering and scientific literature unless they first have undertaken an intensive study of applied mathematics, physics, and related subjects. Taking courses directed toward a degree, however, is seldom possible for practicing engineers.

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 educational record.

Engineering courses in this category may take many forms. They may be offered over a quarter's duration, with lectures given during the evenings or weekends; or, they may take the form of the Continuing Education for Engineers Series, which combines the advantages of a residential course with those of independent study.

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

Students who intend to work toward advanced degrees must fulfill the admission requirements of the Graduate School and of the department in which they expect to major. Acceptance also will depend 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.

Departmental Graduate Programs

Graduate study leading to the Master of Science degree with departmental designation or to the Doctor of Philosophy degree is available in all departments of the college. In addition, the Master of Science degree is available in the Department of Civil Engineering, as is the Master of Science in Engineering degree in both civil and mechanical engineering departments. The Department of Aeronautics and Astronautics has a two-year Master of Aeronautics and Astronautics degree program.

Interdepartmental Graduate Programs

Inter-Engineering Group

Through the Inter-Engineering Group, under the direction of Associate Dean Kermit L. Garland and interdepartmental faculty members, a program leading to the Master of Science in Engineering degree is offered. This degree is for qualified graduate students engaged in an interdepartmental or intercollege graduate program developed with the assistance of a faculty adviser and
approved by the Inter-Engineering Group. The degree provides for graduate studies involving work in more than one engineering department or in newly developing fields not yet recognized by departmental status. Examples are bioengineering, engineering mechanics, environmental engineering, ocean engineering, and social management of technology. Students may apply for admission directly into the inter-engineering program or may transfer from one of the established engineering departments. See the "Interschool or Intercollege Programs" section of this catalog for descriptions of bioengineering and social management of technology.

Engineering Mechanics

Graduate study in engineering mechanics is offered through the cooperation of the departments of Aeronautics and Astronautics, Civil Engineering, and Mechanical Engineering. The student usually enrolls in one of these departments. Work can lead to the Master of Science degree with departmental designation, to the Master of Science in Engineering degree, or to the Doctor of Philosophy degree.

Students who enter this program should have completed an undergraduate degree in a field such as aeronautical, civil, or mechanical engineering, physics, engineering physics, mathematics, or an equivalent. The course program is planned through consultation with an adviser to fit the student's interests and background. The student's program ordinarily includes continuing study in mathematics and the engineering sciences (solid mechanics, fluid mechanics, dynamics, thermodynamics), and must satisfy the basic requirements of the department in which he or she is enrolled.

Ocean Engineering

313 Harris Hydraulics Laboratory

The expanding and diversifying needs of society are exerting greater pressures on the water environment, both fresh and salt, from the edge of the shore to the deep lake or ocean. Problems that arise with this greater utilization cross the borders of many disciplines, such as biology, economics, fisheries, geology, law, oceanography, physics, public affairs, and transportation. Informed and careful planning and management of the marine resources is essential, because the impact of actions taken today will have lasting effects. To provide a curriculum for training the engineer to practice in this arena, programs in ocean engineering are offered as specialties in the several departments of the College of Engineering. Their objective is to develop a strong competence in one of the branches of engineering, with a capability of using that basic competence to cope with the interdisciplinary problems that arise in the marine setting.

Requirements for entry into the program and for acquisition of the graduate degrees with specialization in ocean engineering are those of the department the student selects as fitting his or her career objectives. The interdisciplinary aspects of each study program are evidenced by the inclusion of marine-oriented courses from the engineering departments and from the special subject areas mentioned above. The research can be carried on either in individual departments or in the ocean engineering laboratory facilities. Although the program is primarily at the graduate level, interested undergraduates may participate by attending seminars, by selecting their free electives in the background areas of the special subjects, or by planning an individual program through the Bachelor of Science in Engineering degree offering in the College of Engineering.

DEPARTMENTAL AND INTERDEPARTMENTAL PROGRAMS

College Courses

Executive Director

T. W. Macartney

111 Sieg

College courses are nondepartmental courses used by both engineers and nonengineering students to provide a general technological component to their courses of study. The college courses carry the prefix ENGR and are taught by faculty drawn from throughout the college.

For the engineering student, college courses in functional techniques and engineering science provide skills essential to engineering and complement the mathematics and science part of the curriculum. The courses broaden the technical exposure of the student and show how similar principles are applied in the various engineering disciplines.

For nonengineering students, college courses provide an essential technological component needed for many courses of study. Through such courses as ENGR 307, The Energy Question, or ENGR 305, Environmental Radioactivity, students also can study important present-day concerns about the impact of technology on society, including a rational analysis of the technical and social needs involved.
Elementary Computer Programs (1) is recommended.

SECOND YEAR
This schedule may be altered to include early studies in a major field. Mathematics (12-14); science (12-16); functional techniques (8-12); humanistic-social studies or electives (11-17); total--45.

FUNCTIONAL TECHNIQUES
Visual Presentation: ENGR 123, Graphical Analysis (1-8, maximum 8); ART 105, 106, or 107, Drawing; ARCH 310, 311, 312, Introduction to Design Graphics.

Written and Oral Communication: ENGR 130, Techniques of Communication (3); ENGR 131, Scientific and Technical Reporting (3); skill courses in English and speech.

Computational Technology: ENGR 140, Measurement and Experimentation (4); ENGR 141, Computer Applications to Engineering Problems I (4); MATH 114, Elementary Computer Programming; MATH 374, Principles of Digital Computers and Coding.

Design and Synthesis Technology: ENGR 150, Design and Synthesis (3); ARCH 300, 301, 302, Introduction to Design—Laboratory; ART 109, 110, Design.

Laboratory Techniques: CHEM 151, General Chemistry Laboratory; CHEM 241, 242, Organic Chemistry Laboratory; MICRO 301, General Microbiology; MICRO 320, Media Preparation; PHYS 131, 132, 133, General Physics Laboratory; PHYS 231, 232, Electric Circuits Laboratory; PHYS 331, Optics Laboratory.

ENGINEERING SCIENCE AREAS
Materials: ENGR 170, Fundamentals of Materials Science (4 credits); ENGR 171, Materials Science Laboratory (1).

Discrete Mechanics: ENGR 180, Engineering Statics (4); ENGR 230, Kinematics and Dynamics (4).
Linear Systems: ENGR 190, Introduction to Logical System Design (3); ENGR 250, Introduction to Engineering System Dynamics (4).

Thermodynamics: ENGR 260, Thermodynamics (4).
Career Planning: ENGR 110, Career Planning I (1); CER E 198, Career Planning II (1).

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 studies in the engineering technology of aeronautics and astronautics. In the senior year, the student selects a professional objective, either to continue studies at the graduate level or to enter directly into professional practice.

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
R. J. H. Bollard, Chairman; Ahlstrom, Christiansen, Decher, Dill, Eastman (emeritus), Fyfe, Ganzer, Herzberg, Holsapple, Joppa, Kevorkian, Ness, Oates, Parmeter, Pearson, Rae, Russell, Street, Vagners.
Undergraduate Program
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.

Bachelor of Science in Aeronautics and Astronautics Degree
The department sets no specific requirements for technical preparation in the first two years, but does recommend PHYS 123, 221, 222 in satisfying the natural science requirement; MATH 224, 238, 327 in satisfying the mathematics requirement; and in fulfilling the engineering science requirement, the inclusion of ENGR 170, Fundamentals of Materials Science; ENGR 180, Engineering Statics; ENGR 240, Introduction to Continuum Mechanics; and ENGR 260, Thermodynamics.

THIRD YEAR
First quarter: A A 300 (3 credits), A A 310 (3), A A 320 (2), A A 330 (3), electives (4); total—15. Second quarter: A A 301 (3), A A 311 (3), A A 321 (2), A A 331 (3), electives (4); total—15. Third quarter: A A 302 (3), A A 312 (3), A A 322 (2), A A 332 (3), electives (4); total—15.

FOURTH YEAR
27 credits of senior-level electives are to be chosen from the following: gas dynamics—A A 400, 401, 402; aircraft design—A A 410, 411, 412; structural mechanics—A A 430, 431, 432; flight mechanics—A A 440, 441, 442; space mechanics—A A 450, 451, 452; propulsion—A A 460, 461, 462; systems dynamics and aerelasticity—A A 480, 481; acoustics—A A 482; applied mathematics—A A 370, 470.

In choosing these electives, it is expected that the student will follow at least two one-year sequences in areas of specialization. Additional electives, beyond the 27 credits in aeronautics and astronautics, are required to make a total of 180 credits for graduation.

Students may wish to use some of their free elective credits and remaining credits in engineering science to augment their preparation in aeronautics and astronautics. Appropriate subject areas would be: electronics, automatic control, mathematics, applied mathematics, and physics.

Additional mathematics or 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 advisor and must meet with the approval of both the advisor and the department.

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
J. Kevorkian

Students who intend to work toward advanced degrees must apply for admission to the Graduate School and meet the requirements outlined in the "Graduate Study" section of this catalog.

Master of Science in Aeronautics and Astronautics Degree
Students who have earned a bachelor's 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, but must possess 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. A foreign language is not required.

Master of Aeronautics and Astronautics Degree
The Master of Aeronautics and Astronautics 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 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 Study" 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 3.50 grade-point average will be 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.

CHEMICAL ENGINEERING
105 Benson

Chemical engineering is a branch of engineering that deals principally with the development and application of processes and equipment whereby matter is treated to induce a change in chemical composition.

Faculty
R. Wells Moulton, Chairman; Babb, Berg, David, Finlayson, Gardner, Garlid, Heideger, Hoffman, Johanson, Larson, McCarthy, Sarkane, Sather, Sleicher.

The chemical engineering graduate of today must cope with new and complex technologies that until recently existed only in the minds of those with vision and imagination. For this reason and many others, today’s undergraduate is presented with a less descriptive and a less industry-oriented approach to education than he or she would have been ten to fifteen years ago. Current emphasis is on a more fundamental treatment, offering a good foundation in mathematics, physics, and chemistry. Such a sound, fundamental background, coupled with practical engineering training, is needed to prepare the graduate for work in the wide diversity of problems and the variety of careers offered the chemical engineer of today.

Undergraduate Program
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 and 122 (8 credits) are recommended to satisfy the natural science requirements. The technical preparation requirement is CHEM 231, 235, and 241 (8 credits). MATH 238 and 327 (6 credits), ENGR 260 (4 credits), together with CHE 200 (3 credits) as a career-planning course, are also strongly recommended.

THIRD YEAR

FOURTH YEAR

A minimum grade-point average of 2.00 in chemical engineering courses is required for graduation.

Graduate Programs
Graduate Program Adviser
R. W. Moulton

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.

Master of Science in Chemical Engineering Degree

Thesis program: The requirements for this program are a minimum of 39 credits, of which 30 credits are in formal course work and 9 credits are in thesis. The course work usually is divided in the ratio of about two to one between Chemical Engineering and other departments. At least half of these courses must be numbered 500 or above.

Nonthesis program: The requirements for this program are a minimum of 39 credits of course work, including 9 credits of graduate-level design and 3 credits of graduate seminar. The remaining 27 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.

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.

**CIVIL ENGINEERING**

*201 More*

The civil engineer is the designer and builder of the constructed facilities of our society. He or she holds major responsibility for planning, designing, constructing, operating, and preparing impact analyses of transportation facilities, bridges, commercial and industrial structures, river and harbor development, environmental control facilities, and waste disposal systems. The modern civil engineer works with urban planners, architects, economists, sociologists, systems analysts, biologists, and chemists to define problems in our technology-based society, to seek solutions to these problems, and to assess the probable impact of the proposed solutions. An essential part of this role is to bring to the conference table an understanding of what is possible and practicable to be achieved.

The civil engineer requires a broad-based technical education with increased attention given to the social and life sciences. Necessary skills in design and theoretical analyses are founded on mathematics, chemistry, physics, biology, and engineering sciences, such as mechanics, thermodynamics, and systems analyses as well as an appreciation for the effects on living systems of one’s developments and structures.

**Faculty**

Dale A. Carlson, Chairman; H. P. Mittet, Associate Chairman; Awad, Baker, Benedict, Betchart, Bogan, Brown, Burges, Charlson, Chenoweth, Clanton, Cord, Cottrell, Dunn, Ekse (emeritus), Elias, Evans, Gehner, Hammer, Hartz, Hawkins, Hennes (emeritus), Hoag, Horwood, Kent, Konichek (emeritus), Lamb, Macartney, Mar, Mattock, McNeese, Meese, Miller, Nece, Nihan, Norris (emeritus), Pilat, Rhodes (emeritus), Richey, Rossano, Sawhill, Schneider, Seabloom, Secrist, Sergev (emeritus), Sherif, Spyridakis, Straussser, Sylvester, Terrel, Vasarhelyi, Veress, Waggoner, Welch, Wenk, Wessman (emeritus).

**Affiliate Faculty**

Baumgartner, Birkeland, Edde, Olesen.

**Undergraduate Program**

*Adviser*

Jack R. Clanton

*201 More*

**Bachelor of Science in Civil Engineering Degree**

The first two years of the curriculum for the degree of Bachelor of Science in Civil Engineering are administered by the College of Engineering. The junior year provides a strong core in civil engineering planning, analysis, and design, with emphasis on problem formulation and the systems approach. A flexible senior year enables the student to prepare either for early entry into professional practice or for graduate study, to specialize, or to become a generalist.

**THIRD YEAR**


**FOURTH YEAR**

Civil engineering electives (18 credits), humanities and social sciences (15) †, electives (15) ‡; total—48.

**Graduate Programs**

*Graduate Program Adviser*

H. P. Mittet

**Master of Science in Civil Engineering, Master of Science in Engineering, Master of Science Degrees**

The Department of Civil Engineering offers courses leading to the degrees of Master of Science in Civil Engineering, Master of Science in Engineering, Master of Science, and Doctor of Philosophy.

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 M.S.E. is for other engineering graduates who wish to do graduate work in civil engineering; and the 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.

Graduate work is offered in most fields of civil engineering through the divisions of Structural Engineering and Engineering Mechanics; Transportation, Construction, and Geometronics; and Water and Air Resources.

**Requirement for the master’s degree is completion of a**

† In addition to 15 credits required in first and second years.

‡ In addition to 5 credits required in first and second years.
minimum of 39 credits, of which 30 credits must be in formal course work and 9 are in thesis.

**Doctor of Philosophy Degree**

Students working for the Ph.D. degree must complete an approved Program of Studies and research that usually require two or three years' study beyond the master's degree.

**ELECTRICAL ENGINEERING**

**211 Electrical Engineering**

Electrical engineering is a professional field that deals with the control of electricity and the electrical properties of materials used by mankind. Typical major areas of interest are electrical generation and transmission, electronic computation, communication systems, and electro-optical components and systems. The educational program of the department is based upon mathematics, physics, and chemistry and their application to electrical problems. Specific experience in electrical science, analysis, and design are also essential features.

Because of the rapidity with which new discoveries are made and engineering practice is revised, it is necessary to emphasize the fundamental principles of the field, rather than the details of current practice. The close relationship between technology and society also requires a significant emphasis on studies in the humanities and social sciences.

The bachelor's degree is the entry level for many jobs. However, the electrical industry is so complex that many professional jobs require education at the master's level, and there are also opportunities in industry, government, and education for those that have received the Ph.D. degree.

**Faculty**

Daniel G. Dow, Chairman; Alejandro, Andersen, Auth, Bergseth, Bjorkstam, Blood, Carlson, Clark, Cochran (emeritus), Damborg, Daniels, Dow, Duff, Eastman (emeritus), Ehrenberg, Golde, Guilford, Guy, Harris, Harrison (emeritus), Helms, Hernandez, Hill, Hoard (emeritus), Holden, Hsu, Ishimaru, Johnson, Lauritzen, Lewis, Lytle, Martin, Moritz, Noe, Noges, Peden, Pinter, Potter, Redeker, Reid, Reynolds, Robbins (emeritus), Rogers, Sigelmann, Smith (emeritus), Swarn, Yee.

**Affiliate Faculty**

Ancker-Johnson

**Undergraduate Program**

**Bachelor of Science in Electrical Engineering Degree**

In the student advising office, 213 Electrical Engineering, faculty, staff, and student assistants are available on a posted schedule. For general academic advising or course scheduling, the curriculum adviser or advising assistant should be consulted. Faculty members representing the professional groups in the department are available for professional and career advising. Students who have not chosen a major are encouraged to talk with any or all of the advisers. Also available in 213 Electrical Engineering are copies of the Bachelor's Degree Planbook, in which the curriculum requirements and suggestions are treated in detail.

The student chapter of the Institute of Electrical and Electronic Engineers, a national professional society, is located in 222 Electrical Engineering.

The departmental curriculum consists of:

**Technical preparation:** MATH 238, PHYS 123 (7 credits); specified electrical engineering courses: EE 331, 333, 351, 310, 371, 381, 383, 312 (30); electrical engineering electives (18); professional non-electrical engineering electives (4); free electives, in addition to college requirements (8); total 67.

A normal curriculum program, for the student who starts his or her major at the beginning of the third year, is shown below. The department recommends, however, that those students able to do so should start their major programs during the sophomore year with one or more of EE 331, 351, 310.

**THIRD YEAR**

First quarter: EE 331 (4 credits); EE 351 (4); EE 310 (3); humanistic-social studies, mathematics, or science (3–5); total—14–16. Second quarter: EE 333 (4); EE 381 (4); engineering science (4); humanistic-social studies (3–5); total—15–17. Third quarter: EE 383 (4); EE 371 (4); EE 312 (3); electives (3–5); total—14–16.

**FOURTH YEAR**

To be taken in any order: electrical engineering electives (18 credits); humanistic-social sciences (9); professional non-electrical engineering electives (4); free electives (15); total—46.

The total of free elective credits is 21. These electives can be the key to realization of the student's individual educational goals and should be selected carefully as part of an educational plan. In some cases, the electives are taken in technical fields, but the opportunity exists
for cultural enrichment or for pursuit of other areas of
particular interest to the student.

It is possible, but not required, that a student specialize
in a particular subarea of electrical engineering. The
student is urged to consult with faculty advisers in a
particular field if he or she wishes to specialize. Stu-
dents who plan to continue into graduate studies should
consult with the graduate adviser well before comple-
tion of their undergraduate programs.

**Graduate Programs**

**Graduate Program Adviser**

R. W. Clark

Students who intend to work toward advanced degrees
must apply for admission to the Graduate School and
must meet the requirements outlined in the “Graduate
Study” section of this catalog.

Although most graduate students in electrical engi-
neering have received their bachelor's degree training in
the same area, students from other physical sciences or
from mathematics often are able to pursue graduate
study in electrical engineering with little difficulty. Per-
sons coming from other schools or other backgrounds
are encouraged to discuss their probable standing, with
respect to a graduate program in this department, with
the graduate adviser.

**Master of Science in Electrical Engineering Degree**

A total of 45 credits, of which 36 are in course work
and 9 are for a thesis, are required for this degree.
Course work usually is divided between electrical engi-
neering and supporting courses in other fields in the
ratio of approximately two to one.

Some students may wish to pursue a program toward
the degree of Master of Science in Engineering, de-
scribed elsewhere in this catalog, which is basically in-
terdisciplinary in nature. Such a program may be car-
ried out under an electrical engineering adviser and is
of special interest to students with backgrounds in other
disciplines or to those seeking education in interdisci-
plinary fields such as biomedical instrumentation, ocean
engineering, or others.

**Doctor of Philosophy Degree**

The Ph.D. degree is primarily 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 essentially on general
proficiency and distinctive attainments in electrical engi-
neering, particularly on the demonstrated ability to
pursue independent research. Evidence of research
investigation is the production of a doctoral dissertation
that makes a definite contribution to knowledge and is
presented with a satisfactory degree of literary skill.

Prospective candidates for this degree normally have
obtained the master's degree. They must meet the re-
quirements of the Graduate School (see the “Graduate
Study” 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 stu-
dents obtain an effective general education. The De-
partment of Humanistic-Social Studies assists in
achieving this goal. It offers courses designed to in-
crease awareness of the full human setting, in which the
practice of engineering takes place.

**Faculty**

Myron L. White, Chairman; Botting, Chapman (emer-
itus), Douthwaite, Elliott, Higbee, Leahy, Skeels,
Souther, Trimble.

**Adjunct Faculty**

Selinker

Courses offered by the department fall into three areas:
the humanities, the social sciences, and scientific and
technical communication.

**Humanities and Social Sciences**

All HSS courses in the humanities and social sciences
are appropriate for fulfilling the College of Engineer-
ing's requirement of 30 credits in these areas. They also
are approved for meeting the distribution requirement
in the College of Arts and Sciences.

In fulfilling the 30-credit requirement, engineering stu-
dents may take one or several HSS courses, or they may
choose to meet it entirely with these courses. However,
they also may select appropriate courses from the fol-
lowing fields:

**Humanities Area**

Architecture, landscape architecture, anthropology, art,
art history; Asian languages and literature, classics,
classical archaeology, comparative literature, drama,
English, Germanic languages and literature, history,
Typical activities of industrial engineers include selecting operating processes and methods; developing work performance measures and standards; selecting proper tools, machines, and adequate equipment; designing facilities and layout of buildings; designing control systems for financial planning and cost analysis; and devising ways to improve productivity and worker morale.

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

The Bachelor of Science in Industrial Engineering degree consists of a regular four-year course of study in an engineering department that offers a full curriculum, supplemented by an additional 45 credits as described below. A basic knowledge of statistics and computer programming is required for these courses. The program takes advantage of interaction with local industries to provide valuable practical experience in the application of theory. A student may pursue the degree concurrently with the first engineering degree, but must consult with an adviser about the program.

The departmental curriculum consists of:

- M E 410, Engineering Administration (3 credits); M E 411, Engineering Economy (3); M E 412, Industrial Cost Analysis (4); M E 413, Engineering Operations Research (4); M E 415, Statistical Analysis of Engineering Measurements (3); M E 417, Work Systems Design (4) or M E 418, Work Simplification (2); M E 419, Work Environment Design (3); M E 420, Quantitative Analysis of Industrial Processes (4); School of Business Administration electives (6); electives (11); total—45.

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

III General Engineering

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. At the time he or she develops a personal interdisciplinary curriculum that must be approved by the Interdisciplinary Engineering Studies Committee, the student is assigned, when possible, to a faculty adviser with interests paralleling those of the student. Students are urged to contact the advising center for information on established procedures and guidelines for entry into the nonprofessional B.S.E. and B.S. programs.

Bachelor of Science in Engineering Degree

A student must meet all college requirements for a bachelor's degree as specified earlier in this catalog in order to obtain a B.S.E. degree. These consist of 120 credits divided among mathematics, natural sciences, functional techniques, engineering sciences, humanities, and social sciences. The minimum credit requirement for graduation is 180 credits, and there is no technical preparation requirement. The student should select the remaining 60 credits to provide a Program of Study consistent with his or her career objectives. The program should include 30 credits of at least 300-level engineering courses. The remaining 30 credits may be chosen from any University offering in engineering, mathematics, or the natural sciences, but at least half of these courses must be of at least the 300 level. Courses elected in this 60-credit category should provide a logical sequence of course work aimed at the desired goal of the student.

Two different uses of the B.S.E. degree are available:

1. Nondepartmental, but semiformalized B.S.E. degree programs in bioengineering, computer science, 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 student must complete a minimum of 30 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 even greater flexibility than does the Bachelor of Science in Engineering degree. It is a good base for professional studies in law, medicine, or business, as well as in other fields, such as technical writing, engineering sales, or environmental studies.

To obtain a B.S. degree, a student must satisfy the same college requirements (120 credits) specified for the B.S.E. degree. The minimum credit requirement for graduation is 180 credits, and there is no technical preparation requirement. The student should select the remaining 60 credits to provide a Program of Study consistent with his or her career objectives. Of these 60 credits, at least 35 credits must be selected from engineering, science, or mathematics courses numbered 300 or above, and at least 25 of these 35 credits must be in engineering courses. The remaining 25 credits may be selected from among any courses offered by the University.

MECHANICAL ENGINEERING

143 Mechanical Engineering

Mechanical engineering is the branch of engineering that is broadly concerned with energy, including its transformation from one form to another, its transmission, and its utilization. Mechanical engineers conceive, plan, design, and direct the manufacture, distribution, and operation of a wide variety of devices, machines, and systems, including complex man-machine systems, for energy conversion, environmental control, materials processing, transportation, materials handling, and other purposes. They must have a thorough grasp of the fundamentals of the engineering sciences, along with such skills as computer and graphic communication techniques.
A balance between engineering practice and a grasp of fundamentals is emphasized, so that young engineers can contribute when they begin their careers and, at the same time, have the background they will need for a lifetime of professional growth. Mechanical engineers are engaged in all the engineering functions, including creative design, applied research, development, and management.

Faculty
Morris E. Childs, Chairman; Adec, Alexander, Anderson, Balise, Bodoja, Bunney, Chalk, Chalupnik, Clark, Collins, Corlett, Crain, Daly, Day, Depew, Drui, Emery, Firey, Ford, Galle, Gessner, Gray, Guidon, Holt, Huntsman, Jorgensen, Kieling, Kippenhan, Kobayashi, Love, Marshall, McFeron, McIntyre (emeritus), McMinn (emeritus), Merchant, Messer, Mills, Morrison, Murphy, Osborn, Roberts, Sandwith, Schaller (emeritus), Sherrer, Taggart, Vesper, Vlases, Waibler, Walker, Wolak.

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
The Department of Mechanical Engineering requires that MATH 238, Elements of Differential Equations, and ENGR 180, Engineering Statics, be included in the engineering college program as technical preparation for departmental courses. ENGR 170, Fundamentals of Materials Science, and ENGR 141, Computer Applications to Engineering Problems I, are strongly recommended. MATH 327, Advanced Calculus, or MATH 205, Elementary Linear Algebra, should be taken in fulfilling the mathematics requirement. Students may begin mechanical engineering courses as soon as they have completed ENGR 180 and MATH 126 or their equivalents. Satisfaction of the minimum professional engineering requirements results from completion of the listed courses plus three courses in one of three options—energy and fluids, materials and processes, or systems and dynamics. A total of 180 applicable credits is required for graduation.

THIRD YEAR
First quarter: M E 320 (4 credits)*, M E 352 (3), M E 365 (4) † electives (4); total—15. Second quarter: M E 323 (4), M E 343 (4), M E 373 (4), electives (3); total—15. Third quarter: M E 304 (3) M E 333 (4), M E 353 (3), M E 394 (1), electives (4); total—15.

FOURTH YEAR
First quarter: M E 480 (4 credits), M E 495 (4), mechanical engineering option (3), electives (4); total—15. Second quarter: M E 469 (3), E E 306 (5), mechanical engineering option (3), electives (4); total—15. Third quarter: mechanical engineering option (3), electives (12); total—15.

Graduate Programs
Graduate Program Adviser
A. S. Kobayashi

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 is 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 Study" 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 or in Ceramic
Engineering; and Master of Science and Doctor of Philosophy in the fields of metallurgy and ceramics.

Faculty

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 properties; and of the feasibilities and economics of manufacture and application of ceramics.

Undergraduate Program
Bachelor of Science in Ceramic Engineering Degree

The course of study leading to the degree of Bachelor of Science in Ceramic Engineering includes a total of 62 credits, plus 8 credits of technical preparation courses, including HSS 300 and E E 306. Recommended is the selection of CHEM 350 and 351, Elementary Physical Chemistry, for satisfying part of the engineering science requirements.

Although no formal work-study program is available in ceramic engineering, assistance is offered in obtaining industrial experience during the summer vacations following the second and third years.

THIRD YEAR
First quarter: CER E 300* (5 credits), CER E 301 (4), CER E 306 (1), MET E 322 (3), electives (3); total—15. Second quarter: CER E 302 (4), CER E 311 (3), CER E 312 (4), CER E 322 (3), electives (3); total—17. Third quarter: CER E 303 (5), CER E 313 (4), CER E 323 (3), CER E 499 (1), electives (3); total—16.

FOURTH YEAR

Graduate Programs
Students may select courses and research in accordance with their special interests and objectives. Graduate

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

work is mostly concerned with advanced physical sciences 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 curricula who complete the basic undergraduate courses in ceramic engineering and in science.

Master of Science in Ceramic Engineering Degree

A bachelor's degree in engineering is required. If field of specialization is not ceramic engineering, some background courses also are required.

A total of 39 credits, including 9 credits of suitable thesis research, and a comprehensive oral examination also are required.

Master of Science (Ceramics-Metallurgy) 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

The list of courses recommended for majors in metallurgy should be considered in planning schedules that
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.


THIRD YEAR


FOURTH YEAR

First quarter: MET E 468 (1), technical electives (9), electives (5); total—15. Second quarter: MET E 468 (1), technical electives (9), electives (5); total—15. Third quarter: MET E 468 (1), technical electives (9), electives (5); total—15.

**Graduate Programs**

**Master of Science in Metallurgical Engineering Degree**

A total of 39 credits, including 30 credits in course work, 9 credits for a thesis, and an oral examination are required for this degree. Prospective candidates may select courses in accordance with their special interests and objectives.

Master’s degree work is mostly concerned with advanced materials science as applied to physical metallurgy, extractive metallurgy, or mineral processing. Courses that prepare for plant operation and management also may be selected. Eligible to work for this degree are graduates of accredited metallurgical engineering curricula and graduates of other engineering curricula who complete the basic undergraduate courses in metallurgical engineering.

**Master of Science (Ceramics-Metallurgy) Degree**

Students with undergraduate majors in science, particularly chemistry or physics, may work for this degree after completing basic undergraduate courses in metallurgy or equivalent.

**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 Examinations are 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

As approved by the Board of Regents on January 21, 1972, the degree programs of Bachelor of Science and Master of Science in Mining Engineering are being discontinued over a period extending until December 16, 1976. Students who entered the University before June, 1972, and will complete their degree requirements before December 16, 1976, will continue to be accommodated. Transfer students who can expect to complete their degree requirements by December 16, 1976, will also be accepted into the program.

Information and personal assistance in planning a curriculum leading to a degree in mining can be obtained by writing to the Division Head, Prof. Donald Anderson, or by telephoning 543–2611 or 543–2600.

It is anticipated that undergraduate courses related to mineral natural resources and the mineral industries will continue to be offered as electives for students in the natural sciences and engineering. Through use of the new and flexible program leading to the degree of Bachelor of Science in Engineering, students can acquire the background in the mineral resource field to seek employment in the industry or to become qualified to continue graduate studies in mining engineering at another institution.
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 fast breeder reactors, controlled thermonuclear energy, 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, Chairman and graduate adviser; Albrecht, Chalk, Garlid, McCormick, Robkin, Vlases, Woodruff.

Affiliate Faculty

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 bachelor's 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, Waves; MATH 238, Elements of Differential Equations; and CHE 330, Transport Processes I, be included in the engineering college program as technical preparation for department courses.


Nuclear Technology Requirements: (30 credits minimum)—ENGR 305, Environmental Radioactivity; ENGR 307, The Energy Question; ENGR 308, The Energy Question Laboratory; NUC E 400 (4), 477 (3), 485 (3), 486 (3), 488 (4), 489 (3), 498 (1–6, maximum 6), 499 (1–6, maximum 6).

Nontechnical Elective Requirements: (12 credits minimum)—It is recommended that students plan a series of courses that consider the legal, political, and economic aspects of directing technology in the service of mankind.

Complementary Engineering Studies: (30 credits minimum)—This sequence of courses is prepared by the student and must be approved by the Interdisciplinary Engineering Studies Task Group and the Chairman of the Department of Nuclear Engineering. Fields of study that provide a sound complement to the disciplines of nuclear engineering include, but are not limited to:

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 bachelor's degree in engineering, mathematics, chemistry, or physics are eligible for admission. Strong foundation in atomic and nuclear physics and in advanced mathematical analysis recommended.

A total of 39 credits required: 30 in formal course work, including basic courses in nuclear reactor theory, nuclear engineering laboratory, nuclear reactor engineering, nuclear engineering seminars including at least 6 credits in nuclear engineering courses numbered 530 and above, 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 become expert 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:

Neutronic Analysis of Nuclear Systems: Primarily concerned with the analysis of fission reactors and other neutronic systems from a fundamental point of view. Includes topics such as neutron transport theory; the slowing down, thermalization, and diffraction of neutrons; fast reactor systems; criticality; and mathematical and computational methods.

Nuclear System Dynamics: Emphasis on the time-dependent behavior of reactors and on other nuclear engineering systems. Stability and control of nuclear reactors, noise analysis, and pulsed neutron source analysis included.

Thermonuclear Systems and Plasmas: Includes the study of plasmas and their behavior, explores the problems and promises associated with fusion reactors. Emphasis on fundamental characteristics of plasmas, both theoretical and experimental work, is possible.

Engineering Analysis of Nuclear Systems: A specialization concerned with the engineering aspects of nuclear systems. Some possible areas: Thermal-hydraulics—concerned with heat transfer to different fluids, such as boiling liquids and liquid metals, combined conduction-radiation heat transfer, and steady-state and transient flow problems in single-phase and two-phase flow. Materials—concerned with the effect of neutrons and ionizing radiation on materials, and the properties of materials used in nuclear engineering systems. Environmental engineering—concerned with the application and control of nuclear energy systems and with nuclear radiations in our environment. Includes atmospheric and water pollution; control, disposal, and possible uses of radioactive and thermal by-products; optimization of nuclear reactor siting; and the analysis and optimization of power systems in which nuclear reactors are incorporated with other power sources.

Bionuclear Engineering: A specialization involving the student in applying the methods and techniques of nuclear engineering to the study of biological systems. Includes use of trace-element analysis by neutron activation, treatment and diagnosis of disease by use of nuclear energy, and the interaction of nuclear radiation with biological materials.

Other Areas: Include nuclear engineering systems and principles applied to oceanography, marine sciences, forensic sciences, and direct energy conversion. Designed to meet the student's interests and goals.

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.

Qualifying Examination: This examination may be taken after 30 credits of graduate work have been successfully completed, and should be completed during the second year of regular graduate study. It is given once each school year, usually during Winter Quarter. This examination is designed to assess the student's understanding of the basic scientific and engineering concepts upon which his or her doctoral work will be based. Subject material includes undergraduate funda-
mentals in mathematics, physics, and the engineering sciences, as well as material in the first year of graduate work in nuclear engineering.

*Oral General Examination:* The student is examined on topics related to the field of specialization in nuclear engineering and the area of dissertation research. A student is not permitted to take the General Examination until accepted by a member of the faculty as a research student. The student should take the General Examination soon after passing the qualifying examination, usually within one year. Passing the General Examination constitutes admission to candidacy for the Ph.D. degree.

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.

*Final Examination:* The student orally presents and defends the results of his or her investigation.
Both in research and in training, the College of Fisheries is concerned with the investigation of possible ways to use stocks of fish and shellfish more effectively, of how to make better use of all waters to produce more food from living organisms, and of how to culture aquatic plants and animals more effectively.

The college is also deeply concerned with the impact of pollution, of industry, and of population pressure on the aquatic environment, both as these affect fisheries and as they influence 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. Rather than work with isolated technical questions, the college attempts to deal with whole problems, an approach that involves many phases of biology, with particular emphasis on the quantitative aspects. Full attention is given to political, social, and economic problems associated with the use of resources. Although fishery problems of the Pacific Northwest are emphasized, so many features of their case histories are also applicable to problems of harvesting aquatic resources throughout the world that many foreign students register in the college.

Because commercial fishing is so closely related to the food industry, the college maintains the Institute for Food Science and Technology to prepare food scientists for careers in both industry and government. Both the graduate and the undergraduate programs emphasize the role of the basic physical and biological sciences in the solution of problems resulting from a recent technological revolution in the food industry.
Although the food science program concentrates on general principles applicable to a wide range of food products, the extensive research programs are largely 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, Assistant Director; Lord, Mathisen, Rogers, Salo, Smith, Stober, Thorne, Wissmar.

Research Staff
Cederholm, Dawson, Donnelly, Gilbertson, Hartt, Leistikow, Opperman, Parr, Pease, Poe, Roger, Simenstad, Snyder, Tyler.

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. Much of this work on salmon is important to the United States section of the International North Pacific Fisheries Commission, and members of the institute staff participate in the meetings of the commission.

Research related to the impact of man's activities on the quality of our environment includes projects on effects of logging, effects of underground nuclear tests, toxic effects of salmon cannery wastes, and ecological impacts of nuclear power plants, as well as studies of effects of dams and equalizing reservoirs. Under the National Science Foundation, Analysis of Ecosystems Program, the institute is participating with other departments in the University in an extensive ecological study of 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 field stations at Big Beef Creek, Kiket Island, and Fern Lake. The program and aspects of 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.

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 station are used for work in Washington. 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, especially Economics, Engineering, Law, and Oceanography.

The Kumtucks, a ninety-nine-foot floating physiology laboratory, is used in Puget Sound and nearby waters for the study of biochemistry and physiology 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 and Alaska. It is equipped with a small laboratory and with winches for handling specialized fishing or sampling gear.

The thirty-two-foot Iliamna, thirty-foot Sa-yak, and thirty-foot Kakkonak 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.
Institute for Food Science and Technology
Faculty
John Liston, Director; Matches, Pigott, Taub.
Research Staff
Hung, Palmer, Read, Shenouda.

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 safety, radiation processing of foods and seeds, food process engineering, biochemical processes in foods, marine microbiology, aquatic microsystems, seafood technology, and nutrition. Active within each of these areas is at least one specific research project usually funded by federally derived grants from agencies such as the Public Health Service, Atomic Energy Commission, and National Science Foundation. These projects provide opportunities for research training for both undergraduate and graduate students in food science.

Industrial research is carried out 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 the 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, and questions from industry or the public are frequently answered directly from the information in this source, which is kept current. Usually working with the seafood specialist, the institute offers workshops and other such programs from time to time for the seafood industry. Workshops on more general food science topics are also offered by 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
Allyn H. Seymour, Director; Nevissi, Schell, Welander.
Research Staff
Johnson, Jokela, Lusk, McAlpin, Nelson, 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, to some extent, from other colleges and departments on the campus.

The laboratory was established in 1943 as the Applied Fisheries Laboratory and later was renamed the Laboratory of Radiation Ecology. The original program focused attention on the effects of X-rays on salmon, trout, and other aquatic organisms for the purpose of evaluating the impact of the Hanford plutonium production reactors on the fishery resource of the Columbia River. The field studies began with a radiobiological survey at Bikini Atoll in 1946 and have continued to the present. The locations of other field studies have included many areas of the Central Pacific, Cape Thomson in the Arctic, Amchitka in the Aleutian Islands, and the coastal and inland waters of Washington. The field programs are complemented by research projects in the laboratory. Originally, most of the field work 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 have been also 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 research programs are conducted by the core staff, which is strongly supported by graduate students, some of whom select thesis research projects related to the laboratory's research programs. Examples of recent thesis projects include the following subjects: effects of ionizing radiation plus temperature on the eggs and larvae of oysters; effects of tritium on the development and behavior of guppies; effects of radiation and temperature on primary productivity; the use of radionuclides to determine the biological half-life of iron in rainbow trout; and the distribution of lead and mercury in the biota, water, and sediments of Lake Washington. Other current research programs of the laboratory are
the study of heavy metals in the Puget Sound Basin; naturally occurring lead-210 and polonium-210 in the water, biota, and sediments of Washington's inshore and coastal waters; the biogeochemistry of transuranic elements at Bikini Atoll; radioecological studies at Amchitka Island related to the containment of radionuclides produced by underground nuclear detonations; radioecological studies at Eniwetok and Bikini Atolls related to the resettlement of the native people; and the distribution of Hanford-produced radionuclides in the water and biota of Washington's coastal waters.

Washington Cooperative Fishery Unit

Faculty
Richard R. Whitney, Unit Leader; Gilbert B. Pauley, Assistant Unit Leader.

Cooperators in the Washington Cooperative Fishery Unit are the Department of the Interior’s Bureau of Sport Fisheries and Wildlife, the Washington Department of Fisheries, the Washington Department of Game, and the University of Washington. In addition, projects are being funded by the National Science Foundation, the Bureau of Reclamation, and by the Washington Fly Fishing Club. The funds are used by staff of the unit and graduate students to carry out research projects dealing with recreational fisheries. Currently under way are studies of: effects of flow and temperature on timing of steelhead runs on coastal streams; diseases and parasites of trout; benthic and littoral fishes in Lake Washington, particularly as they respond to human influences; and effects of cedar leachate on fish and aquatic invertebrates, as well as studies generally related to under-utilized fishes potentially important as sport fishes. In these studies, the unit's staff often works with students interested in credit for undergraduate research (FISH 499).

Offices of the Cooperative Fishery Unit are in 106 Fisheries Center. Facilities of the cooperating agencies can be made available for use by students through the unit.

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 Game Department in Olympia. Many of the senior research members of these organizations, as well as many from industry, are lecturers or affiliate faculty 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 Research Center.

The newly established Institute for Marine Studies will provide coordination between the diverse marine activities throughout the University. It also will develop interdisciplinary programs relating marine sciences to social sciences and other disciplines. As these new programs are developed, students will find many additional options open to them, although any graduate student already may develop his own interdisciplinary program and seek its approval through the Graduate School. 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 Forestry, Fisheries, and Wildlife

Faculty
Benjamin A. Jayne, Director; Bare, Bevan, Bledsoe, Chapman, Dugdale, Fletcher, Gallucci, Hatheway, Kelley, Male, Mathews, McCaughran, Schreuder, Turnbull, Walsh, Winter.

Research Staff
Brown, Buss, Gales.

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 special emphasis on statistical inference and experimental design for the biological sciences; and applied analysis consisting of differential mathematics 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 participated in the research activities of several academic units of the University. These include, in addition to the two resource colleges, 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.

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 imbedded in backgrounds of interrelated physical, biological, and economic activities, and under numerous institutional constraints. Such 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 preparations of the descriptions of complex ecosystems.

Wildlife Science Program

Committee

Donald E. Bevan, Chairman; McCaughran, Salo, Scott, 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 will 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 North Pacific marine fishes and northwestern freshwater fishes. However, the collection also includes extensive material from the Philippine Islands and the South Pacific, as well as representative collections from other parts of the world.

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. 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 two thousand-gallon annular tank.

Other laboratories provide for the study of the physiology 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 card punching, as well as assistance with the use of the computer; the college maintains a 200 User Terminal to provide ready access to the larger
computers in the Computer Center, CDC 6400 and Burroughs B5500. 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 sixty-seven-foot diesel-powered boat, the Commando, is used for instruction and research in Lake Washington, Puget Sound, and the North Pacific Ocean. Capable of trawling to a depth of six thousand feet, it is equipped for other types of fishing undertaken in the North Pacific, as well as for handling a wide variety of experimental gear. The Commando has facilities for marine microbiological studies and for technological investigations at sea. These include freezers, other refrigeration equipment, and a small laboratory unit. Periodic training cruises introduce students to shipboard operations, including the use of various types of sampling equipment, and acquaint them with a diversity of marine habitats.

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 and halibut fisheries, Puget Sound has extensive bottom fish, commercial oyster, clam, crab, 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 undertaken at the college’s Fern Lake station in Kitsap County, where special attention is given to limnology and to the influence of the watershed on the lake.

Food science facilities include separate well-equipped laboratories for food microbiology, food biochemistry, and food analysis. The food-processing and engineering laboratory complex is composed of several separate facilities that contain equipment for teaching and experimental work in thermal processing, including canning, plus the drying, smoking, and freezing of foods. A wide variety of low-temperature equipment and cold rooms is available.

A unique feature of the food science laboratories is the Cobalt-60 research food irradiator (Mark II). This radiation unit contains a source of about thirty thousand curies' strength. Food or other materials to be irradiated are loaded into metal containers, which are moved mechanically into proximity to the radiation source. Operational safety is ensured by a water shield, and the containers are designed to provide for temperature and atmosphere control during irradiation.

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, including simulated seabed equipment, pressure-bomb incubators, deep-sea sampling equipment, etc., are maintained in the Institute for Food Science and Technology for graduate studies in the field of marine microbiology.

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 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.

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 spend the equivalent of their first two years, or approximately 90 credits, as fisheries or food science premajors. At his or her option, a student admitted to the University of Washington may become a fisheries premajor by application to the college.

Premajor Program

Prior to becoming a fisheries or food science major, a student must complete the credits in the subjects shown below:

Fisheries Science: General biology (15 credits); general chemistry (10); organic chemistry (5); English (expository writing) (5); mathematics (algebra, calculus) (9); statistical methods (5); general economics (3); speech, public speaking (5); total—57.

Food Science: General biology (10 credits); general chemistry (14); qualitative and quantitative chemistry (8); organic chemistry (10); English (expository writing) (5); mathematics (algebra, calculus) (9); statistical methods (5); general physics (12); total—73.

FISH 101, courses in humanities, social sciences, 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 biology and food science curricula. Students at community colleges in Washington should consult the most recent Bulletin of Community College Transfer Programs. Students at other institutions should take equivalent courses.

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 students 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.

Minority and women students are urged to consider potential futures in this field. Literature on career opportunities is available in the college office. 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.

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.

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.
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.

FISHERIES SCIENCE

Adviser
Allyn H. Seymour
104 Fisheries

Bachelor's degrees require completion of a common core curriculum and no fewer than 36 credits in fisheries. The standard program includes the subjects listed below, or their equivalents.

Core Curriculum

Basic Science: (30 credits minimum) Biology, general—BIOL 101–102 (5–5) and BOT 113 or 220 (5, 5); or BIOL 210, 211, 212 (5, 5, 5). Chemistry, general—CHEM 140, 150, 151 (4, 4, 2). Chemistry, organic—CHEM 102 or 231, 232 (5, 3, 3).

Mathematics and Statistics: 9 credits minimum, beyond MATH 105, Elementary Functions (5). Mathematics (calculus)—MATH 124, 125 (5, 5); or 157 (4);

or Q SCI 291, 292 (3, 3). Statistics—Q SCI 281 or 381 (5, 5).

Environmental Sciences: (11 credits minimum) BIOL 472, Ecology (3); BIOL 473, Limnology (3); and OCEAN 203, Introduction to Oceanography (5); or BIOL 474, 475, Ecology Laboratory, Limnology Laboratory (3, 2).

Fisheries Science: (14 credits minimum) FISH 101, 311, 401 (5, 4, 5).

Social Science: (11 credits minimum) The following courses are recommended: ECON 211, General Economics (3); ECON 435, Natural Resource Utilization and Public Policy (5); POLS 471, Administrative Processes (5) or A ORG 440, Organization Theory (3).

Functional Techniques: (20 credits minimum) ENGL 271, Advanced Expository Writing (5); FISH 314, 340, 395; (3, 4, 3); SPCH 220, Introduction to Public Speaking (5).

Bachelor of Science in Fisheries Degree

In addition to the core curriculum, students select any two sets of prescribed courses from the following seven sets:

Fish Culture: FISH 444, 451, 452, 454, 460, 467 (3, 5, 5, 5, 5, 5); Q SCI 382, 383, Statistical Inference in Applied Research (5, 5).

Invertebrate Culture: FISH 405, 406, 454, 459 (5, 5, 5, 5); Q SCI 382, 383, Statistical Inference in Applied Research (5, 5); ZOOL 330, Natural History of Marine Invertebrates (5).

Recreational Fisheries: FISH 367, 467 (3, 5); FOR R 451, Outdoor Recreation Economics (3); FOR R 452, Sociology of Leisure and Outdoor Recreation (2); Q SCI 382, 383, Statistical Inference in Applied Research (5, 5); SOC 110, Survey of Sociology (5); SOC 330, Human Ecology (5). Choose at least 5 credits from: FISH 425, 460, 499 (5, 5, 5); 1–3, max. 9; FOR R 467, Sociology of Natural Resources (2); Q SCI 480, Sampling Theory for Biologists (4); URB P 440, Forecasting Methods in Urban Planning (3).

Aquatic Resource Management: FISH 379, 425 (3, 5); Q SCI 382, 383, Statistical Inference in Applied Research (5, 5); Q SCI 391, Introduction to Matrices and Their Application (3); Q SCI 376, Operations Research in Resource Utilization I (3); Q SCI 456, Mathematical Models in Population Biology (4); Q SCI 457, Management of Exploited Animal Populations (4); Q SCI 486, Experimental Design (3).
Water Quality: BOT 443, Algalogy (or introductory course on plants) (5); CHEM 221, Quantitative Analysis (5); FISH 435, 459, 460 (3, 5, 5). Choose at least 6 credits from: CEWA 450, Man and the Pollution of His Environment (3 or 5); CEWA 434, Ecological Effects of Waste Water (4); CEWA 457, Water Quality Analysis (3); FISH 434, 471, 472, 477 (3, 3, 3, 3); Q SCI 382, 383, Statistical Inference in Applied Research (5, 5).

Fish Processing: CHEM 221, Quantitative Analysis (5); FD SC 380, 381, 481, 484 (3, 3, 5, 5); MICRO 301, 302, General Microbiology and Laboratory (3, 2), or 400, 401, Fundamentals of Bacteriology and Laboratory (3, 3). For this set, choose CHEM 231, 232, Organic Chemistry (3, 3) from the core curriculum.

General Environmental Studies: FISH 459 (5); FD SC 381 (3); WLFS 350, Survey of Wildlife Biology and Conservation (3). Choose at least 15 credits from: CEWA 450, Man and the Pollution of His Environment (3 or 5); FISH 434, 435, 472, 473 (4, 3, 3, 3); FOR R 493, Ecology of the Northwest I (2); GEOG 303, Perspectives on Man and Nature (5); GEOG 444, Geography of Water Resources (3 or 5); ZOOL 465, Natural History of Mammals (5).

Bachelor of Science Degree With a Major in Fisheries
A student who wishes to enlarge his opportunity for a choice of electives may pursue a Bachelor of Science degree with a major in fisheries. In addition to the core curriculum, he or she selects any single set of prescribed courses from the above seven sets. Electives, sufficient to bring total credits to 180 and fisheries credits to 36, are subject to approval by the college.

FOOD SCIENCE
Adviser
John Liston
217 Fisheries

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 has completed mathematics to include advanced algebra and trigonometry, and laboratory science to include chemistry and physics.

FOOD SCIENCE MAJORS
A student continues as a food science premajor until the credits required by the premajor program have been completed. In addition to these core requirements, the following courses must be taken by students whose applications for major status have been accepted by the college:

BIOC 405, Introduction to Biochemistry (5); BIOC 408, Introduction to Biochemistry Laboratory (3); CHEM 350, Elementary Physical Chemistry (3); FISH 395 (3); FD SC 380, 481, 482, 483, 484, 485, 486, 498 (3; 5; 5; 5; 5; 5; 2–6, max. 6); MICRO 302, 301, General Microbiology and Laboratory (3, 2); PC EH 440, Water and Waste Sanitation (4); PC EH 441, Milk and Food Sanitation (4).

Students who intend to proceed to graduate study should consult with an adviser about the substitution of courses at a more advanced level 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); electives (6). Second quarter—CHEM 150, 151 (4, 2); electives (9). Third quarter—CHEM 160, 170 (4, 3); MATH 157 (4).

Second Year: First quarter—CHEM 231, 241 (3, 2); ENGL 271 (5); PHYS 114 (4); elective (1). Second quarter—CHEM 232, 242 (3, 2); PHYS 115 (4); electives (6). Third quarter—CHEM 221 (5); Q SCI 281 (5); PHYS 116 (4); elective (1).

Third Year: First quarter—MICRO 301, 302 (3, 2); PC EH 440 (4); electives (6). Second quarter—CHEM 350 (3); FD SC 380 (3); PC EH 441 (4); electives (5). Third quarter—BIOC 405, 408 (5, 3); FD SC 481 (5); electives (2).

Fourth Year: First quarter—FD SC 482, 484, 498 (5; 5; 1–6, max. 6); FISH 395 (3). Second quarter—FD SC 483, 485, 498 (5; 2, max. 6); electives (3). Third quarter—FD SC 486, 498 (5; 2–6, max. 6); electives (8).

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 bachelor's 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. Preference will be given to those with a strong background in the
basic sciences. A student admitted with a bachelor's 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
William K. Hershberger
180 Fisheries

Alternate Graduate Program Advisers
Donald A. McCaughran, John Liston (Food Science).

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 522, and 6 additional credits in courses numbered 500 or above; food science majors must complete 6 credits in FD SC 521. 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. 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 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, will be 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. Numerous 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.

Opportunities for graduate work at the College of Fisheries are supplemented by the presence of international, federal, and state fishery and water research agencies that have staffs working in laboratories on or near the campus. In the college as lecturers are many senior research or affiliate faculty members of the cooperating laboratories, as well as many experts from industry. Besides finding financial support in such laboratories, graduate students 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 the application of the natural and social sciences to the uses of forest, range, and recreational lands and the related technological and managerial processes applicable to the production and provision of forest-based goods and services. The many aspects of forestry-related subjects range from the development of ecological and environmental principles governing the dynamics of biotic population and methods of management techniques to both private and public lands, as well as manufacturing and production processes.

The College of Forest Resources was founded in 1907, when forestry education in the United States was in its infancy. Since then the college has evolved to provide instruction in a substantial array of natural sciences, social sciences, and humanities, both as applied in the several professional areas in forestry and as subjects for advanced study and research.

The University of Washington is located centrally in one of the world's most important forest regions. Unique opportunities are available to integrate the instruction and research programs with the management of nearby public and private forest land as well as the operation of extensive and diverse industrial facilities and numerous research centers.

Undergraduate curricula of the College of Forest Resources emphasize a thorough and appropriate academic preparation during the first two years, which is followed by one of several professional upper-division programs selected to fulfill the individual student's objectives. Elective possibilities exist in all curricula, and opportunities for independent study and research are available. Because of the modest size of the under-
graduate enrollment, an atmosphere of close association between students and faculty members exists in classroom and laboratory. The diversity of educational experiences and the superior facilities found only in a large university also are available to forest resources students at the University of Washington.

The College of Forest Resources is accredited by the Society of American Foresters. All curricula, no matter how specialized, are flexible enough to provide qualification in the Society of American Foresters or for the United States Forest Service Civil Service. Students can consult with advisers in planning their schedules to include the specific academic requirements for SAF and civil service qualifications.

Graduate programs in forest resources are designed to accommodate a wide range of educational objectives. A student may concentrate upon advanced professional training or upon appropriate science or social science disciplines that are related to forestry.

The College of Forest Resources offers curricula leading to the degree of Bachelor of Science in Forest Resources and, through the Graduate School, the degrees of Master of Forest Resources, Master of Science, and Doctor of Philosophy.

The College of Forest Resources faculty helps forestry students to obtain summer employment while in the University and permanent employment upon graduation. Summer work is available through several federal and state public agencies and numerous private companies in the wood-using industry of the region. Many of these agencies and companies send representatives to the college to interview prospective employees. All students are encouraged to seek suitable summer employment, because such work offers an excellent opportunity for both practical experience and financial help.

Undergraduate Programs
In addition to meeting the University's general admission requirements for all undergraduates, students who plan to enter the College of Forest Resources should have completed Algebra III (intermediate) and a course in trigonometry. While in high school, prospective students also should have completed at least one unit of biological science and one unit of physical science.

A choice of high school electives in the natural sciences, social sciences, and humanities serves to strengthen a student's preparation for University study. This part of the applicant's record receives the same careful atten-

The College of Forest Resources offers seven undergraduate curricula, and an additional means of implementing the individual student's educational objectives is available through the use of elective credits available in all curricula. Elective credits can be taken in the College of Forest Resources and in other schools and colleges of the University. Students are encouraged to take elective credits outside the College of Forest Resources in order to broaden their education beyond that provided in the specialized curricula.

Students in all curricula must meet general requirements of the University and the college. Specific college regulations state that no required course may be taken on a satisfactory/unsatisfactory or credit/no credit basis. Specific curriculum requirements are described below under the division programs.

Undergraduate programs offered by the college are administered by three divisions. The Management and Social Sciences Division administers programs in forest management, outdoor recreation, and forest engineering. The Biological Sciences Division administers programs in forest sciences and wildlife science. The Wood and Paper Division administers programs in wood and fiber science and in pulp and paper technology.

The advising of students is the joint responsibility of the College Advising Center and the divisions. All students entering the Management and Social Sciences Division and the Biological Sciences Division are considered to be premajors until they have completed at least 75 credits of applicable lower-division course work with a cumulative grade-point average of at least 2.00. At this level, students are admitted to unrestricted upper-division curricula with concurrent registration for remaining lower-division requirements. Certain majors may be designated as restricted majors, a status to which admission sometimes necessitates compliance with additional selection procedures. Students who contemplate entering a restricted major should contact the College Advising Center no later than the February 1 preceding the junior year regarding submission of a restricted major application and other selection procedures in effect.

The honors program in the College of Forest Resources provides opportunities in all curricula for students who qualify. The program is directed by two members of the college faculty. Students may request information from the honors advisers.
MANAGEMENT AND SOCIAL SCIENCES DIVISION

Chairman
Thomas R. Waggner
123 Anderson

Programs in the Management and Social Sciences Division are oriented toward professional careers in the management of forested lands. Emphasis in all programs is on the application of the social, physical, and biological sciences to forest resource management and allocation problems. The curriculum in forest management prepares the student to manage the management of forest land for the production of a variety of goods and services consistent with ownership objectives. The curriculum in forest engineering provides specialized concentration in the planning, layout, and supervision of transportation and timber harvesting systems. The curriculum in outdoor recreation is oriented toward the specialized use of forested lands for recreational purposes and focuses on the planning and management of outdoor recreational facilities as well as on the interpretation of natural phenomena.

Lower-Division Requirements
Forest resources—FOR R 100, Introduction to Forest Resources Management (5 credits); FOR R 201–207 (to total 4 credits). Mathematics—Q SCI 291, 292, Analysis for Biologists (6); Q SCI 281, Elements of Statistical Method (5). Physical sciences—CHEM 101, General Chemistry (5); PHYS 114, 117, General Physics and Laboratory (5). Biological sciences—Biol 101–102, General Biology (10). Earth sciences—ECON 200, Introduction to Economics (5); English, engineering, or humanistic-social studies (3); electives (5). Engineering sciences—ENGR 123, Graphics (2); Free electives (16). Curriculum specialization (15).

FOREST MANAGEMENT CURRICULUM SPECIALIZATION
Physical sciences—CHEM 102, General Chemistry, or PHYS 115, 118, General Physics and Laboratory (5 credits). Social sciences—electives (5); English, engineering, or humanistic-social studies (3). Computer programming (2).

OUTDOOR RECREATION CURRICULUM SPECIALIZATION
Social sciences—SOC 110, Survey of Sociology (5 credits); approved electives (5); English, humanistic-social studies, or engineering (3). Free electives (2).

FOREST ENGINEERING CURRICULUM SPECIALIZATION
Physical sciences—PHYS 115, 118, General Physics and Laboratory (5 credits). Social sciences—electives (5). Engineering sciences—ENGR 161, Plane Surveying (3); computer programming (2).

Upper-Division Requirements
FOREST MANAGEMENT CURRICULUM SPECIALIZATION
Forest resources—FOR R 300, Dendrology (5 credits); FOR R 320, Forest Ecology (5); FOR R 322, Silviculture I Methods (3); FOR R 340, Forest Surveying (3); FOR R 360, Forest Measurements (5); FOR R 362, Aerial Photos in Forestry (3); FOR R 365, Forest Resources Management I (5); FOR R 468, Forest Resources Management II (5); FOR R 469, Forest Resources Management III (5); forest resources electives (20). Forest resources, wildlife science, quantitative science (10). Free electives (20).

FOREST ENGINEERING CURRICULUM SPECIALIZATION
Forest resources—FOR R 300, Dendrology (5 credits); FOR R 304, Wood: Properties and Best Use (3); FOR R 320, Forest Ecology (5); FOR R 340, Forest Surveying (3); FOR R 360, Forest Measurements (5); FOR R 362, Aerial Photos in Forestry (3); FOR R 365, Forest Resources Management I (5); FOR R 377, Elements of Timber Design (4); FOR R 440, Construction (4); FOR R 441, Forest Engineering (5); FOR R 442, Financial Analysis of Logging Equipment and Operations (4); FOR R 443, Safety in Forest Industries (1); FOR R 446, 447, 448, 449, Senior Forest Engineering Field Studies (15). Civil engineering—CETC 310, Forest Highway Location (5); CETC 417, Cadastral Surveys (3); electives (6). Business administration and economics electives (9). Statistics and operations research electives (6). Free electives (4).

OUTDOOR RECREATION CURRICULUM SPECIALIZATION
Forest resources—FOR R 320, Forest Ecology (5 credits); FOR R 340, Forest Surveying (3); FOR R 350, Field Studies in Outdoor Recreation (3); FOR R 351, Introduction to Outdoor Recreation (5); FOR R 353, Principles of Natural History Interpretation (3); FOR R 354, Introduction to Management of Recreation Areas (3); FOR R 355, Introduction to Planning and Design of Recreation Areas (3); FOR R 362, Aerial Photos in Forestry (3); FOR R 452, 453, 455, Advanced Outdoor Recreation Studies (2–5); FOR R 459, Case Studies in Outdoor Recreation (5). Forest resources electives (20–22). Free electives (32).

BIOLOGICAL SCIENCES DIVISION

Chairman
Leo J. Fritschen
104 Winkenwerder

The programs administered by the Biological Sciences...
Division provide sufficient flexibility to allow for a variety of preparation in natural resources as related to forestry. A student's objective can be either a professional career following undergraduate education or subsequent graduate training.

The wildlife science curriculum provides a sound foundation in natural sciences, mathematics, and social sciences and in their application to the conservation and manipulation of wildlife populations. The curriculum supplies an excellent basis for graduate study in this field.

The forest science curriculum allows much latitude for specialization, but it can be used to best advantage when the student seeks to become qualified as a professional forester, as defined by the United States Civil Service or the Society of American Foresters, and at the same time to develop in depth a particular area of interest in the natural resource field. Suggested programs of this nature are available in the following options: environmental analysis, forest genetics, forest hydrology, forest protection, forest soils, physical processes in forest ecology, resource management, population and community ecology, urban forestry, and wildlife. For details, interested students should consult either an academic adviser in the division or the college curriculum adviser as early as possible in order to utilize lower-division electives appropriately.

**Forest Science Curriculum**

**Lower-Division Requirements**


**Upper-Division Requirements**

Forest resources electives¹³ (30 credits). Mathematics, quantitative science, physical science⁹ (9). Biological sciences⁹ (9). Social sciences and humanities⁹ (9). Free electives (33).

**Wildlife Science Curriculum**

**Lower-Division Requirements**

Biological sciences—Biol 210, 211, 212, Introductory Biology¹⁴ (15 credits). Physical sciences—CHEM 140, General Chemistry (4); CHEM 150, 151, General Chemistry and Laboratory (6), CHEM 231, 232, Organic Chemistry¹⁵ (6). Mathematics—MATH 105, Elementary Functions (5); Q SCI 291, 292, Analysis for Biologists (6); Q SCI 281, Elements of Statistical Method (5). Social sciences—ECON 200, Introduction to Economics (5); ECON 201, Introduction to Microeconomic Theory (5); social science electives¹⁶ (15); ENGL 271, 272, Advanced Expository Writing¹⁸ (10). Earth sciences—GEOL 205, Introduction to Geological Sciences (5). Fisheries—FISH 340, Computer Application to Biological Problems (4). Free electives (1–3).

**Upper-Division Requirements**


**WOOD AND PAPER DIVISION**

**Chairman**

Kyosti V. Sarkanan
296 Bloedel

Programs in the Wood and Paper Division focus on the use of wood as a raw material for the many products derived from the forest. This orientation can be either toward professional aspects of forest-based industries or toward specialized scientific fields associated with wood utilization. Study in pulp and paper technology emphasizes principles related to chemical and mechanical production of wood pulp, manufacture of paper, and management of firms in the pulp and paper industry. Students completing this program may return for a fifth year and complete requirements for the Bachelor of Science in Chemical Engineering degree. The wood and fiber curriculum allows the student to orient his education in one of several directions through the choice of elective courses. The wood products option of this curriculum provides a background adaptable to a wide variety of employment opportunities in the forest products industries. The science option prepares the student either for graduate study or for industrial research positions.
Pulp and Paper Technology Curriculum

Lower-Division Requirements

Forest resources—FOR R 101, Introduction to Wood and Paper (1). Mathematics—MATH 105, Elementary Functions (5); MATH 124, 125, 126, Calculus With Analytic Geometry (15); MATH 238, Elements of Differential Equations (3); MATH 281 or Q SCI 281, Elements of Statistical Methods (5); MATH 327, Advanced Calculus (3). Physical sciences—CHEM 140, General Chemistry (4); CHEM 150, 151, General Chemistry and Laboratory (6); CHEM 160, General Chemistry (4); CHEM 231, 232, Organic Chemistry (6); CHEM 241, Organic Chemistry Laboratory (2); PHYS 121, 122, 123, Mechanics, Electromagnetism, and Oscillatory Motion, Waves (12). Biological sciences—BOT 110, Plants in Man’s Environment (5). Social sciences—ECON 211, General Economics (3); ENGL 171, 172, College Writing (6). Engineering—ENGR 260, Thermodynamics (4).

Upper-Division Requirements

Forest resources—FOR R 323, 324, Forest Biology I, II (6); FOR R 400, Wood and Fiber Structure (5); FOR R 401, Physics of Wood and Fiber Composites (4); FOR R 403, Fibrous Structure and Rheology I (3); FOR R 406, Wood Chemistry I (3); FOR R 407, Wood Chemistry I Laboratory (2); FOR R 464, Economics of Forest Products Industries (3); FOR R 476, Pulp and Paper Technology (3); FOR R 477, Pulp and Paper Laboratory (2); FOR R 485, Undergraduate Research (3). Free electives (7).

Wood and Fiber Curriculum

SCIENCE OPTION

Lower-Division Requirements

Forest resources—FOR R 101, Introduction to Wood and Paper (1). Mathematics—MATH 105, Elementary Functions (5); MATH 124, 125, 126, Calculus With Analytical Geometry (15); Q SCI 281 or MATH 281, Elements of Statistical Methods (5). Physical sciences—CHEM 140, General Chemistry (4); CHEM 150, General Chemistry (4); CHEM 231, 232, Organic Chemistry (6); PHYS 121, 122, 123, Mechanics, Electromagnetism, and Oscillatory Motion, Waves (12). Biological sciences—BOT 110, Plants in Man’s Environment (5). Social sciences—ECON 211, General Economics (3); ENGL 171, 172, College Writing (6). Electives (10) (24).

Upper-Division Requirements

Forest resources—FOR R 323, 324, Forest Biology I, II (6); FOR R 374, Wood Utilization (3); FOR R 400, Wood and Fiber Structure (5); FOR R 401, 402, Physics of Wood and Fiber Composites (8); FOR R 403, Fibrous Structure and Rheology I (3); FOR R 406, Wood Chemistry I (3); FOR R 407, Wood Chemistry I Laboratory (2); FOR R 408, Wood Chemistry II (3); FOR R 464, Economics of Forest Products Industries (3); FOR R 476, Pulp and Paper Technology (3); FOR R 477, Pulp and Paper Laboratory (2); FOR R 485, Undergraduate Research (3). Electives (10) (43).

WOOD PRODUCTS OPTION

Lower-Division Requirements

Forest resources—FOR R 10120, Introduction to Woodland Paper (1). Mathematics—MATH 105, Elementary Functions (5); Q SCI 291, 292, Analysis for Biologists (6); Q SCI 281 or MATH 281, Elements of Statistical Methods (5). Physical sciences—CHEM 101, General Chemistry (5); CHEM 102, General and Organic Chemistry (5); PHYS 114, 115, General Physics (8). Biological sciences—BOT 11021, Plants in Man’s Environment (5). Social sciences—ECON 200, Introduction to Economics (5); English, engineering, or humanistic-social sciences (6). Electives (23) (39).

Upper-Division Requirements

Forest resources—FOR R 323, 324, Forest Biology I, II (6); FOR R 374, Wood Utilization (3); FOR R 375, Wood Utilization Laboratory (2); FOR R 377, Elements of Timber Design (4); FOR R 400, Wood and Fiber Structure (5); FOR R 401, Physics of Wood and Fiber Composites (4); FOR R 406, Wood Chemistry I (3); FOR R 407, Wood Chemistry I Laboratory (2); FOR R 464, Economics of Forest Products Industries (3); FOR R 470, Wood Deterioration and Control (4); FOR R 472, Plywood and Laminating Processes (3). FOR R 473, Gluing Process Technology (4); FOR R 476, Pulp and Paper Technology (3); FOR R 477, Pulp and Paper Laboratory (2); FOR R 485, Undergraduate Research (3). Electives (24).

See “Explanation of Requirements” on page 207.

Graduate Programs

Graduate Program Adviser

Robert I. Gara
102 Winkenwerder

Graduate programs offered in forest resources lead to degrees of Master of Forest Resources, Master of Science, and Doctor of Philosophy. Graduate students usually center their graduate study in one of the special-
izations: management and social sciences; biological sciences; or wood and paper. Students who prefer an interdisciplinary program of graduate study are encouraged to devise such a program with the assistance of faculty in the appropriate specializations. Such programs are a long-standing tradition in the college. Soon after he or she is enrolled, the student is assigned a Graduate Program Committee, which is responsible for guiding the student in the early stages of the graduate program.

Graduate education in the management and social sciences specialization includes programs in forest land management, resource economics, economics of the forest products industry, forest biometry, forest fire science, forest engineering, forest policy, mensuration, watershed management, forest photogrammetry, forest recreation, forest sociology, and conservation.

In the biological sciences specialization, graduate study and research include the fields of wood anatomy and morphology, genetics of forest trees, forest tree physiology, tree nutrition, ecology of forest tree species and communities, forest soils, forest meteorology, forest influences, forest entomology, forest pathology, forest hydrology, silviculture, and wildlife biology.

The wood and paper specialization offers graduate programs in the physics of wood and fiber composites, nonwoven systems technology, wood and extractives chemistry, wood technology, pulp and paper technology, and composition board technology.

Other special programs can be developed in response to particular graduate needs.

In all areas of study, the college maintains a close working relationship with faculties in associated colleges and departments throughout the University, including service on graduate committees.

Admission

A student who intends to work toward an advanced degree must apply for admission to the Graduate School and must meet the requirements set forth by the Graduate School and the College of Forest Resources.

Basic requirements for admission to the Graduate School are a bachelor's 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 Study” 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 by 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 of the student successful preparation for the General Examination in forest resources and the necessary research and dissertation. The time required, beyond minimum limits, for the preparation depends on the thoroughness and the 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, which may be oral, centers on the specific areas of forest resources and of natural or social science in the student's major field. The examination covers most of the remaining subject matter of forest resources.

Scholarships and Financial Aids

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
The Institute of Forest Resources, Laboratories for Forest Resource Management, and the Laboratories for International Forest Resources Studies are an interdisciplinary group concerned with wildlands use planning and management, decision making on forest practices and associated environmental impacts, forest product manufacturing, and outdoor recreation. Research in the nearly thirty concurrent projects stresses social, economic, and technological considerations, using and building onto the biological information generated by the Center for Ecosystem Studies.

Laboratories for International Forest Resources Studies
Director
Kenneth J. Turnbull
107 Anderson

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 these laboratories 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, impact of herbicide on forests of Vietnam, wildlife and forest insects in Chile, 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.

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. The modernized Anderson Hall, the eight-year-old Winkenwerder building, and the recently completed Bloedel Hall 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 26,000 bound volumes and 33,000 pamphlets, reports, and monographs. It also has an excellent collection of approximately 2,500 periodi-
ternary 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' field work 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 plants 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. Specific laboratories are designed to study soil chemistry and soil physics, polymer chemistry, meteorology, tree physiology, genetics, wood and extractives chemistry, physics of fibrous composites, applied mechanics, wood process technology, pulp and paper technology, pathology, entomology, and recreation.

The college field facilities include four major forested areas covering nearly ten thousand acres, an arboretum, two reserves, and three cooperative research centers and stations. These lands offer a wide variety of terrestrial and aquatic characteristics favorable to the full range of scientific investigations. These field units provide a general natural science laboratory for the many disciplines in the college specifically related to, or concerned with, the research and teaching of natural resources behavioral patterns and management.

The Charles Lathrop Pack Demonstration Forest, a tract of more than 2,300 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 Malitia 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 Winnifred Denney Moore Forest is a 450-acre tract in the eastern Cascade Mountains. It is especially useful for ecological studies in eastern Cascade timber types and studies of land management practices applicable to the high-altitude sections of eastern Washington.

The Gordon D. Marckworth Experimental Forest is a 6,900-acre area managed jointly by the State Department of Natural Resources and by the University. Located about twenty miles from campus and offering a wide variety of forest soil and water conditions, the forest is an ideal site for study and research. Numerous 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 the City of Seattle for studies in forest hydrology and mineral cycling in the forest ecosystem. This area serves as a principal research site for the Coniferous Forest Biome study. Other research stations in this program are established at Chester Morse Lake and in the Findley Lake watershed.

The Washington Park Arboretum, a 120-acre natural setting located within Washington Park, is only a ten-minute walk from the University campus. Through a long-term lease with the City of 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.

The McBride Reserve in rural King County also will be included as part of the arboretum system for collections, research, and studies.
Explanation of Requirements

1. Or equivalent courses.
2. Or BIOL 210, 211, 212.
3. From GEOL 101, 205, 310 or ATM S 101, 201, 301.
4. From Q SCI 340, ENGL 111, 121, 171, 172 or ENGR 130, 131 or HSS 302.
5. From the social sciences section of the College of Arts and Sciences distribution list. For outdoor recreation, courses must be selected from ANTH 100, PSYCH 100, POL S 101 or 102, and at least one humanities course must be taken.
6. Completion of curriculum specialization consistent with the selection of upper-division major.
7. From ENGR 141, 215, 315 or Q METH 200 or equivalent courses.
8. From approved elective lists.
9. To be selected with the approval of adviser.
10. From the social sciences and humanities sections of the College of Arts and Sciences distribution list.
11. From natural sciences, social sciences, and humanities.

12. From GEOL 101, 205, 311 or ATM S 101, 201, 301.
13. From approved list.
14. Or BIOL 101 102 and BOT 113 or 220.
15. Or PHYS 114, 115.
16. Or ENGR 130, 131.
17. ZOOL 409 or 458 may be substituted.
18. Or PHYS 114, 115, 116 with adviser's approval.
19. 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 laboratories.
20. Or FOR R 100.
22. ECON 211 may be substituted by a transfer student.
23. A minimum of 10 credits in social sciences and 14 from the following: physical sciences, mathematics, earth sciences, computer programming, FOR R 201 through 207, ENGR 120, 121, ME 302, 303, ACCTG 210, 220, 230.
24. A minimum of 29 credits must come from approved list.
INTERDISCIPLINARY GRADUATE DEGREE PROGRAMS

ART HISTORY
131 Art

Faculty
Millard B. Rogers, Chairman; Bliquez, Bravmann, Christofides, Edmonson, Grossmann (emeritus), Holm, Kingsbury, Opperman, Pascal, Pundt, Reed, van der Marck, Webb, Weston, Wilson. Millard B. Rogers, graduate program adviser.

In art history, students study the creation and meaning of works of art in relation to the artists and cultures that produce them. Being, in nature, comparative, the history of art involves the interaction of styles and ideas from different centers over long periods of time; hence, its study requires many different skills, including languages, bibliography, historic and stylistic analysis, and connoisseurship. Advanced study in the history of art leads primarily to positions in higher education and museums and is research oriented. Students are encouraged to work in areas in which the program offers special strengths, including Asian, Classical, Primitive, and Tribal, and Western art from the Renaissance to the present. The graduate program in art history leading to the Doctor of Philosophy degree is administered by an interdisciplinary art history group of the Graduate School. The Bachelor of Arts and Master of Arts degrees in art history are administered by the School of Art.

Doctor of Philosophy Degree

Admission Requirements: Prior sound preparation at a general level, which usually means having acquired a Master of Arts degree in the history of art.

Graduation Requirements: (1) a minimum of 72 credits in art history and related fields beyond the Bachelor of Arts degree, exclusive of thesis and dissertation credits; at least 36 of these must be in courses numbered 500 or above, of which a maximum may be in fields related to art history; (2) reading knowledge of French or German as tested by the Educational Testing Service examination, 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) South and Southeast Asia, (b) Eastern Asia, (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 graduate art history program offers the Samuel H. Kress Foundation Fellowship of $3,000 each year to a student who is pursuing a program in the history of art. Limited Kress funds are available for the assistance of graduate students in the history of art. Also available are teaching assistantships for which students may apply. It is a policy to make such awards only to students who have been in residence at the University of Washington for one year.

BIOLOGY TEACHING
212 Johnson

Faculty
Ingrith Deyrup-Olsen, Chairman; Donald S. Farner, Associate Chairman; Douglas (Microbiology), Farner (Zoology), Gordon (Biochemistry), Halperin (Botany), Kohn (Zoology), Meuse (Botany), Nester (Microbiology), Olstad (Education), Stettler (Forest Resources), Gallucci (Fisheries), Hatheway (Forest Resources), Kelley (Center for Quantitative Science), Kelley (Oceanography), Martin (Biostatistics), McCaughran (Fisheries), Paine (Zoology), Pyke (Mathematics), Shorack (Mathematics), Stevens (Physics), Wahl (Biostatistics), Young (Physiology and Biophysics).

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 biology. 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 biology 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 Study" section of this catalog.

Specific requirements for the M.A.T. degree in the field of biology 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 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 a laboratory or field, library, or classroom 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
F361 Health Sciences

Faculty
Richard A. Kronmal, Chairman; Birnbaum (Mathematics), Breslow (Biostatistics), Brown (Physiology and Biophysics), Chapman (Fisheries), Diehr (Biostatistics), Feigl (Biostatistics), Felsenstein (Genetics), Fisher (Biostatistics), Gallucci (Fisheries), Hatheway (Forest Resources), Jayne (Center for Quantitative Science), Kelley (Oceanography), Martin (Biostatistics), McCaughran (Fisheries), Paine (Zoology), Pyke (Mathematics), Shorack (Mathematics), Stevens (Physics and Biophysics), Thompson (Biostatistics), Turnbull (Forest Resources), Wahl (Biostatistics), Young (Physiology and Biophysics).

Biology and medicine are undergoing revolutionary advances in their development as quantitative sciences. 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 recently instituted programs relating mathematics or statistics, or both, to one particular biological field. The aim of this graduate program at the University of Washington is to give students wider scope in their areas of biological interest with the possibility of cross-fertilization of ideas not only be-
tween mathematical statistics and one field of biology but also among several fields of biology.

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 beyond college algebra and 15 or more credits in a biological field. Students with minimum mathematical or biological preparation may find it to their advantage to enter during the summer session to take preparatory courses. For some of the elective courses in the program, a knowledge of chemistry or physics, or both, is necessary.

The number of students admitted to the biomathematics program is limited, and the selection is made by a faculty admissions committee. Review of applications begins in March for admission Autumn Quarter. The earlier an application is submitted, the greater is the possibility of admission. Applications also are accepted for other quarters.

In addition to fulfilling Graduate School requirements, an applicant must submit three letters of recommendation from persons competent to evaluate the applicant's abilities and a narrative statement regarding the applicant's purpose and interest in entering the program.

Programs of Study

The Biomathematics Group offers programs leading to a Master of Science degree or a Doctor of Philosophy degree.

MASTER OF SCIENCE DEGREE

<table>
<thead>
<tr>
<th>Courses</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>MATH 394, 395 Probability (3,3)</td>
<td>6</td>
</tr>
<tr>
<td>MATH 482, 483 Statistical Inference (3,3)</td>
<td>6</td>
</tr>
<tr>
<td>MATH 484 Distribution-Free Inference</td>
<td>3</td>
</tr>
<tr>
<td>MATH 485 Analysis of Variance</td>
<td>3</td>
</tr>
<tr>
<td>PC BS 511, 512, 513 Medical Biometry I, II, III (3,3,3)</td>
<td>9</td>
</tr>
</tbody>
</table>

Approved electives, 6–10 credits, depending upon student's background. At least 9 of the above course credits must be for work in courses numbered 500 or above. A thesis also is required.

DOCTOR OF PHILOSOPHY DEGREE

There are four pathways to the biomathematics Doctor of Philosophy degree. (1) The biostatistics pathway trains Ph.D. program students in biostatistics, usually with a medical or health services emphasis. (2 and 3) The quantitative ecology pathway offers an ecology emphasis with a close association with fisheries, forestry, wildlife, or oceanography. The student may choose between two alternative branches: an applied mathematics–differential equations branch and a probability-statistics branch. (4) Under exceptional circumstances, individual programs in other areas of biomathematics may be arranged.

Biostatistics Pathway

<table>
<thead>
<tr>
<th>Courses</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>MATH 394, 395, 482, 483, 484, and 485 (as listed above)</td>
<td>18</td>
</tr>
<tr>
<td>MATH 424, 425, 426 Fundamental Concepts of Analysis (3,3,3)</td>
<td>9</td>
</tr>
<tr>
<td>MATH 581, 582, 583 Advanced Theory of Statistical Inference (3,3,3)</td>
<td>9</td>
</tr>
</tbody>
</table>

9 credits in applied statistics from among the following:

<table>
<thead>
<tr>
<th>Courses</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>PC BS 571, 572, 573 Special Topics in Biostatistics (3,3,3)</td>
<td>9</td>
</tr>
<tr>
<td>Q SCI 486 Experimental Design</td>
<td>3</td>
</tr>
</tbody>
</table>

Approved electives in biology of at least 9 credits. Particularly recommended are the following options: PC EP 511, 512, 513 (9 credits); GENET 351 or 451 (3); Q SCI 456, 457 (8); FISH 556, 557, 558 (9); BIOL 472 (3) and ZOOL 572, 574, 578 (11). Additional approved electives in biology or applied statistics so that the total is at least 15 credits.

All students are required to register for PC BS 580, Seminar in Biostatistics, for 1 credit per quarter for at least 5 credits. Approved electives may be taken for an additional 4 credits. Students who have not had a one-year course in applied statistics will be requested to take PC BS 511, 512, 513, Medical Biometry I, II, III, or an equivalent, such as Q SCI 382, 383, Statistical Inference in Applied Research. Also required are 3 credits in biostatistical consulting, such as Q SCI 499 or PC BS 590.

Additional Requirements: (1) Demonstration of competence in computer programming. (2) Examinations. Near the completion of the course work, the student takes the General Examination to qualify for advancement to Candidacy. The General Examination consists of written examinations in theoretical statistics, applied statistics, and an appropriate biological area, as well as an oral examination. The oral examination may be given to test the student's ability to integrate mathematical methods with the field of application or may deal with a dissertation proposal. (3) Dissertation. Most of the student's time after completion of the General Examination should be devoted to his or her dissertation research program, although consulting requirements might also be satisfied at that time.

Quantitative Ecology Pathway

<table>
<thead>
<tr>
<th>Courses (For Both Branches)</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH 394, 395, 396 Probability (3,3,3)</td>
<td>9</td>
</tr>
<tr>
<td>Q SCI 381 Introduction to Probability and Statistics</td>
<td>5</td>
</tr>
<tr>
<td>and Q SCI 382, 383 Statistical Inference in Applied Research (5,5)</td>
<td>10</td>
</tr>
<tr>
<td>or PC BS 511, 512, 513 Medical Biometry I, II, III (3,3,3)</td>
<td>9</td>
</tr>
</tbody>
</table>

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APPLIED MATHEMATICS-DIFFERENTIAL EQUATIONS BRANCH

Additional course requirements:

**Applied Analysis**

Courses Credits
MATH 427, 428, 429 Topics in Applied Analysis (3,3,3) 9
MATH 464, 465, 466 Numerical Analysis I, II, III (3,3,3) 9
MATH 482, 483 Statistical Inference (3,3) 6
MATH 484 Distribution-Free Inference 6

**Stochastic Processes**

Courses Credits
BMA TH 554 Stochastic Processes in the Life Sciences 3
or MATH 491, 492 Introduction to Stochastic Processes (3,3) 6

Followed by 9 credits from:

**Partial Differential Equations**

Courses Credits
MATH 574, 575, 576 Advanced Partial Differential Equations (3,3,3) 9
A A 587, 588, 589 Topics in Applied Analysis I, II, III (3,3,3) 9
A A 562, 563, 564 Methods of Partial Differential Equations I, II, III (3,3,3) 9

**Nonlinear Differential Equations**

Course Credits
MATH 538, 539 Nonlinear Ordinary Differential Equations (3,3) 6

**PROBABILITY-STATISTICS BRANCH**

**Statistical Theory**

Courses Credits
MATH 482, 483 Statistical Inference (3,3) 6
MATH 484 Distribution-Free Inference 3
MATH 485 Analysis of Variance 3

Followed by 9 credits from:

Courses Credits
Q SCI 480 Sampling Theory for Biologists 4
Q SCI 486 Experimental Design 3
PC BS 571, 572, 573 Special Topics in Advanced Biostatistics (3,3,3) 9
MATH 424, 425 Fundamental Concepts of Analysis (3,3) 6

**Stochastic Processes**

Courses Credits
MATH 491, 492 Introduction to Stochastic Processes (3,3) 6
or BIOL 554 Stochastic Processes in the Life Sciences 3

Followed by either:

**Advanced Statistics**

Courses Credits
MATH 581, 582, 583 Advanced Theory of Statistical Inference 9

or **Advanced Probability**

Courses Credits
MATH 521, 522, 523 Probability (3,3,3) 9

Additional Requirements: (1) All students are required to register for the seminar in quantitative ecology (BMA TH 597) for 1 credit per quarter for at least 5 credits. (2) Examinations. To qualify for advancement to Candidacy, the students in the Probability-Statistics Branch take the same General Examination as do the biostatistics students (i.e., a written examination in theoretical statistics, applied statistics, an appropriate ecological area, and an oral examination). To qualify for advancement to Candidacy, the students in the Applied Mathematics-Differential Equations Equations Branch take a sequence of written examinations in applied analysis prepared by the biomathematics faculty in consultation with the mathematics faculty, plus a written examination in an appropriate ecological area and an oral examination. (3) Dissertation. Most of the student's time after completion of the General Examination should be devoted to his or her dissertation research program, although consulting requirements also might be satisfied at that time.

COMPARATIVE LITERATURE

B434 Padelford

Faculty

Frank J. Warnke, Chairman; Ernst Behler, Associate Chairman; D. Behler, E. Behler, Christofides, Ellrich, Grummel, Hildebrand, Hruby, F. Jones, L. Jones, Konick, J. Leiner, W. Leiner, Loraine, MacKay, McKinnon, McLean, Reinert, Sehmsdorf, Thompson, Wang, Warnke, Willeford. Frank W. Jones, 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 study of literature concerns itself with literature in its essential nature, not as restricted to one specific national culture or language. The comparative task proceeds by means of concentration on two or more national literatures, studied in their original languages. Typical areas of inquiry for the comparative lit-
Literature scholar include literary traditions prevailing for long periods of time in large cultural areas, major genres and forms as they are manifested in different linguistic and cultural environments, patterns of influence and reception of literary works among various national cultures, and the general principles of literary theory and criticism.

On receiving the Master of Arts or Doctor of Philosophy degree, the graduate is qualified for teaching and research in comparative and world literature and in the history of literary genres, as well as in the language and literature of his or her specialization.

**Master of Arts Degree**

**Admission Requirements:** Bachelor of Arts degree in comparative literature, English, or any foreign literature, or equivalent background. Advanced competence in one foreign language.

**Graduation Requirements:** 40 quarter credits, of which 25 must be in courses at the 500 or 600 level, with a maximum of 10 credits of 600-level work, allowed except with special permission. Of the required work, three courses, or a minimum of 10 credits, must be taken in comparative literature, including C LIT 510; the remaining must include study in two or more literatures, and at least three courses must be taken in each of two literatures. Advanced foreign-language competence must be demonstrated on entering the program; basic reading knowledge of a second foreign language must be acquired before the degree is awarded. A comprehensive written examination must be taken after completion of course work. With permission of the graduate program adviser, 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 80 post-baccalaureate degree credits, of which at least half, in each section of the student's program, must be in courses at the 500 or 600 level, with a maximum of 15 credits of 600-level work, except with special permission. Of these total credits, at least 20 must be in comparative literature courses, including C LIT 510 and 511 or any equivalent course in linguistics or stylistics; at least 35 credits in the literature of major interest to the student; at least 25 credits in the student's minor field or fields. If more than one minor field is chosen, at least 15 credits must be taken in each. 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. Written and oral General Examinations, 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, namely, 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, B434 Padelford.

**COMPUTER SCIENCE**

**228 Roberts**

**Faculty**


Computer science is devoted to the representation, storage, manipulation, and presentation of information in an environment permitting automatic information systems. The computer scientist is interested in discovering the means by which information can be transformed in order to model and analyze the information transformations in the real world. This interest leads to: inquiry into both the theory and the application of effective ways to represent information of all forms, effective algorithms to transform information, effective languages with which to express algorithms, effective means to monitor the process and to display the transformed information, and economic ways to accomplish all of these.

**Master of Science Degree**

**Admission Requirements:** To be admitted to the graduate program in computer science, an applicant must satisfy the admissions criteria outlined in the “Graduate Study” 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: (1) a knowledge of computer organization and computer programming, including the development of algorithms; (2) advanced undergraduate preparation in the mathematical, natural, or engineering sciences, although this preparation does not imply a major in these fields.
Three letters of recommendation must accompany the application. Results of Graduate Record Examinations also are desired.

**Graduation Requirements: Without Thesis**—40 credits, of which at least 20 must be in courses at the 500 level or above. At least 30 credits must be in courses chosen from the computer science list. The remaining course work should be in one or more supporting fields. Satisfactorily passing a written examination on the computer science core curriculum. Submission of a written report acceptable to the student's faculty adviser, based on a computer science project in which the student has participated. **With Thesis**—40 credits, of which 9 must be from C SCI 700, Master's Thesis, and 20 must be in courses at the 500 level or above. At least 24 credits must be in courses chosen from the computer science list. The remaining course work should be in one or more supporting fields. Satisfactorily passing an oral examination on the thesis work. The computer science core curriculum and course list may be obtained from the adviser.

**Doctor of Philosophy Degree**

**Admission Requirements**: The same as for the Master of Science degree.

**Graduation Requirements**: (1) Passing a Ph.D. degree qualifying examination administered by Computer Science. The examination usually is taken after completion of one year 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) Demonstrating proficiency in a foreign language, usually French, German, or Russian. (3) Passing the General Examination specified in the "Graduate Study" section of this catalog. In this examination, the student must demonstrate depth of knowledge in the area of programming languages and in one of a number of special areas acceptable to his or her Supervisory Committee. Examples of such areas are numerical analysis, computer design, and theoretical foundations of computer science, including automata theory, mathematical logic, and modern algebra. (4) Completing approximately 60 credits of course work, 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. (5) Preparation of a dissertation acceptable to the Supervisory Committee. Students must register for at least 27 credits of C SCI 800, Doctoral Dissertation.

**DRAMA ARTS**

**113 Drama-TV**

**Faculty**
Gregory A. Falls, Chairman; Falls (Drama), Jones (English), Kechley (Music), Kingsbury (Art), Loper (Drama), Lorenzen (Drama), McDiarmid (Classics), McKinnon (Asian Languages and Literature), Smith (Art), Wolcott (Drama). Gregory A. Falls, graduate program adviser.

Drama Arts Group of the Graduate School comprises faculty members from Drama, Art, Asian Languages and Literature, Classics, English, Music, Scandinavian Languages and Literature, Slavic Languages and Literature, and other disciplines. Through the group, the University offers a program that leads to the Doctor of Philosophy degree for students interested in research and scholarship.

The Doctor of Philosophy degree program in drama arts is concerned with the relationship of theatre history, criticism, and the theatre arts. The program for the first year concentrates on theatre history, with allied studies in criticism, architecture, and art. Students who enter the program are expected to have had some theatre experience, both practical and academic. Because of the interdisciplinary character of the faculty, intensive study of the drama and theatre of a number of nations is possible if the student has an appropriate language competence.

Proficiency in one foreign language is required. The General Examination consists of a series of prepared essays in a major field and an oral examination in both a major and a minor field. After the first year, the study is primarily in tutorials and independent projects in the student's major and minor fields.

**EAST ASIAN STUDIES**

**406 Thomson**

The East Asian Studies Group, an interdisciplinary group of the Graduate School, offers programs that lead to the Master of Arts degree. The group, comprising faculty members from a number of disciplines cooperating within the Institute for Comparative and Foreign Area Studies, offers several East Asian regional specializations leading to the degree, and these are described later in this section.

Complete course listings and additional information may be obtained from the Institute for Comparative and Foreign Area Studies, the Department of Asian Lan-
guages and Literature, and other cooperating departments.

Outlined below are regional Master of Arts degree specializations currently offered by the group.

Admission Requirements

An applicant to any of the regional specializations in the Master of Arts degree program must meet the requirements of the Graduate School as outlined in the "Graduate Study" section of this catalog. An undergraduate grade-point average of 3.00 in the junior and senior years usually is a prerequisite for admission. Submission of the scores of the aptitude section (verbal and quantitative) of the Graduate Records Examination is required.

China and Inner Asia

Faculty

James R. Townsend (Political Science), Associate Director; Brandauer (Asian Languages and Literature), Chan (Asian Studies), Chang (Geography), Cirtautas (Asian Languages and Literature), Dunn (History), Hsiao (emeritus), Kapp (History), Knechtges (Asian Languages and Literature), Mah (Economics), Norman (Asian Languages and Literature), Poppe (emeritus), Serruys (Asian Languages and Literature), Taylor (Asian Studies), Treadgold (History), Wang (Asian Languages and Literature), Wilhelm (emeritus), Wuston (emeritus), Wylie (Asian Languages and Literature), Yen (Asian Languages and Literature). Kozo Yamamura, graduate program adviser.

China Regional Studies

This course of study combines language instruction with area training. It is designed for the student with a Bachelor of Arts degree in a discipline (1) as a terminal degree in preparation for a career in government, journalism, business, or teaching, or (2) as a transitional degree for a Doctor of Philosophy degree program in a discipline. Students with Bachelor of Arts degrees in Chinese languages and area studies or the equivalent are encouraged to pursue programs leading to the Master of Arts or Doctor of Philosophy degrees in a discipline department and to concentrate much of their work on China.

Course Requirements

Language training is an essential component of the program. Each student is required to complete Chinese language training through at least the third year of instruction (45 credits); each student is encouraged to take as much instruction in Chinese as possible, including summer intensive courses.

Interdisciplinary study is another essential component of the program. Each student is required to take EASIA 521-522, Seminar: Introduction to the Interdisciplinary Study of China (10 credits), during his or her first year. This two-quarter sequence introduces the student to work on China undertaken in various disciplines.

Course work in the disciplines is the third essential component of the program. A student can choose from a broad range of courses in disciplines, with the selections representing, at a minimum, a total of 26 credits in addition to EASIA 521-522. Of these 26 credits, 8 must be in courses at the 500 level or above.

Other Requirements

A student has the option of submitting two seminar papers or a thesis. The requirement for the two seminar papers may be met in the EASIA 521-522 sequence and in the discipline seminar. Both papers (or the thesis, which usually will build on work undertaken in the seminar) must be read and approved by at least two faculty members. A student also must pass a comprehensive oral examination covering course work and the seminar papers or thesis.

Japan and Korea

Faculty

Kenneth B. Pyle (History), Associate Director; Beckmann (Asian Studies), Butow (History), Hanley (History), Hellmann (Political Science), Henderson (Law), Hiraga (Asian Languages and Literature), Kakushchi (Geography), Lukoff (Asian Languages and Literature), McKinnon (Asian Languages and Literature), Miller (Asian Languages and Literature), Niwa (Asian Languages and Literature), Palais (History), Suh (Asian Languages and Literature), Takaya (Asian Languages and Literature), Tatsumi (emeritus), Webb (Art), Yamamura (Institute for Comparative and Foreign Area Studies and Economics). Kozo Yamamura, graduate program adviser.

Japan Regional Studies

This course of study combines language instruction with area training. It is designed for the student with a Bachelor of Arts degree in a discipline (1) as a terminal degree in preparation for a career in government, journalism, business, or teaching, or (2) as a transitional degree for a Doctor of Philosophy degree program in a discipline. Students with baccalaureate degrees in Japanese language and area studies or the equivalent are encouraged to pursue programs leading to the Master of Arts or Doctor of Philosophy degrees in a discipline department and to concentrate much of their work on Japan.
INTERDISCIPLINARY GRADUATE DEGREE PROGRAMS

Course Requirements
Language training is an essential component of the program. All students are required to complete Japanese language training through at least the fourth year of instruction (60 credits).

Interdisciplinary study is another essential component of the program. Each student is required to take EASIA 555, Introduction to Modern Japanese Studies (5 credits), in his or her first year. This course provides a systematic introduction to the interdisciplinary approach in the study of modern Japan. In the second year, each student must take EASIA 559, Interdisciplinary Seminar on Japan (5 credits). This course is designed for interdisciplinary or problem-oriented research.

Course work in the disciplines is the third essential component of the program. Each student is expected to enroll in discipline courses totaling 25 credits, of which at least 8 must be in courses at the 500 level or above.

Other Requirements
Each student must submit an essay of distinction. The essay, which usually builds on work undertaken in EASIA 559, must be read and approved by at least two faculty members. A student must also pass a comprehensive oral examination covering course work and the essay.

KOREA REGIONAL STUDIES
This course of study combines language instruction with area training. It is designed for the student with a Bachelor of Arts degree in a discipline (1) as a terminal degree in preparation for a career in government, journalism, business, or teaching, or (2) as a transitional degree for a Doctor of Philosophy degree program in a discipline.

Course Requirements
Language training is an essential component of the program. Each student is required to complete Korean language training through at least the second year of instruction (30 credits), or KOREAN 313 or its equivalent. A student with language background will, on admission, usually be expected to continue to enroll in Korean language courses. Each student is required to take HSTAS 481, 482, History of Korea, and one graduate seminar in Korean history, either HSTAS 585, Research Seminar: Modern Korea, or HSTAS 583-584, Seminar in Korean History. Each student is expected to enroll in discipline courses totaling at least 36 credits, of which 18 or more must be at the 500 level or above.

Students preparing for additional work in a Doctor of Philosophy degree program should consider taking additional language instruction in Japanese or Chinese and courses in Chinese or Japanese history, politics, and other social sciences.

Other Requirements
A student may submit an essay of distinction or two seminar papers. The essay may be an extension of a seminar paper, and it must be read and approved by at least two faculty members. If two seminar papers are submitted in lieu of an essay, one of them must be from HSTAS 585. Each student also must pass a comprehensive oral examination covering course work and the essay.

HEALTH SERVICES ADMINISTRATION AND PLANNING
F351 Health Sciences

Faculty
William C. Richardson, Chairman; Alberts (Finance, Business Economics, and Quantitative Methods), Benoliel (Comparative Nursing Care Systems), Bergman (Pediatrics and Health Services), Blackman (Health Services), Bracht (Social Work), Grey (Urban Planning), Gross (Sociology), Johnson (Management and Organization), Lagace (Health Services), Lyden (Public Affairs), McCaffree (Economics and Health Services), Miller (Urban Planning), Morrill (Geography), Patti (Social Work), Pealy (Public Affairs), Phillips (Family Medicine), Richardson (Health Services), Rosenzweig (Management and Organization), Saxberg (Management and Organization), Schneider (Urban Planning), Seifert (Health Services), Shipman (Public Affairs), Williams (Public Affairs). Thomas R. Seifert, graduate program adviser; Allan Blackman, alternate graduate program adviser.

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 program accommodates degree candidates in any one of three areas of specialization: hospital administration, medical care administration and organization, and comprehensive health planning. The curriculum is designed to be highly interdisciplinary, with a faculty drawn from several academic units within the University.

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Admission Requirements: Admissibility to the Graduate School, including a bachelor's 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 Examination, Admission Test for Graduate Study in Business, or the Miller Analogies Test in conjunction with the Doppelt Mathematical Reasoning Test; a narrative statement regarding the applicant's objectives; three letters of reference; and, for applicants who pass initial screening, final selection interviews by members of the program-faculty for their designees. In general, applications are accepted only for Autumn Quarter of each year.

Graduation Requirements: Degree requirements include three quarters of study with emphasis on multidisciplinary basic discipline and methods courses following distribution requirements established by the program; introductory health services courses; a summer internship at an institution, agency, or program appropriate to the applicant's Program of Study; and an additional three quarters of health services core courses, specializations, courses, and electives. In addition, as part of the graduation requirement, second-year students undertake a field analysis or research report. The project is supervised by the faculty, and academic credit is awarded.

Additional information and application materials may be obtained from University of Washington, Health Services Administration and Planning, F351 Health Sciences, SC-37, Seattle, Washington 98195.

PHYSIOLOGY PSYCHOLOGY
333A Guthrie

Faculty
Moncrieff H. Smith, Jr., Chairman. Psychology—Earl B. Hunt, Chairman; Makous, Rose, M. Smith, Teller, Woods. Physiology and Biophysics—Harry D. Patton, Chairman; Luschei, Miller, O. Smith, Stevens, Towe. Moncrieff H. Smith, Jr., graduate program adviser.

This interdisciplinary program administered by the Physiology Psychology Group of the Graduate School has been designed to meet a need for intensive training in the overlapping area of the behavioral and the physiological sciences. Currently, physiology and other departments of medical schools are appointing psychologists to carry on certain types of physiological research and to teach medical students. Psychology departments long have felt the need for individuals more highly conversant with physiological techniques and concepts than is usual for Ph.D.'s 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

Faculty
Kenneth L. Jackson, Chairman; Bichsel (Radiology), Christensen (Radiology), Fairhall (Chemistry), Figley (Radiology), Gordon (Biochemistry), Moulton (Chemical Engineering), Nelp (Radiology), Robkin (Nuclear Engineering), Roman (Genetics), Seymour (Fisheries), Wolf (Pathology), Wootton (Radiology). Kenneth L. Jackson, graduate program adviser.
INTERDISCIPLINARY GRADUATE DEGREE PROGRAMS

Master of Science in Radiological Sciences Degree

The program leading to the degree of Master of Science in Radiological Sciences is offered by the Radiological Sciences Group of the Graduate School. Study for this degree is open to students with baccalaureate degrees in a physical or biological science or in engineering, depending on the option selected. Several curriculum options are offered to satisfy different requirements and interests of biological scientists, physical scientists, or engineers. The various options described below prepare students for careers in health physics, radiological health, radiological physics, radiation biology, or hospital physics.

Thesis topics include studies in radiation biology, radioecology, nuclear medicine, radiochemistry, radiation physics, or nuclear engineering. Opportunity for research in the Hanford Laboratories of the United States Atomic Energy Commission also may be provided by special arrangement.

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 bachelor's degree in a physical science or engineering, and a year of general biology at the college level.

<table>
<thead>
<tr>
<th>Courses</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>PHYS 431, 433 Modern Physics Laboratory (3,3)</td>
<td>6</td>
</tr>
<tr>
<td>NUC E 484 Introduction to Nuclear Engineering</td>
<td>4</td>
</tr>
<tr>
<td>NUC E 485 Nuclear Instruments (3)</td>
<td></td>
</tr>
<tr>
<td>CHEM 410 Radiochemical Techniques and Radioactivity Measurements (3)</td>
<td>3</td>
</tr>
<tr>
<td>NUC E 477 Introduction to Radioactive Tracer Techniques</td>
<td></td>
</tr>
<tr>
<td>FISH 473 Aquatic Radioecology II</td>
<td>3</td>
</tr>
<tr>
<td>RADGY 501-502 Biological Effects of Ionizing Radiation</td>
<td>2-2</td>
</tr>
<tr>
<td>RADGY 503-504 Laboratory in Radiation Biology</td>
<td>1-3</td>
</tr>
<tr>
<td>RADGY 517 Radiation Dosimetry</td>
<td>3</td>
</tr>
<tr>
<td>RAD S 520 Radiological Sciences Seminar</td>
<td>1, max. 6</td>
</tr>
<tr>
<td>RAD S 700 Master's Thesis</td>
<td>9</td>
</tr>
</tbody>
</table>

BIOLOGICAL SCIENCE OPTION

Prerequisites for this option include a bachelor's degree in biological science, courses in mathematics through differential and integral calculus and statistics, and chemistry through quantitative analysis and organic chemistry.

<table>
<thead>
<tr>
<th>Courses</th>
<th>Credits</th>
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<tbody>
<tr>
<td>500-level course in a biological science</td>
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</tr>
<tr>
<td>RADGY 501-502 Biological Effects of Ionizing Radiation</td>
<td>2-2</td>
</tr>
<tr>
<td>RADGY 503-504 Laboratory in Radiation Biology</td>
<td>1-3</td>
</tr>
<tr>
<td>RADGY 505 Radiological Physics</td>
<td>2</td>
</tr>
<tr>
<td>RADGY 507 Radiation Hazards Analysis and Control</td>
<td>1</td>
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</table>

ENVIRONMENTAL SCIENCE OPTION

An applicant with a bachelor's degree in a physical science or engineering and a year of general biology at the college level generally will be prepared to pursue this curriculum.

<table>
<thead>
<tr>
<th>Courses</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CEWA 455 Ecological Effects of Waste Water</td>
<td>4</td>
</tr>
<tr>
<td>FISH 473 Aquatic Radioecology II</td>
<td>3</td>
</tr>
<tr>
<td>CEWA 461 Air Resources Engineering</td>
<td>3</td>
</tr>
<tr>
<td>NUC E 484 Introduction to Nuclear Engineering</td>
<td>4</td>
</tr>
<tr>
<td>NUC E 485 Nuclear Instruments</td>
<td>3</td>
</tr>
<tr>
<td>NUC E 486 Nuclear Power Plants</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 410 Radiochemical Techniques and Radioactivity Measurements</td>
<td>3</td>
</tr>
<tr>
<td>RADGY 501-502 Biological Effects of Ionizing Radiation</td>
<td>2-2</td>
</tr>
<tr>
<td>RADGY 503-504 Laboratory in Radiation Biology</td>
<td>1-3</td>
</tr>
<tr>
<td>RADGY 517 Radiation Dosimetry</td>
<td>4</td>
</tr>
<tr>
<td>RAD S 520 Radiological Sciences Seminar</td>
<td>1-1</td>
</tr>
<tr>
<td>RAD S 700 Master's Thesis</td>
<td>9</td>
</tr>
</tbody>
</table>

MEDICAL RADIATION PHYSICS OPTION

Prerequisites for this option include a bachelor's degree in a physical science or engineering.

<table>
<thead>
<tr>
<th>Courses</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CONJ 400 Human Anatomy and Physiology</td>
<td>9</td>
</tr>
<tr>
<td>P BIO 437 Computer Programming for Biological Research</td>
<td>3</td>
</tr>
<tr>
<td>RADGY 501-502 Biological Effects of Ionizing Radiation</td>
<td>2-2</td>
</tr>
<tr>
<td>RADGY 505 Radiological Physics</td>
<td>3</td>
</tr>
<tr>
<td>RADGY 507 Radiation Hazards Analysis and Control</td>
<td>1</td>
</tr>
<tr>
<td>RADGY 517 Radiation Dosimetry</td>
<td>3</td>
</tr>
<tr>
<td>NUC E 485 Nuclear Instruments</td>
<td>3</td>
</tr>
<tr>
<td>RAD S 520 Radiological Sciences Seminar</td>
<td>1, max. 6</td>
</tr>
<tr>
<td>RAD S 600 Independent Study or Research (Hospital Physics Board Certification Related Experience)</td>
<td>3</td>
</tr>
<tr>
<td>RAD S 700 Master's Thesis</td>
<td>9</td>
</tr>
</tbody>
</table>

RUSSIAN AND EAST EUROPEAN STUDIES

503 Thomson

Faculty

Peter F. Sugar, Associate Director; Augerot, Boba, Coats, Ellison, Gershetsky (emeritus), Gribanovsky, Hagglund, Haney, Jackson, Kapetanic, Konick, Kramer, Legters, Mickleen, Paul, Reshetar, Romanowski, Scherr, Spector (emeritus), Swayze, Szefel (emeritus), Thornton, Troadgold, Trnka, Velikonja, West, Waugh. Peter F. Sugar, graduate program adviser.

Russian and East European Program, administered by an interdisciplinary group of the Graduate School, offers courses that lead to the Master of Arts degree. The
program faculty, consisting of specialists drawn from a number of cooperating departments and from the Institute for Comparative and Foreign Area Studies, offers specializations in Russian regional studies and in East European regional studies. Inquiries concerning these specializations and requests for applications for admission should be addressed to the graduate program adviser.

Complete course listings and additional information appear in the catalog offerings of the Institute for Comparative and Foreign Area Studies, or of the departments of Economics, Geography, History, Political Science, Slavic Languages and Literature, and Asian Languages and Literature.

RUSSIAN REGIONAL STUDIES

Admission Requirements: The aspirant must meet the requirements of the Graduate School as outlined in the "Graduate Study" section of this catalog. An undergraduate grade-point average of 3.00 in the junior and senior years is a minimum prerequisite, but not a guarantee of admission. Presentation of the scores of the aptitude section (verbal and quantitative) of the Graduate Record Examination is strongly recommended.

Program Requirements: Language training is an essential component of the program. Aspirants must have the equivalent of six quarters (30 credits) of instruction in Russian at this university and, as candidates, must complete language training through the fourth year (an additional 30 credits). Students are encouraged to take as much instruction in Russian as possible, including summer intensive courses.

To graduate, the aspirant must complete the equivalent of 39 credits of work in interdisciplinary courses other than language, to be selected as follows: (1) 15–20 credits in area-oriented courses determined in consultation with the adviser in the discipline or topic of concentration. At least 9 credits to be taken in courses numbered 500 or above. (2) 10–15 credits in at least two additional disciplines. (3) 9 credits of thesis. (4) In addition, candidates must qualify for the master's degree by taking a written examination in the discipline(s) they have selected within the program and an oral interdisciplinary examination on the area of concentration; and by submitting to his or her major professor(s) an acceptable thesis three months from the date of the examination. This deadline may be extended under special circumstances on petition by candidates.

EAST EUROPEAN REGIONAL STUDIES

Admission Requirements: The aspirant must meet the requirements of the Graduate School as outlined in the "Graduate Study" section of this catalog. An undergraduate grade-point average of 3.00 in the junior and senior years is a minimum prerequisite, but not a guarantee of admission. Presentation of the scores of the aptitude section (verbal and quantitative) of the Graduate Record Examination is strongly recommended.

Program Requirements: Students who plan to enter the program with previous training in Russian, German, or French already possess a valuable asset. However, knowledge of an East European language other than Russian is essential. To meet the requirements of the program, the aspirant must have a knowledge of two languages, of which one 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).

To graduate, the aspirant must complete the equivalent of 39 credits of work in interdisciplinary courses other than language, to be selected as follows: (1) 15–20 credits in area-oriented courses determined in consultation with the adviser in the discipline or topic of concentration. At least 9 credits to be taken in courses numbered 500 or above. (2) 10–15 credits in at least two additional disciplines. (3) 9 credits of thesis. (4) In addition, candidates must qualify for the master's degree by taking a written examination in the discipline(s) they have selected within the program and an oral interdisciplinary examination on the area of concentration; and by submitting to his or her major professor(s) an acceptable thesis three months from the date of the examination. This deadline may be extended under special circumstances on petition by candidates.
BIOENGINEERING
328 Aerospace Research Laboratory

Faculty
Robert F. Rushmer, Director; Allen S. Hoffman, Assistant Director; Chimoskey, Holloway, Huntsman, Johnson, Moritz.

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 adviser.

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 program under the auspices of the Inter-Engineering Group of the College of Engineering. Available are courses and thesis topics that are oriented toward the application of engineering technology to problems of biology and medicine. 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, biomechanics, clinical engineering, computer applications, fertility studies, wave energies, and diagnostic ultrasound.

MARINE STUDIES
Establishment of the Institute for Marine Studies in September, 1972, was the Board of Regents' response to an increasing interest among faculty and students in having more comprehensive and interrelated study and research about contemporary marine problems. Relying
on new interdisciplinary courses of study and research approaches, the institute is supported by the strength and breadth of marine programs at the University, which has a long history of involvement and accomplishment in marine education and research. In keeping with the breadth of its concerns, the institute is administered through the University’s central marine affairs policy-making group, the Marine Affairs Board, which is composed of deans and senior administrators.

The institute is designing an academic program and curriculum in marine studies and expects to secure authority to grant graduate degrees in this field. The proposed program is intended to meet the needs and interests of students in (1) policy and institutional problems of the oceans, including those that combine natural sciences and engineering with law, economics, international affairs, and public administration; (2) applied science and engineering problems that couple scientific knowledge with well-defined social or economic needs, including resource and technology management, multidisciplinary and systems approaches, and assessment functions associated with environmental impact analysis; and (3) broader perspectives that surround chosen areas of subject-matter specialization in existing disciplines of natural science, engineering, and fisheries, and combinations thereof that have not been systematically integrated.

Advanced marine study also can be undertaken as a major or minor field of emphasis in a number of diverse programs offered at present in the following University units:


Additional information concerning the institute program may be obtained from Richard H. Fleming, graduate student adviser.

**UNIVERSITY CONJOINT**

University Conjoint courses are offered cooperatively through interschool or intercollege programs. They are listed under “Interschool or Intercollege Programs” in the “Description of Courses” section of this catalog.

**QUANTITATIVE SCIENCE**

**Faculty**

Benjamin A. Jayne, Director; Bare; Bevan, Bledsoe, Chapman, Fletcher, Gallucci, Hatheway, Mathews, Mc-Caughran, Rajagopal, Schreuder, Sollins, Swartzman, Turnbull, Walsh, Winter.

**Adjunct Faculty**

Mar, Meier, Newell.

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, 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 special emphasis on statistical inference and experimental design for the biological sciences; and (6) applied analysis, consisting of differential mathematics applied to the life sciences. Courses in each of the six areas are interrelated in a way that meets a wide range of student interests and needs.

The faculty participates in the research activities of several academic units of the University. In addition to the two resource colleges, these include the College of Engineering, the College of Arts and Sciences, the departments of Economics, Geography, and Oceanography, and the graduate schools of Business Administration and Public Affairs.

Both the teaching and the research programs of the Center for Quantitative Science are designed to bring together living systems, mathematics, and the computer for purposes of description and management. Particular emphasis in placed on the use of the computer for quantitative descriptions of both terrestrial and aquatic ecosystems and resource management. Computerization makes possible study of the impact of exploratory management policies on simulated resource systems embedded in backgrounds of interrelated physical, biological; and economic activities and under numerous institutional constraints. Such computer-based models have been successfully employed in the descriptions of complex ecosystems and in the management of forest.
stands, the control of insect pests, and the management of fish and aquatic mammal stock.

WILDLIFE SCIENCE

Chairman
Donal E. Bevan

The colleges of Fisheries and of 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. The student in forest resources who obtains a degree of Bachelor of Science in Forest Resources 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 find it desirable to major in one of the other curricula of the college, where he may select an elective concentration in wildlife science. Additional information may be obtained from the Chairman, Biological Sciences Division, 104 Winkenwerder.

SOCIAL MANAGEMENT OF TECHNOLOGY

428 Aerospace Research Laboratory

Faculty
Edward Wenk, Jr., Director; Flajser, Lee, Porter.

Advisory Faculty
Carlson, Crutchfield, Day, Flathman, Fleagle, Marcus, Wolfe.

Social management of technology refers to the study of the assessment of society's disparate technological needs and wants, of the sociopolitical, legal, and market processes by which policy is developed to satisfy these needs, of the public and private institutions that apply their specialized capabilities to meeting the goals established by society, and of their policy-level decision mechanisms.

The program is administered through a committee of deans from the College of Arts and Sciences, the School of Business Administration, the Graduate School of Public Affairs, and the Graduate School, with the Dean of the College of Engineering serving as chairman.

The widely recognized influence of technology on society has opened new challenges for guiding technolo­gies more effectively, both to extract intended benefits for mankind and to minimize undesirable side effects. The problems involved in analyzing and managing technological systems, particularly in the public sector, have created a demand for a new professional. The program in the social management of technology aims to fulfill this demand in two ways: (1) to complement an individual's primary skills with a policy focus to enable the professional, such as an engineer, to work effectively on matters involving policy; and (2) through education and research, to prepare persons to specialize in technology policy per se, drawing upon disciplinary training but with a primary interest in technological policy analysis or policy making. Such endeavors require a knowledge not only of scientific and engineering principles but also of behavioral and social sciences and law for comprehension of processes and institutions by which technology is implemented, of humanities that give expression to our pluralistic society's value preferences, and of associated techniques of analysis that facilitate technology assessment.

This program is committed to a principle of contact and experience in the real settings where technology policy is generated. It is also committed to a group practice of scholarship by faculty and students as an essential mechanism for synthesizing disciplinary contributions when dealing with the complexities of technology management.

The program is an interdisciplinary, interschool, and intercollege effort with its most developed ties to the College of Engineering and the Graduate School of Public Affairs. It draws upon both a full-time faculty in social management of technology and a part-time faculty with appointments in such disciplines as aeronautics and astronautics, business administration, civil engineering, economics, health sciences, law, mechanical engineering, natural sciences, political science, and public affairs. Thus the program contributes to strengthening the science and public policy dimension of the other professional schools, of the social sciences, and of the institutes for Marine Studies, Environmental Studies, and Governmental Research.

At present, the number of courses and undergraduate and graduate degree programs are being enlarged with assistance of a Sloan Foundation Grant intended to emphasize the framework of public policy considerations within which engineers apply technology.

Undergraduate Studies
Students enrolled in any schools or colleges of the University may select courses from, or may minor in, this program to enrich their general appreciation of the in­
teraction of technology and society or to expand their comprehension of public policy aspects in the application of their specialized disciplines. Students in engineering whose interests embrace interdisciplinary aspects of technology, such as environmental law, public administration, and long-range planning, will find the Bachelor of Science in Engineering degree programs flexible enough to meet educational goals. Under development is a double major curriculum that combines concentration in one field of engineering with public policy aspects of technology.

Opportunities will be available for work-study programs in cooperation with local industry and government.

**Graduate Studies**

Graduate students specializing in social management of technology come from atmospheric sciences, business administration, economics, engineering, fisheries, geography, oceanography, physical and biological sciences, political science, and public affairs. 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 impact of applications of natural science or engineering; or (3) to broaden their perspectives of the role of technology in modern society.

Graduate students may formulate their individual programs in several ways, but all programs require student enrollment in an established school or college. 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 to develop courses of study tailored to meet student interests that cross departmental or college lines (e.g., the Inter-Engineering Group in the "College of Engineering" section of this catalog); or (4) make special arrangements with other departments on an individual basis.

Internship arrangements are being developed in cooperation with industry and governmental bodies to provide opportunities for technology policy research. Under direction of the faculty of Social Management of Technology or the faculty of the College of Engineering and other disciplines, some research support is available for this program to provide assistance to graduate students working on theses in this interdisciplinary area.

**Course Work**

The program offers courses at both the undergraduate and graduate levels. They deal with such topics as technology assessment, energy policy, technology policy analysis, and institutional means of regulating technology. These are listed in the "Description of Courses" section of this catalog as SMT 498, 499, 520, and 599. In addition, offered through other departments are several courses that deal with the area of technology and public policy. These include CIVE 540, 541, 542, or PB PL 540, 541, 542, and PB PL 583, 584, 585.
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 of Washington 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 228,000 volumes and 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 co-curricular activities, including the Student Bar Association, affiliated with the American Bar Association; a chapter of the National Lawyers Guild; a comprehensive program of legal services to prisoners of McNeil Island and Monroe State Reformatory; an extensive moot court program; a nationally recognized law review; chapter of the Order of the Coif and three national law school fraternities; an active Minority Law Student Association; 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. Consisting of both grants and loans, it usually is 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 Legal Research and Analysis.

Courses in the second and third years are elective, and a student may choose a program designed to suit his or her interests and needs. Only the course in professional responsibility and a seminar are required during these two years. In addition, LAW 600, Independent Study or Research, and LAW 605, Research and Writing, are available to students interested in pursuing individual projects. The seminar program is 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 from each student.

Postgraduate Degrees in Law

Applicants for admission to the postgraduate (postgraduates in law are graduate students in the Graduate School) programs in law must meet the requirements of the faculty in law as well as the requirements of the University Graduate School, and each student should familiarize himself 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 Study" 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, Director of Admissions, 320 Schmitz, PC–30, Seattle, Washington 98195.

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 the first professional degree (LL.B. or J.D.) in the United States or in another common law country 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 bilingual in English and Japanese or in English and Chinese. Both programs contemplate one year in residence, to include at least 36 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 is necessary in order to accomplish the work that must be done in order 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 a number of courses during Summer Quarter for its own students, for students from other law schools who have completed at least one year of law study, and, in limited numbers, 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

Beginning students may enter the school only in Autumn Quarter, and they are required to be present a few days early to participate in the Foundations of Law Program.

Applicants for admission must present a baccalaureate degree from an approved college or university and also must submit a score on the Law School Admission Test.

Details about admission to the School of Law appear in the current University of Washington bulletin School of Law, available from the admission office of the School of Law. Applications for admission must be received by February 1 of the year in which the applicant desires to enter.

It is recommended that applicants for admission obtain a copy of the Prelaw Handbook published by the Law School Admissions Council. It contains much valuable information on the legal profession, prelegal education, and the law schools of the United States. It also contains a complete Law School Admission Test to familiarize the applicant with the kind of examination he will be required to take.
Established in 1911 in response to the need for professionally qualified librarians, the School of Librarianship is one of more than fifty schools that offer programs accredited by the American Library Association. Degrees granted are the Master of Librarianship and the Master of Law Librarianship, which are designed to prepare students for professional programs in many types of libraries.

The basic professional curriculum, including the prerequisite courses, is organized around a group of studies designed to provide a sound foundation in principles and methods, and is required of all students pursuing a graduate degree in librarianship. In addition, students select courses that will prepare them for special fields of library service such as those designed for children, for young adults or adults, for information science, and for law librarianship. Other programs may be designed in accordance with needs of the individual student, which may include his or her choice of type of library and undergraduate subject major.

Librarianship is a nenthesis program, but a thesis may be undertaken if a student wishes to engage in special investigation or research in a cognate field.

Admission Requirements
The approval of both the Graduate School and the School of Librarianship is necessary for admission to the graduate program. Students enter the school in Summer Quarter or Autumn Quarter only. The faculty admissions committee begins to examine applications in autumn for entrance to the school in the following summer and autumn. Early application is advisable.

A foreign student who holds a bachelor's degree from an institution in which the language of instruction is not English must submit a recent Test of English as a Foreign Language examination. A foreign student requires at least two years to complete the program and may enter only in the Autumn Quarter. To assure consideration of an application, it is advisable for a foreign student to submit complete credentials by February 1.

Enrollment as a graduate student is permissible while the four prerequisite courses are being completed.
These courses do not carry graduate credit, but they are required before the student begins graduate-level courses in librarianship. These are LIBR 440, 441, 442, and 443. LIBR 441, 442, and 443 must be completed either simultaneously or in sequence.

Each of the four prerequisite courses carries 3 quarter credits, making a total of 12 credits. The courses are designed both to form a basic foundation for graduate work to follow and to serve as terminal library courses for students not seeking the graduate library degree.

Librarianship courses offered by other colleges and universities accredited by the Northwest Association of Secondary and Higher Schools may be articulated with the graduate program of the School of Librarianship. A student admitted from another accredited institution may be granted up to 12 quarter credits for courses completed, without a reduction in the required 45 quarter credits for the Master of Librarianship degree.

The entrance requirement of a modern foreign language may be met either by submitting one academic year of a modern foreign language at the college level, or its equivalent through placement beyond one year, or by passing the Graduate School foreign-language examination. Foreign students may submit academic credit in their national language or another modern foreign language, in addition to English. Any language deficiency must be removed prior to enrollment.

The applicant must submit results of a Graduate Record Examination aptitude test, (verbal and quantitative), taken within five years of the year of application.

Some familiarity with computer programming, statistics, or college algebra would be helpful for students preparing for a career in academic or special libraries, although this is not a requirement for admission to the program.

Course Requirements
Those enrolled in the Master of Librarianship program must complete 45 quarter credits of graduate course work in addition to the 12 quarter credits of prerequisites. Students planning a full-time program should seek admission to begin work on prerequisites in Summer Quarter. An additional four quarters of graduate work is generally required for the degree.

Required courses to be completed include LIBR 502 or 454, 515, 516, 535, and 599, although not in that sequence. Other courses may be required, depending on the student's area of specialization.

Summer Program
The full program for the Master of Librarianship degree is available to Summer Quarter students. The prerequisite and required courses are offered every summer. Elective course offerings vary from year to year, but are planned to enable students to complete requirements for the degree by attendance during summers only.

Law Librarianship
An applicant for entrance to the law librarianship program must hold a degree from an accredited American law school or from a law school in one of the other common-law countries. Because specialized law librarianship courses are not offered during Summer Quarter, requirements for the Master of Law Librarianship degree must be completed in the consecutive quarters of the regular academic year. Prerequisite courses are, however, offered during Summer Quarter.

Library Facilities
The School of Librarianship is in the south wing of the Suzzallo Library. The professional materials of librarianship, including an outstanding collection of children's books and a high school library collection, are a part of the Suzzallo Library. These materials are supplemented by the library's central, undergraduate, and departmental research libraries containing almost two million volumes. In addition, the School of Librarianship has the William E. Henry collection of rare books. Students have access to the facilities of the Pacific Northwest Bibliographic Center and the University's audiovisual services. The Seattle Public Library and the King County Library System are also available for student use.
The University of Washington School of Medicine is housed in the Health Sciences Center on the University campus. The schools of Dentistry, Nursing, and Public Health and Community Medicine also occupy this building. The basic health science departments located there provide educational services for the schools mentioned above as well as for many other schools and colleges within the University. The University Hospital is also a part of the health sciences complex.

Clinical teaching programs are conducted not only in the Health Sciences Building but also in the University Hospital and affiliated hospitals in the city and throughout the Pacific Northwest. The four major teaching facilities other than the University Hospital are Children's Orthopedic Hospital and Medical Center, Harborview Medical Center, United States Public Health Service Hospital, and Veterans Administration Hospital, all located in Seattle.

The location of the School of Medicine assures opportunities for both students and faculty to participate in the total programs of a large university. The education of physicians and of all who are educated for careers in the health sciences cannot be narrowly viewed as purely a matter of professional training. As educated men and women, physicians are called upon to assume roles of leadership in their communities and in the nation. Students are therefore urged to participate in the general affairs of the University. The current curriculum, which went into operation in 1968, was designed with this goal in mind.

The 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 four prescribed pathways. Attainment of the M.D. degree is based upon credits earned and is not dependent upon a specific time requirement.

The Basic Curriculum
The basic curriculum has two parallel programs: the Lecture-Discussion Program and the Independent Study Program. Each covers the basic information prerequisite to the clerkship rotations in the University affiliated hospitals. The major differences between the two
programs are the method of study and the time framework. In general, the basic curriculum is distributed over six quarters. In the Independent Study Program, the student proceeds at his own pace. In the Lecture-Discussion Program, capable students, who take a maximum load per quarter, may complete their degree requirements in ten to eleven academic quarters. Such students, by utilizing summer quarters, may finish their requirements in three years. Other students may proceed at a slower pace, taking four to five years to complete their requirements. The curriculum thus offers flexibility in educational experience and flexibility in individual programming.

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 aspects. 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 18 credits per quarter. Assumption of an academic load in excess of 18 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.

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<tr>
<th>FIRST QUARTER (AUTUMN)</th>
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<td>HUBIO 411 Anatomy</td>
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<td>HUBIO 414 Molecular and Cellular Biology I</td>
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<td>HUBIO 415 The Ages of Man</td>
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<td>HUBIO 420 Cell and Tissue Response to Injury</td>
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<td>HUBIO 421 Natural History of Infectious Diseases and Chemotherapy</td>
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<td>HUBIO 422 Introduction to Clinical Medicine</td>
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<tr>
<td>HUBIO 423 System of Human Behavior</td>
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<td>HUBIO 424 Molecular and Cellular Biology II</td>
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<td>HUBIO 432 Nervous System</td>
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<td>HUBIO 433 Medicine, Health, and Society</td>
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<td>HUBIO 442 Introduction to Clinical Medicine</td>
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<td>HUBIO 453 Musculoskeletal System</td>
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Pathway Curricula

Four 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, his family, and his 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.

Behavioral Specialist Pathway: This pathway is intended to train physicians who will become specialists in those areas in which a sound knowledge of the nervous system and human behavior is essential. These include neurologists, neurological surgeons, and psychiatrists. Required is a firm grounding in hospital medicine; ambulatory clinic experience, particularly in psychiatry; and detailed education in the basic sciences relevant to the nervous system and behavior.

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 investigation 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. A minimum of 21 quarter credits of free electives is provided in each pathway, and 90 quarter credits are required in each, with the exception of the medical scientist pathway, which requires 135 quarter credits. The M.D. degree may be granted after the attainment of 180 quarter credits (90 basic curriculum, 90 pathway) in the prescribed distribution. For the medical scientist, 225 quarter credits are required.

The curriculum of the University of Washington 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 himself to make a career choice and to develop his own education toward the fulfillment of his chosen career.

WAMI Program
As an integral part of the undergraduate medical curriculum intended to provide a broader range of educational opportunities for students, the University of Washington embarked upon an experiment in decentralized medical education in 1969. The WAMI Program, as it is called, drew its name from the states of Washington, Alaska, Montana, and Idaho. It provides students with the opportunity to receive the beginning portion of their medical education at the University of Alaska, the University of Idaho, Montana State University, or Washington State University, instead of at the University of Washington. Following this exposure all students return to the School of Medicine for the remaining portion of the basic curriculum. Once they have reached the pathway portion of the curriculum, students have the opportunity to receive a portion of their clinical training in communities under the supervision of practicing physicians within any of these four states. Included among the subdisciplines that have community-based learning experiences are family medicine, obstetrics and gynecology, internal medicine, psychiatry, and pediatrics. By capitalizing upon the assets of both the medical center setting and the community setting, students will develop broader backgrounds of experience and training than previously had been possible. They also have gained a better understanding of the spectrum of career opportunities that medicine has to offer.

Admission Requirements
The faculty of the School of Medicine believes that the appropriate level of scholarly achievement and preparation for medicine can best be developed in a liberal arts program with the emphasis on a major area of interest.
selected by the student in any field sufficiently demanding in scholastic discipline. No particular major is given preferential attention in selection.

Before admission each applicant must have completed the minimum requirements listed below and must have demonstrated his academic proficiency in these subjects by obtaining an acceptable grade-point average. In addition to the following credits, proficiency in English and basic mathematics is expected of every applicant. A bachelor's degree is encouraged, but it is not required for admission.

Biology, 12 quarter credits (8 semester credits); chemistry, 18 (12); physics, 12 (8).

In recognition of the diverse opportunities afforded the graduate in medicine, the specified requirements are purposely kept to a minimum. In this manner each student has the opportunity to pursue, as his major field of study, any area of special interest to him—the physical sciences, biological sciences, or humanities—and still acquire the intellectual skills necessary for the regular medical curriculum. Throughout the medical program, elective time as well as time for research and thesis affords the student an opportunity to apply the knowledge and concepts acquired in his major field to the appropriate areas of medicine.

Applicants are urged to discuss undergraduate credentials and curriculum with a premedical adviser at their undergraduate institution.

**Application Procedure**

The University of Washington 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.

Primary preference for admission is given to qualified residents of Washington. Second preference is given to qualified residents of Alaska, Idaho, Montana, and Wyoming, which have contractual arrangements for this purpose with the state of Washington and the University of Washington. Residents outside these regions, except for M.D.–Ph.D. and educationally disadvantaged applicants, are seldom considered. The mean grade-point average of students entering in 1972 was 3.50 with mean Medical College Admission Test (MCAT) scores approximately in the eightieth percentile per section. Washington, Alaska, Idaho, Montana, and Wyoming applicants must submit a three-hundred-word autobiography (page 2 of the AMCAS Application may be used) and request that their premedical committee's evaluation be sent directly to the school. Evaluations of three science and two nonscience instructors may be substituted. Applicants must state by letter from whom recommendations should be expected, or if application is for the M.D.–Ph.D. program, or both. These letters must evaluate critically the candidate's academic ability, strengths and weaknesses, motivation for medicine, maturity, difficulty of course work attempted, and special attributes and assets. This supplemental information must be received by the school before an application can be processed. Nonresidents should not submit supplemental information unless requested to do so by the school.

These requirements must be met and MCAT results must be available before applications can be processed. The $10 nonresident fee should not be submitted until requested, and it may be waived for economic reasons. Deadline is December 15 (early decision, September 1).

**Medical College Admission Test**

Each applicant must provide the scores received on the Medical College Admission Test. Arrangements for this test may be made with the premedical adviser at the institution at which premedical training is being taken. Medical aptitude tests are customarily given in May and September of each year. The MCAT must be taken by autumn of the year preceding the proposed date of the enrollment, with scores to be sent directly to the University of Washington School of Medicine admissions committee. Additional information on this test may be obtained from the American College Testing Program, P.O. Box 414, Iowa City, Iowa 52240.

**Early Decision Program**

The School of Medicine participates in the Early Decision Program as formulated by AMCAS. Details of the program can be obtained from AMCAS, but it essentially provides that a small number of highly qualified applicants will have been accepted for a given class by October 1 of the preceding year. These applicants may apply only to the University of Washington. If a place is offered they must accept the offer or, if not accepted, they may apply to this and other schools under the regular program.

After consultation with their premedical advisers, applicants for consideration in the Early Decision Program must submit completed applications by September 1.

**Miscellaneous**

It is the policy of this school not to accept for admission
students who have failed in other medical schools or
who have been dismissed from them.

All applicants are given consideration on the same
basis, regardless of race, color, sex, religion, or pa-
rental occupation.

Information concerning admission to the curriculum in
physical therapy and in occupational therapy is in-
cluded under the Department of Rehabilitation Medi-
cine, and in medical technology under the Department
of Laboratory Medicine.

Transfer Students

Transfer students are admitted for clinical training into
the third-year class in those rare instances in which va-
cancies develop in classes. Ninety credits are required
for completion of the clinical training phase, but flexi-
bility in programs is possible. Students should contact
the admissions committee for the latest information.

When vacancies do occur, applicants from two-year
medical schools are given preference. Transfer applica-
tions should be filed no later than March 1 of the pro-
posed year of entry. Transfer students are not charged a
fee. Each applicant must submit:

1. Formal application for admission on the form fur-
nished by the School of Medicine.

2. One official transcript of premedical and medical
training, which is sent directly to the admissions com-
mittee from the registrars of the institutions in which
the training was taken.

3. Score received in the Medical College Admission
Test.

4. Letter from the Dean of the medical school indicating
the student’s status and relative standing in his class.

Once admitted, transfer students must meet the same
requirements for graduation as other medical students.

Residency

Future classes are expected to consist only of Washing-
ton, Alaska, Idaho, Montana, and Wyoming residents
and educationally disadvantaged students, regardless of
residence. Other candidates are unlikely to be admitted,
and, therefore, their applications will not be reviewed
until all applicants as noted above have been con-
sidered. Upon review of an application, the admissions
committee may request proof of legal residence. The
Office of Residence Classification provides legal classi-
fication of Washington residency.

Processing of Applications

Evaluation of Credentials: The admissions committee
examines each applicant’s credentials and bases its deci-
sions on the objective evaluation of these factors: pre-
professional training, evidences of scholarship, place of
residence, Medical College Admission Test rating, and
personal evaluation of the student by premedical in-
structors in their letters of recommendation.

Personal Interview: If an examination of the credentials
shows them to be within the competitive group, the ap-
plicant may be requested to appear for a personal inter-
view by the admissions committee. Interviews are by
invitation only. Applicants who are in school a con-
siderable distance from Seattle should inform the admis-
sions committee, in advance, of the times when they
may be in the Seattle area.

Notification of Acceptance or Rejection: Attempts are
made to issue notices of acceptance on October 1 (early
decision), January 15, February 15, March 15, and
April 15. An acknowledgement of notification of ac-
ceptance should be made in writing by the successful
applicant within two weeks.

Acceptance of Appointment: Within several weeks after
an applicant has accepted the position offered him in
the School of Medicine, the Registrar’s Office of the
University requests a deposit of $50. This deposit is
applied to the first quarter’s tuition. If the student
wishes to withdraw, the deposit is refundable before the
deadline set by the Comptroller’s Division of the Uni-
versity of Washington. After that date, the advance fee
payment is not transferable to another person or quarter
and is not generally refundable.

Western Interstate Commission for Higher Education

The School of Medicine participates in the student ex-
change program of the Western Interstate Commission
for Higher Education (WICHE), under which legal resi-
dents of certain Western states that do not have medical
schools may pay the tuition and fees charged to legal
residents of Washington State rather than the higher
nonresident rate. These states are Alaska, Arizona,
Idaho, Montana, Nevada, and Wyoming. To be eligible
for this program, the student must be certified by his
home state. State eligibility requirements vary, and the
number of students who can be included in the program
each year depends on appropriatons by the legislatures.
A student interested in this program must apply to the
certifying officer in his home state, whose address may
be obtained from the Western Interstate Commission
for Higher Education, University East Campus, Boul-
der, Colorado.
Books and Supplies: The average annual cost for medical students is $450 in the first year and $250 each year thereafter. This includes books, equipment, microscope rental, and examination fees.

Transportation: Students are responsible for providing their own transportation and paying the parking fees required at the University and the several affiliated hospitals. Budgets should be planned accordingly.

Student Evaluation and Promotion

Student evaluation is based upon the faculty's observations of the student's work and upon written papers and examinations. Periodic review of student progress is made, and students are informed of their deficiencies and their strong qualities. Dismissal from the school may occur if a student fails to maintain an acceptable academic record. Opportunities to make up unsatisfactory work are allowed at the discretion of the Dean and the executive committee of the School of Medicine. Dismissal also may occur if qualities of character and personality not deemed commensurate with a career as a physician come to light at any point. Once dismissal has occurred, readmission requires the approval of the executive committee of the School of Medicine. Readmission after dismissal is not considered unless there is substantial evidence that the problems causing dismissal have been resolved.

All students are required to pass parts 1 and 2 of the National Board of Examinations. They are also required to participate in special surveys and examinations directed toward the evaluation of student performance and of the educational objectives of the School of Medicine.

Fees, Extra Service Charges, and Rentals

All fees, extra service charges, and rentals are payable in United States dollars upon demand. The University reserves the right to change any of its fees and charges without notice.

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<th>Per Quarter</th>
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<tr>
<td><strong>Full Time (more than 12 credits)</strong></td>
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<tr>
<td>Resident</td>
<td>$280</td>
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<tr>
<td>Nonresident</td>
<td>$613</td>
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<tr>
<td><strong>Part Time (2–12 credits)</strong></td>
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<tr>
<td>Resident</td>
<td>$148–$268</td>
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<tr>
<td>Nonresident</td>
<td>$250–$580</td>
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Medical technology, physical therapy, prosthetics and orthotics, and occupational therapy fees are the same as general student fees (see "General Information" section of this catalog).

Financial Aid

The lengthy training required to master the accumulated knowledge necessary to the practice of medicine has resulted in costs that seem prohibitive to many prospective students. No student interested in becoming a physician should be deterred from applying to the University of Washington School of Medicine for financial reasons. Both public and private endowments have been given to the school to provide financial aid to deserving medical students. During the academic year, scholarships, grants-in-aid, loans, and traineeships are available.

Application for Aid Procedures

Unless otherwise specified, applications for fellowships, scholarships, and grants-in-aid should be directed to the Office of the Dean of Medicine before June 1 of each year. Application forms and related information may be obtained from the Office of the Dean of Medicine upon request. The student must be willing to submit a detailed and realistic analysis of his complete financial situation. In case of emergency or special need, an application for grant-in-aid may be made at any time. Application for a loan also may be made at any time to the Office of the Dean. Applications for assistantships should be made to faculty members. All payment of monies concerned with endowment awards, prizes, stipends, grants-in-aid, and loans are made by the University comptroller.

Financial Assistance

Scholarships have been established for entering students who are unable to finance their medical education. Substantial loans are available to students in need of financial assistance to help cover costs of their medical education.

Outside employment is discouraged, and a number of scholarships and grants-in-aid are given with the stipulation that the student will not engage in remunerative employment without consent of the Financial Aid Committee. There exist a few opportunities in Seattle hospitals for part-time work for third- or fourth-year students. A limited number of research assistantships and fellowships are available in the summer months.

Stipends of the various scholarships, loans, and grants range from full tuition and fees to amounts sufficient to cover the entire financial needs of the student through four years of medical school.
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. Extensive 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.

Traineeships
A traineeship is an academic award of honor based upon scholastic achievement and designed to aid and encourage the student in his 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 his results as a condition of the grant. He is expected to devote his full time and energy to his project and may not be otherwise gainfully employed during the period of his 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.

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 in it is initiated by the student. Often a student will become especially interested in some particular field in medicine. This interest will lead him to a desire to learn more about the field or to do special work in it. The thesis program is a means of fulfilling his 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 may be obtained from the chairman of the Medical Thesis Committee or from the Dean's office.

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, by a scholarly analysis of a clinical subject comparable to review papers and case reports, or by nomination of the faculty.

Academic Programs
Doctor of Medicine Degree
Upon completion of the curriculum of the School of Medicine, the M.D. degree is awarded to candidates who (1) have given evidence of good moral character; (2) have satisfactorily completed the requirements of the basic and pathway curricula and have earned a minimum of 180 quarter credits (for transfer students, 90 quarter credits); (3) have fulfilled all special requirements; and (4) have discharged all indebtedness to the University.

Bachelor of Science Degree
Programs leading to a bachelor's 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 program is designed to train young men and women to be professional workers in hospital, clinic, public health, and medical research laboratories. The prescribed preparatory program consists of three years of regular university training with emphasis placed upon certain courses in chemistry and biology. This is followed by a twelve-month period of full-time instruction and training in medical technology itself. 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 the clinical use of occupational therapy. Information concerning admission to occupational therapy appears under "Rehabilitation Medicine" in this catalog.

Bachelor of Science in Prosthetics and Orthotics 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, Pathology, Pharmacology, and Physiology and Biophysics. Master's degree programs are offered by the departments of Biomedical History and Rehabilitation Medicine. Students who work toward these degrees concurrently with the M.D. degree pursue the Medical Scientist Pathway.

In order to expedite the training of physicians who wish to specialize in public health or community medicine, the school has made available a program that leads simultaneously to the degrees of Doctor of Medicine and Master of Public Health. In most cases, the program can be completed in four years, provided that at least two summers are spent in course or research work, or both. In general, the concurrent degree program students 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 and International Health, or Health Services.

A student who intends to work toward a graduate degree should confer with the Chairman of the department in which graduate study is to be pursued. Specific requirements for admission to work for advanced degrees appear in the "Graduate Study" section of this catalog.

Medical Accreditation and Licensure
The University of Washington School of Medicine is approved by the Association of American Medical Colleges, the Council on Medical Education, and hospitals of 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 an 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 Licensure, P.O. Box 649, Dept. 71175, Olympia, Washington 98504.

Postgraduate Medical Education
Internships and Residencies
Internships and other first-year postgraduate programs are available at the University of Washington Affiliated Hospitals—University Hospital, Harborview Medical Center, Veterans Administration Hospital, United States Public Health Service Hospital, and the Children's Orthopedic Hospital and Medical Center. 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, general surgery, medicine, neurology, neurological surgery, obstetrics, gynecology, orthopaedic surgery, pathology, pediatrics, rehabilitation medicine, psychiatry, radiology, family medicine, laboratory medicine, radiation therapy, and urology. The residency programs vary in duration from two 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 further research and teaching experience for the advanced students who already have obtained their Ph.D. or M.D. degrees.

CONTINUING MEDICAL EDUCATION

Director
John N. Lein
E305 Health Sciences

The Division of Continuing Medical Education at the School of Medicine offers approximately twenty-five refresher courses of one- to five-day duration for prac-
ticing physicians and allied health workers. The programs are developed and presented by clinical and basic sciences faculty in cooperation with the Washington State Medical Association, federal and state agencies, physicians' organizations, and voluntary organizations.

Activities of the division are coordinated with a group of voluntary practicing physicians, the Continuing Education Community Coordinators, who advise the sponsoring organizations on educational needs, implement programs in their communities, and help to select topics and instructors. The coordinators are appointed jointly by the School of Medicine and the Washington State Medical Association.

The Division of Continuing Education has worked closely over the past five years with the Washington/Alaska Regional Medical Program to develop a multimedia approach to continuing medical education.

Courses focus on a review of fundamental concepts and recent advances in diagnosis and treatment in the spectrum of medical specialties and of health professionals (e.g., dietitians, medical technologists, physical therapists, and occupational therapists). A family practice review is held annually. Brochures for each course, listing dates, faculty, enrollment limitations, and tuition fees, are available from the Division of Continuing Medical Education.

The Postgraduate Preceptorship Project offers individualized refresher training for physicians at the University Hospital, at affiliated teaching hospitals, and at other community hospitals in the region.

An integral part of the WAMI Program is the support of the peripheral university and clinical faculties through continuing education. In addition, the community clinical units of the WAMI Program serve as models for the continuum of medical education and for the introduction of students to the process of quality assurance.

Physicians are welcome to participate in the regular rounds and conferences scheduled at the University Hospital and clinics and at the hospitals affiliated with the University's teaching program.

ANESTHESIOLOGY
BB1469 Health Sciences

Faculty
John J. Bonica, Chairman; Thomas F. Hornbein, Vice Chairman; Aasheim, Akamatsu, Amory, Black, Burnham, Chapman, Cheney, Cullen, de Jong, Everett, Fink, Freund, Heavner, Horton, W. Kennedy, Martin, Mather, Murphy, Pfug, Pollack, Stanton-Hicks, Ward, Wetstone, Winter, Wong.

The Department of Anesthesiology has broad responsibilities for the teaching of medical students throughout their four years of undergraduate training. Departmental faculty participate in the teaching of applied anatomy to students during their first year. 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. Instruction is provided by lectures, conjoint courses, and clinical clerkships. In addition, the department has an active training program for interns and residents in anesthesiology and affords experience in anesthesiology to residents in surgery, obstetrics, and respiratory therapy, pain clinic.

BIOCHEMISTRY
J405 Health Sciences

Faculty
Hans Neurath, Chairman; Agabian, Bard, Bornstein, Byers, Davie, Deranleau, Fischer, Gordon, Hall, Hauschka, Herriott, Kaplan, Keller, Morris, Palmiter, Parson, Petra, 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 biology) enroll in biochemistry courses. The department offers the Master of Science and Doctor of Philosophy degree programs in biochemistry, with admission preference given students who seek the Ph.D. degree.

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 Study" section of this catalog, should be consulted.
Graduation Requirements

Master of Science Degree: With thesis—36 credits. Without thesis—27 credits, of which one-half are in courses numbered 500 or above, 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.

BIOENGINEERING

BB1021 University Hospital

Faculty
Robert F. Rushmer, Director; Allen S. Hoffman, Assistant Director; Chimoskey, Holloway, Huntsman, Johnson, Moritz.

Bioengineering is a multidisciplinary program of collaborative research and training designed to accelerate adoption of new engineering technologies in applications to clinical practice and research.

Faculty and students in the health sciences may engage in studies of mutual interest with faculty and students in the College of Engineering through undergraduate, graduate, and postdoctoral programs. Information on bioengineering also appears in the “Interschool or Intercollege Programs” section of this catalog.

BIOLOGICAL STRUCTURE

G511 Health Sciences

Faculty

In the Department of Biological Structure, courses are offered that comprise all levels of structural organization of the body, from the gross to the molecular.

The traditional major fields of anatomy are represented in the department by three divisions: Gross Anatomy and Neuroanatomy, Growth and Development, and Histology. The submicroscopic and molecular levels are represented by the Division of Ultrastructure.

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., anatomy, biology, and biophysics). 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 Study” 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 will be provided, without staff participation. The fees are proportional to the amount of gross material supplied.

BIOMEDICAL HISTORY

A204 Health Sciences

Faculty
Charles W. Bodemer, Chairman; Sloan, Whorton. Charles W. Bodemer, 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.

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. Its courses and its research sponsorship in the history of medicine and biology are available to undergraduates, medical students, graduate students, and postdoctoral fellows. Approximately twelve hundred rare books relevant to the development of the modern medical sciences provide a valuable adjunct to the teaching program.
CONJONT COURSES

Conjoint courses are offered cooperatively by departments in the School of Medicine. They are designed to integrate basic medical training with clinical work and, in some cases, to integrate basic medical training in two or more fields. For the list of courses, see the "Description of Courses" section of this catalog.

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 Physicians, the American Academy of Family Physicians, and the Council on Medical Education of the American Medical Association.

LABORATORY MEDICINE

AA210 University Hospital

Faculty
Paul E. Strandjord, Chairman; Behrens, Chatrian, Cheng, Clausen, Clayson, Coyle, Detter, Gilliland, Hamernyk, Heywood, Kaplan, Kenny, Labbe, LeCrone, Lettich, McGonagle, Minckler, Plorde, Pollock, Raisys, Ray, Roby, Schiller, Schmer, Schoenknecht, Smith, Utauffer, Strandjord, Szabo, Wilkus.

The Department of Laboratory Medicine includes divisions of clinical chemistry, hematology, microbiology, coagulation, immunology, genetics, 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 quarter credits) and by the Department of Laboratory Medicine in the junior and senior years (professional, 105 quarter credits).

Admission Requirements: The professional curriculum consists of seven consecutive quarters of study that must be taken at the University of Washington School of Medicine. Prerequisite requirements may be satisfied at the University of Washington 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, 10 quarter credits of organic chemistry; college algebra; and 15 quarter 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. 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 310; BIOC 405, 408; LAB M 320, 321, 322, 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 program is approved by the Council on Medical Education and Hospitals of the American Medical Association. Graduates are eligible for, and are encouraged to take, the examination of the Board of Registry of the American Society of Clinical Pathologists to become registered medical technologists.
The Department of Microbiology 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 dealing 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 offers programs in microbiology that lead to a bachelor's 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: A minimum of a B grade average in the junior and senior years and approval by the faculty of microbiology. An undergraduate major in microbiology is not required. For the nonthesis medical microbiology option, one year of acceptable work experience in a medical or public health laboratory is required. Verbal and quantitative parts of the Graduate Record Examination must be taken by applicants. An advanced GRE 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. Two courses must be taken from among the research methods courses offered in bacteriophage studies, enzymology, nucleic acid chemistry, immunochrome, microbial genetics, and electron microscopy. Research. Laboratory teaching experience. General Examination, dissertation, and Final Examination. There is no for-
eign-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 applications for, the Medical Scientist Training Program may be obtained by writing to: University of Washington, Office of the Dean, School of Medicine, C304 Health Sciences, SC–70, Seattle, Washington 98195.

**NEUROLOGICAL SURGERY**

**RR744 University Hospital**

**Faculty**

Arthur A. Ward, Jr., Chairman; Calvin, Chatrian, DeVito, Doddrell, Fetz, Harris, Kelly, Lettich, Lockard, Loeser, Lund, Ojemann, Reitan, Troupin, Westrum.

The Department of Neurological Surgery is concerned with teaching and research in the entire spectrum of surgical 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 neurosciences core course, as well as in elective clinical experiences, of which most are available only at the University Hospital. The department's neurosciences research seminar is available for those students interested in correlating research and clinical problems of the nervous system.

Selected medical students also may elect research experience within the Department of Neurological Surgery. The departmental research facilities are housed in the Medical Research Tower of the University Hospital, where investigations are under way in all types of neurophysiology, in behavioral research with primates, and in light and electron microscopic examination of the anatomy of the nervous system. Particular research interests include the basic aspects of animal models of such disease processes as epilepsy, including confirmation from human material. Opportunities are available for selected students from related basic science departments to participate in the multidisciplinary research activity in the department.

In addition to the undergraduate instruction, a fully certified residency program in neurological surgery is available for selected postgraduate physicians. The five-year program emphasizes preparation for a career in academic neurosurgery.

**OBSTETRICS AND GYNECOLOGY**

**BB607 Health Sciences**

**Faculty**

Walter L. Herrmann, Chairman; Briggs, J. Conrad, S. Conrad, Der Yuen, Donahue, Donohue, Eschenbach, Figge, Gellert, Gibson, Heinrichs, Karp, Lein, Petra, Spadoni, Ueland, Tabel, Vontver, Wagner.

The Department of Obstetrics and Gynecology encompasses the study 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**


The Department of Ophthalmology is responsible for the instructional and research programs in diseases of the eye and related structures.

**ORTHOPAEDICS**

**BB1043 University Hospital**

**Faculty**

D. Kay Clawson, Chairman; Baker, Bath, Chaplin, Dimond, Fry, Garrick, Greenlee, Hansen, Knot, Kirkpatrick, LaVigne, Lippert, Sandler.

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.

**OTOLARYNGOLOGY**

**BB1165 University Hospital**

**Faculty**

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
D413 Health Sciences

Faculty

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, pathology encompasses the entire animal and plant kingdoms. The main interests of the department are diseases of vertebrates, especially of man and other mammals.

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, analysis of disease by light and electron microscopy, histochemistry and cytochemistry, analytical biochemistry, cell and organ culture, and immunology.

Courses are offered 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, Swedish Hospital, and Virginia Mason Clinic.

Research programs in the department include studies of the basic pathological process involved in such diseases as arteriosclerosis, cancer, and inflammation (including allergic diseases), and of the injurious effects of various drugs, toxins, foods, and other things derived from the environment. Diseases of certain systems, including such organs 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 cell biology. 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 developmental pathology and neuropathology.

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. N. Karle Mottet is program director.

PEDIATRICS
RR314 University Hospital

Faculty
Beverly Morgan, Chairman; Axelrod, Beckwith, Bergman, Berlin, Bernstein, Campbell, Carlson, Chen, Counts, Cuene, Davis, Deisher, Doan, Emanuel, Graham, Guntheroth, Hall, Haring, Hayden, Hill, Hodson,
PHYSIOLOGY AND BIOPHYSICS

G412 Health Sciences

Faculty

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
A student who intends to work toward a degree of Master of Science or Doctor of Philosophy must meet the requirements of the Graduate School. A student with a bachelor's degree in zoology, psychology, chemistry, engineering, or physics, or with an M.D. degree, is acceptable as an applicant for an M.S. or Ph.D. degree.

Graduate students in physiology and biophysics with a medical degree have their curricula adjusted in accordance with their training.

Programs of Study
In the organization of the graduate program in physiology and biophysics, several specializations within the broad field of physiology are recognized, and the requirements and curricula are different for each, although there is considerable overlapping. The areas of specialization cover the functions of cell membranes, the nervous system, the renal and gastrointestinal systems, muscle, circulation, respiration, and the endocrines. For students who desire a program equally divided between physiology and psychology, an interdisciplinary Ph.D. degree program in these subjects is the program is

PHARMACOLOGY

F421 Health Sciences

Faculty

Pharmacology is the science that deals with the nature of the selective interactions between drugs and the biological system, and with the application of these drugs to the treatment of disease.

Graduate Programs

Master of Science and Doctor of Philosophy Degrees

Admission Requirement: A bachelor's degree with a major in any of the sciences, such as biochemistry, chemistry, pharmacy, physics, physiology, psychology, or zoology.


Pediatrics involves the study of the physical and behavioral development of man, in health and disease, from conception to maturity. Alterations of the developmental process from genetic and environmental causes, the changing response to stress during maturation, and the effect of nutritional, physical, and emotional stress on development are the manifestations of child health of primary pediatric concern. The holistic approach to the ontogenetic and ecological changes is intrinsic to understanding the changes, both of disease and function, occurring throughout the life span of man.

Instruction is provided through conjoint courses, lectures, conferences, clerkships, and electives.
administered by the Physiology Psychology Group of the Graduate School. The basic graduate courses include P BIO 409, 410, 411, 412, 413, 414, 415 (see “Interdisciplinary Graduate Degree Programs” section of this catalog).

PSYCHIATRY AND BEHAVIORAL SCIENCES
BB1644 Health Sciences

Faculty

The coordinated research, teaching, and clinical programs of the Department of Psychiatry and Behavioral Sciences are designed to provide students with a basic knowledge of (1) the broad range of conditions that cause and sustain behavior disorders; (2) the factors that influence the effectiveness of the professional as a behavior change agent; and (3) the techniques and clinical skills required for successful behavioral intervention.

Emphasis is on a multidisciplinary approach to research and treatment in three program areas: (1) Ecological—concerned with the impact upon behavior of sociocultural factors, institutions and systems, and the epidemiology of behavior disorders; Interpersonal—concerned with social relations and perception, group processes, and other social psychological phenomena; and Intraindividual—concerned with the biological bases of behavior, learning, cognition, and the developmental and aging processes.

Instruction in psychiatry and behavioral science is given during each of the four years of the medical school curriculum and is coordinated and integrated with the various disciplines of medicine. Thus, from the beginning of his career, the student is stimulated to think in terms of understanding the totally functioning human being.

RADIOLOGY
SS230 University Hospital

Faculty

Radiology is the branch of clinical medicine that applies electromagnetic and nuclear radiations to the detection and treatment of disease. In diagnostic radiology, the differential absorption of penetrating radiation is detected by fluorescent crystals (fluoroscopy) or by photographic emulsions (radiography). The majority of important diseases have some radiologic expression. The diagnostic radiologist is, in effect, a general pathologist with special methods for nondestructive internal examination.

Therapeutic radiology depends upon the differential destruction of neoplastic cells by radiations. Many forms of cancer are best treated by radiation for either primary cure or palliation of symptoms. Of necessity, the therapeutic radiologist is a specialist in dealing with cancer.

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.

Radiation biology and radiation physics are the basic sciences related to clinical radiology having to do with study of the effect of radiations on living systems and the description of radiation fields in terms of geometry and intensity. Research in these aspects, including the development of instrumentation, is basic to progress in clinical radiology.

The Department of Radiology is represented in each of these divisions by senior staff with extensive practical experience. Instruction is provided in each area for medical students, residents, and other physicians. Certain courses are open to graduate students. The staff and its teaching and research activities are represented in each of the hospitals affiliated with the University.

REHABILITATION MEDICINE
CC814 University Hospital

Faculty
Justus F. Lehmann, Chairman; Anderson, Berni, Bolinger, Caldwell, Chandler, Clowers, Delateur, Donovan, Drale, Fordyce, Fowler, Guy, Halar, Harlock,

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 for use of physical therapy, occupational therapy, 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, Bachelor of Science in the field of prosthetics and orthotics, and a Master of Science for residents in physical medicine and rehabilitation who wish to enter the academic field.

Occupational Therapy
Head
Jennie A. Lucci
BB863 University Hospital

Occupational therapy is one of the vital health care disciplines that provides service through planned activities, such as creative and manual arts; self-care and homemaking skills; and perceptual-motor, prevocational, or recreational activities to those individuals whose abilities are impaired by developmental deficits, aging, poverty, cultural differences, physical injury, illness, or psychologic and social disability. Its direction is to evaluate abilities, to re-educate, to treat, to prevent, or to restore the disabilities, and to assist in the psychological and social adjustment.

The program in occupational therapy is approved by the Council on Medical Education of the American Medical Association and the American Occupational Therapy Association. Graduates are eligible to become registered occupational therapists by passing the American Occupational Therapy certification examination.

Bachelor of Science in Occupational Therapy Degree
Admission Requirements: Students are admitted to the professional program at the junior level. Preprofessional requirements prior to admission include completion of the proficiency and distribution requirements, with a minimum of 20 credits each in the humanities, natural sciences, and social sciences, and EDC&I 312; B STR 301; PHYS 114, 117; PSYCH 100 or 101; PSYCH 306; SOC 110; ZOOL 118 or 208; REHAB 290 on a letter-grade basis 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. Transfer students should consult the Division of Occupational Therapy to determine eligibility for the professional program. All interested applicants should obtain a copy of the program requirements and selection process from the Division of Occupational Therapy.

Graduation Requirements: REHAB 320, 321, 332, 380, 414, 442, 444, 445, 446, 447, 468, 469 (as required), 473, 474, 477, 481, 482, 483, 484, 499; EDC&I 313; HEC 329; PSYC 451, 452; 8 credits from PSYC 267, 457, 458, 553, 565; PSYC 305, 345; SOC 352, 347 or UCONJ 490; and REHAB 494 (six months of field experience) with a minimum cumulative grade-point average of 2.50 in major courses.

Physical Therapy
Head
Jo Ann McMillan
BB867 University Hospital

Physical therapy is a health care profession whose practitioners work in hospitals, clinics, nursing homes, and private practice. Physical therapy practitioners receive patients on the referral of a licensed physician or dentist and maintain contact with them regarding the care of the patient. Patients treated by physical therapists include those disabled by illness or accident or born with a handicap.

The treatments given by physical therapists 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 and cold, sound, and water, to relieve pain or to alter physiological status. In addition, physical therapists try to motivate and instruct the patient, the patient's family, and others who might help during the treatment and convalescent period.

Several of patterns of education lead to basic professional certification in physical therapy. The University of Washington offers only the baccalaureate degree program for that objective. The degree awarded by the School of Medicine is approved by the American Medical Association in collaboration with the American Physical Therapy Association.

Admission Requirements: Students are admitted to the professional program at the junior level. Preprofes-
sional 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 a minimum of 22 credits in two of the three major areas of the following prerequisite course work:

Physical Sciences: CHEM 101, General Chemistry (5 credits); CHEM 102, General and Organic Chemistry (5). One year of general chemistry may be substituted for the above courses in chemistry. PHYS 114, 115, 117, 118, General Physics (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 (5).

Social Sciences: PSYCH 100, General Psychology (5 credits); one additional psychology or psychiatry course (5).

The preceding courses must be taken on a letter-grade basis with a minimum cumulative grade-point average of 2.50. Applicants also must have achieved a cumulative grade-point average of 2.50 in all academic work in order to be considered for admission. Transfer students should consult the Division of Physical Therapy office to determine eligibility for the professional program. Detailed program requirements and selection process information may be obtained from the Division of Physical Therapy.


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 on all required courses for satisfactory standing and for graduation from the curriculum. At the end of each academic year, the Advisory and Evaluation Committee for Physical Therapy reviews the accomplishment of the student during the year and determines his or her fitness for promotion. This determination is based upon the committee’s judgment of the likelihood of the student’s satisfactory performance as a professional physical therapist.

Prosthetics and Orthotics

Undergraduate Program Adviser

Bernard C. Simons

BB12 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 and, among other qualifications, usually must have completed the specific requirements or their equivalent with a cumulative grade-point average of at least 2.50. Exceptional cases are considered when applications are supported by adequate evidence of qualifications. Detailed admission requirements and description of the program may be obtained from the prosthetic-orthotic curriculum office.


Program Requirements: The last two years of the curriculum must be taken at the University of Washington School of Medicine. Entrance to this part of the program is dependent on the decision of the Prosthetics and Orthotics Laboratory Advisory Committee.

Proficiency requirements for the program are completion of the freshman English requirements, and MATH 101 or equivalent by test score, and trigonometry in high school or college.

A listing of required courses appears in the professional bulletin of the School of Medicine.

Students who are interested in pursuing this program may contact the Director of Prosthetics and Orthotics, BB12 University Hospital.

Graduate Programs

Graduate Program Adviser

Justus F. Lehmann

The graduate programs in rehabilitation medicine lead to the degrees of Master of Science or Master of Occupational 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. One year of working experience is desirable. In addition, all applicants must meet the requirements of the Graduate School.

A program leading to the Master of Physical Therapy degree has been approved and will be offered, beginning Autumn Quarter 1975. This program will be for professional physical therapists seeking a second-level degree.

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 to 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 graduate program is designed to prepare the registered occupational therapist as an academic or clinical educator, administrator-supervisor, or researcher in the field of occupational therapy. Departmental requirements include the established core courses and an approved thesis. Remaining credits may be earned through appropriate elective courses directed to the student's area of interest. Opportunities for supervised teaching, as well as administrative practice, are incorporated in course work. Based on an applicant's needs and prior preparation, the program can be planned to cover a span of one to two academic years.

 Admission Requirements: One-year program, open to the registered occupational therapist with a bachelor's degree from an accredited institution. Graduate Record Examination score; one year of professional work experience desirable.

Two-year program approved by the American Medical Association and the American Occupational Therapy Association for those with bachelor's degrees in a related field from an accredited institution. Graduate Record Examination scores 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 electives in area of special interest. Completion of an approved thesis.

Two-year program, minimum of 75 quarter credits, with approximately 35 credits in courses at the 500 level or above, six months of field work, and completion of an approved thesis.

Detailed admission requirements and descriptions of the available programs may be obtained from the Division of Occupational Therapy.

SURGERY
BB487 University Hospital
Faculty
G. Thomas Shires, Chairman; Brockenbrough, Canezaro, Cantrell, Carrico, DeShazo, DeVito, Dillard, Hessel, Manhas, Marchioro, Merendino, Moe, Mohri, Radke, Sevin, Stevenson, Strandness, Sumner, White, Winterscheid, Yates.

In the Department of Surgery, instruction is carried on during all four years of the medical 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, Chairman; Barnes, Chapman, Correa, Keene, Kiviat, Miller, Monda, Tremann.

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 has a unique societal role in assisting individuals, families, and community groups to cope with health problems of a physical, emotional, cultural, or social nature. Individuals and groups are in continuous interaction with a changing sociophysical environment as they strive to meet their health needs. A variety of conditions and pressures exert an impact upon the individuals, families, and community groups in maintaining a healthy state of well-being. Moreover, individuals and social units vary in their ability to deal effectively with such life stresses and environmental conditions. The practice of nursing focuses upon ways to help individuals and groups to promote and maintain an optimal health state and endeavors to provide remedial care and treatment to persons from many different social, cultural, and economic groups. The art and science of providing comprehensive nursing care services is the focus of nursing and of our educational programs.

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. 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 to individuals and groups. Nurses, as practitioners, are expected to be creative thinkers and initiators of change and to be 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. In order to maintain and coordinate quality care, the professional nurse also assumes the responsibility for directing nursing care of nursing assistants who have less preparation.

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 under the leadership of Elizabeth Sterling Soule, R.N., M.A., D.S., the first Dean of the school (1945–50). Building on the groundwork laid by Dean Soule were Dean Lillian Patterson, R.N., M.A., (1950–55), and Dean Mary Tschudin, R.N., Ph.D., (1955–69). In 1969, under the leadership of Dean Madeleine Leininger, R.N., Ph.D., the school began to develop new innovations in teaching, research, and community service. Recognized as one of the outstanding schools of nursing in the country, the school has prepared distinguished leaders, teachers, administrators, researchers, and practitioners who have been active in regional, national, and international nursing endeavors.

The present philosophy of the School of Nursing was adopted by the faculty in November, 1970. This philosophy supports the undergraduate and graduate programs within the framework of the overall philosophy of the University of Washington. The faculty assumes the responsibilities for the quality of the educational programs offered and for the promotion of effective nursing for the public through teaching, research, and service. Successful completion of the undergraduate program with the appropriate level of academic achievement enables the student to continue directly into graduate study. In response to the changing needs within our society and in acknowledgment of the growing involvement of citizens concerned with their health care and the quality of their total environment, the faculty of the School of Nursing accepts the following statements as a reflection of its beliefs:

We believe that each human being is endowed with individual qualities but holds, in common with other humans, the basic need for dignity, respect, and recognition of his individual worth and uniqueness. The individual develops as a whole being and interacts with his environment. He is affected by and affects his environment through dynamic reciprocal relationships that involve his health and his ability to develop his potential. Man is concerned with the quality of his life, and each person has a right to participate in the decisions affecting his well-being.

Man's ability to utilize his full potential is basic to health. Health is influenced by the changes that affect man and his environment, and vice versa. All persons have a right to competent health care services. 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 the 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. 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 man and his 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. 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. Implicit in caring is respect for the individual that is essential to the realization of his maximal 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.

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 to become 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 maximal potential and to continue in a life-long educational pursuit if desired. Students enter the program with diverse and varying educational
and personal experiences. Persons desiring baccalaureate education in nursing are allowed to enter at the point complementary to each individual’s background. Throughout the program, students are encouraged to assume increasing self-direction and independence. Core content germane to professional nursing practice is provided for all students enrolled in baccalaureate education. Increased complexity of nursing knowledge and practice precludes intensive preparation in all major areas of nursing practice at the undergraduate level. Exposure to specialization is offered through opportunities to pursue selected nursing and related interests.

The baccalaureate graduate is prepared to make informed judgments and to do critical thinking. The graduate is able to assume the initiative and responsibility for making nursing decisions and formulating new approaches as necessitated by varying circumstances and technological advances. Essential to the development of the above processes is a curriculum based on knowledge and scientific findings from nursing, the physical and behavioral sciences, and the humanities. Opportunities for learning include many types of experiences and environments. 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.

In February, 1971, addition of five new organizational units to the School of Nursing was approved by the Board of Regents. The five new departments were established primarily for the advancement and transmission of knowledge in the field of nursing.

Undergraduate students do not affiliate directly with a specific department, because the program of study is designed to draw upon knowledge and skills from all 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.

COMPARATIVE NURSING CARE SYSTEMS

Chairperson
Jeanne Benoliel
T518 Health Sciences Teaching

Courses of study available through this department are concerned with two areas of knowledge.

Cross-cultural Nursing: This program is designed to prepare professional nurses for roles in cross-cultural and international systems of health care delivery and to encourage advancement and transmission of nursing knowledge and practices within these systems. The program seeks to prepare professional nurses to function effectively among people of different cultural and subcultural backgrounds in Western and non-Western societies. Emphasis is on the reciprocal influences of health care systems and the dynamics of cultural and societal change processes; the similarities and differences in value orientations; the sociocultural perceptions and cognitions of illness and health; the biocultural processes in health and disease; and the cross-cultural and subcultural patterns of nursing care.

Health Care Systems: This program focuses on structural-functional and interactional elements of these systems. Levels of analysis may range from the smallest segments within the system to the interaction of the health care system with other societal systems. Study in nursing administration is available under this program.

FAMILY AND COMMUNITY NURSING

Chairperson
Marguerite Cobb
T517 Health Sciences Teaching

Programs of study offered through this department are directed toward the preparation of professional nurses with a major interest in family and community nursing. Courses of study available through this department have three major components: (1) a clinician component that focuses on the therapeutic process in relation to family health assessment and counseling and advanced community health nursing; (2) a leadership component that focuses on principles and practices of group leadership processes, teaching, and administration; and (3) a research component that focuses on independent study and the use of research findings in relation to family and community health.

MATERNAL AND CHILD NURSING

Chairperson
Patricia Rose
T410 Health Sciences Teaching

Programs in maternal-child nursing focus upon the normal physiological and psychological stresses inherent in the individual’s life from birth through the
child-bearing and -rearing years. The influence of the intergenerational biological, genetic, social, and emotional adaptations of children and parents are of major interest. Stresses related to growth and development, preparation for family life, role adaptation, pregnancy, childbirth, child-rearing, and middle age provide areas for teaching and research.

**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 are a major element for 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.

**PSYCHOSOCIAL NURSING**

Chairperson
Oliver Osborne
T407 Health Sciences Teaching

Programs in psychosocial nursing offer several pathways of study pertinent to individual career goals. The pathways include individual treatment, group treatment, family treatment, child psychiatric nursing, and community mental health. These pathways are built upon a required theoretical basis of three courses. Students are expected to select at least two pathways and to take the seminar and practicum in each. 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.

**Facilities and Services**
The School of Nursing is part of the Health Sciences Center, which comprises the schools of Dentistry, Medicine, Nursing, and Pharmacy. In November, 1972, the School of Nursing moved into a new building with facilities such as 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.

Supplementing the main campus library, the Health Sciences Library in the new building incorporates the latest developments in planning and facilities. Some areas of the library remain open at night.

**Associated Students of Nursing**

All students registered in the undergraduate program of the School of Nursing are eligible for membership in the Associated Students of Nursing organization. By belonging to ASN, students are eligible to belong to the State of Washington Association of Nursing Students (SWANS), whose membership comprises students from all the schools of nursing in the state. As a member of SWANS, a student is automatically a member of the National Student Nurse Association. Registered nurses who are students join the Washington State Nurses Association.

**Continuing Nursing Education**
The University of Washington School of Nursing, to meet increasing demands and challenges for improved health care, has given new emphasis to the development of a viable Continuing Nursing Education program for registered nurses who are not enrolled as students at the University. Through grant support from the United States Public Health Service, Division of Nursing, the program provides supportive service to the School of Nursing faculty, the University, and the community, to help nurses continue their education and gain new knowledge and skills.

**Undergraduate Programs**

Assistant Dean, Director of Undergraduate Programs
Florence Gray
T301 Health Sciences Teaching

**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) with no previous preparation in nursing, or (2) a graduate of a hospital or community college school of nursing, who is referred to as 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 to synthesize 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 study nursing and health problems. (8) Implements a plan of nursing care that contributes to the total plan of health care. (4) Implements using research or systems. (5) Implements teaching to improve 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 being 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.

Undergraduate Admission

The School of Nursing curriculum offers the undergraduate student two major entry points into the professional program: Summer Quarter or Winter Quarter of the sophomore year.

Some students with additional backgrounds may, after testing, be allowed to enter more advanced levels. Admission into the professional part of the program is restricted and selective and may occur either by progression of freshman students enrolled in the university, or by transfer of students from other institutions.

In the filling of the enrollment quota for the professional part of the nursing program, preference will be given those applicants, in the judgment of the school, best qualified to undertake the program. Equal consideration will be 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 must 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 and male students will be given special consideration.

A total of 45 credits must be completed before the professional part of the program, with registration in CONJ 317–318, Introductory Anatomy and Physiology, is undertaken. Selection of students for the professional part of the program will be based on the following criteria: applicant's admissibility to the University; applicant's scholastic standing in high school and college; completion of 25 credits, including at least one required chemistry course; additional specifics for selection and evaluation that are available from the undergraduate advising office; indication of plans to complete 45 credits prior to enrollment in the professional component; submission to the School of Nursing by specified deadlines of all required information.

The 45 credits should include: college-level science proficiency shown by: CHEM 101 and 102 (10 credits). Humanities and behavioral science proficiencies shown by: freshman English (5); PSYCH 100 or 101 (5); and electives (2–7). College-level analytic proficiency shown by: MATH 105 or 106 (3–5).

Admission With Advanced Standing

Students from other schools of nursing who wish to transfer into the advanced nursing courses at the University of Washington should be aware that limited clinical facilities and limited educational resources restrict the number of transfer students who may be accommodated. Students contemplating transfer to this school must contact the undergraduate advising office of the School of Nursing prior to the quarter they wish to enter. The undergraduate advising office has the responsibility of deciding how the student's previous nursing program coincides with the current curriculum requirements at the University of Washington. Students are placed on a first-come-first-served basis to the extent that space is available.

Fifth-Year Students

Those students who already possess a baccalaureate degree and who wish to pursue a second baccalaureate degree in nursing will be accommodated to the extent that there is room for them. The application procedure is the same as that for admission to the professional part of the program.

Students who hold a baccalaureate degree in nursing with a deficiency in basic community-health nursing or psychosocial nursing may be admitted with fifth-year status as space becomes available. A student admitted with fifth-year status is not in Graduate School.

Registered Nurse Students

The School of Nursing makes available to the registered nurse student the opportunity to complete requirements
for the Bachelor of Science in Nursing degree. The student follows the standard School of Nursing admission procedure.

**Specific School Requirements**

NURS 281, 263, 297, 301, 303, 300, 321, 322, 361, 323, 324, 325, 326, 400, 405, 406, 401, 423; CHEM 101, 102; PSYCH 100 or 101; ANTH 202 or SOC 110; MATH 105 or 106; CONJ 317–318; MICRO 301, 302; a course in pharmacy; SOC 223 or EDPSY 490 or PC BS 472; a course in nutrition; freshman English, 5 credits; PE 205; electives, 31–35 credits. A total of 194 credits is required for the Bachelor of Science in Nursing degree.

**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. These examinations, however, will not be available until courses have been taught at least once in the new curriculum. 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 advanced credit examination.

**Other Programs**

**Supplementary Community Health Nursing Program**

Supplementary study is available to prepare for community health nursing the registered nurse holding a baccalaureate degree in nursing or higher degree. The program extends over two quarters and includes a minimum of 20 credits in required and elective courses. At least half of the course credits must be in nursing. The program must include community health nursing field practice. Satisfactory completion of the program will be noted on the student’s transcript.

**School Nurse Certification**

Supplementary study to prepare for school nurse certification the registered nurse holding a baccalaureate degree in nursing that includes an accredited component in community health nursing is jointly planned and administered by the College of Education and the School of Nursing. The College of Education and the School of Nursing review credentials and make recommendations for either provisional or standard certification, the College of Education on completion of the professional education requirements and the School of Nursing on completion of the nursing requirements.

**Affiliate Program**

Selected arrangements with schools or individuals for community health nursing and upper-division psychosocial nursing theory and field courses may be worked out. Affiliating students enroll in the University and the School of Nursing for the quarter during which they are taking the designated courses. They are required to meet the admission requirements prescribed by the University and must pay the usual tuition and fees. University credit is granted upon successful completion of the courses.

**Health Care**

Any student who enrolls in the School of Nursing is required to have had a recent physical examination, a chest X-ray, and inoculations for smallpox, tetanus, poliomyelitis, and diphtheria before beginning clinical laboratory courses in the second year. Physical defects must be corrected at the student’s own expense. Students are expected to assume initiative in following the health program. Undergraduate students should see details of health care requirements listed in the Handbook for Nursing Students, available from the University Book Store.

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.

**Additional Expenses**

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. Students should plan to allot approximately $85–$100 for the purchase of uniforms in the sophomore year and approximately $2 for special achievement tests throughout the program.

**Graduate Programs**

Also see “Graduate Programs and Degree Policies,” page 57.

**Associate Dean, Director of Graduate Programs**

Dorothy M. Crowley

T624 Health Sciences Teaching

**Graduate Program Adviser**

Edna Brandt

T615 Health Sciences Teaching

The School of Nursing offers graduate curriculums leading to the degrees of Master of Arts and Master of Nursing. Also available are post-master’s programs planned on an individual basis, including a doctoral minor for students matriculated in another discipline.

The graduate program in the School of Nursing is con-
sistent with the philosophy of the University of Washington Graduate School. It is assumed that the student enters with basic knowledge and nursing ability as a professional practitioner and that the student's undergraduate education has provided a foundation in the liberal arts. Graduate offerings provide opportunity for the student to increase clinical skills and to develop teaching and research skills.

The faculty recognizes that each student enters 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:

The faculty believes that theories, concepts, and a scientific rationale underlie the nursing process. Theories and concepts from related fields are reconceptualized and applied in each of the specialty areas as appropriate.

As part of a graduate program, each student will have an opportunity to test nursing theory, to observe and analyze phenomena in the health care situation in a specific clinical area, to identify researchable problems, and to specialize in one area of knowledge. The curriculum also offers theory basic to teaching, administration, and clinical specialization in nursing. Opportunity for the application of these theories will be provided throughout the clinical field-experience. The student thus is given a base for continuing the refinement of these competencies after graduation.

Majors are offered in the following areas: comparative nursing care systems, family and community nursing, maternal-child nursing, physiological nursing, and psychosocial nursing. The major area includes advanced clinical study with opportunity for functional preparation in teaching, administration, and clinical specialization.

Most programs are four quarters in length, but the individual program may vary with the particular major field and the number of credits carried each quarter. At least half of the total credits taken must be in courses 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 an entire Program of Study in order 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. Mastery of a foreign language is not required for this degree. A typical program would include: Major—advanced nursing courses (19 credits); related fields—courses in at least two other disciplines (12); and research—courses in research and thesis (14); total, 45 credits.

Master of Arts Degree

The M.A. degree 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 the exact number of credits for the minor are determined by the minor department. A student seeking this degree must demonstrate a reading knowledge of one foreign language. A typical program: Major—advanced nursing courses (19 credits); minor—courses in another discipline (12 minimum); research—courses in research and thesis (14); total, 45 credits minimum.

Post-Master's Degree Programs

Students who hold the master's degree may enroll for an additional period of study at the post-master's level to gain additional depth in an area of study, added breadth of preparation, and increased knowledge and skill in nursing research. The opportunity for post-master's study is offered in selected areas, such as care of the patient dependent on alcohol, care of the handicapped child, and cardiovascular nursing. Individual programs of study are planned in relation to the student's scholarly interests and long-range professional goals.

Nurse Science Programs

Although the University of Washington does not currently offer a doctorate in nursing, the following patterns of program planning are open to qualified professional nurses: (1) nurse scientist program plan, (2) predoctoral programs in related fields, and (3) special individual Ph.D. program.

The nurse scientist program plan is designed to prepare a nurse scientist and leads to a Doctor of Philosophy degree with a major in the fields of anthropology, microbiology, physiology, or sociology. A predoctoral minor in nursing, consisting of a total of 35 graduate credits, of which at least half are in courses at the 500 level, is an integral part of this program. The sequence of courses for each individual is determined on the basis of previous preparation and goals.
Professional nurses who wish to extend formal study and to increase scholarly and research competence through doctoral preparation in a specific field related to nursing, such as business administration, education, genetics, history, or one of the sciences related to their professional goals, may apply directly to the predoctoral program in that field. If desired, a predoctoral minor in nursing may be planned to meet the student's needs.

A limited number of research assistant and teaching assistant positions are available to qualified premaster’s, post-master’s, and predoctoral students. Information can be obtained from the graduate program adviser’s office.

The special individual Ph.D. program offered by the University’s Graduate School is a unique research-oriented program in two or more disciplines. Designed for exceptionally able and unusually well-qualified students, the program is available to a limited number of applicants. Additional information appears in the “Graduate Study” section of this catalog.

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. Additional information appears in the “Graduate Study” section of this catalog. Applicants must be graduates of a baccalaureate program with an upper-division major in nursing comparable to that of the University of Washington School of Nursing. Transcripts of applicants who are graduates of programs not accredited by the National League of Nursing are evaluated on an individual basis. Professional experience is not required prior to admission to the graduate program. Completion of the Graduate Record Examination (aptitude test) and completion of a basic course in statistics are required prior to admission.

Extra Fees and Expenses
Graduate students who are matriculated in advanced degree programs should plan to have available approximately $150 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. All students are required to provide their own transportation and should be prepared to have a car available for use.
Dean
Jack E. Orr
102 Bagley

Men and women qualified for professional service in one or more of the fields of pharmaceutical practice are essential in the health care delivery system of today's society.

The University of Washington School of Pharmacy provides an instructional program, based on a five-year curriculum, that includes studies in liberal arts, business, basic sciences, and pharmaceutical sciences, and the application of this knowledge to good patient care. In addition, the school aspires to cultivate a high regard for professional ethics and the concept of service.

Many different opportunities exist for pharmacists as members of the professional team providing health care to the public. Holders of the Bachelor of Science in Pharmacy degree may be found in a variety of settings wherever pharmaceutical services are rendered. The majority of graduates engage in the community practice of pharmacy, and many are owners or part owners of pharmacies. Still others become pharmacists in hospital and clinic pharmacies; professional representatives of pharmaceutical manufacturers; production, control, or research pharmacists in the manufacture of medicinal and other pharmaceutical products; personnel in wholesale drug distribution; food- and drug-control chemists or inspectors for governmental health agencies; or pharmaceutical association executives.

The search for new knowledge to achieve the major goals of the health professions, the maintenance of public health and the relief of human ills, is carried on through advanced research. The graduate programs are designed to prepare advanced students for research, teaching careers, or specialized levels of professional practice.

The School of Pharmacy is a member of the American Association of Colleges of Pharmacy. It is accredited by the American Council on Pharmaceutical Education.

The University of Washington School of Pharmacy was founded in 1894, when it offered a two-year course of study. This was followed by three- and four-year programs. In 1957, the school adopted a five-year curriculum, which is continually being revised to prepare the pharmacy graduate for the ever-changing practice of pharmacy. The latest change, recently effected, was the introduction to the curriculum of patient-oriented clinical pharmacy. Since 1925, the school has accepted prospective candidates for the degree of Doctor of Philosophy with specialization in various areas of the pharmaceutical sciences.

School and Related Facilities
The School of Pharmacy is located in Bagley Hall,
which it shares with the Department of Chemistry. Among the school's facilities in Bagley Hall are the pharmacy undergraduate and graduate laboratories, advisory office, faculty offices, stockroom, and the drug service department. The State Food and Drug Laboratory also is housed in Bagley Hall. Many of the pharmacy classes are taught in Bagley Hall, but because a number of courses are taught by faculty members of the various departments of the School of Medicine, these classes are held, as are the clinical pharmacy courses, in the Health Sciences Center and the University Hospital.

The University Hospital, the Harborview Medical Center, the Children's Orthopedic Hospital and Medical Center, the Veterans Administration Hospital, and other Seattle area hospitals serve as training facilities for undergraduate and graduate students in clinical pharmacy. Students are assigned to various clinical areas of the hospital and outpatient clinics, where they relate complex drug therapy to disease state and treatment planning.

The Drug Information Service is operated by the School of Pharmacy with the cooperation of the Health Sciences Library. Located in the Health Sciences Library, the service provides drug information and consultation to qualified health professionals and serves as a teaching laboratory for students in the clinical pharmacy program.

The University Hospital pharmacy and the Hall Health Center pharmacy serve as training facilities for the school. Senior students who so elect are assigned to these pharmacies, where they gain practical experience in prescription practice under the direction of staff pharmacists. The University Hospital pharmacy and seventeen other hospital pharmacies in Seattle serve as laboratories for undergraduate and graduate programs in hospital pharmacy. The hospitals' chief pharmacists, each of whom holds a clinical faculty appointment in pharmacy, direct the laboratory instruction.

The drug plant gardens comprise approximately three acres of formal plantings adjoining a laboratory building and greenhouse. These facilities are utilized for instruction of undergraduate and graduate students, for research, for reference source materials in plant identification in poison control, and for continuing educational and public educational purposes.

The drug service facility manufactures specialized pharmaceutical preparations for the schools of Medicine and Dentistry, Hall Health Center, the University Hospital, and other divisions of the University. Much of the work done by this facility is in drug formulation, product development, and preparation of dosage forms to be used in clinical and experimental research.

The school maintains a laboratory that performs the analysis of food products for the Director of the State Department of Agriculture, of drugs for the State Board of Pharmacy, and of alcoholic beverages for the State Liquor Control Board. The Dean of the school is the state chemist.

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, national pharmaceutical association for the promotion of pharmacy (the chapter is also an affiliate of the Washington State Pharmaceutical Association); Kappa Psi, men's professional fraternity; Lambda Kappa Sigma, women's professional sorority; or Rho Chi, pharmaceutical honor society. All of these groups are affiliated with their respective national organizations, the first three of which have graduate groups throughout the nation and encourage continued participation after graduation.

Employment
As positions become available in pharmacies, they are posted for qualified applicants by the School of Pharmacy.

PHARMACEUTICAL SCIENCES
303 Bagley

Faculty
Lynn R. Brady, Chairman; Allen, Brady, Elmer, Fischer, Goodrich (emeritus), Huitric, Krupski, Levy, McCarthy, Nelson, Spitznagle, Trager, Vincenzi.

The Department of Pharmaceutical Sciences provides the pharmaceutical sciences component of the pharmacy curriculum. Courses include background training in bionucleonics, biopharmaceutics, pharmacokinetics, mechanisms of drug action and drug metabolism, medicinal chemistry, pharmaceutical analysis, and pharmacochemistry. 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, mechanism of drug action, microbial metabolism and physiology, radiopharmaceuticals, and structure-activity relationships. A number of projects involving drug distribution, drug metabolism, and radio pharmaceuticals are cooperative efforts with research groups in the School of Medicine.

PHARMACY PRACTICE
306 Bagley

Faculty
Donald L. Sorby, Chairman; Hall, Hammarlund, Ivey, Kradjan, Orr, Pittle, E. Plein, J. Plein, Rising (emeritus), Smith, Sorby.

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, manufacturing pharmacy, and pharmacy administration. Courses concerning pharmacotherapeutics and drugs in society are also provided for nonpharmacy majors. Development and evaluation of innovative teaching techniques also receive major attention.

A pharmacy externship program is currently under development to provide students a better opportunity to relate their academic educations to professional pharmacy practice. In recognition of the importance of continuation of education after graduation, programs and seminars are presented annually to graduate pharmacists. The Department of Pharmacy Practice is administratively responsible for operating the Hall Health Center pharmacy, the Drug Service Laboratory, and the Drug Information Service. These facilities are also used as teaching sites for pharmacy students.

Faculty members of the Department of Pharmacy Practice conduct research programs on methods of delivery of pharmaceutical services in health care and on optimizing drug effects in patients.

Undergraduate Program
Adviser
Louis Fischer
300 Bagley

Bachelor of Science in Pharmacy Degree
The pharmacy program is a five-year course of study that leads to a Bachelor of Science in Pharmacy degree. The final three years must be spent in residence in the School of Pharmacy. Students working toward the bachelor's 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 225 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 3 credits in physical education activity courses numbered 100–199, no more than 6 credits in PHARM 495, and no more than 6 credits in professional courses numbered 499 may be applied toward graduation.

Admission Requirements: Freshman admission requirements for the School of Pharmacy are those of the University. The School of Pharmacy is limited in the number of transfer students it can accept into the second-through-fifth-year classes. In addition to applying to the University of Washington, transfer students desiring to enroll in pharmacy must apply to the School of Pharmacy and submit a complete set of all transcripts to the following address: University of Washington, School of Pharmacy, Director of Student Affairs, B&–20, Seattle, Washington 98195.

To receive first consideration for admission, applicants must submit applications and complete up-to-date scholastic records to both the School of Pharmacy and the Office of Undergraduate Admissions prior to April 1, a date which applies only to applications for pharmacy, not to other schools or colleges in the University. Students usually are admitted to the School of Pharmacy only at the beginning of Autumn Quarter.

Students who have submitted applications will be contacted by telephone or mail for the arranging of a personal interview. 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.

An applicant who is admissible to the University is not necessarily assured of admission to the School of Pharmacy.

LICENSURE
In order to be admitted to the practice of pharmacy as a registered pharmacist in the state of Washington, the applicant must graduate from an accredited school of pharmacy, must complete the internship requirements as prescribed, and must pass the licensing examination.

After enrollment in the School of Pharmacy, the student should file an application with the State Board of Pharmacy for registration as a pharmacy intern. The board
establishes the nature and amount of internship experience required prior to the licensing examination, which may be taken after completion of the internship requirement.

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.

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.

First Year
Autumn Quarter: CHEM 140, General Chemistry (4 credits); ENGL 171, College Writing (3); MATH 105, College Algebra (5); approved electives (2–5); total—14–17.

Winter Quarter: CHEM 150, General Chemistry (4 credits); CHEM 151, General Chemistry Laboratory (2); ENGL 172, College Writing (3); MATH 124 or 157, Calculus (5 or 4); PHYS 114; General Physics (4); PHYS 117, General Physics Laboratory (1) (student exempt if physics was taken in high school); total—18–19.

Spring Quarter: CHEM 160, General Chemistry (4 credits); English or speech (2–3); PHYS 115, General Physics (4); PHYS 118, General Physics Laboratory (1) (student exempt if physics was taken in high school); approved electives (3); total—14–15.

Second Year
Autumn Quarter: BIOL 210, Introductory Biology (5 credits); CHEM 231, Organic Chemistry (3); CHEM 241, Organic Chemistry Laboratory (2); PHYS 116, General Physics (4); PHYS 119, General Physics Laboratory (1) (student exempt if physics was taken in high school); total—15.

Winter Quarter: BIOL 211, Introductory Biology (5 credits); CHEM 235, Organic Chemistry (3); CHEM 242, Organic Chemistry Laboratory (2); approved electives (5); total—15.

Spring Quarter: BIOL 212, Introductory Biology (5 credits); CHEM 236, Organic Chemistry (3); approved electives (7); total—15.

Third Year
Autumn Quarter: PHSCI 320, Pharmaceutical Sciences Laboratory (3 credits); PHARM 328, Pharmaceutical Calculations (0–); PHARM 331, General and Physical Principles (4); PB10 360, General Human Physiology (5); approved electives (2); total—14.

Winter Quarter: BIOC 405, Introduction to Biochemistry (5 credits); PHSCI 321, Pharmaceutical Sciences Laboratory (2); PHSCI 332, General and Physical Principles (3); PHARM 329, Pharmaceutical Calculations (0–); approved electives (5); total—15.

Spring Quarter: BSTR 301, General Anatomy (4 credits); MICRO 301, General Microbiology (3); MICRO 302, General Microbiology Laboratory (2); PHSCI 400, Biophysical Medicinal Chemistry (4); PHARM 330, Pharmaceutical Calculations (1–); approved electives (2); total—16.

Fourth Year
Autumn Quarter: PATH 310, General Pathology (3 credits); PHCOL 401, General Pharmacology (5); PHSCI 412, Pharmacognosy (3); PHSCI 440, Medicinal Chemistry (4); total—15.

Winter Quarter: PHCOL 402, General Pharmacology (5 credits); PHSCI 413, Pharmacognosy (3); PHSCI 441, Medicinal Chemistry (4); approved electives (3); total—15.

Spring Quarter: PHARM 450, Pharmacy Laws (3 credits); PHSCI 405, Biopharmacy and Pharmacokinetics (5); PHSCI 414, Pharmacognosy (2); PHSCI 442, Medicinal Chemistry (3); approved electives (2); total—15.

Fifth Year
Autumn Quarter: PHARM 407, Prescription Practice (4 credits); PHARM 484, Introduction to Clinical Pharmacy (5); approved electives (6); total—15.

Winter Quarter: PHSCI 497, Toxicology (2 credits); PHARM 408, Evaluation of Drug Products (3); approved electives (10); total—15.

Spring Quarter: PHARM 452, Contemporary Problems (1 credit); approved electives (14); total—15.

PHARMACEUTICAL SCIENCES
Graduate Programs
Graduate Program Adviser
Jack E. Orr
102 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 bionucleonics, biopharmaceutics, medicinal chemistry, pharmaceutical chemistry, pharmaceutics, or pharmacognosy. These pharmaceutical sciences 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 upon petition 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 of 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.

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 preparation 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 the University of Washington.

PHARMACY PRACTICE

Graduate Programs
Graduate Program Adviser
Jack E. Orr
102 Bagley

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 pharmacy teaching, research, manufacturing or hospital pharmacy, or in other advanced levels of professional practice.

These programs combine formal course work with independent study and research training in the area of specialization. The choice of adviser and research problem is a matter of mutual consent between the student and faculty member. Course work taken by the graduate student depends upon his background and chosen area of specialization. All programs including research and preparation of the thesis usually are 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. 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 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.
Dean
Brewster C. Denny
266 Smith

Faculty and Cooperating Faculty

Graduate Programs
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 the 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 in 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.

Graduation 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 option 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 gen-
eral concentrations: (1) public administration, for stu-
dents 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 pol-
icy, 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 through­
out 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 semi­
nars at which distinguished public servants appear, in
workshops, in conferences sponsored by the Graduate
School of Public Affairs, and in the activities of the In­
stitute of Governmental Research. An important feature
of the program of the school is the sponsorship of the
public policy seminars. These are faculty seminars in,
which professors from several colleges, schools, and
departments of the University, as well as distinguished
experts from off-campus, discuss a particular problem
area of public policy. Students participate as auditors at
the invitation of faculty members. Interdisciplinary
seminars in natural resources, urban and regional
public policy, and health care already are regular fea­
tures of the program. Others are in the planning stages
for future years.

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 Univer­
sity is one of eight universities participating in the Edu­
cation for Public Management program sponsored by the
United States Civil Service Commission. 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.

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 adminis­
tration in the state of Washington and in the Pacific
Northwest. In the performance of these roles, a primary
mission of the institute is to work with other organiza­
tions 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 com­
mittees composed of representatives of University
schools and departments that wish to participate in ef­
forts 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 ac­
tivities 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 oppor­
tunities 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 broad­
ening in mission and an expansion of University re­
search and service in urban affairs, is the successor or­
ganization 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, Grad­
uate Program Adviser, 253 Smith, DP-30.
When the School of Public Health and Community Medicine was established at the University of Washington on July 1, 1970, it became the eighteenth such school accredited in the United States and the only such school in the Pacific Northwest. The new school's nucleus were its faculty; its educational, training, residency, and research programs; and the physical space of the former Department of Preventive Medicine in the School of Medicine. The school's organization is strongly departmental, admission being permitted only through one of five departments. Its mission and objectives are defined in terms of leadership, research, training, and service—all dedicated to shaping the structure and policies of the "new" public health.

Existing and projected training programs are characterized by their dependence on the research and service programs of the school, by careful selection of students, by emphasis on high quality and flexibility for adaptation to the needs and interests of individual students, and by utilization of strength within its own and other units of the University. Through its academic programs, the school is designed to produce qualified investigators and teachers, innovative leaders to direct and coordinate community health programs, and highly trained specialists in the fields of biostatistics, epidemiology, health services and health care administration, environmental health, and pathobiology.

School Facilities and Services
The basic facility for housing the faculty, students, staff, and administrative offices, as well as for "in-house" re-
search and research training, is a $2,500,000 six-story building constructed in 1966 in the health sciences complex. Well-equipped laboratories serve the departments of Environmental Health, Epidemiology and International Health, and Pathobiology and contain facilities for work in biochemistry, immunochemistry, microbiology, toxicology, electron microscopy, and industrial hygiene. Students have ready access to the large Health Sciences Library, with its comprehensive collection of references and textbooks, about 115,000 volumes, and some 3,300 journals relevant to all health professions. The school maintains its own General Automation SPC 16, Model 50, computer with a 32k storage capacity. Projects requiring a larger computer capacity can be handled through the adjacent Health Sciences Computer Center. Facilities for experimentation with animals, including primates, are available.

The school also maintains faculty members in a foreign setting, on Taiwan, where opportunities are provided for research and training in areas relevant to international health, as well as in comparative studies related to the diseases of worldwide occurrence and to delivery of health services. Affiliations exist with the United States Naval Medical Research Unit No. 2 and the Institute of Public Health, National Taiwan University. Local affiliations important to public health and community medicine exist with many Seattle hospitals and medical centers and with other state, community, official, and voluntary health agencies.

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, Paula Diehr, Ph.D.; Environmental Health, Jack Hatlen, M.S.; Epidemiology and International Health, John P. Fox, M.D.; Health Services, Ann Browder, M.D.; Pathobiology, George E. Kenny, Ph.D., or to the graduate program adviser, James L. Gale, M.D.

If there is a problem determining the proper department to which to apply, inquiries should be sent to the graduate program adviser. 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 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 wishes to study. Graduate School application forms will be sent to all persons interested in degree programs offered by this school. The school forms also will be 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.

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 and Autumn Quarter, April 1; Winter Quarter, October 1; Spring Quarter, January 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
Because of the withdrawal of federal support for training programs, no stipend support is generally available at this time. 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 may be sent to the program adviser of the department in which the applicant has a major interest.

Undergraduate Program
Bachelor of Science Degree

The Department of Environmental Health, School of Public Health and Community Medicine, offers an environmental health curriculum leading to a Bachelor of
Science degree. This program prepares individuals for positions as environmental health specialists responsible for the recognition, identification, and change of environmental conditions hazardous to man. Such a specialist must have the skills necessary to motivate and educate the public toward change, as well as the ability to enforce environmental and public health laws.

A student in this program is expected to meet the distribution requirements as established by the College of Arts and Sciences. He or she should take additional courses in the social sciences and humanities that will help him or her develop an awareness and understanding of the social issues and limited skills or techniques in community planning and communications.

The environmental health major also is required to take technical courses important to future professional work. These courses cover environmental health problem areas, such as water and food sanitation, air and water pollution, vector control, solid-waste disposal, housing, institutional sanitation, occupational health, industrial hygiene and safety, and noise control. Toward the end of the student's academic training, he or she is required to write on an environmental health topic that has been investigated through research and as a study project. Summer field training is highly recommended and may be taken between the junior and senior years, during the senior year, or directly following graduation.

Graduates from this program generally will be employed by health departments and similar regulatory agencies. They will be in constant contact with the public in a never-ending variety of problem-solving situations aimed at enhancing man's environment as well as reducing its disease potential.

Graduation Requirements: All requirements for a degree from the College of Arts and Sciences must be met. A total of 50 credits is required in environmental health and closely related subjects.

Required environmental health courses and related health services administration and planning, biostatistics, and epidemiology courses include: PC EH 411, 440, 441, 442, 450, 453, 457, 480, 499; PC HS 323, 424; PC BS 472; PC EP 420.

Additional required or related courses: CHEM 140, 150, 151, 160, and 231, 232 or 102; BIOL 101–102 or 210, 211, 212; PHYS 114, 115, 116; MATH 105 or 106; MICRO 301; ENGL 171 or 271; BG&S 200; ECON 200; URB P 400.

Graduate Programs
Graduate Program Adviser
James L. Gale
F358 Health Sciences

Available degree programs include the Master of Public Health, Master of Science in Public Health, Master of Health Administration, and Doctor of Philosophy. A prior doctoral degree ordinarily is required for the schoolwide Master of Public Health degree program, in which training is offered by the school's entire graduate faculty, although each student develops an area of specialization. Training for the master's or doctoral degree is offered by the faculties of departments or groups. All programs are flexible and designed to meet the background and needs of the individual student. However, to ensure adequate student preceptorship, admission to any of the programs is permitted only through a department. In general, master's level training requires a year of academic course work and another year of research. Admission to any of the degree programs requires admission to the University of Washington Graduate School, and usually at least a 3.00 grade-point average in the final two undergraduate years. Unless otherwise indicated, inquiries should be addressed to the departmental program advisers or to the graduate program adviser.

Master of Public Health Degree
The Master of Public Health degree is intended for the student who has an extensive background in human health and biology. In addition to meeting the requirements for admission to the Graduate School, an applicant for admission to the M.P.H. degree program is evaluated competitively with respect to: (1) past academic performance and ability; (2) adequacy of preparation (a prior doctoral degree in a health field or other appropriate qualification based on education, prior experience, and training); (3) intent to pursue a career utilizing the training; and (4) acceptability to the department responsible for supervising the student's work in the designated area of concentration.

Each student in the program must choose an area of concentration, corresponding to one department of the school (usually Biostatistics, Environmental Health, Epidemiology and International Health, or Health Services), and in addition must complete a project leading to a written thesis. An applicant should indicate the desired area of concentration to ensure that resources exist within the school for suitable advising, individual studies, and a thesis project.

Breadth of knowledge in the field of public health constitutes an important objective of this degree. Although distributional requirements for courses are not specified,
each applicant, in conjunction with the faculty and his or her advisory committee, plans a course of study at the beginning of the program that ensures this breadth. Changes and modifications of this plan during the student’s enrollment are expected. Most students need 60 credits, and all students must obtain 9 thesis credits. The individual nature of each student’s program, based on prior experience, prior training, and career objectives, results in a variation around this average recommended number of credits. In some instances, the program can be completed within four quarters. The school encourages use of challenge examinations, evaluation of prior training, and other mechanisms as alternatives to formal courses.

Concurrent credit as a resident in General Preventive Medicine is provided physician applicants for this degree. Because the Board of Preventive Medicine requires a minimum of one year of graduate study and two years of residency, students with prior residency training in a cognate clinical field may wish joint board certification. Two calendar years of preventive medicine residency often satisfies these various certification requirements, depending on the particular clinical specialty residency criteria and on prior or subsequent training in the clinical field. The American Board of Preventive Medicine also requires completion of an investigation leading to a written statement. The M.P.H. thesis generally satisfies this requirement.

Individuals who wish to pursue this degree on a part-time basis, often in conjunction with employment, usually require a longer calendar period to satisfy course, field study, and research experiences leading to acquisition of the degree.

Undertaken during the summer of 1974 was an experimental course amalgamating basic content from the areas of environmental health, health services, and epidemiology. Other modification and educational initiatives are being tested for their suitability in providing a more efficient learning experience for selected applicants for this degree.

Other Master's Degrees

The Master of Science in Public Health degree program, requiring approximately the same number of credits and time as that for the Master of Public Health degree, is offered through the School of Public Health and Community Medicine.

A Master of Science degree in the field of biomathematics is offered by the Biomathematics Group, which includes certain faculty members from the colleges of Fisheries and Forest Resources, the departments of Genetics, Mathematics, Oceanography, Physiology and Biophysics, and Zoology, as well as from the School of Public Health and Community Medicine.

A Master of Health Administration degree is offered through the Health Administration and Planning Group, which includes certain faculty members from the schools of Business Administration, Nursing, Public Affairs, and Social Work, and the departments of Economics, Geography, Sociology, and Urban Planning, in addition to the School of Public Health and Community Medicine.

The programs administered by the School of Public Health and Community Medicine for the Master of Science in Public Health degree include the specialization of biostatistics training for health services research, environmental health, sanitation, industrial hygiene and safety, epidemiology and international health, health services, and pathobiology.

BIOSTATISTICS

F363 Health Sciences

Chairman

Donovan J. Thompson

The biostatistics–health services 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; and courses in epidemiology, health economics, health administration, and related areas. A supervised period of work is included in a setting appropriate for gaining experience in the area. Applicants should have an interest in the quantitative assessment of the state of health of population groups and in the method and technique for judging the effectiveness of programs designed to conserve or improve health. (See also description of biomathematics program below for additional degree programs.)

ENVIRONMENTAL HEALTH

F463 Health Sciences

Acting Chairman

Donald R. Peterson

Students taking the environmental health specialization (sanitation, industrial hygiene, and safety) are prepared to serve as sanitarians, industrial hygienists, and environmental health management specialists for upper-
echelon positions in environmental health programs in official health agencies or in other government agencies utilizing environmental control or management personnel. They also may serve in private industry, in educational institutions, and in private consultation capacities. It is expected that applicants will have preparation in the relevant biological, physical, and social science areas. Preference is given to those who have had undergraduate education or experience in environmental health practice. Students with such a background may complete their programs in six quarters. Those without it should expect to take seven or eight quarters, including field training.

EPIDEMIOLOGY AND INTERNATIONAL HEALTH
F263 Health Sciences
Chairman
E. Russell Alexander

The objective of the epidemiology and international health 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 and international health 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. The conduct of an independent study (original research or field project) constitutes the most important aspect of the program.

HEALTH SERVICES
F358 Health Sciences
Chairman
William C. Richardson

The health services specialization offers graduate training in two areas: community medicine and health services administration and planning (described below). Concentration in community medicine focuses on issues relating to the organization of medical care, including the evaluation of delivery models, assessment of quality of care, and developing and evaluating care for specific socioeconomic and ethnic groups. Extensive use is made of community agencies and resources. Students with a background in medicine or dentistry may approach this area of concentration as applicants for residency training in community medicine, for a master's degree, or for both. In exceptional cases, nonpostdoctoral students with appropriate community experience and background may be accepted for the Master of Science in Public Health degree program with an emphasis on community medicine.

PATHOBIOLOGY
F161 Health Sciences
Chairman
George E. Kenny

The pathobiology specialization prepares the student for a career as a teacher, investigator, or manager of a clinical or public health laboratory. 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 to a student with a baccalaureate degree in biology or biochemistry.

BIOMATHEMATICS
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. Fundamental courses in mathematical statistics and quantitative methods are generally integrated into an individual Program of Study through cooperative arrangements with the Department of Mathematics and with the Center for Quantitative Science. This flexibility gives an excellent opportunity for biostatistics students to acquire a broad background in modern theoretical developments applicable to research activities in the health sciences. Information concerning the graduate program in biomathematics appears in the "Interdisciplinary Graduate Degree Programs" section of this catalog. Inquiries concerning this program should be addressed to Richard Kronmal, Ph.D., group chairman.
HEALTH SERVICES ADMINISTRATION AND PLANNING

The Health Services Administration and Planning Group, administratively located in the Department of Health Services, accommodates degree applicants in one of three areas of concentration: hospital administration; medical care administration and organization; and comprehensive health planning. The curriculum is designed to be highly interdisciplinary, drawing on faculties from other academic units throughout the University (e.g., business, public affairs, and urban planning). Additional information about this degree program may be found in the “Interdisciplinary Graduate Degree Programs” section of this catalog. Inquiries about this program should be addressed to Chairman, Health Services Administration and Planning Group.

Doctor of Philosophy Degree

Programs leading to the Ph.D. degree are offered by both the Department of Epidemiology and International Health and the Biomathematics Group, 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 program’s independent study project and the resulting dissertation, and in the expected time required to complete the program, a minimum of three years.

The epidemiology Ph.D. Candidate studies the distribution of disease in mankind and seeks to identify factors that influence its occurrence in human populations. 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, he or she 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 who will be considered are students enrolled in the schools of Dentistry or Medicine and recommended for the concurrent D.D.S.-Ph.D. or M.D.-Ph.D. program.

Postdoctoral Training

The school offers three-year residencies in general preventive medicine, approved by the American Board of Preventive Medicine, for training in the four subspecialty areas of epidemiology, environmental health, community medicine, and health services administration. Opportunity for combined residencies in general preventive medicine and pediatrics now exists, and a combined program with internal medicine is being developed. Depending on whether the candidate has taken a straight internship, which is counted as one year of residency in pediatrics and medicine, the residency requirements for two specialty boards may be satisfied by four or five years of postinternship training.

Graduates of accredited medical schools in the United States or Canada who have completed at least one year of internship are eligible for admission to these residency programs. Those seeking regular board certification must be licensed to practice in at least one of the states or in Canada. Foreign medical graduates who do not possess such a license but satisfactorily complete three years of approved residency training may seek special certification from the board (not valid in the United States or Canada). Acceptance into the program is on a competitive basis, the criteria being academic performance in medical school; overall professional competence, as judged from letters of recommendation from former teachers and supervisors; motivation in seeking training and relating it to career objectives as judged from narrative statements; and a personal interview when possible. All residency programs include formal course work as required by the American Board of Preventive Medicine, independent research, and supervised field experience.

Possessors of M.D. or Ph.D. degrees, not interested in degree programs or residency training, may be accommodated in advanced, specialized research training in their areas of interest. Such programs generally are for periods of not less than one year and are pursued under the supervision of individual senior faculty members. Interested persons may direct inquiries to the particular faculty member with whom they wish to work, if known to them, or to the appropriate departmental chairman.
RESERVE OFFICER TRAINING PROGRAMS

The departments of Aerospace Studies, Military Science, and Naval Science, offer ROTC programs under agreements between the University and the United States Air Force, Army, and Navy. Eligible freshman students 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, a modified three-year, and a special two-year program, each of which leads to a commission as a second lieutenant in the Army.

The Department of Naval Science offers both a four-year and a two-year program that may lead to a commission in the Navy or 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 may apply for the two-year program. AFROTC counselors are available at all times in the Department of Aerospace Studies.

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 Hunt, USAF, Professor of Aerospace Studies; Armstrong, Boudreaux, Doggett.

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.
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 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.

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.

Flight Training
Flight training is available to physically qualified cadets during their senior year. The Air Force pays the costs incident to this training. Successful completion results in the receipt of a private pilot's license and further flight training after being commissioned, leading finally to becoming an Air Force pilot.

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
145 Savery

Faculty
Col. Karl O. Kuckhahn, USA, Professor of Military Science; Bacon, Boling, Johnson, Knowlton.

The Department of Military Science offers the college student five elective options for the attainment of an Army officer's commission through Army ROTC while pursuing the academic degree of his 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, and military law. Placement credit toward completion of ROTC courses may be given for prior ROTC or military training. All military textbooks and uniform items, plus a tax-free subsistence allowance during the junior and senior years of $100 per month for a maximum of 20 months, 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 both for time at camp and for travel expenses to and from the camp location. The program is divided into two courses: the basic (first and second years) and the advanced (third and fourth years). Enrollment in the advanced course requires selection by the Professor of Military Science. A student chosen for the advanced course must sign a contract wherein he agrees to complete the course, to enroll in the Army Reserve, to accept a commission if offered, and to serve on active duty for a period of two years after commissioning. A three-to-six-month option for active duty training with the balance of service in an active Army Reserve unit recently has been offered.

Modified Three-Year Program
This program is open to men and women of sophomore standing. The program is the same as that for the four-year program, except that the basic course (first and second years) is compressed into one year.

Special Two-Year Program
This program is open to upper-division or graduate men presently enrolled at the University or to upper-division or graduate transfer men from other colleges. This program requires attendance at a basic camp for six weeks between the sophomore and junior years in lieu of the basic (first and second years) course. The basic camp may not be necessary for veterans or others with pre-
vious ROTC or military training. While at camp, the student receives pay, plus travel pay to and from the camp location. Academic subjects covered in the two-year program, including the advanced camp, are the same as those covered in the advanced course of the four-year program. The obligations are the same in each program. This program is scheduled to be open to women in 1975.

Scholarship Program for Currently Enrolled Students
This program is open to men and women 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 (see below).

Four-Year Scholarship Program
Application for this program should be made while the student is still in high school. Selection of students is made on a nationwide competitive basis. This program leads to a commission in the Regular Army or the Army Reserve. All tuition, laboratory fees, textbooks, and uniform items, plus tax-free retainer pay of $100 per month for a maximum of four years, are provided by the Army. The program requires four years of academic study on campus, as well as a six-week advanced camp training period between the junior and senior years, for which the cadet is paid for both his 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.

Flight Training
Flight training is available to interested cadets after completion of the first year of the advanced course. Successful completion of this training may lead to receipt of a private pilot's license and assignment as an Army aviator.

Uniforms
Students in the basic program are provided uniforms, which are turned in at the completion of the basic course. Students in the advanced program are provided new uniforms, which become their personal property when commissioned. Uniforms are worn at all leader-

ship laboratory classes and when otherwise specified. At the time of registration, all students, except those on scholarships, must make a $25 deposit, which is refunded when the uniform and textbooks are returned undamaged.

Inquiries about enrollment or other information should be addressed to the University of Washington, Professor of Military Science, 145 Savery, DK–10, Seattle, Washington 98195.

NAVAL SCIENCE
309 Clark

Faculty
Col. William H. Rice, USMC, Professor of Naval Science; Beltz, Egan, Foucht, Karr, Medford, Rider.

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 just prior to the beginning of Autumn Quarter. Applications for the two-year program are accepted from current sophomores in community college or four-year colleges and must be received prior to May 1.

Those students selected for the two-year program attend a six-week course of instruction at the Naval Science Institute (NSI) during the summer prior to their junior year. Successful completion of NSI qualifies students for enrollment in the advanced course in the NROTC program. NROTC college program students pay their own college expenses, but receive subsistence pay of $100 per month during their junior and senior years, including the intervening summer.

The Navy furnishes the uniforms and textbooks used in naval science courses. College program students may obtain scholarships through various avenues, including the national competition and direct appointments by the professor of naval science. 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 naval ROTC scholarship program and the two-year nuclear propulsion scholarship program. Selection for the four-year program is based upon nationwide competition and selection by a central selection committee. Application must be made by November 15 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 nuclear propulsion scholarship program, applications from current sophomores, or juniors in five-year programs of study, must be received prior to April 1. 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. Scholarship students are appointed as midshipmen, USNR, and upon graduation are commissioned a 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. A flight instruction program is available for physically qualified students interested in becoming naval aviators. Successful completion of the program results in qualification for a private pilot's license and consideration for assignment to naval flight training and designation as a naval aviator.

Additional information concerning the Naval ROTC Programs may be obtained by writing the University of Washington, Professor of Naval Science, 309 Clark, DU-10, 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 wide variety of professional roles and functions. The school’s undergraduate, graduate, and continuing education offerings are designed to equip students possessing differing academic and experience backgrounds with the knowledge and skills needed for improved practice. Consistent with the aims of the University, the program of the School of Social Work has three major objectives: (1) the transmission of existing knowledge through the professional curriculum and participation in instructional offerings of other units of the University; (2) the acquisition of new knowledge through research and scholarship by the faculty and students; and (3) service to the community through collaborative training programs, sponsorship of professional institutes, and consultation.

Undergraduate Program
Director
William C. Berleman
109 Eagleson

The School of Social Work undergraduate program prepares students to receive a Bachelor of Arts degree with a major in the field of social welfare. Students who desire a basic liberal arts background with concentra-
tion in social welfare and the social and behavioral sciences may satisfy their interests by enrollment in this major. Specific objectives include preparation for human services occupations at the beginning level of practice competence, for graduate education in social work or related fields, as well as for informed participation in contemporary society. Students interested in other fields and disciplines have an opportunity to add an enriching experience to their program of study.

The education of students in an applied profession calls for integration of academic training and practical learning. The social welfare program is designed to provide students with the basic liberal arts and with an introduction to the theory and practice of social work. Requirements include introductory courses in social welfare policy, social welfare research, and the theory and practice of social work. In addition, students are required to take at least one course concerned with the racial ethnic minorities and are expected to supplement their programs with relevant elective courses offered through the School of Social Work and elsewhere in the University. Classroom study during the senior year is accompanied by an extended practicum in a number of social agencies in which students participate directly in the provision of social services. Students interested in pursuing a particular practice specialty or academic theme are encouraged to do so, and efforts are made to build classroom and practicum experiences around this specialization whenever possible. Examples of themes might be the child and family in contemporary society; social welfare policy and the legislative process; or minority groups and the provision of social services.

An increasing number of elective and specialized offerings in social welfare are available as service courses to students in other schools and colleges of the University.

Admission

Students contemplating this major spend their freshman and sophomore years as premajors, fulfilling the distribution requirements set forth by the College of Arts and Sciences. They should have junior status (90 credits) at the time of their admission to the program. Thenceforth, they are advised by the school's undergraduate program adviser. Additional information about admission procedures and an application form are available at the undergraduate social welfare office, 109 Eagleson.

Financial Aid

Information concerning scholarship awards, fellowships, stipends, and loans may be obtained from the Office of Student Financial Aid, 170 Schmitz, and from the Chairman, Scholarship Committee, School of Social Work. A limited number of awards are available to graduate students.

Graduate Program

Graduate Program Adviser
Catherine J. Macdonald

Admission to the graduate professional program of the School of Social Work requires formal admission to the Graduate School as well as to the School of Social Work; hence, separate application forms should be submitted.

Master of Social Work Degree

A two-year program of study leads to the Master of Social Work degree. Students are prepared for professional work in social agencies and for programs serving individuals, families, and small groups. Graduates also may work in various capacities with governmental or community groups and organizations in social planning, research, or administrative activities. Consistent with its responsibility to the profession and to the public, the school exercises discretionary judgment concerning the suitability of students for admission to, or continuation in, the degree program.

The curriculum is composed of courses concerned with issues of social welfare; the philosophy, organization, and administration of service delivery systems; social work practice; human behavior and social change; and research methods. A field instructional experience or practicum integral to the educational program is offered.

In the second and third quarters, this field experience is concurrent with classwork; in the fourth and fifth quarters, it is a block plan wherein students spend up to five days a week in the field. Thus, through a blending of theory and practice, the student acquires the knowledge and skills necessary for professional competence.

In the course of his or her graduate education, the student; with the assistance of an academic adviser, chooses one of three major tracks: human services, community and organizational development, or research services. Within each of the tracks, the student elects a major area of specialization that defines the focus of his or her didactic and practicum courses.

Track I, Human Services: Choices for major—(1) childhood and adolescence; (2) youth and young adulthood; (3) middle age and aging.
Track II, Community and Organizational Development: Choices for major—(1) social planning; (2) community development and social action; (3) organizational development.

Track III, Research Services: In combination with—(1) human services; (2) community and organizational development.

Requirements for the degree include completion of the prescribed curriculum and a minimum of three quarters in residence at the school. Each student must present a total of 68 quarter credits in passing work and maintain a 3.00 grade-point average in all courses numbered 400 and above. No more than 6 quarter credits of work of less than B quality is accepted. The degree is awarded on the basis of the student’s competence in theory and practice, as evidenced through satisfactory completion of class and practicum and through advisory committee assessment.

In addition to tuition costs and general fees, each student must plan for the costs of transportation to and from field instruction agencies.

Courses for Non-Social Work Majors
Class enrollment permitting, and with permission, a number of courses are available to students enrolled in other graduate and professional departments of the University. These are: SOC W 500, 501, 502, 504, 505, 509, 510, 511, 520, 550, 551, 560, 580, and 590.
DESCRIPTION OF COURSES

Colleges and schools are listed in alphabetical order in this section. Courses are arranged alphabetically by department under the heading of the college or school in which they are offered.

Courses numbered from 100 through 299 are lower-division courses for freshmen and sophomores; those numbered from 300 through 499 are upper-division courses for juniors, seniors, and fifth-year students.

Courses numbered 500 and above are intended for, and restricted to, graduate students. Some courses numbered in the 300s and 400s are open both to graduates and to upper-division undergraduates. Such courses, when acceptable to the major department 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.

Undergraduate students of senior standing who wish to register for a 500-level course must obtain permission from both the instructor of the class and the Dean of the Graduate School.

The number in parentheses following the course title indicates the amount of credit each course carries. In most lecture courses, a credit is given for each weekly class hour during a quarter; laboratory courses generally carry less credit than the work time required. An asterisk in place of a credit number means that the amount of credit is variable.

The letters A, W, Sp, and S, following the number of credits, refers to the quarter or quarters in which the course is offered. A refers to Autumn Quarter, W to Winter, Sp to Spring, and S to Summer.

Each course number includes a group of letters, known as the prefix. This prefix must precede each course number on the Program of Studies.

Not all of these courses are offered every quarter. Final confirmation of courses to be offered, as well as a list of times and places of class meetings, is given in the Time Schedule, published each quarter.
The three courses numbered 600, 700, and 800 are restricted to graduate 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. The asterisk (*) following the course title indicates the amount of credit is variable.

600 Independent Study or Research (*)
Individual readings or study, including independent study in preparation for doctoral examinations, research, etc. Prerequisite, permission of Supervisory Committee Chairman or Graduate Program Adviser. 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 pre-master 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 Chairman, or Graduate Program Adviser. Name of faculty member responsible for supervising the student should be indicated on Program of Studies.

800 Doctoral Dissertation (*)
Research for the doctoral dissertation and research preparatory or related thereto. Limited to Intermediate graduate students, i.e., those 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 Chairman or Graduate Program Adviser. Name of faculty member responsible for supervising the student should be indicated on the Program of Studies.
ARCHITECTURE AND URBAN PLANNING

ARCHITECTURE

Courses for Undergraduates

ARCH 150, 151 Appreciation of Architecture I, II

(2,2) A WSp S, WSp

Pundt

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

ARCH 152 Environmental Design Professions (3) Sp

Boratsek

Survey of professional role in shaping physical environment. For nonmajors.

ARCH 250 American Architecture and Urban Environments (2) Sp

Pundt

Study and critical investigation of architecture and the problems of urban design in North America from colonial times to the present. Prerequisite, 151 or permission. For nonmajors.

ARCH 300, 301, 302 Introduction to Design: Laboratory (6,6,6) AWSp, A WSp, A WSp

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; socio-behavioral determinants of design; introduction to design synthesis sections. Detailed descriptions of work in all sections are available quarterly from the Department of Architecture. Prerequisites, 310, 311, and permission.

ARCH 314 Introduction to Architectural Sketching (2) A WSp

Rohrer

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. Prerequisites, 310, 311, and permission.

ARCH 315 Architectural Sketching (2) A WSp

Rohrer

See 314 for course description. Prerequisites, 314 and permission.

ARCH 320 Introduction to Structural Theory I (3) A

Lebert, Onouye, Torrence

Lectures on vectors, equilibrium of forces, graphic and analytical study of force systems, and load tracing in buildings. Prerequisite, permission.

ARCH 321 Introduction to Structural Theory II (3) A

Lebert, Onouye, Torrence

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

ARCH 322 Introduction to Structural Theory III (3) Sp

Lebert, Onouye, Torrence

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

ARCH 340, 341, 342 Overview of the Selethe of the Built Environment (3,3,3) A, WSp

MacGowan

Overview lecture series investigating the technological means available for making the built environment effective as a modifier of natural climate to satisfy the needs of human comfort and well-being. The third quarter of the series includes an introduction to the mechanical, thermal, electrical, optical, and chemical properties of materials.

ARCH 350 Survey of Environmental Arts I (3) A

Hildebrand

Survey of architecture, city, and land form, from earliest times to circa 1150.

ARCH 351 Survey of Environmental Arts II (3) W

Hildebrand

Survey of architecture, city, and land form, from circa 1150 to 1750. Prerequisite, 350.

ARCH 352 Survey of Environmental Arts III (3) Sp

Survey of architecture, city, and land form, from circa 1750 to the present. Prerequisite, 351.

ARCH 400, 401, 402 Introduction to Architectural Design Laboratory (6,6,6) A WSp S, A WSp, A WSp S

Donnet, Zuberbuhler

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 studies; and introduction to urban design. Detailed descriptions of work in all sections are available quarterly from the Department of Architecture. Prerequisites, 302 and permission.


Donnet, Zuberbuhler

Continuation of design graphics laboratory with emphasis on advanced architectural graphics. Prerequisites, 312 and permission.

ARCH 413 Architectural Photography Projects (2) A WSp

Staub

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. Prerequisites, 313 and permission.

ARCH 414 Architectural Sketching (3) A

Sproule

Exercises in freehand representational drawing using charcoal, graphite, and conte crayon with emphasis on line, proportion, values, and composition. Studies progress from geometric to nongeometric forms. Prerequisite, permission.

ARCH 415 Photography for the Built Environment (2) A WSp

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. Student must provide own camera with lens, shutter, and aperture controls. Prerequisite, 313 or permission.

ARCH 416 Architectural Sketching (3) W

Sproule

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. Prerequisite, 414. (Formerly 511.)

ARCH 417 Architectural Sketching (3) Sp

Sproule

Studying 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. Prerequisite, 416. (Formerly 512.)
ARCH 420 Structural Design I (4) AS
Albrecht, Radcliffe, Torrence
Design of complete building frames in timber, laminated wood, and steel; considering earthquake resistance, building responses, continuity, and the structural design process. Prerequisites, 322 and permission.

ARCH 421 Structural Design II (4) AW
Albrecht, Radcliffe, Torrence
Development of basic reinforced and pre-stressed concrete design process and design of continuous structures in reinforced concrete, employing beams, girders, and slabs. Prerequisites, 420 and permission.

ARCH 422 Structural Design III (4) WSp
Albrecht, Radcliffe, Torrence
Design of reinforced concrete structures, including flat slabs and plates, columns, footings, shearwalls and retaining walls. Prerequisites, 421 and permission.

ARCH 426 Structural Unit Masonry (3) Sp
Lebow
Structural behavior and design of reinforced brick, tile, and unit masonry structures. Offered jointly with the Department of Civil Engineering as CESM 487. Prerequisites, 421, 422 or permission.

ARCH 427 Architectural Problems (3-7) AWSpS

ARCH 430, 431, 432 The Science of the Built Environment (3,3,3) A,W,Sp
MacGowan
Study of microclimatic controls in the built environment with special emphasis on lighting, acoustics, and thermal phenomena. Lectures, laboratory work, and student presentations. Prerequisites, 340, 341, 342, or permission.

ARCH 434 Mechanical Equipment of Buildings—Plumbing and Sanitation (2) A
Basic considerations for water supply and disposal systems, including technical design factors relating to sources of water, its quality, collection, storage, treatment, and distribution. Fire protection, sanitation, and sewage systems are similarly considered.

ARCH 435 Mechanical Equipment of Buildings—Electrical (2) W
Lyons
Basic considerations for electrical power distribution in buildings, including elementary residential wiring design. Light sources and elementary lighting design concepts; evaluation of electric heating methods; sound and signal systems.

ARCH 436 Mechanical Equipment of Buildings—Heating and Ventilation (2) Sp
Basic considerations of heating and ventilation of buildings, including technical design factors and physical characteristics of typical installations.

ARCH 440 Human Needs Analysis (3) A

ARCH 441 Laboratory in Human Needs Analysis (3) W

ARCH 442 Social Implications of Architecture (3) Sp

ARCH 447 Physical Structure and Human Interaction (2) W
Resnick, Sasanoff
For social work and architectural students examining the effect of physical structure on human interaction. Offered jointly with the School of Social Work as Social Work 447. Prerequisite, permission.

ARCH 450 Survey of Environmental Arts (5) S
Hildebrand
The environmental arts of architecture, landscape architecture, and urban planning. A historical evolution with special emphasis on factors shaping these arts in the Western world and the twentieth century. For non-majors.

ARCH 451 History of Modern Architecture (3) A
Pundt
Study and critical analysis of major architectural achievements since the mid-nineteenth century. Prerequisites, 352 and permission.

ARCH 452 Characteristics of Puget Sound Architecture and Towns (3) Sp
Steinbrueck
Form, detail, and construction as determining and identifying qualities of buildings. Esthetic and historical values as seen in the visual qualities of the urban form of the Puget Sound town. Prerequisites, 352 and permission.

ARCH 453 Architecture of the Ancient World (3) W
Bosworth
Study and critical analysis of major architectural achievements of ancient Greece and Rome, Prerequisites, 352 and permission. (Offered alternate years.)

ARCH 454 Romanesque and Gothic Architecture (3) Sp
Hildebrand
Architecture of Western Europe from the decline of the Roman Empire through the fifteenth century. Prerequisite, 352 or permission. (Offered alternate years.)

ARCH 455 Renaissance and Baroque Architecture (3) Sp
Pundt
Study and critical analysis of European architecture and urban design from circa 1450 to 1750. Prerequisites, 352 and permission. (Offered alternate years.)

ARCH 456 History of Chicago School Architecture (3) WS
Pundt
Study and critical investigation of the contribution of major architects in Chicago, the Midwest, and the West Coast from circa 1870 to 1920. Prerequisite, permission.

ARCH 457 Neoclassicism and Romanticism in Europe and America (3) Sp
Pundt
Study and critical investigation of European and American architecture and urban design from 1730 to 1850. Prerequisites, 451 and permission. (Offered alternate years.)

ARCH 458 South Asian Architecture (3) W
Curts
Introduction to South Asian architecture, its generating forces, parameters, and consequent environments. Prerequisite, HSTAS 201 or permission. (Offered alternate years.)

ARCH 459 American Utilitarian Architecture (3) Sp
Examination of significant American environmental design efforts arising from utilitarian needs (e.g., factories, barracks, mass housing schemes, and associated technological building innovations). Prerequisites, 352 and permission.

ARCH 460 Design Theory and Analysis (3) AWSpS
Nyberg, Seilgmann
Problematic nature of philosophies of architecture; interaction of philosophical concepts and architectural form and expression. Fundamentals of architectural criticism. Prerequisite, 352 or permission.

ARCH 470 Production Management I (2) Sp
Investigation and evaluation of office production management methods; production development, production drawings, contract documents, construction administration, construction cost control, postconstruction evaluation. Prerequisite, concurrent registration in 432.

ARCH 480, 481, 482, 483, 484, 485 Contract Drawings (3,3,3) A
Carroll
Lectures and drafting-room practice.

ARCH 495 Architectural Studies Abroad (9) Sp
Zarina
Studies conducted under faculty supervision in various locations outside the United States. Student may be registered concurrently in an appropriate studio section. Prerequisite, permission.

ARCH 498 Special Projects (1-6, max. 6) AWSpS
Instructor-initiated and department-approved systematic study and offering of specialized subject matter. Topics vary and are announced in preceding quarter. Prerequisite, permission.

ARCH 499 Undergraduate Research (1-6, max. 6) AWSpS
Prerequisite, permission.

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. Prerequisite, permission.

ARCH 502, 503, 504, 505 Architectural Studies Options (6,6,6,6) AWSpS, AWSpS
A group of courses concerned architectural studies design and sequences in general architectural synthesis, in special projects examining particular architectural development in detail, and in architectural research. Prerequisite, permission.
ARCH 513 Design Communication I (3) A, W
Rohrer
Historical and contemporary survey of design illustration and work in application to current design solution explanation. Prerequisite, permission.

ARCH 514, 515 Design Communication II, III (3,3) A, W
Rohrer
Survey of contemporary professional practice in design and solution presentation; field trips to current design presentation events. Individual research projects in graphic drawing, photography, scale models, advanced photography, mechanical and electronic aids toward a synthesis of design solution communication. Prerequisites, 513 for 514; 514 for 515.

ARCH 520 Advanced Structural Design (3) Sp
Albrecht
Identification and study of the basic mechanism of resistance to forces of all structural types. Building case studies emphasize the fundamental design approach. Prerequisite, 422.

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 the Department of Civil Engineering as CESM 477. Prerequisite, 422 or permission.

ARCH 522 Skin-Roof Structures (3) A
Albrecht
Resistance mechanisms, structural systems employing plates, folded plates, shells, and membranes with applications to the structural design process. Prerequisite, 422.

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

ARCH 526 Advanced Architectural Studies (6) A, W
Advanced experimental studies dealing with significant architectural relationships involving scholarly investigation, development, and presentation of results. Prerequisite, permission. (Last time offered: Spring Quarter 1975.)

ARCH 530, 531, 532 Graduate Studies in the Science of the Built Environment (3,3,3) A, W
MacGowan
Graduate studies in microclimatic controls in the built environment, including individual opportunities for investigation in depth of lighting, acoustic and thermal conditions, as well as other related research interests. Prerequisites, 430, 431, 432, or permission.

ARCH 535 Illumination Seminar (2) Sp
Principles and methods of natural and artificial lighting.

ARCH 536 Acoustics Seminar (2) A, W
Principles of acoustical design as applied to buildings.

ARCH 550, 551 Graduate Seminar: Environmental Design Issues (1-3,1-3) A, W
Seminars concerning a wide variety of current issues in the area of environmental design. Seminar focuses on different special topics and is directed by seminar leaders who are authorities in their fields.

ARCH 560 Graduate Seminar on Architectural Theories (3) W
Seligmann
Recent developments in architectural theory, urban design theory, criticism, and the methodology of criticism. Prerequisites, 352, 460, or equivalent, and permission.

ARCH 570 Production Management II (3) Sp
ARCH 571 Building Economics (3) A
Mithun
Social, political, and economic factors affecting the location, construction, financing, and marketing of buildings.

ARCH 572 Specifications and Contracts (3) W
Mithun
Detailed organization and composition of contracts, specifications, and related contract documents.

ARCH 573 Professional Practice (3) Sp
Mithun
Operation of an architectural office and professional practice.

ARCH 575 Graduate Seminar, Research and Analysis (3) W
Bonsteel, R. Schneider
Survey of concepts and methods used in research and analysis, with particular emphasis on research in architecture and related disciplines; includes a review of extant works of significance to design decision making. Prerequisite, permission.

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.

ARCH 590 Graduate Seminar on Education Facilities Evaluation (3) A
R. Schneider
Small-group discussion of extant models used in the evaluation of educational facilities and a review of relevant research, with some emphasis on user perceptions of the teaching/learning environment. Offered on credit/no credit basis only.

ARCH 591 Graduate Seminar on Education Facilities Programming (3) W
Small-group discussion of the educational facility programming as a process; and relevant theory and practice. Offered on credit/no credit basis only.

ARCH 592 Graduate Seminar on School Site Problems (3) Sp
R. Schneider
Small-group discussion of factors affecting location, use, and development of the school site, and problems associated with inappropriate procedures undertaken and their consequences. Offered on credit/no credit basis only.

ARCH 594 Health Facilities Planning (3)
Bennett, Bonsteel
Examination of the organization and execution of the total planning process for health care facilities, with individual parallel studies in selected topics.

ARCH 596 Field Work in Professional Practice (9)
Varey
On-location study under the supervision of a practicing professional involved in an aspect of environmental design. Approval of Professional Studies Committee required in the preceding quarter. Prerequisite, permission.

ARCH 598 Special Topics for Graduate Students (1-6) A
Systematic study and offering of specialized subject matter. Topics vary and are announced in the preceding quarter. May be repeated for credit. Prerequisite, permission.

ARCH 599 Terminal Project for Professional Degree (1-9) A
Project terminal for nonthesis graduate professional program in architecture, requiring a supervisory committee as with thesis option. May be repeated for credit. Prerequisite, graduate standing.

ARCH 600 Independent Study or Research (1-6) A
In addition to other studies, a student may elect to conduct, individually or cooperatively with a fellow student or faculty member, a special research project. The objective of this research should be to investigate certain areas of either basic or applied research. May be repeated for credit. Prerequisite, permission.

ARCH 700 Master's Thesis (1-9) A

BUILDING CONSTRUCTION

Courses for Undergraduates

B CON
301, 302 Building Industry (3,3) A, W
Eberharder
Organization and functioning of the building industry, legal, ethical, business, and management aspects.

B CON
303 Construction Safety (2) Sp
Short
Explanation of the requirements of the Occupational Safety and Health Act and other related federal and state legislation, as ap-
plied to the building construction industry. Standards for accident prevention and responsibility for compliance are emphasized.

**B CON 310 History of Building (3) Sp**
Historical survey of building techniques and materials as conditioned by environmental, technical, and social influences.

**B CON 330 Building Methods and Materials I (2) A**
Introduction to building materials and methods, with detailed emphasis on the properties, the products, and the uses of building materials.

**B CON 331 Building Methods and Materials II (2) W**
Introduction to building methods and materials, with emphasis on methods of assembly of buildings in detailed analysis. Prerequisite, 330.

**B CON 332 Building Methods and Materials III (3) Sp**
Introduction to building methods and materials with emphasis on the assembly and finish of masonry commercial and institutional buildings. Prerequisite, 331.

**B CON 410 Senior Study (4) AWSpS**
Independent study of a specific building industry problem with assigned proctor. Prerequisite, senior standing.

**B CON 420 Building Financing (3) Sp**
Flaherty
The financing of building construction, financial institutions, regulations, government participation, and financing principles.

**B CON 499 Undergraduate Research (**, max. 12) AWSpS**
Individual or small-group studies in which students may select topics with approval of faculty sponsor and department. Prerequisite, permission.

**LANDSCAPE ARCHITECTURE**

**Courses for Undergraduates**

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

**L ARC 302 Landscape Design Studio (6) W**
*Buchanan, Sakuma*
Urban design through landscape architecture. Design of public use areas in the urban area. Project types for this course are waterfront development, commercial areas, campus and cultural centers, plazas and historical sites; recommendation for policy to be established as part of the design solution.

**L ARC 303 Urban Recreational Design (3) Sp**
*Haag*
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 recreation areas. Design projects dealing with the play environment for all ages. Open to nonmajors.

**L ARC 401 Landscape Design Studio (6) A**
*Buchanan, Sakuma*
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**
*Streetfield, 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. Program development to maximize site utilization, and preservation of natural attributes.

**L ARC 403 Landscape Design Studio (6) Sp**
*Streetfield, Untermann*
Environmental and technological aspects of site development. Project design studies in areas of "critical concern," related to environmental restraints, 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 area, from metropolitan to neighborhood scale.

**L ARC 405 Landscape Design Studio (6) W**
*Streetfield*
Landscaping policies utilizing natural systems. Examination of the ecological restraints and the design criteria for selected land use and development categories. Case studies dealing with landscape types, features, amenities, and cultural resources; their identification, classification, visual assessment, and interpretation for design planning, program development, and policy decisions. Metropolitan to regional scale.

**L ARC 406 Landscape Design Studio (6) Sp**
*Streetfield*
Senior projects in landscape architecture. Projects vary according to the student's particular emphasis and need. Open only to majors in landscape architecture with faculty permission and one quarter prior notice.

**L ARC 411 Landscape Graphics (2) A**
*Chittock*
Delineation techniques and office presentation methods for landscape perspectives, sections, rendering of plant materials. Stresses plant

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ARCHITECTURE AND URBAN PLANNING

identification and associations generally used in landscape architecture. Discussion of historical and contemporary examples of landscape drawing.

L ARC
412 Landscape Graphics (2) W
Haag
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
421 Landscape Horticulture (3) W
Chittock
Basic horticultural principles with special attention given to the problems encountered in urban situations. Course deals with design implications and the effect of environmental influences, such as wind, sun, heat, precipitation, and soil, on plant growth; maintenance and related cost factors. Prerequisite, experience in plant sciences or Botany 331.

L ARC
422 Plants and Their Design Characteristics (3) W
Untermann
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.

L ARC
423 Planting Design (5) Sp
Miller
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. (Formerly 422.)

L ARC
433 Large-Scale Site Construction (4) Sp
Mauck
Includes studies of natural determinants and constraints on large-scale construction, development affected by service and utility systems, physiographic suitability of site, cost-benefit analysis, and critical path methodology for site construction projects. Prerequisites, surveying and 331, or permission. (Formerly 333.)

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

L ARC
463 Natural Processes as Planning and Design Determinants (3) W
Streufeld
Introductory lecture course relating methods, procedures, and rationale for use of natural

URB P
490 Introduction to Urban Planning (3) AWSp
History, principles, theories of city growth and planning. Emphasis on city structure, present urban problems and planned action. Prerequisite, 340.

URB P
491 Urban Planning Policies and Programs (3) Sp
Norton
Goals, processes of policy formulation, methods of planning, evaluation, and related problems. Community, regional, state, and national programs. Prerequisite, 411 or permission. (Formerly 490.)

URB P
410 Theory and Philosophy of Planning (3) A
Norton
An attempt to reveal "planning theory" as a synthesis or integration of concepts of societal structure (sociology), with concepts of environmental structure (cosmology), and with the social decision processes by which a society may alter itself and its environment. Restricted to urban planning seniors. (Formerly 470.)

URB P
411 The Urban Planning Process (4) W
Miller
The urban plan and plan making. Emphasis on comprehensive, coordinative urban planning. Various planning surveys and methodology and techniques discussed. Prerequisite, 400. (Formerly 480.)

URB P
412 Forecasting Methods in Urban Planning (3) W
J. P. 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 success stories. Applications to urban planning problems. (Formerly 440.)

URB P
422 Quantitative Methods in Urban Planning (3) AWSp
J. P. Bell
Methods of statistical analysis applied to urban planning; measurement and inference. Central tendency, correlation, trends, probability, surveys. (Formerly 430.)

URB P
421 Quantitative Analytical Models and Methods (3) WSp
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 model and implications for planning rather than on mathematical detail. Prerequisite, 420 or permission. (Formerly 431.)

URB P
429 On-line Planning of Urban Systems (3) WSp
J. B. Schneider
Survey of on-line planning applications; use of various on-line systems to solve urban systems design problems; investigation of hard-
 war/softwar~ trade-offs; human factors in man-computer systems design theory as it relates to problem-solving activity.

**URBP 400**

**Introduction to Urban Transportation (3)**

**Horwood**

Identification of the framework, central concepts, constraints, and issues of the urban transportation planning problem. Offered jointly with the Department of Civil Engineering as CETC 425. (Formerly 425.)

**URBP 446**

**Field Study (4, max. 8) AWSp**

Explicit task assignment in a community development organization under professional and academic supervision. Placement arranged by the Division of Community Development. Participation ordinarily limited to seniors. Prerequisite, permission.

**URBP 447**

**Social Factors in Urban Planning (2) A**

An analysis of 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, 400, which may be taken concurrently. (Formerly 474.)

**URBP 448**

**Directed Social Change (3) A**

General course for both undergraduate and graduate students on the theories and practice of directed social change and citizen involvement in the planning process. (Formerly 475.)

**URBP 449**

**Planning Problems of the Black Community (3) W**

Course objective is to enable students to acquire an understanding of the complexity of factors operating in urban communities that give rise to and sustain the inner-city ghetto and how planning has been related to these problems in both their creation and solution. (Formerly 473.)

**URBP 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, 400. (Formerly 482.)

**URBP 451**

**Housing (3) AWSp**

**Grey, Ludwig**

Survey of housing and redevelopment problems, theories, standards, and practice. Development of public policies, finance, technological considerations, social factors, and priorities. Prerequisite, 400. (Formerly 485.)

**URBP 460**

**History of City Development (3) A Johnston**

Analysis of city forms and designs emphasizing their relation to the culture of each period.

**URBP 461**

**History of Urban Planning in the United States (3) W Hancock**

Seminar inquiry into the origins, development, and significance of the American planning movement and 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. (Formerly 494.)

**URBP 466**

**Regional Planning and Development (5) Sp Thomas**

Emphasis placed primarily on the process of implementing regional development policies in economically advanced and lesser-developed countries. Resultant changes that occur in the distribution and structure of economic activities and settlement patterns are also studied and evaluated. Offered jointly with the Department of Geography as Geography 466. (Formerly 451.)

**URBP 470**

**Introduction to Urban Design (3) Pr Noonan**

Definitions and examples of basic urban design; importance of urban physical form in the attainment of social objectives; heritage of urban design; and building codes of the city; theories of city building; the role of urban design in the fields of architecture, landscape architecture, civil engineering, and urban planning. Prerequisites, Architecture 300, 310, and 201, 311, or three quarters of basic design. (Formerly 423.)

**URBP 477**

**Social Functions of Environmental Form: A Behavioral Basis for Urban Design/Physical Planning (3) A**

Organization and character of the environment as significant variables in social processes basic to effective functioning, with special emphasis on the implications of urban design.

**URBP 478**

**Psychological Functions of Environmental Form: A Behavioral Basis for Urban Design/Physical Planning (3) Sp**

Organization and character of the physical environment as significant variables in psychological processes basic to effective individual functioning, with special emphasis on the implications for urban design/physical planning.

**URBP 479**

**The Urban Form (3) A Wolfe**

Examination of the physical patterns of urban areas related to the forces producing them. Observation, identification, and methods of recording aspects of the urban scene. Prerequisite, 400.

**URBP 480**

**Introduction to Urban, Suburban, and Metropolitan Political Systems (5) ASp Lamore**

Conceptual problems in metropolitan analysis; urban governmental systems; regional political decision-making structures; metropolitan, state, and federal relations; value implications of formal organization. Offered jointly with the Department of Political Science as Political Science 480. (Formerly 460.)

**URBP 498**

**Special Topics (2-4) AWSp**

Systematic study of specialized subject matter. Topic for each quarter varies, depending upon current interest and needs, and is announced in the preceding quarter. May be repeated for credit. Prerequisite, permission.

**URBP 499**

**Special Projects in Urban Planning (5) AWSp**

Independent or tutorial study for undergraduates. Individual reading, research, field work, or other special project, outlined in advance, approved by, and under the direction of, the faculty advisor most appropriate for the project proposed. A report on the purposes, procedures, and results of the study is required. Prerequisites, senior standing and permission of the supervising instructor.

**Courses for Graduates Only**

**URBP 500**

**Survey of Urban Planning (3) A Miller**

Concepts and logic of planning as a professional activity. Evolution of guiding ideas in relation to changing social, economic, and environmental conditions within the American political framework. Major procedures used by planners. Critical appraisal. Not open for credit to students who have taken 400.

**URBP 501**

**Resources for Urban Planning (3) A**

Introduction to areas of specialized study in environmental planning and policy programming. Organization for planning in the Seattle region; range of activities and emphases, established and changing roles. Required of new graduate students; not open to others.

**URBP 502**

**Metropolitan Planning Analysis (3) W J. B. Schneider**

Investigative 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. (Formerly 522.)

**URBP 506**

**General Urban Planning (2) Sp Calkins, Grey, Horwood, Norton**

Introduction to applied professional planning. Consideration of analysis, programming, and implementation methods in preparation for General Urban Planning Laboratory. Prerequisites, 500 and 501. (Formerly 521.)

**URBP 507**

**General Urban Planning Laboratory (5) Sp Calkins, Grey, Horwood, Norton**

Laboratory exercise in applied professional planning, utilizing a local study area to examine the realities of problem solving in situations of functional and normative conflict. Integration of analysis, programming, implementation, and presentation phases of the planning process. Prerequisite, 506. (Formerly 541.)

**URBP 508**

**Specialized Planning Laboratory (5) A**

Several different sections or options are to be offered each year, such as regional-environ-
mental planning, urban systems analysis, housing, metropolitan planning, urban design, and community services and organization. Prerequisites, 500 and 501. Some sections may have prerequisite urban planning lecture or seminar courses. (Formerly 542.)

URBP 510 Theories and Methodologies of Planning I (4) W Ludwig, Shiner
Survey of the philosophy, methods, and analytical techniques used in planning public actions and policies, with emphasis on the logic and assumptions on which these are based. Various planning surveys and methods discussed. Prerequisites, 500 and 501. (Formerly 580.)

URBP 511 Theories and Methodologies of Planning II (4) Sp Miller
Factors relating to the timing, phasing, and programming of urban development. The bearing of amenity, density, etc., on the actual development process. Prerequisite, 510. (Formerly 581.)

URBP 512 Research Seminar (2) A Development and presentation of advanced topics of individual investigation. (Formerly 550.)

URBP 527 Information Systems for Planning and Research (3) A Horwood, Staff
Computer programming technology and data systems design for large-scale data inputs. Machine editing, data manipulation, and information retrieval. Laboratory problems adapted to specialized interests of students. No previous computer programming experience required. Offered jointly with the Department of Geography as Geography 527 and the Department of Civil Engineering as CETC 527.

URBP 528 Automated Mapping and Graphing (3) W Horwood
Computer applications to statistical and areal analysis. Laboratory problems adapted to specialized interests of students. Offered jointly with the Department of Geography as Geography 528 and the Department of Civil Engineering as CETC 528. Prerequisites, basic statistics and 527, or permission.

URBP 529 Computer Applications to Urban and Regional Analysis (3) Sp Horwood, Staff
Simulation models and automated systems for the study of land use and related economic and demographic data. Machine methods of planning analysis and feedback review. Laboratory projects. Offered jointly with the Department of Geography as Geography 529 and the Department of Civil Engineering as CETC 529. Prerequisite, 528 or permission.

URBP 530 Transportation and Land Use Planning Models (3) A J. B. Schlarb
Theory underlying land use and transportation planning models. Past attempts to model urban development. Modeling of alternatives. Forecasting technological innovations, assessing their land use implications. Offered jointly with the Department of Civil Engineering as CETC 525. Prerequisite, permission. (Formerly 525.)

URBP 534 Airport Systems Planning (3) W Shiner
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 the Department of Civil Engineering as CETC 535. (Formerly 535.)

URBP 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. (Formerly 575.)

URBP 545 Minor Community Development (2) Sp Carter
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.

URBP 546 Practicum (4, max. 8) AWSp Amos, Staff
Field work assignments to participate in some phase of a community problem-solving activity utilizing planning skills. Placement is ordinarily arranged by the Division of Community Development. Prerequisite, permission.

URBP 550 Benefit-Cost Analysis Applied to Urban Development (3) W Seyfried Practical application of benefit-cost methodology to the decision-making process for urban development. In a "workshop" format, benefit-cost analysis procedures are applied to urban development projects or programs, 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. (Formerly 505.)

URBP 551 Allocation Processes in Urban and Regional Planning (3) A Grey, Rabinowitz
General economic context of planning analysis and social decision making. Priorities and public budgets. Measurement of collective needs. Allocative processes applied to land use. (Formerly 512.)

URBP 565 Comparative Urbanism (3) Sp Wolfe
Characteristics and problems of urbanization in the world; comparisons of origins and development; physical form, land utilization, and planning. Selected major cities. Prerequisite, permission. (Formerly 579.)

URBP 566 Regional Planning Seminar (3) W Thomas
Regional planning and development theories and methodologies. Critical evaluation of regional planning in selected "economically advanced" and "lesser developed" countries. Offered jointly with the Department of Geography as Geography 566. Prerequisite, 466 or Geography 466. (Formerly 551.)

URBP 567 Research Seminar: Geography and Development (3, max. 6) A Thomas
Offered jointly with the Department of Geography as Geography 567. (Formerly 530.)

URBP 570 Urban Design Process (2) W Wolfe
The study of concepts, methods, and processes basic to planning, design, and effectuation. Prerequisite, 479. (Formerly 523.)

URBP 571 Research and Analytical Methods for Urban Design (3) W Wolfe
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. Prerequisites, 400, 479 or academic design background, or permission. (Formerly 524.)

URBP 572 Graphic Communication in Urban Planning (3) W Prasanna
Intended to introduce the nondesign student to the use of graphics and other representational techniques as a means of conceptualizing and expressing ideas, and for recording, analyzing, and controlling the environment. The course covers the use of drawing, three-dimensional models, mapping, diagrams, report layout, photography, exhibit preparation, etc., as tools for the effective communication of ideas. (Formerly 502.)

URBP 573 Laboratory in Urban Design (5) W Development of urban design within the context of the total planning process. Specifically, the following areas are emphasized: investigation, development, and application of survey techniques, analyses, programming, concepts and methods of implementation relative to urban design. Prerequisite, 570 or permission. (Formerly 543.)

URBP 580 Legal and Administrative Framework for Planning (3) A Rabinowitz
Political, legal, and administrative institutions closely related to the planning process. Issues of devolution of authority and public representation and participation. Legal basis for planning and associated regulation. (Formerly 504.)

Reseable issues in research methodology. Discussion and critique of selected pieces of recent research work. Presentation and critique of research proposed by members of the seminar. Credits given on satisfactory completion
ARCHITECTURE AND URBAN PLANNING

of the three-quarter sequence. Prerequisite; master's degree or the equivalent in a planning discipline.

URBP 598 Special Topics (1-4) AWSpS
Systematic study of specialized subject matter. Topic varies for each quarter, depending upon current interest and needs, and is announced in the preceding quarter. Prerequisite, permission.

URBP 600 Independent Study or Research (*) AWSpS

URBP 700 Master's Thesis (*) AWSpS

URBP 800 Doctoral Dissertation (*) AWSpS

COLLEGE OF ARTS AND SCIENCES

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 open for credit to students who have had or are currently taking other courses in anthropology, archaeology, or physical anthropology.

SOCIOCULTURAL ANTHROPOLOGY

ANTH 212 Afro-American Culture (3)
Introduction to the cultures and societies of Africa with emphasis on sub-Saharan Africa.

ANTH 216 Oceanica (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 301 Human Nature and Culture (3)
Sources of variations in the customs, values, and beliefs of human groups. Appraisal of the anthropological notion of "cultural relativism." Not open to students who have had or are currently taking other sociocultural anthropology courses. May be taken by students who have had archaeology or physical anthropology courses. Prerequisite, sophomore standing.

ANTH 311 Indian Cultures of the Pacific Northwest (3)
Comparative analyses of the social and political institutions and belief systems of the native peoples of the Pacific Northwest, including plateau peoples. Emphasis centers on contemporary life styles. Prerequisite, 100 or 202.

ANTH 316 South Asia (3)
Major cultural features of the Indian and Pakistan subcontinent. Prerequisite, sophomore standing.

ANTH 317 Southeast Asia (3)
Survey of the culture, history, and contemporary ethnology of the peoples of Southeast Asia. Prerequisite, 216 or 202.

ANTH 322 Peoples of South America (3)
Comparative societies of South America: economic, political, ethnic, and cultural characteristics; historical background. Prerequisite, sophomore standing or permission.

ANTH 332 Micronesian Societies (3)
Comparative social anthropology of the social systems of high islands and coral atolls of Micronesia. Intensive treatment of the kinship systems, religious institutions, ecology, and sociopolitical systems of the people of Micronesia. Prerequisite, 202 or permission.

ANTH 335 Art of the Northwest Coast Indian (3)
Northwest coast Indian art as related to drama and dance with special attention to the Kwakwaka'wakw and Indians. Offered jointly with the School of Art as ART H 335. Prerequisite, sophomore standing.

ANTH 338 The Civilization and the Primitive (3)
Development of urban modes of life in the light of the common and distinctive social and cultural characteristics of cities, peasant communities, and tribal groups or bands. The process of urbanization, the disappearance of truly primitive peoples, and the emergence of the peasant. Selected case studies from the past and the present. Prerequisite, sophomore standing.

ANTH 401 West African Societies (3)
Detailed analysis of social and cultural features, including the western Sudan area. Prerequisite, 202 or permission.

ANTH 406 Polynesian Societies (3)
Comparative social anthropology of the high and low islands of Polynesia, including the Polynesian outliers in Melanesia and Micronesia. History, ecology, economics, political organization, and ritual systems are covered as well as special topics such as colonialism, land tenure in relation to kinship, and child adoption. Prerequisites, 202, and either 216 or permission.

ANTH 411 Australian Aboriginal Societies (3)
Examination of archaeological and linguistic evidence of the distribution of and relationships among aboriginal groups before white con-
tect. Ethnographic comparisons of local organization and land tenure, kinship, law, and religion. Past and present use of aboriginal data in social science theory. Prerequisites, 202, and either 216 or permission.

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

ANTH 416 North American Social Structure (5)
Survey of the cultural features of the North American Plateau with particular attention to modern problems of cultural change. Prerequisite, Sophomore standing or permission. (Formerly 319.)

ANTH 418 Meso-American Society and Culture (3)
Analysis of the social and cultural features of Meso-America. Prerequisite, 202 or permission.

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.

ANTH 429 Anthropological Aspects of Communication (5)
Introduction to the communicational aspects of culture. Prerequisite, 202.

ANTH 430 Comparative Methods in Anthropology (3)
Quantitative methods and inferential statistics intended for students in anthropology. Prerequisites, ANTH 202, ARCHY 205 or PHY A 201, and Mathematics 281, or permission.

ANTH 431 Oral Traditions (3)
Oral traditions and verbal expression, examined anthropologically and in relation to student interests. Critical examination of relevant theories and methods of analysis. Prerequisite, 100 or 202.

ANTH 432 Visual Anthropology (3)
The place of photography and films in ethnography; their use in the documentation and interpretation of cultural and social systems. Prerequisite, 202 or permission.

ANTH 434 Comparative Morals and Value Systems (3)
Sociological functions of morality in simple societies. Prerequisite, 202 or permission.

ANTH 435 Primitive and Peasant Economic Systems (5)
Chief features of nonmonetary and simple monetary economies. The impact of monetary economy and industrial technology on preindustrial systems and those of limited monetary circulation. Prerequisite, 202 or permission.

ANTH 437 Political Anthropology (5)
Survey of the major approaches and theories. Prerequisite, 202 or permission.

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.

ANTH 439 Anthropology of Law (5)
Juridical activities in preliterate societies. Relations of law to religion, politics, and social structure. Prerequisite, 202 or permission.

ANTH 440 Child-Rearing, Culture, and Health (3)
Cross-cultural study of the child-rearing practices, the cultural norms, and the health behavior of children and adolescents in different societies. Comparative 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. No prerequisites; however, it is recommended that a student has taken courses in child development, introductory anthropology, and psychological anthropology. Offered jointly with the School of Nursing as Nursing 495.

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. Prerequisites, 202 and any introductory course in general psychology or personality theory, or permission.

ANTH 442 Anthropological Aspects of Communication (5)
Introduction to the communicational aspects of culture. Prerequisite, 202.

ANTH 445 Quantitative Methods in Anthropology (3)
Quantitative methods and inferential statistics intended for students in anthropology. Prerequisites, ANTH 202, ARCHY 205 or PHY A 201, and Mathematics 281, or permission.

ANTH 450 Introduction to Language (5)
The science of language surveyed with the emphases and orientations of anthropological linguistics. Prerequisite, 202 or permission.

ANTH 451, 452, 453 Phonology (3,3,3)
Detailed study of speech sounds, mechanism of their production, and structuring of sounds in languages; practical experience with a wide variety of languages; field techniques. Offered jointly with the Department of Linguistics as Linguistics 451, 452, 453. Prerequisite, Linguistics 200 or 400, which may be taken concurrently, or permission.

ANTH 455 Areal Linguistics (3, max. 6)
Linguistic analyses of the languages of a selected area. Offered jointly with the Department of Linguistics as Linguistics 455.
zation, and analysis of typical anthropological data. Lectures, demonstrations, class projects. Prerequisites, 202 and 20 additional credits in anthropology or permission.

ANTH 493 Advanced Topics in Expressive Culture (3)
Analysis and testing of special domains of esthetic expression, such as graphic arts, oral literature, dance, and humor among non-Western peoples. Prerequisites, 202, 429, 450 (or 453), and permission.

ANTH 495 Advanced Problems in Ethnology (3)
One or more current problems in ethnology. Seminar, format. Prerequisites, 25 credits in anthropology and permission.

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.

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

ARCHAEOLOGY

ARCHY 205 Principles of Archaeology (5)
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, (Offered Summer Quarter only.)

ARCHY 303 Prehistoric Cultures of the Old World (3)
Beginnings of culture in the Old World to the Early Iron Age in Western Europe. Prerequisite, sophomore standing.

ARCHY 304 Prehistoric Cultures of the New World (3)
Beginnings of culture of the New World from Pleistocene times until European exploration and conquest. Prerequisite, sophomore standing.

ARCHY 370 Methods and Problems of Archaeology (5)
Field experience in the Pacific Northwest. Prerequisite, permission.

ARCHY 371 Analysis of Archaeological Data (3)
Designed for students who have had field experience in archaeology. Prerequisite, permission.

ARCHY 469 Special Studies in Archaeology (3, max. 6)
Consideration in detail of specific archaeological topics, either methodological or substantive in content, that are of current interest. Offered occasionally by resident, new, or visiting faculty. For advanced undergraduates and graduate students. Prerequisites, 205 and permission.

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

ARCHY 473 Prehistoric Cultures of Mexico (5)
Pre-Hispanic culture history of Middle American civilizations in central and southern Mexico and the desert dwellers in northern Mexico. Prerequisite, 304 or permission.

ARCHY 474 Prehistoric Cultures of South America (3)
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.

ARCHY 475 Archaeology of the Mayan Civilization (3)
Pre-Hispanic culture history of the Mayan peoples of Guatemalan, the Yucatan peninsula, Honduras, and Chiapas (Mexico). Prerequisites, 304 and permission.

ARCHY 476 Middle America Prehistory: Seminar Tour I (7) S
Seminar-tour of major archaeological sites and museums in Middle America. The course is designed to follow ARCHY 473, Prehistoric Cultures of Mexico, and includes visits to the federal district of Mexico, Hidalgo, Morelos, Guanajuato, Veracruz, Oaxaca, and Jalisco. Knowledge of Spanish recommended. Prerequisites, 304 and permission.

ARCHY 477 Middle America Prehistory: Seminar Tour II (7) S
Seminar-tour of major archaeological sites and museums in Middle America. The course is designed to follow ARCHY 475, Archaeology of the Mayan Civilization, and includes visits to the federal district of Mexico, Veracruz, Tabasco, Chiapas, Campeche, Yucatan, Quintana Roo, the Peten, and Highland Guatemala. Knowledge of Spanish recommended. Prerequisites, 304 and permission.

ARCHY 492 Prehistoric and Ethnographic Populations (3)
Detailed examination of relationship between man and his environment, present and prehistoric. Primary emphasis on nature and size of population in relation to food and other resources over the last three million to four million years. Use of ethnographic data and the study of various historical approaches to this problem. Prerequisites, 205, ANTH 445 or Mathematics 281 or Quantitative Science 281 or Sociology 223, and permission. (Offered alternate years; offered 1974-75.)

ARCHY 497 Archaeological Theory and Method I, Formal Theory (3)
Examination of theoretical constructs in the analysis of archaeological data. Terminology, typologies, and interregional comparisons. Prerequisites, 205, 20 additional credits in anthropological anthropology, and permission.

ARCHY 498 Archaeological Theory and Method II, Explanatory Theory (3)
Conceptual frameworks employed by archaeologists in obtaining explanation in the three major areas of culture history, cultural reconstruction, and explanatory prehistory, considering the nature of explanation as conceived in these areas, the basic assumptions employed in achieving these aims, and an introduction to the methods employed. Prerequisites, 205 and 497.

ARCHY 499, 499H Undergraduate Research (*, max. 12; max. 18 for honors students) Prerequisite, permission.

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 281 African Origins: Social Biology of Sub-Saharan Africa (3)
Origin and biological nature of the peoples of Africa south of the Sahara with emphasis upon the influences of ecology, disease, and nutrition. Race mixtures, growth and development, physique, heat stress physiology, and genetics. Prerequisite, sophomore standing. (Offered Summer Quarter only.)

PHY A 282 Afro-Americans: Social Biology of Blacks in the New World (3)
African source areas, distribution; and biology of Negroes in the Americas with special emphasis on the United States. Race mixture, racial laws, and Negro reactions. Racial composition, growth patterns, body build, climatic stresses, and disease susceptibilities. Prerequisite, sophomore standing. (Offered Summer Quarter only.)

PHY A 284 Social Biology of the North American Indian (3)
Peopling of the aboriginal New World, its population at time of discovery, and subsequent changes. Past historical and seen through skeletal remains and analysis of morphological and genetic variation in living North American Indians. Race mixture. Effects of cultural, dietary, and disease factors in their physical and clinical status. Prerequisite, sophomore standing.

PHY A 285 Social Biology of Middle and South American Indians (3)
Synthesis of archaeological, historical, cultural, and biological data in delineating the clusters of extant populations of living Indians. intensive review of nutritional and clinical studies in Guatemala and Peru. Current genetic data on largely intact Indian populations. Prerequisite, 284 or permission.
PHY A

387 Ecology and Biological Adaptation In Man (5)

Man's biological legacy and present adaptability viewed from various aspects of human ecology: the cultural past, climate and geography, nutrition and disease, and pollutants and contaminants. Oriented in terms of natural and cultural selection of those who are to live to reproduce and those who are not, and of the physical and mental damage resulting from ecological factors. Prerequisites, 201 or Biology 101-102 or 210.

PHY A

388 Evolution and Ecology of Early Man and Other Primates (5)

Nature of the evolutionary process as applied to primate and human evolution. Discussion of geological and ecological background and of pertinent dating methods. Relevance of behavioral, cytogenetic, and biochemical data to morphological distance in primate systematics. Man, ecology, and culture in the Pleistocene and recent periods. Prerequisite, 201.

PHY A

470 Introduction to the Primates (3)

In-depth examination of the origin and distribution of primates in time and space; growth and development, posture and locomotion, sexual and intraspecific differences, special sense organs, oral cavity, skin and hair, behavior, and major evolutionary trends. Prerequisite, 201.

PHY A

480-481 Primate Anatomy: Structure and Function (5-6)

Anatomy of various primates is studied in detail with special reference to structural and functional relationships. The evolution and present ecology of primates are examined as they relate to the total anatomical picture. The laboratory consists of dissection of a specified primate and a study of the dentition and osteology. Prerequisite, 201 or permission.

PHY A

482 Physical Anthropology: Population Genetics (5)

The population as a unit of study defined, and methods of analyzing the forces of evolution operative in human populations presented. Prerequisites, Genetics 351 or 451 and statistics.

PHY A

483 Primate and Human Variations (5)

Discussion of the morphological, physiological, and genetic variability of living primate and human populations with special reference to adaptation. Stressed are adaptive responses to selective pressures engendered by the total environment. Laboratory. Prerequisites, Genetics 351 or 451 and statistics, or permission.

PHY A

484 Primate and Human Growth (3)

Genetics of growth and maturation in experimental primates and man. Emphasis is the effect of the total environment upon growth processes with special reference to non-Western human societies. Prerequisite, statistics or permission.

PHY A

485 Primate and Human Growth Laboratory (2)

Laboratory dealing with current methods used to assess growth and development. Must be accompanied by 484. Prerequisite, statistics or permission.

PHY A

486 Primate and Human Evolution (5)

Discussion of living forms and the fossil record with reference to the nature of primate evolution. Morphological, genetic, and behavioral data are used to appraise taxonomy of living primates and their phylogenetic implications. Special emphasis is placed on the evolution of the hominids and their cultures. Laboratory. Prerequisite, Geological Sciences 437, which may be taken concurrently, or permission.

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.

PHY A

498 Advanced Topics in Physical Anthropology (3, max. 9)

Series of seminars on different aspects of physical anthropology. Prerequisite, permission.

Courses for Graduates Only

GENERAL

ANTH

500 Independent Study or Research (*)

AWSP

ANTH

700 Master's Thesis (*)

ANTH

800 Doctoral Dissertation (*)

SOCI CULTURAL ANTHROPOLOGY

ANTH

500 Preceptorial Reading (6)

For beginning graduate students who have not had prior training in the problems, principles, and methods involved in the analysis and comparison of social and cultural systems.

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.

ANTH

504 Anthropological Research Design (3)

Focus is on a number of research designs useful in anthropological research. Primary emphasis is on the analysis of quasi-experimental designs that as a class hold considerable promise for the development of anthropological science. Students are expected to analyze examples of actual anthropological research in terms of the conceptual framework developed in the class.

ANTH

505 Field Techniques in Ethnography (3)

Techniques of collecting, recording, ordering, and utilizing ethnographic data in the field. Problems of rapport, sample, interview, observation, and interpretation.

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

525 Seminar in Culture Processes (3, max. 6)

The concept of process and its application to the study of culture.

ANTH

527 Acculturation (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.

ANTH

537 Non-Western Political Systems (3)

Ethnic manifestations, methodological problems, and theoretical implications of polity in a wide range of cultures.

ANTH

540 Anthropology and Health (3)

Seminar on the history, development, and future of anthropological contributions to problems of health and illness. Offered jointly with the Departments of Epidemiology and International Health as Epidemiology 540. Prerequisite, permission.

ANTH

541 Seminar in Psychological Aspects of Culture (3)

Selected problems in the relation of culture and personality types. Prerequisite, 441 or permission.

ANTH

550 Field Text Recording (3)

Training in verbatim recording in non-Western connected speech such as myth and biographical dictations; especially designed for sociocultural anthropologists, rather than linguists, who are shortly leaving for a long session of field research.

ANTH

553 Analysis of Linguistic Structures (3, max. 6)

Offered jointly with the Department of Linguistics as Linguistics 553. Prerequisite, permission.
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
562 Implications of Concepts From Anthropology for Nursing (3)
Examination of selected core concepts from anthropology and an assessment of the implications of these concepts for nursing research. Offered jointly with the School of Nursing as Nursing 562.

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 of Anthropological Sciences (3,3,3)
Series of core courses for the beginning graduate student in which the growth and development of anthropological science is analyzed.

ANTH
569 Social and Cultural Change: Africa (3, max. 9)
Urbanization, stratification, technology, education, social and religious movements, and cultural pluralism in contemporary Africa. Offered jointly with the Department of Sociology as Sociology 569. Prerequisite, graduate standing in a social science department.

ANTH
570 Research Techniques in the Anthropological Study of Kinship (3-9)
Introduction to research methods in the study of kinship systems. Prerequisite, 438 or permission.

ANTH
571 Communicational Anthropology (3-9)
Introduction to communicational aspects of culture. Prerequisite, permission.

ANTH
591 Seminar in Museology (3)
Research into problems of museology. Prerequisite, permission.

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.

ARCHY
570 Seminar in Theory and Method in Archaeology (3)

ARCHY
571 Field Course in Archaeology (5)
Study of prehistoric cultures through archaeological excavation and analysis. Work is largely in the state of Washington, but other areas may be included. (Offered Summer Quarter only.)

ARCHY
572 Seminar in North American Archaeology (3, max. 6)
Selected problems in the archaeology of North America north of Mexico. Prerequisite, 472 or permission.

ARCHY
573 Seminar in Middle American Archaeology (3, max. 6)
Selected problems in the archaeology of Middle America. Prerequisite, 473 or 475 or permission.

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.

ARCHY
575 Strategy of Archaeology (3)
Systematic examination of the methodology and elementary techniques of archaeology for the objective of prehistory, acquainting the student as well as sources of material and techniques of wide applicability in the field situation. Prerequisite, permission.

ARCHY
590 Advanced Archaeological Analysis (6)
Practical laboratory instruction in the preparation of regional scale archaeological data for analysis, attribute recognition and analysis, stylistic and functional analysis, pattern recognition, and correlative analysis of edaphic, floral, and faunal data in a controlled laboratory case. Prerequisite, permission.

ARCHY
591 Advanced Field Course in Archaeology (9) W
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.

ARCHY
600 Independent Study or Research (*)
Prerequisite, permission.

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 evolution of modern populations.

PHY A
581 Dental Anthropology (5)
Intensive survey of the dentitions of primates from tree shrews to man. Emphasis placed on the range of metric and morphologic variability existing in the teeth of these animals, both in fossil and living groups. Environmental and genetic factors are considered within this ontogenetic and phylogenetic framework.

PHY A
582 Seminar in Populations and Genetics (3, max. 9)
Examination of various problems dealing with the forces of evolution operative on human populations. Prerequisite, 482 or permission.

PHY A
583 Topics in Growth and Development (3, max. 9)
Seminar dealing with various topics of child growth and development. Topics change from quarter to quarter. Prerequisite, 484 or permission.

PHY A
584 Topics in Ecology and Adaptation (3, max. 9)
Seminar dealing with various aspects of ecology and adaptation. Topics change from quarter to quarter. Prerequisite, 483 or permission.

PHY A
586 Topics in Primate and Human Evolution (3, max. 9) Consideration of one or more major topics relevant to the evolution of man and the primates. Prerequisite, permission.

ART
Courses for Undergraduates

HUM
103 The Arts of Africa, the Caribbean, and Black America (5)
Creative achievements by the Blacks of Africa, the Caribbean, and America in visual arts, music, dance, literature, and theatre. Guest lecturers and performing artists.

ART
100 Introduction to Art (3)
For majors in elementary education.

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. Prerequisite, permission.

ART

ART
109, 110 Design (3,3) Art structure as the basis for creative work. Organization of line, space, and color. Lectures, discussion, and supplementary reading. Prerequisite, 109 for 110.

ART
115 Contemporary American Indian Art (1)
Research and analysis of traditional Indian art forms by region; study of contemporary works by Indian artists; experimentation in media.

ART
129 Appreciation of Design (3)
Lectures on design fundamentals, illustrated with slides and paintings, pottery, textiles, etc. Reading and reference work.

ART
197 Study Abroad: Nonmajor Individual Projects (3-5, max. 10) Prerequisite, permission.

ART
201, 202, 203 Ceramic Art (3,3,3) Pottery: hand-building processes, wheel throwing, glazing, kiln firing. Prerequisites, 107, 110, 129 for 201; 201 for 202; 202 for 203.
ART 205 Graphical Design (3)  
Survey and introduction (design and use of letter forms). Prerequisites, 107, 110, 129.

ART 206 Graphical Design (3)  
Basic problems in visual design. Prerequisite, 205.

ART 207 Graphical Design—Project Design (3)  
Structured to allow students to work with a designer on applied design projects for one quarter. Prerequisite, 206.

ART 210 Art and the Individual (3)  
Studio-lecture survey of contemporary art forms and their significance as they relate to the individual. One of a three-quarter series required of all art education majors on the sophomore level 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 required of all art education majors on the sophomore level to develop a core of knowledge appropriate to prospective teachers of art. Prerequisite, sophomore standing in art education.

ART 212 Art in the Community (3)  
Studio-lecture survey of contemporary art forms and their significance as they relate to the community. One of a three-quarter series required of all art education majors on the sophomore level to develop a core of knowledge appropriate to prospective teachers of art. Prerequisite, sophomore standing in art education.

ART 220 Drawing and Painting (6, max. 18)  
Integrated approach to drawing and painting for three consecutive quarters with the same instructor. Prerequisites, 107, 110, 129, and permission.

ART 250 Design and Materials Textiles—Printing and Dyeing (3, max. 9)  
Printing and dying of textiles. Techniques include block printing, batik, tie and dye, discharging. Prerequisites, 107, 110, 129.

ART 251 Design and Materials: Glass (3)  
Fusing, forming, laminating, and surface treatments of glass (glass-blowing excluded). Prerequisites, 107, 110, 129.

ART 252 Design and Materials: Plastics (3)  
Forming, joining, and casting of plastics. Prerequisites, 107, 110, 129.

ART 253 Design and Materials: Wood (3)  
Shaping and forming of wood. Lamination and fabricating techniques. Usage of hand and power tools. Prerequisites, 107, 110, 129.

ART 254 Design and Materials: Metal (3)  
Basic techniques in manipulation and construction of metals. Visual, tactile, and aesthetic aspects. Prerequisites, 107, 110, 129.

ART 255 Design and Materials: Textile Construction (3, max. 9)  
Knitting, hooking, stitching, and other non-woven constructional techniques. Prerequisites, 107, 110, 129.

ART 256 Painting (3)  
Beginning oil painting. Prerequisites, 107, 110, 129.

ART 257 Painting (3, max. 6)  
Oil painting. Prerequisite, 256.

ART 259 Water-Soluble Media (3, max. 9)  
Prerequisites, 107, 110, 129.

ART 261 Elements of Interior Design (3)  
Study of basic residential spaces and furnishings. Scale drawings, materials, and color.

ART 262 Essentials of Interior Design (2)  
Illustrated lectures on color, texture, and form in residential space. Prerequisite, interior design major status.

ART 265 Intermediate Drawing (3, max. 9)  
Prerequisites, 107, 110, 129.

ART 272 Beginning Sculpture Composition (3, max. 6)  
Fundamentals of composition in the round and in relief. Prerequisites, 107, 110, 129.

ART 274 Life Sculpture (3, max. 9)  
Work in clay from the posed model. Figure composition, discussions, reading, and sketch book. Prerequisite, 6 credits from 272.

ART 300 Art Education: Crafts (3)  
General techniques and processes involved with various materials. Prerequisites, 107, 110, 129.

ART 301 Art Education: Crafts (3)  
Design in leather. Exploration of techniques and processes leading to creative work. Prerequisites, 107, 110, 129.

ART 302 Art Education: Crafts (3)  
Bookbinding. The design and construction of books including decorative paper techniques. Prerequisites, 107, 110, 129.

ART 303 Art Education: Crafts (3)  
Paper techniques and processes. Prerequisites, 107, 110, 129.

ART 304 Art Education: Crafts (3)  
Textile techniques and processes. Prerequisites, 107, 110, 129.

ART 307 Intermediate Painting (3, max. 6)  
Prerequisite, 6 credits from 257.

ART 309 Portrait Painting (3)  
Prerequisite, 6 credits from 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, models, and presentation. Prerequisites, 107, 110, 129, 262; Architecture 300, 301; Home Economics 125 for 310; 310 for 311; 311 for 312.

ART 313, 314 Fundamentals of Photography (3,3)  
Basic theory and techniques of photographic reproduction. Lighting, exposure, camera technique, and processing. Application of photographic techniques to the solution of problems in visual presentation. Prerequisites, junior standing in graphic or industrial design and permission for 313; 313 and permission for 314.

ART 316, 317, 318 Design for Industry (5,5,5)  
Product design, working drawings, models, presentation drawings, product analysis, display, marketing. Prerequisites, junior standing in industrial design for 316; 316 for 317; 317 for 318.

ART 319, 320, 321 Furniture Design (5,5,5)  
Design for full-scale construction of furniture in the shop, including working drawings, scale models, and layout. Prerequisites, 312 for 319; 319 for 320; 320 for 321.

ART 325 Advanced Drawing (3, max. 9)  
Study on the advanced level involving history, practice, and theory of drawing as an art form. Prerequisite, 9 credits from 265.

ART 328 The Film as Art (3)  
Historical development of film as an esthetic medium with an emphasis on pivotal filmmakers 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, 274.

ART 335 Metal Casting (3, max. 6)  
Introduction to foundry techniques as applied to fine arts casting of nonferrous material. Prerequisite, 6 credits from 272.

ART 337 Welding (3, max. 6)  
Study and application of welding methods as a sculpture technique making use of oxyacetylene, electric arc, and heliarc. Prerequisite, 6 credits from 272.

ART 339 Filmmaking (5, max. 15)  

ART 340 Design for Printed Fabrics (3)  
Hand-block and silk-screen printing; mass-
production design. Prerequisite, 250 or permission.

ART 350 Introduction to Printmaking (3)
Prerequisites, 107, 110, 129.

ART 351 Printmaking (3, max. 6)
Prerequisite, 350.

ART 353 Advanced Ceramic Art (5, max. 15)
Advanced work in forming, decorating, and glazing. Prerequisite, 203.

ART 357 Metal Design (5)
Construction includes processes of raising, soldering, forging in copper, pewter, silver. Lectures and research on historic and contemporary examples. Prerequisites, 107, 110, 129.

ART 358 Jewelry Design (5)
Jewelry design and construction, including stone setting and forging in silver and gold. Lectures and research on historic and contemporary examples. Prerequisites, 107, 110, 129.

ART 359 Enameling (5)
Enamel design for metal work or jewelry, champlevé, Plique-à-Jour, Limoges, Cloisonné on copper, silver, or gold. Prerequisites, 357 or 358.

ART 360 Life (3, max. 9)
Drawing and painting from the model. Prerequisites, 9 credits from 265 and 6 credits from 257.

ART 366, 367, 368 Graphic Design (5,5,5)
Emphasis on the development of visual ideas. Developing proficiency in working with equipment and materials. Prerequisites, 206 for 366; 366 for 367; 367 for 368.

ART 410 Graphic Design (5)
Composition and history. Prerequisite, 368.

ART 411 Graphic Design (3 or 5, max. 15)
Advanced photography. Emphasis on individual creative projects. Prerequisite, permission.

ART 436 Sculpture Composition (5, max. 15)
Individual compositions in various media in large scale. Prerequisite, 15 credits from 332.

ART 459 Advanced Filmmaking (5, max. 15)
Advanced individual projects in filmmaking. Prerequisites, 15 credits from 339 and permission.

ART 445, 446, 447 Advanced Industrial Design (5,5,5)
Market analysis and selected professional problems in industrial design. Consultation techniques, psychological, sociological, and economic factors involved in designing for consumer acceptance. Prerequisites, 318 for 445; 445 for 446; 446 for 447.

ART 450 Advanced Printmaking (5, max. 15)
Prerequisite, 6 credits from 351.

ART 451 Advanced Printmaking (5, max. 15)
Prerequisites, 15 credits from 450 and permission.

ART 457 Advanced Metal Design (5)
Individual problems in metal design and construction. Prerequisite, 357.

ART 458 Advanced Jewelry Design (5)
Individual problems in jewelry design and construction. Prerequisite, 358.

ART 459 Advanced Enameling (5)
Individual problems in enameling. Prerequisite, 359.

ART 460 Advanced Metal Design (5, max. 15)
Advanced individual projects in metal design. Prerequisites, 459 and permission.

ART 463 Advanced Painting (3 or 6, max. 18)
Development of individuality in painting through creative exercises. Prerequisites, 6 credits from 307 and 9 credits from 360.

ART 466, 467, 468 Graphic Design (5,5,5)
Expression of ideas in terms of design. Variety of media and reproduction processes. Prerequisites, 368 for 466; 466 for 467; 467 for 468.

ART 472, 473, 474 Advanced Interior Design (5,5,5)
Comprehensive problems related to contemporary needs, both public areas and residences, usually offered in conjunction with off-campus designers. Further research of historic interior masterpieces. Models, materials and their sources, perspective and working drawings. Prerequisites, 312 for 472; 472 for 473; 473 for 474.

ART 479, 480 Graphic Design (3,3)
Prerequisites, 410 for 479; 479 for 480.

ART 485 Advanced Ceramic Art (5, max. 15)
Pottery design and construction, stoneware, clay bodies, glazes. Prerequisite, 15 credits from 353.

ART 490 Art Education In the Schools (3)
For school administrators and teachers requiring help in problems related to the teaching of art. Workshop experiences, lectures, and discussions. No previous art experience necessary. Prerequisite, teaching experience.

ART 491 Readings In Art Education (3)
Basic readings in art education. A survey of leaders and movements that have contributed to the development of art education, with special attention to social and philosophical factors that have influenced art programs in American schools. Prerequisite, permission.

ART 492 Field Study In Art Education (3, max. 9)
Individual study of a selected problem in art education within a school setting under the direction of a faculty member. Prerequisite, permission.

ART 493 Problems In Art Education (3, max. 9)
Designed to consider significant and critical problems in the field of art education. Topic to be announced. Prerequisite, permission.

ART 494 Instructional Materials In Art Education (3, max. 9)
Preparation of teaching materials in selected media appropriate to the learner and with concern for subject matter. Prerequisite, permission.

ART 497 Study Abroad—Studio Individual Projects (3-10, max. 20)
Prerequisite, permission.

ART 498 Individual Projects—Painting/Sculpture (3 or 5, max. 15)
Prerequisite, permission.

ART 499 Individual Projects—Design (3 or 5, max. 15)
Prerequisite, permission.

Courses for Graduates Only

ART 500, 501, 502 Seminar In Art Education (3 or 5, 3 or 5, 3 or 5)
Special problems related to the teaching of art. Prerequisites, teaching experience and permission.

ART 509 Portrait Painting (3)

ART 512 Seminar In Painting (3, max. 9)

ART 522 Sculpture (3 or 5, max. 15)

ART 530 Design (3 or 5, max. 15)

ART 550 Printmaking (3 or 5, max. 15)

ART 553 Ceramic Art (3 or 5, max. 15)

ART 560 Life Painting (3 or 5, max. 15)

ART 563 Advanced Painting (3 or 5, max. 15)

ART 600 Independent Study or Research (*)

ART 700 Master's Thesis (*)

ART HISTORY

Courses for Undergraduates

ART H 201, 202, 203 History of Western Art (5,3,3)
Introduction to major achievements in the principal media from prehistoric times to the
ARTS AND SCIENCES

ART H 204 Study Abroad: Art In London (3-5, max. 15)
General introduction to art and art history through the study of objects in London's museums, of buildings in and near London, and through selected readings and research projects. Specific course content is announced in Study Abroad bulletins. Prerequisite, permission.

ART H 230 Black American Art (3)
History of Black American art as reconstructed from colonial times until the present, the African background, and extensions of Black art in the West Indies and in Brazil.

ART H 301 Survey of Asian Art (5)
Origins and interplay of the major movements of Asian art.

ART H 305 Survey of Medieval Art (5)
Art of Europe from the beginnings of Christian art in the late Roman Empire to the end of the fourteenth century. The course is designed for the art history major, but is open to any student, and treats the major monuments and acquaints the student with the bibliography.

ART H 306 Survey of Renaissance Art (5)
Sculpture, painting, and architecture in Europe from 1300 to 1600, with main emphasis on Italy.

ART H 307 Baroque and Rococo Art (5)
Opperman
Arts and architecture of Europe from the end of the sixteenth century to the latter half of the eighteenth century. Prerequisite, sophomore standing or permission.

ART H 308 Survey of Modern Art (5)
Art of Europe and America from the late eighteenth century to the present, with emphasis on stylistic and thematic changes in painting.

ART H 331 Tribal Art (5)
Bravmann
Survey of the arts of sub-Saharan Africa, pre-Columbian America (North and South), and the Pacific islands, including Australia and New Zealand, from prehistoric times to the ethnographic present.

ART H 333 Art of the Northwest Coast Indian (3)
Holm
Northwest coast Indian art, with emphasis on the structure and style of two-dimensional art of the northern tribes. Offered jointly with the Department of Anthropology as ANTH 333. Prerequisite, sophomore standing.

ART H 334 Art of the Northwest Coast Indian (3)
Holm
Three-dimensional art of the Northwest coast culture area, with emphasis on esthetic principles, techniques, cultural functions. Offered jointly with the Department of Anthropology as ANTH 334. Prerequisite, sophomore standing.

ART H 335 Art of the Northwest Coast Indian (3)
Holm
Northwest coast Indian art as related to drama and dance, with special attention to the Southern Kwakiutl. Offered jointly with the Department of Anthropology as ANTH 335. Prerequisite, sophomore standing.

ART H 340 Pre-Classical Art and Archaeology (3)
Edmonson
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 the Department of Classics as Classical Archaeology 340.

ART H 341 Greek Art and Archaeology (3)
Bliquet, Edmonson
Survey of the material remains and the developing styles in sculpture, vase painting, architecture, and the minor arts from the Geometric to the Hellenistic periods; illustrated by slides. Principal sites and monuments, as well as techniques and methods of excavation, are examined in an attempt to reconstruct the material culture of antiquity. Offered jointly with the Department of Classics as Classical Archaeology 341.

ART H 342 Roman Art and Archaeology (3)
Fould, Vignon
Roman architecture, painting, and sculpture, with emphasis on the innovations of the Romans in these areas; illustrated by slides. Offered jointly with the Department of Classics as Classical Archaeology 342.

ART H 381 History of Painting Since the Renaissance (3)
Moseley
Illustrated lectures. Prerequisite, 203.

ART H 382 History of Modern Sculpture (2)
Sculpture from the Renaissance to the present; lectures and slides. Prerequisite, 203.

ART H 391 History of Pottery (3)
Kotlier
Survey of stylistic and technical history of world pottery. Prerequisite, junior standing in art.

ART H 392 History of Printmaking (3)
Alps
Selective survey of major artists and media in the field of printmaking. Prerequisite, junior standing in art.

ART H 401 Oriental Ceramic Art (2)
Rogers
Survey illustrated by specimens in the collection of the Seattle Art Museum. Prerequisite, 301 or major standing in ceramic art.

ART H 404 Study Abroad: Art In London (3-5, max. 15)
Advanced or specialized work in art history based on materials available in the museums, private collections, libraries, and buildings of London, conducted through lectures, reading and research projects. Specific course content is determined by the assigned faculty member and is announced in Study Abroad bulletins. Prerequisite, permission.

ART H 406 Study Abroad: Art In Provence (5, max. 15)
Monuments in and around Avignon. Emphasis on Roman and Romanesque architecture and sculpture, later medieval French painting, great works of all periods and countries in regional museums, and the Provencal landscape of Cézanne, Van Gogh, and Gauguin. Prerequisite, permission.

ART H 411 Early Chinese Painting: T'ang to Y'dan (3)
Webb
Study of the changing styles and attitudes accompanying the development of painting (particularly landscape painting) in China from earliest times. Prerequisite, upper-division standing.

ART H 412 Later Chinese Painting: Yuan Through Ch'ing (3)
Webb
Chinese painting from the time that the study of individual masters became the main task at hand. Prerequisite, upper-division standing.

ART H 415 Early Japanese Painting: Twelfth to Sixteenth Century (3)
Webb
Yamato-e and the art of the illustrated handscroll of Heian and Kamakura times, and the ink landscape tradition associated with Shubun and Sesshu. Prerequisite, upper-division standing.

ART H 416 Later Japanese Painting: Sixteenth to Nineteenth Century (3)
Webb
Survey of later Japanese painting with emphasis on the art of the Kano, Satotsu/Korin, Shijio/Maruyauma, and Nanga schools. Prerequisite, upper-division standing.

ART H 417 Buddhist Painting of China and Japan (3)
Webb
Survey of Buddhist painting in China and Japan from the fifth century until circa 1300. Prerequisite, upper-division standing.

ART H 418 Buddhist Sculpture of China and Japan (3)
Webb
Survey of Buddhist sculpture in China and Japan from the fifth century until circa 1300. Prerequisite, upper-division standing.

ART H 419 Chinese and Japanese Architecture (3)
Webb
Religious and secular architecture of China and Japan, with emphasis on Japanese temples and shrines. Prerequisite, upper-division standing.
ART H 420 Study Abroad: Art and Architecture of the Kannai (8) Webb
Study, conducted in the field and in lecture/discussion sessions, of all the important monuments of Japanese art in the temples, shrines, and museums of Kyoto, Otsu, Nara, Osaka, and their vicinities.

ART H 421 Art of India (3) Rogers
Stylistic and iconographic study of the art of India. Prerequisite, 301 or permission.

ART H 431 Primitiv Art I (3) Bravmann
Arts of Mesoamerica, South America, and Oceania.

ART H 432 Arts of Sub-Saharan Africa I (3) Bravmann
Tribal arts of the western Sudan and the Western Guinea coast with their archaeological antecedents.

ART H 433 Arts of Sub-Saharan Africa II (3) Bravmann
Tribal arts of the Central Guinea coast, Nigeria, the Cameroons, and Gabon.

ART H 434 Arts of Sub-Saharan Africa III (3) Bravmann
Tribal arts of the Congo, Southern Savannah, and clusters of artistic traditions outside of generally defined artistic maps of Africa.

ART H 435 Selected Studies in African Art and Music (3)
Interdisciplinary seminar on specific problems related to the study of art and music in Africa. Prerequisite, 436 or 437 or 438 or Music 427.

ART H 442 Greek and Roman Pottery (3) Edmonson
Shapes, fabrics, and decorations from the Neolithic period to the sixth century A.D. Offered jointly with the Department of Classics as Classical Archaeology 442. (Offered alternate years; offered 1975-76.)

ART H 444 Greek and Roman Sculpture (3) Edmonson
History and development of Greek sculpture and sculptors, their Roman counterparts, and Roman portraits and sarcophagi. Emphasis on Greek sculpture of the fifth century B.C. Offered jointly with the Department of Classics as Classical Archaeology 444. (Offered alternate years; offered 1975-76.)

ART H 453 Romanesque Art (5) Christofides
History of Western European art in the eleventh and twelfth centuries. The course focuses on monuments along the pilgrimage roads to Compostela in France and Spain. Prerequisite, upper-division standing.

ART H 461 Early Renaissance Painting (3)
Painting of the fourteenth and fifteenth centuries in Florence and Siena. Prerequisite, familiarity with vocabulary of art or with related history.

ART H 462 High and Late Renaissance Painting (3)
Painting of the sixteenth century in Florence and Rome. Prerequisite, familiarity with vocabulary of art or with related history.

ART H 463 Early Renaissance Sculpture (3)
Sculpture of the late thirteenth, fourteenth, and fifteenth centuries in the Florentine tradition. Prerequisites, 201, 202, or equivalent background.

ART H 465 Renaissance Architecture and Architectural Theory (3, max. 9)
Architecture in Italy (1400-1600) from Brunelleschi to Palladio, with an emphasis on the development of Renaissance architectural theory from Alberti to Palladio and Vignola. Prerequisite, 202 or 306 or Architecture 351.

ART H 469 Problems in Northern European Art (3, max. 12)
Evolution of Northern European art during the fifteenth through seventeenth centuries treated in such a manner as to direct the attention of students to the many points of iconography, style, and attribution that need clarification. The major artistic traditions of this area are covered during four academic quarters. Prerequisite, upper-division standing.

ART H 470 Problems in the Hispanic Arts (3, max. 9)
Various specific areas within the general range of Spanish and Latin American arts in the Renaissance and the Baroque are dealt with in successive quarters; among them: Mexican colonial architecture; the Renaissance in Spain; the arts of the Spanish Baroque; etc. Prerequisite, 306 or 307, or permission.

ART H 471 Masters and Monuments of Counter-Reformation—Rome (3) Opperman
Works and impact of the major architects, sculptors, and painters active in Rome from the death of Michelangelo to the death of Bernini (1654-1660). Concentration upon Caravaggio, Bernini, Pietro da Cortona, Poussin, and Borromini. Prerequisite, 307 or permission.

ART H 472 Art in France: Henry IV-Louis XVI (3) Opperman
Architecture, painting, sculpture, decoration. The classic ideal: formation, center, extinction around 1700, and rebirth in the later eighteenth century. Main points: Versailles, Watteau, the decorators of the Rococo, and tendencies of the period. Prerequisite, 307 or permission.

ART H 473 Dutch Painting of the Golden Age (3) Opperman
Genesis, development, and decline of painting in the United Provinces from their independence in 1581 to the end of the seventeenth century. Emphasis upon the antimannerist reaction in Utrecht, Frans Hals, Rembrandt, and upon the origins of Dutch genre traditions. Prerequisite, 307 or permission.

ART H 474 Problems in Eighteenth Century Art (3, max. 12)
Selected problems in the art and art theory of eighteenth-century Europe and America. Different topics are covered each time the course is offered; among them: Watteau and the French Rococo; Neoclassicism; Central Europe in the eighteenth century; English art. Prerequisite, 307 or permission.

ART H 478 History of English and American Interior Design (3) Hill
Illustrated lectures on the evolution of furniture and interior architecture. (Formerly 283.)

ART H 479 History of Italian and French Interior Design (3) Leiner
History of interior architecture and furnishings of Italy and France from the Dark Ages to the early nineteenth century. Prerequisite, 203.

ART H 481 Origins of Modern Art (3) Kingsbury
Stylistic and iconographic study of European painting and sculpture from 1750 to 1848. Prerequisite, 203.

ART H 482 Impressionism and Post-Impressionism (3) Kingsbury
Stylistic and iconographic study of European painting and sculpture from 1848 to 1900. Prerequisite, 203.

ART H 483 Art of the Twentieth Century (3)
Kingsbury
Painting and sculpture in Europe and America from 1900 to the present. Prerequisite, 203.

ART H 484 Thematic Studies in Modern Art (3, max. 6) Sp
t Jones
Comparative studies of theme and technique in art and literature to illustrate major concerns of a particular period as expressed in these two media. Offered jointly with the Department of Romance Languages and Literature as French 458. 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).

ART H 485 French Art and Literature: Period Studies (5) Sp
t Jones
Comparative studies of theme and technique in art and literature to illustrate major concerns of a particular period as expressed in these two media. Offered jointly with the Department of Romance Languages and Literature as French 458. 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).

ART H 486 History of American Art—Colonial Period (3)
Reed
Survey of Architecture, town design, painting, sculpture, and the decorative arts in the United States from original European settlement to the Revolutionary War. Prerequisite, junior standing.
ART H
487 History of American Art to 1913 (3)
Survey of American art, especially painting, to
the Armory Show, with attention to major fig­
ures, the American culture context, and parallel
European trends. Prerequisite, familiarity with
vocabulary of art or with related history or lit­
erature.

ART H
491, 492, 493 Art History and Criticism
(3,3,3)

ART H
496 Study Abroad—Art History Individual
Projects (3-10, max. 20)
For participants in Study Abroad programs.
Prerequisite, permission.

ART H
498 Individual Projects—Art History (3 or 5,
max. 15)
Prerequisite, permission.

Courses for Graduates Only

ART H
500 Methods of Art History (3)
Introduction to the specialized bibliography of
art historical research and to the wide variety of
approaches to art historical problems of all
periods and regions. Prerequisite, graduate
student standing in art history; others by per­
mission.

ART H
501, 502, 503 Seminar In the General Field of
Art (3 or 5, 3 or 5, 3 or 5)

ART H
511 Seminar In Chinese Art (3, max. 9)
Webb
Critical appraisal of the principal research
methods, theories, and types of literature
dealing with the art of China. Prerequisite, per­
mission.

ART H
515 Seminar In Japanese Art (3, max. 9)
Webb
Critical appraisal of the principal research
methods, theories, and types of literature
dealing with the art of Japan. Prerequisite, per­
mission.

ART H
521 Seminar In Indian Art (3, max. 9)
Rogers
Critical appraisal of the principal research
methods, theories, and types of literature
dealing with the art of India. Prerequisite, 421.

ART H
531 Seminar In Tribal Art (3, max. 9)
Methodological and cross-disciplinary prob­
lems in the visual arts of precolonial Africa,
Oceania, and America. Specific content varies.
Prerequisite, permission.

ART H
566 Seminar In North European Art (3)
Deals with problems of style and iconography of
the northern European masters of the four­
teenth through fifteenth centuries. Prerequisite,
permission.

ART H
577 Seminar In Baroque Art (3, max. 9)
Opperman
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 seven­
teenth and eighteenth centuries in Europe. Pre­
requisite, permission.

ART H
581 Problems in Modern Art (3, max. 9)
Kingsbury
Art-historical problems of the nineteenth and
twentieth centuries. Prerequisite, permission.

ART H
590 Seminar In Criticism of Contemporary
Art (3, max. 9)
Seminar on contemporary art and appropriate
methodology. Prerequisite, 581.

ART H
600 Independent Study or Research (*)

ART H
700 Master's Thesis (*)

ART H
800 Doctoral Dissertation (*)

ASIAN LANGUAGES AND
LITERATURE

Courses for Undergraduates

CHINESE

CHIN
101, 102, 103 Spoken Cantonese (3,3,3)
A,W,Sp
Provides students with instruction in a major
dialect of Chinese in addition to the traditional
courses in the Mandarin dialect. Basic dia­
logues are stressed. Prerequisites, 101 for 102;
102 for 103.

CHIN
111, 112, 113 First-Year Chinese (5,5,5)
A,W,Sp
Yen
Introduction to the standard language. Em­
phasis is placed on learning correct pronunci­
ation and basic structure. Drill in oral use of
the language. Active usage of a minimum of
six hundred characters will be expected of the
students.

CHIN
121 Accelerated Chinese (10) A
Norman
Intensive. In conjunction with 222 and 223, cov­
ers material of 111, 112, 113 and 211, 212,
213 in three quarters.

CHIN
134 First-Year Intensive Chinese (15) S
A,W,Sp
Yen
Reading of literary texts in the modern lan­
guage. An introduction to the older vernac­
ular style. Prerequisite, 313 or equivalent.

CHIN
411, 412, 413 Fourth-Year Chinese (5,5,5)
A,W,Sp
Brandauer
Practical phonetics with special application to
the problem of articulation improvement. Mor­
phology with application to vocabulary build­
ing, use of particles and syntax. Prerequisite,
313.
ARMS AND SCIENCES

CHIN
Serruys
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 223, or equivalent.

CHIN
454 Accelerated Classical Chinese (10) S
Serruys
Same focus and method as 451, 452, 453. Nonmajors only. Prerequisite, 213 or 223.

CHIN
461, 462, 463 Chinese Literature (5,5,5) A,W,Sp
Knechges
461: lectures on Chinese literature from earliest times to the end of Han. 462: lectures on Chinese literature from the end of Han to the end of T'ang times. Prerequisite, 213 or 223, or equivalent.

CHIN
499 Undergraduate Research (3-5, max. 15) A,W,Sp
For Chinese language and literature majors. Prerequisite, permission.

HINDI-URDU
HD UR
201-202, 203 Elementary Hindi-Urdu (5-5,5) A,W,Sp
Shapiro
Introduction to the spoken language. Oral drills emphasizing pronunciation and elementary conversation. Grammatical and syntactical exercises. Introduction to the two writing systems in 203.

HD UR
Shapiro
Systematic expansion of vocabulary and grammatical forms and structures. Oral and writing practice based on Hindi prose readings. Prerequisite, 203 or equivalent.

HD UR
401, 402, 403 Advanced Hindi (5,5,5) A,W,Sp
Prerequisite, 303 or equivalent.

HD UR
499 Undergraduate Research (3-5, max. 15) A,W,Sp
For Hindi-Urdu language and literature majors. Prerequisite, permission.

INDIAN
INDN
100 Introduction to South Asian Languages (3-5) A
Schiffman, Shapiro
Introduction to the languages of South Asia. Structures of various language families of South Asia are examined and compared, as are other linguistic problems of the subcontinent, such as sociolinguistics, language politics, writing systems, and inscriptive decipherment. Special emphasis on the introduction of grammatical terminology that is encountered in actual language courses.

INDN
401, 402 Pali (3,3) W,Sp
Ruegg
Introduction to Pali language and literature. Prerequisite, Sanskrit 401 or equivalent, or specialization in a relevant south/southeast Asian language.

INDN
499 Undergraduate Research (3-5, max. 15) A,W,Sp
For South Asian language and literature majors. Prerequisite, permission.

JAPANESE
JAPAN
Niwa
Introduction to spoken Japanese, pronunciation, oral composition, and grammar; reading of romanized Japanese; conversation, composition, and grammar; introduction to modern written Japanese in 113.

JAPAN
124 First-Year Intensive Japanese (15) S
Niwa
Beginning course covering the same ground as Japanese 111, 112, 113. Introduction to spoken Japanese, pronunciation, oral composition, and grammar; reading of romanized Japanese; conversation, composition, and grammar; introduction to modern written Japanese. (Offered Summer Quarter only.)

JAPAN
Niwa
Reading and translation of modern Japanese. Also oral work in Japanese. Prerequisites, 111, 112, 113 or equivalent.

JAPAN
311, 312, 313 Third-Year Japanese (5,5,5) A,W,Sp
Hiraga
Reading and translation of modern Japanese. Also oral work in Japanese. Prerequisite, 213 or equivalent.

JAPAN
Niwa

JAPAN
405, 406 History of the Japanese Language (3,3) W,Sp
Miller
Introduction to the history of Japanese, including phonology, morphology, syntax, and lexicon. Prerequisites, 411, 412, 413, or equivalent.

JAPAN
Miller
Reading, translation into English, and discussion of Japanese of modern written texts on the advanced level; during Winter Quarter and Spring Quarter the literary language (bungo) also is introduced.

JAPAN
461, 462, 463 Readings in Modern Japanese Literature (3,5-3,5-3) A,W,Sp
Takaya
Close reading and discussion of representative works of twentieth-century poetry, fiction, and drama in the original text. Prerequisite, permission.

JAPAN
499 Undergraduate Research (3-5, max. 15) A,W,Sp
For Japanese language and literature majors. Prerequisite, permission.

KOREAN
KOR
211-212, 213 Elementary Korean (5,5,5) A,W,Sp
Lukoff
Introduction to the modern standard Korean spoken and written language.

KOR
311, 312, 313 Intermediate Korean (5,5,5) A,W,Sp
Lukoff
Systematic expansion of vocabulary and grammatical forms of standard Korean; introduction of Chinese characters in mixed script. Prerequisite, 213 or equivalent.

KOR
411, 412, 413 Readings in Contemporary Korean (5,5,5) A,W,Sp
Lukoff
Reading in a variety of modern standard styles, with oral and written practice. Prerequisite, 313 or equivalent.

KOR
465, 466, 467 Readings in Korean Documents (5,5,5) A,W,Sp
Suh
465: Korean bibliography and references. Prerequisite, 413 or permission. 466, 467: primarily for students in the social sciences majoring in the Korean field. Prerequisite, 465 or permission.

KOR
499 Undergraduate Research (3-5, max. 15) A,W,Sp
For Korean language and literature majors. Prerequisite, permission.

MONGOLIAN
MONG
302 Introduction to Mongolian (5) A
Beginner's grammar, easy texts.

MONG
303 Modern Mongolian Literary Language (5) W
Grammar, syntax, and styles of modern Mongolian based on colloquial and Cyrillic alphabet. Prerequisite, 302.
**MONG**

304 Colloquial Mongolian (5) Sp
Grammar of the spoken language in Outer and Inner Mongolia. Reading of colloquial texts, translation into English, conversation in Mongolian. Prerequisite, 303.

305 Classical Mongolian (5) A
Grammar, syntax, styles of the Mongolian written language of the seventeenth to twentieth centuries. Prerequisite, 304.

306 Manchu Grammar for Beginners (3) A
Students are first introduced to the Manchu alphabet; study phonology, morphology, a brief survey of the history of the language; and then proceed to some simpler reading materials.

307 Advanced Manchu Reading (3) W Norman
Students read historical documents originally written in Manchu, with or without parallel texts in Chinese or Mongolian; also read translations from classical and secular Chinese literature, such as songs, romances, and novels. Prerequisite, 306.

402, 403, 404 Intermediate Mongolian (5,5,5) A,W,Sp
Selected readings in modern Mongolian literature, history, political science, and newspaper materials. Prerequisite, 304 or equivalent.

409 Undergraduate Research (3-5, max. 15) AWSp
For Mongolian language and literature majors. Prerequisite, permission.

**SNKRT**

301, 302, 303 Introduction to Sanskrit (5,5,5) A,W,Sp
Intensive study of the basic grammatical structure of the classical language; reading of elementary texts from the epic and classical periods.

401, 402, 403 Intermediate Sanskrit (5,5,5) A,W,Sp
Advanced classical grammar; rapid reading of a kavya text or texts, ordinarily a drama or major prose work. Prerequisite, 303.

411, 412, 413 Advanced Sanskrit (5,5,5) A,W,Sp
Intensive reading and analysis of classical texts, chosen from the sastraic or belleslettres literature. Prerequisite, 403 or permission.

**TAML**

201-202, 203 Elementary Tamil (5-5,5) A,W,Sp
Schiffman
Introductory introduction to the modern spoken language. Transformation drills are emphasized. The writing system and literary dialect are introduced at a suitable stage.

204, 205, 206 Elementary Kannada (5,5,5) A,W,Sp
Schiffman
Introductory introduction to the modern spoken language. Transformation drills and the writing system and literary dialect.

301-302, 303 Intermediate Tamil (5-5,5) A,W,Sp
Schiffman
Intensive use of the modern spoken language, beginning with moderately difficult conversations and drills, and working up to more advanced materials, including radio, plays, continuation of work with written language. Prerequisite, 203.

401, 402, 403 Advanced Tamil (5,5,5) A,W,Sp
Schiffman
Readings in modern literary Tamil. The modern novel and short story as seen in the writings of such writers as Jayakaran, Putumapiptan, Vayyavan, Janakiramman, Sundara Ramaswamy, and Ramamirthan. Laboratory sessions continue practice in the colloquial dialect. Prerequisite, 403.

**TAML**

455 Structure of Dravidian (3) Schiffman
Comparative description of the phonological and syntactic system with emphasis on areal features and shared rules of Tamil, Telugu, Kannada, or Malayalam. As appropriate, contrasting examples are taken from the lesser Dravidian languages, particularly those of the northern Dekkan. Dravidian group as a source of a major set of borrowings of linguistic features by the North Indian (Indic) language group. (Offered upon demand.)

**THAI**

150 Intensive First-Year Thai (15) S
Cooke
Beginning course covering the same ground as 301, 302, 303. Introduction to spoken Thai: pronunciation, grammar, conversation. Introduction to the written language: reading and writing.

301, 302, 303 Basic Thai (5,5,5) A,W,Sp
Cooke
Introduction to the structure of modern spoken and written Thai. One hour lecture and five hours intensive oral practice (in Thai) per week. Prerequisites, 301 for 302; 302 for 303.

401, 402, 403 Intermediate Thai (5,5,5) A,W,Sp
Cooke
Reading of more complicated material in preparation for classes conducted in Thai where material is discussed. Review of structure. Prerequisites, 303 or equivalent for 401; 401 for 402; 402 for 403.

**TIB**

401, 402, 403 Colloquial Tibetan (5,5,5) A,W,Sp
Norang
Introduction to phonology, morphology, and syntax of spoken Tibetan (Lhasa dialect) by the inductive method.

404, 405, 406 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.

414 Readings in Tibetan (3, max. 9) A,W,Sp Norang, Wylie
Selections from various Tibetan materials. Prerequisite, 406 or equivalent.

421, 422, 423 Advanced Colloquial Tibetan (5,5,5) A,W,Sp Norang
Instruction and drill in advanced colloquial sentence patterns and syntactical constructions.
TURKIC

TKIC

301, 302, 303 Introduction to Uzbek (3,3,3)
A,W,Sp
Statnus
Introduction to the modern Uzbek written and spoken language. Conversation in Uzbek.

TKIC

343 Introduction to a Second Turkic Language of Central Asia (3) Sp
Cirtautas
Introduction of phonology, morphology, and syntax of a second modern Turkic language of Central Asia. Alternately: Kirghiz, Kazakh, Tatar, Turkmen, Azerbijanian. (Offered alternate years; offered 1974-75.)

TKIC

401, 402, 403 Intermediate Uzbek (3,3,3)
A,W,Sp
Cirtautas
Continuation of Turkic 301, 302, 303. Oral work, grammar, and readings in Uzbek literature on the advanced level. Prerequisites, 301, 302, 303, or permission.

TKIC

344 Survey of Turkic Languages (3) A
Cirtautas
Linguistic outlines of modern Turkic languages. Brief phonetical, morphological, and syntactical analysis of selected materials. Of interest to students of Turkic, anthropology, and linguistics.

TKIC

411, 412, 413 Advanced Uzbek (3,3,3)
A,W,Sp
Cirtautas
Continuation of 401, 402, 403. Reading of selected Uzbek writers. Prerequisite, 403 or equivalent.

TKIC

499 Undergraduate Research (3-5, max. 15) AWSSp
For Turkic language and literature majors. Prerequisite, permission.

LITERATURE COURSES IN ENGLISH

CHIN

361 Vernacular Chinese Literature in Translation (5) Sp
Brandauer
Survey of modern and premodern literature written in the vernacular language, including the novel, the short story, drama, and poetry. Works are read in translation.

CHIN

362 Chinese Literature in Translation: Middle and Early Modern Periods (5) W
Brandauer
Survey of classical Chinese literature exclusive of vernacular literature from the T'ang dynasty through the Ch'ing dynasty (A.D. 618-1911). Genres studied include poetry, rhyme-prose, prose essays, and the classical short story. Works are read in translation.

CHIN

363 Chinese Literature in Translation: Ancient Period (5) A
Wang
Survey of classical Chinese literature from earliest times to the T'ang dynasty (A.D. 618). Genres studied include poetry, rhyme-prose, narrative, expository, and philosophical prose. Works are read in translation.

INDN

420 Classical Indian Literature in English (5) A
General survey with special attention to historical, philosophical, and cultural background. Knowledge of the Sanskrit language is not required.

INDN

421 Modern Indian Literature in English (5) W
General survey of the contemporary literature with special attention to the fusion of modernistic trends with tradition. Knowledge of an Indian language is not required.

JAPAN

421 Japanese Literary Tradition in English (5) A
Takaya
Broad inquiry into the literary heritage of Japan through reading and discussion of representative works available in English in prose, poetry, and drama from early beginnings to mid-nineteenth century.

JAPAN

422 Tokugawa Literary Tradition in English (5) W
Takaya
Survey course in Japanese literature covering the period between 1600 and 1867, when the rise and development of popular literature and theatre among the common people had reached the highest peak through men like Chikamatsu, Saikaku, and Basho. Readings and discussion of representative works in prose, poetry, and drama up to the beginning of Meiji period.

JAPAN

423 Modern Japanese Literature in English (5) Sp
Takaya
Discussion and analysis of representative works, especially of fiction, from the late nineteenth and twentieth centuries.

JAPAN

441 Studies in Japanese Poetry in English (5) W
McKinnon
Traditions and techniques; systematic investigation of the major poetic forms, focusing on representative poets and their works.

JAPAN

442 Studies in Japanese Prose in English (5) A
McKinnon
Close examination of a select number of works that trace the development and diversity of Japanese prose literature from eighteenth-century prototypes to the experimental present. Particular attention is given to the evolution of modes of fiction, the role and influence of diary literature and journals, the concept of the novel and the short story, and the critical position poetry occupies in the shape and esthetics of prose works. The impact of literary examples from other countries, Asian and Western, also discussed.

Courses for Graduates Only

ASIAN LANGUAGES AND LITERATURE

ASIAN

600 Independent Study or Research (*)
AWSSp

ASIAN

700 Master's Thesis (*) AWSp

ASIAN

800 Doctoral Dissertation (*) AWSp

CHINESE

CHIN

540 Seminar in Chinese Linguistics (3, max. 9) W,Sp
Norman
Advanced phonology, problems of archaic Chinese, dialectology; descriptive and historical treatment of Sinitic languages. For advanced students of Chinese or of linguistics. Prerequisite, permission.

CHIN

541 Chinese Phonology (3) A
Norman

CHIN

542, 543 Introduction to Texts in Ancient Script (3,3) W,Sp
Serra

CHIN

545, 546 Introduction to Texts in Ancient Script (3,3) W,Sp
Serra
Structure of Chinese characters. Development of Chinese script and related problems. Selected texts of inscriptions. 545: Bronzes II and
**Bone Inscriptions I. 546: Bone Inscriptions II. Prerequisites, completion of 543 and permission. (Offered alternate years; offered 1974-75.)**

**CHIN**

551 Readings In Classical Chinese (5) A
Serruya
Continuation of 451, 452, 453. Focus on early Chou texts: problems of textual criticism and grammar. Prerequisites, 451 for 452; 452 for 453, or permission.

552, 553 Readings In Chinese Dynastic Histories (5,5) W,Sp
Knechtges
552: readings in selections of Shih chi, Han shu, Tsin shu. 553: readings in selections of T'ang shu, Sung shih, Ming shih. Prerequisites, 551 for 552; 552 for 553.

560 Seminar In Chinese Literature (3, max. 15) A,WSp
Wang
Directed study of selected works of poetry. Subject emphasis varies each year. Prerequisite, permission.

561, 562, 563 Studies In Chinese Literature (5,5,5) A,WSp
Wang
561: literature of the Chou and Han periods. 562: literature from Wei to T'ang times. 563: literature since the end of T'ang. (Offered 1975-76.)

571 Seminar In Chinese Poetry (5, max. 15) Sp
Wang
Directed study of selected works of poetry. Subject emphasis varies each year. Prerequisite, permission.

581 Seminar In Chinese Drama (5, max. 15) A
Brandauer
Directed study of selected works of traditional drama, focusing on the Yuan ts'o-chu and the Ming ch'ien-ch'i in alternate years. Prerequisite, permission.

583 Seminar In Chinese Fiction (5, max. 15) A
Brandauer
Directed study of selected works of fiction, focusing on the vernacular short story and novel. Prerequisite, permission.

591, 592, 593 Studies In the History of Chinese Thought (5,5,5) A,WSp
Wang
Directed readings in selected traditional philosophical texts (Chuang-tzu, Han-fei-tzu, Lun-heng, Shih-shuo hisin-yi), and documents of political thoughts and institutions. Subject emphasis varies each quarter. Prerequisite, permission.

**HINDI-URDU**

501, 502, 503 Studies In Hindi-Urdu Literature (3,3,3) A,WSp
Survey of contemporary Hindi-Urdu prose.

**JAPANESE**

JAPAN

501 Readings In Bibliographical Materials (5) W
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.

Hiraga
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.

547 Seminar On Japanese Linguistics (3) Sp
Miller
Directed study in problems in the history and structure of the Japanese language. Prerequisites, 405, 406, or permission.

551, 552, 553 Readings In Classical Japanese Literature (3,3,3) A,WSp
McKinnon
Readings in prose, poetry, and drama, antiquity to fourteenth century. Prerequisite, permission.

560 Seminar In Japanese Theatre (3-5, max. 15) A,WSp
McKinnon
Designed to deal with the major Japanese theatrical traditions through the examination of primary and secondary sources for developing a deeper appreciation and understanding of the theatre as a vital element in Japanese culture. Prerequisite, Japanese theatre courses in English or advanced courses in Japanese or permission. (Offered alternate years.)

580 Colloquium In Japanese Literature (3-5, max. 15) A,WSp
McKinnon, Takaya
Advanced course in Japanese literature in which the students may have the opportunity of studying under scholars and specialists from Japan who will be affiliated with the department on temporary basis. Prerequisite, permission.

**KOREAN**

KOR

501, 502, 503 Seminar In Korean (3-5,3-5, 3-5) A,WSp
Lukoff

521, 522, 523 Modern Korean Literature (5,5,5) A,WSp
Suh
Readings in important works in Korean literature of the twentieth century. Prerequisite, 413 or permission. (Offered alternate years; offered 1975-76.)

531, 532, 533 Classical Korean Literature (5,5,5) A,WSp
Suh
Selected works, primarily in Hangul up to the twentieth century, including representative authors in prose, poetry, and drama. Prerequisite, permission. (Offered alternate years; offered 1974-75.)

541, 542, 543 Readings In Hanmun Texts (5,5,5) A,WSp
Suh
Readings from representative authors from the fifteenth to the late nineteenth centuries. Prerequisites, Korean 413, Chinese 451 or Japanese 413, or permission. (Offered alternate years; offered 1975-76.)

**MONGOLIAN**

MONG

521 Ancient Mongol: b'Phagspa Script (3) A
Script and grammar of b'Phagspa texts; reading and translation. Prerequisite, 305.

522 Mongol: Ancient Texts (3) W
Grammar and reading of Mongol texts of the fourteenth to seventeenth centuries. Historical texts are emphasized.

**MONGOLIAN**

579 Comparative Altic Linguistics (3)
Comparative phonology and morphology of Mongol and Turkic and other related languages. Offered jointly with the Department of Linguistics 579. Prerequisite, permission.

**SANSKRIT**

SNKKT

550 Seminar On Sanskrit Literature (3, max. 9) A,WSp
Thirper
Close examination of selected authors, periods, or traditions, within the context of Indian literary history. Prerequisite, 403. (Offered alternate years.)
SNKRT 555 Seminar on Sanskrit Grammar (3, max. 6) AWSp
Thrasher
Selected problems relating to the history of the Sanskrit language; reading and critical examination of the methodology of Paliani's grammar. Prerequisite, 403 or permission; 550 recommended. (Offered alternate years.)

SNKRT 560 Readings in Philosophical Sanskrit (3, max. 9) AWSp
Potter
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.

SNKRT 581, 582 Readings in Buddhist Texts (3, max. 9) W, SP
Ruegg
Interpretation of original sources. Texts vary from year to year. Prerequisite, ability to study sources in the original languages and an introduction to Buddhist thought.

SNKRT 585 Seminar in Buddhism (3, max. 27) AWSp
Ruegg
Systems 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.

TAMIL
TAMIL
501, 502, 503 Studies in Tamil Literature (3,3,3) A, W, SP
Schiffman
Introduction to Tamil literature, beginning with Sangam poetry and culminating in modern postindependence fiction. Prerequisites, 401, 402, 403 or permission.

TIBETAN
TIB
500 Advanced Literary Tibetan (3, max. 9) AWSp
Nornang, Wylie
Reading of manuscripts and xylographs with emphasis on biographical, historical, and geographical material. Prerequisite, 406 or equivalent.

TIB
534 Buddhist E Tibetan (2, max. 6) AWSp
Ruegg
Reading of Buddhist literature in translation and original Tibetan compositions. Prerequisite, 406 or equivalent.

TIB
544 Ancient Tibetan Documents (2, max. 6) AWSp
Wylie
Reading of selections from ancient documents, inscriptions, and annals. Prerequisite, 406 or equivalent.

TURKIC
TKIC
542, 543 Comparative and Historical Grammar of Turkic Languages (3,3)
W, SP
Cirtautas
Classification of the Turkic languages; alphabets used; phonology, morphology, and syntax; lexical composition; structure changing developments. Prerequisites, 303 or 404, or 103. (Offered alternate years; offered 1975-76.)

TKIC 546 Old Turkic (3) W
Cirtautas
Introduction to Runic script; phonology, morphology, and syntax of the oldest form of Turkic; reading and translation of seventh- and eighth-century inscriptions, of importance for the history of the Turks during this period. Prerequisite, permission. (Offered alternate years; offered 1975-76.)

TKIC 547 Old Uighur (3) Sp
Cirtautas
Introduction to script systems; phonology, morphology, and syntax. Reading and translation of mainly Buddhist texts in Uighur script, through 17th century. Prerequisite, permission. (Offered alternate years; offered 1975-76.)

TKIC 561, 562 Middle Turkic (3,3) A, W
Cirtautas
Introduction to the phonology, morphology, and syntax of the Middle Turkic languages; reading and translation of texts in Kitan and Kipchak in Middle Turkic or a modern Turkic language. (Offered alternate years; offered 1975-76.)

TKIC 563 Seminar on Turkic Literature (5) Sp
Cirtautas
Oral literature (epic, tales, songs); written literature; traditions and techniques. Special consideration is given to the relationship between oral and written literature, and the influences of foreign literatures (Persian, Arabic, Russian). Prerequisite, permission. (Offered alternate years; offered 1974-75.)

ASTRONOMY
Courses for Undergraduates
ASTR 101 Astronomy (5) AWSp
The solar system, stars, galaxies, and cosmology.

ASTR 102 Introduction to Astronomy (5) Sp
Survey of the solar system, stars, galaxies, and cosmology. Prerequisite, one year of high school physics or Physics 101-102 or 110, 110, 112.

ASTR 201 The Universe and the Origin of Life (5)
Continuation of 101 and 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.

ASTR 301 Astronomy for Scientists and Engineers (3)
Introduction to astronomy for students in the physical sciences. Prerequisite, Physics 123.

ASTR 321, 322, 323 Basic Astronomy (3,3,3) AWSp
Intended for physical scientists; this course gives a mathematically oriented treatment of positional astronomy, celestial mechanics, the planets and interplanetary medium, the sun and stellar spectra, luminosities, radii, and temperatures. Prerequisites, Physics 123 and calculus.

ASTR 431, 432, 433 Astrophysics and Cosmology (3,3,3) AWSp
Stellar structure, energy sources and compositions. Interstellar gas and dust, its temperature, density, and interactions with stars. Star clusters, the galaxy, external galaxies, and cosmology. Prerequisite, Physics 322 or 325.

ASTR 499 Undergraduate Research (*, max. 15) AWSp
Current or special astronomical problems. Prerequisite, permission.

Courses for Graduates Only
ASTR 500 Seminar in Elementary Astronomy (1)
Seminar in the preparation of lecture and workshop materials with emphasis on demonstration and visual aids, and on evaluation of students' progress.

ASTR 501 Solar System Astrophysics (3)

ASTR 502 Seminar in Solar System Problems (2)
Origin of the solar system, as inferred from its dynamical, astrophysical, and chemical properties. Emphasis on current research. Prerequisite, modern physics.

ASTR 503 Seminar in Planetary Atmospheres (2)

ASTR 507 Physical Foundations of Astrophysics I (3)
Survey of thermodynamics from 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 magneto-hydrodynamics, basic theorems and application to stellar and interstellar magnetic fields. Introduction to plasma physics, waves in a plasma, kinetic theory and transport phenomena in astrophysics. Prerequisite, Physics 413 or equivalent.

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


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

ASTR 523 Solar Physics (3) Sp Sun as a star, solar photosphere and outer convection zone, granulation and related phenomena, solar chromosphere, and corona, solar activity (especially sunspots and solar flares), sun's radio emission, solar-terrestrial relations. 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, Physics 421 or equivalent.

ASTR 532 Stellar Evolution (3) Theoretical and observational approaches to stellar evolution. 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.

ASTR 551 Stellar Dynamics (3) Kinematics and dynamics of stars in clusters and galaxies. Prerequisites, classical mechanics and differential equations.


ASTR 575 Seminar in Astronomy (1-2, max. 20) Discussion of recent research in astronomy and astrophysics. Prerequisite, permission.

ASTR 576 Astronomy Colloquium (1) Current research topics in astronomy and astrophysics. Prerequisite, permission.

ASTR 597 Topics in Observational Astrophysics (1-5)

ASTR 598 Topics in Theoretical Astrophysics (1-5)

ASTR 600 Independent Study or Research (*) A W Sp

ASTR 700 Master's Thesis (*) A W Sp

ASTR 800 Doctoral Dissertation (*) A W Sp

ATM/S 351 Atmospheric Observations and Analysis (5) A Badgley, Houze, Reed, Wallace
Methods of using common meteorological instruments for measuring precipitation, temperature, pressure, humidity, winds, including upper-air observations. Thermodynamic diagrams. Analysis of surface and upper-level charts and vertical cross sections. Prerequisites, one year of calculus and general physics.

ATM/S 390H 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, Mathematics 224, Physics 123.

ATM/S 406 Geophysics: The Atmosphere (3) Sp Structure and composition of the atmosphere, atmospheric radiation, use of meteorological data, humidity and cloud processes, structure and dynamics of large-scale weather systems. Offered jointly with the Geophysics Group as Geophysics 406. Prerequisite, 404 or permission.

ATM/S 431 Atmospheric Physics (5) A Hobbs
Clothion to cloud and precipitation processes with emphasis on the microphysics. Solar and terrestrial radiation, transfer processes and applications. Prerequisites, 340 or Physics 222, and Mathematics 327 or equivalent.

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

ATM/S 435 Introduction to Cloud Processes (3) W Hobbs

ATM/S 441, 442 Atmospheric Motions (5,5) A, W Holton, Reed, Wallace
441: preliminary mathematics, vector operations, fundamental equations, simplification of equations, circulation and vorticity, the role of friction. Prerequisites, 340 or Mathematics 327, 442: numerical weather prediction, barotropic and baroclinic wave theory, the general circulation. Both courses include laboratory exercises. Prerequisite, 441 for 442.

ATM/S 450 Atmospheric Data Analysis (5) W Reed, Wallace
Statistical and other methods employed in atmospheric data analysis. Frequency distributions, sampling theory, linear correlation, el-
mentary time-series analysis, objective map analysis. Prerequisites, 351, Engineering 141, or equivalent.

**ATMS S**
452 Forecasting Laboratory (5) Sp
Houze, Reed, Wallace


**ATMS S**
462 Sea-Air Transfer Processes (6) S
Badgley

Classroom and field observations relating to the physical processes occurring at ocean-atmosphere boundary. Transfer of energy, momentum, and moisture and their effects on small-scale and large-scale phenomena, including fog formation, convection, modification of air masses. Prerequisite, 442 or permission.

**ATMS S**
492 Readings in Meteorology or Climatology (*) A WSp
Prerequisite, permission.

**ATMS S**
493 Special Problems in Meteorology or Climatology (*) A WSp
Prerequisite, permission.

**Courses for Graduates Only**

**ATMS S**
501 Fundamentals of Physical and Synoptic Meteorology (6) A
Hobbs, Wallace


**ATMS S**
510 Physics of Ice and Snow (3) A
Hobbs

Structure of the water molecule. Crystallographic structures of ice. Electrical, optical, thermal, and mechanical properties of ice. Growth of ice from the vapor and liquid phases. Physical properties of snow. Offered jointly with the Geophysics Group as Geophysics 510. Prerequisite, permission.

**ATMS S**
511 Glaciology I: Formation of Snow and Ice Masse (3) W
Raymond, Untersteiner

Snow climatology. Transport of snow by wind. Transfer of radiative, sensible, and latent heat at the surface of snow and ice. Freezing of natural water bodies. Heat and mass budget of ice masses. Theories of ice ages. Offered jointly with the Geophysics Group as Geophysics 511. Prerequisite, 510 or permission.

**ATMS S**
512 Glaciology II: Dynamic Glaciology (3) Sp
Raymond, Untersteiner


**ATMS S**
513 Glaciology III: Structural Glaciology (3) A
Raymond, Untersteiner

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 relationship between structures and bulk physical properties. Offered jointly with the Geophysics Group as Geophysics 513. Prerequisites, 510, 511, 512, or permission.

**ATMS S**
514 Field Glaciology (6) Sp
LaChapelle


**ATMS S**
521 Seminar in Atmospheric Dynamics (*) A WSp
Holton

Directed at current research in the subject. For advanced students. Prerequisite, permission.

**ATMS S**
523 Seminar in Cloud Physics (*) A WSp
Hobbs

See 521 for course description.

**ATMS S**
524 Seminar in Energy Transfer (*) A WSp
Buisinger

See 521 for course description.

**ATMS S**
525 Seminar in Atmospheric Problems Associated With Air Pollution (2) W
Badgley, Charlton, Harrison

Seminar for both engineers and atmospheric scientists in the atmospheric problems related to air pollution. A wide variety of topics is covered. Offered jointly with the Department of Civil Engineering as CEWA 525. Prerequisite, 301 or permission.

**ATMS S**
526 Seminar in Glaciology (*) A WSp
Untersteiner

See 521 for course description.

**ATMS S**
531 Structure of the Upper Atmosphere (3) A
Leovy

Structure, composition, and dominant physical and photochemical processes. Sound propagation, aurora, air glow, ionosphere, and Van Allen belts. Role of the sun, planetary atmospheres. Offered jointly with the Geophysics Group as Geophysics 531. Prerequisites, Mathematics 238 and Physics 320, or permission.

**ATMS S**
533 Atmospheric Radiation (3) Sp
Leovy

Solar spectrum. Atmospheric scattering, spectra of water vapor and other gases. Albedo of earth and atmosphere. Radiative heat balance. Prerequisites, Physics 320 and Mathematics 238. (Offered alternate years; offered 1974-75.)
Biology

Biology

The courses in biology listed below are administered by several departments. Other courses in biology are listed under such headings as Biochemistry, Biological Structure, Botany, Genetics, Microbiology, and Zoology.

Courses for Undergraduates

Biol 100 Introductory Biology (5) AWSpS
Introduction to biological principles and concepts, and the application of biological knowledge to problems of man and society; development of an awareness to science as process. Offered principally by the departments of Botany, Genetics, and Zoology. Emphasis is determined by staff member offering course.

Biol 101-102 General Biology (5-5) A,W
Fernald, Kruckeberg, Meese, Orians, Osterud
Principles of living systems as viewed at levels from the subcellular to the community. Emphasis on structural and functional analysis of biological organization—its adaptability, its genetic diversity, its energetics—leading to an evolutionary synthesis. The position of man in the biological world. For nonmajors and teaching majors in biology. Credit is not given for 101-102 if any two of the following courses, or their equivalents, have previously been taken: Zoology 111-112; Botany 111, 112.

Biol 103 Introduction to Biology (5) ASp
Fernard
Introduction to basic biological concepts within the context of human biology. Primarily for students in the Educational Opportunity Program. Prerequisite, permission.

Biol 104 Biology for Elementary School Teachers (5) WSp
Fernard
Laboratory-based course dealing with basic concepts of biology. Emphasis on background needed for confident use of new science curriculum materials in the elementary school. Prerequisite, permission.

Biol 210, 211, 212 Introductory Biology (5,5,5) AW,WSp,Sp
Whiteley
Introduction to the phenomena of life for students intending to go on to more advanced biology courses and into preprofessional programs. Emphasis is placed on features common to all living things: molecular and subcellular phenomena; cellular structure, metabolism and energetics; genetic regulation of development; the nature, functional properties, and evolution of plant and animal organisms and groups of organisms. Organic chemistry should be taken concurrently. Prerequisite, one year of college chemistry or permission.

Biol 401 Cell Biology (3)
Whiteley
Structure and function of the cell. Prerequisites, Zoology 301, Genetics 451, or permission.

Biol 402 Cell Biology Laboratory (2)
Whiteley
Prerequisites, 401, which must be taken concurrently, and permission.

Biol 454 Evolutionary Mechanisms (3)
Kruckeberg
Evolutionary change as determined by mutation, recombination, and selection. Effects of the genetic system, isolating mechanisms, hybridization, and polyplody on speciation. Examples of microevolutionary and megaevolutionary changes from plant and animal kingdoms. For advanced undergraduate and graduate students in the biological sciences. Prerequisite, Genetics 451 or equivalent. (Offered alternate years; offered 1974-75.)

Biol 472 Principles of Ecology (3)
Del Moral, Edmondson, Orians
Population biology, interactions between organisms in biological communities, relationship of community to environment, principles of natural selection. Prerequisites, 15 credits in biological sciences and upper-division standing, or permission.

Biol 473 Limnology (3)
Edmondson
Biological, physical, and chemical features of lakes and other inland waters. Prerequisites, 15 credits in biological sciences, 10 credits in college chemistry, and upper-division standing.

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Biol 474 Ecology Laboratory (3)
Edmondson
Prerequisites, 472 and permission. Students may be required to share a portion of the transportation costs of field trips.

Biol 475 Limnology Laboratory (2)
Edmondson
Examination of biota of fresh waters, survey of limnological methods, and analysis of data. Prerequisites, 473 and permission.

Courses for Graduates Only

Biol 501 Advanced Cytology (5)
Detailed study of the structure and function of the cell. Prerequisite, permission.

Biol 508 Cellular Physiology (3)
Whiteley
The cell membrane and permeability, cytoplasmic physiology, intracellular energetics and biosynthesis, physiology of cell division, cell motility. (Biology 508 and 509 may be elected separately, or in either sequence.) Prerequisite, 401 or permission.

Biol 509 Cellular Physiology (3)
Whiteley
Chemistry and physiology of the interkinetic and dividing nucleus, nucleoplasmic interactions, physiology of differentiated cells. (Biology 508 and 509 may be elected separately, or in either sequence.) Prerequisite, permission.

Biol 510 Cellular Physiology Laboratory (2)
Whiteley
Prerequisites, concurrent registration in 508 or 509, and permission.

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.

Biol 575 Topics in Physical and Chemical Limnology (3) W
Staiver
Current limnological problems; among others, the sulfur, carbon, and nitrogen cycles, sedimentation rates, and temperature determinations. Some emphasis on the use of isotopes. Prerequisite, 473 or permission.

Biol 586 Analysis of Development (3) A
Analysis of structural, physiological, and molecular levels of developmental processes including gametogenesis, fertilization, cell and tissue movements, induction, and cytodifferentiation. Prerequisites, Zoology 456 and Biochemistry 442, or permission.

Biol 587 Analysis of Development Laboratory (1-5, max. 5) WSp
Series of intensive workshops in developmental biology, each extending over seven to ten days. Each is based on problems under study in the laboratory of the instructors in-
ARTS AND SCIENCES

volved, using materials, methods, and approaches characteristic of that laboratory. Prerequisites, 586 and permission.

BOTANY

Courses for Undergraduates

Students may be required to pay part of the transportation costs of field trips for the following courses: 113, 313, 333, 421, 445, 446, 447, 451, 454, 551, 462, 464.

BOT

110 Plants in Man's Environment (5) AWSpS
Babler, Stuntz, Walker
Basic course on plants, emphasizing the diversity of organisms, the economic importance of plants, and the function of plants in vegetation systems and human communities. For nonmajors.

BOT

113 Elementary Plant Classification (5) Sp
Denton
Introduction to plant classification; field study and laboratory identification of the common plant families and the conspicuous flora of western and central Washington. Two full-day field trips required of all students.

BOT

220 The Plant Kingdom (5) WSp
Babler, Haskins, Waaland
Introduction to the major groups of the plant kingdom. Structure and reproduction and the theories of evolutionary relationships of the phyla are considered. Prerequisites, Biology 101-102 or equivalent.

BOT

301 Plant Propagation (2) AWSp
Nishitani
Practical course in methods of plant propagation by seeds, cuttings, building, layering, bulbs, divisions, and other special structures. Includes consideration of care and handling of plants in the home, garden, and greenhouse. Not open to students who have taken 201, 202, 203. Prerequisites, Biology 101-102 or equivalent.

BOT

313 Introductory Taxonomy (5) A
Principles of classification; rules of nomenclature; botanical exploration (western North America). Field and laboratory study of Washington flora, concentrating on largest and most important groups, especially grasses, and the sunflower family. Not open to students who have taken 113. Prerequisites, 10 credits in biological science or junior standing, and permission. (Offered on demand.)

BOT

331 Ornamental Plants (3) Sp
Krukeberg
Identification, recognition, and use of cultivated trees and shrubs. Emphasis on landscape 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 (5) W
Del Moral, Taskada
Patterns of world vegetation distributions; the relationships between vegetation and climate; introduction to general theories of plant distribution. Emphasis on the affinities between vegetation in different parts of the world.

BOT

360 General Mycology (5) W
Stuntz, Whiler
General survey of the fungi with emphasis on life cycles, structure, physiology, economic importance. Prerequisite, 10 credits in biological science or permission.

BOT

371 Elementary Plant Physiology (5) WSp
Bendich, Cleland, Halperin, Meeuse, Walker
Study of nutrition, assimilation, transport, growth, photosynthesis, and cellular respiration in plants, with the aid of simple physical and chemical principles. For nonmajors. Prerequisites, Biology 212 or 101-102, and Chemistry 102, or permission.

BOT

421 Bryology (3)
Taxonomy of the 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

433 Advanced Systematics (5) A
Denton
Taxonomic theory and practice; nomenclature; classification systems, historical and modern; individual project required. Prerequisites, 113 and permission. (Offered alternate years; offered 1975-76.)

BOT

434 Advanced Systematics (5) W
Denton
Taxonomic theory and practice; nomenclature; classification systems, historical and modern; individual project required. Prerequisites, 113 and permission. (Offered alternate years; offered 1975-76.)

BOT

443 Freshwater Algae (5) A
Morphology, life histories, systematics, and ecology of freshwater algae, with emphasis on the local flora. Opportunities provided for students to learn basic cytological, morphological, and physiological characteristics of the freshwater algae. Studies are made on algae collected in the field and on specimens grown in laboratory culture. Students are given the opportunity to isolate and grow laboratory cultures of certain local algae. Prerequisite, 220 or permission. (Offered alternate years; offered 1974-75.)

BOT

444 Plant Anatomy (5) A
Babler
Study of the origin and differentiation of tissue systems; practice in interpretation of histology of plant materials. Prerequisite, Biology 101-102 or 212. (Offered alternate years; offered 1974-75.)

BOT

445 Marine Botany (7) A WSp
Norris
Survey of groups of plants that are represented in marine environments; natural history, ecology, distribution, habitat, adaptation, trophic interrelationships, including symbiotic associations, of local marine plants. Offered at Friday Harbor Laboratories. Prerequisites, appropriate credits in biological sciences, concurrent registration in Zoology 430, and permission.

BOT

446 Algology (5) Sp
Waaland
Examination of algal phyla from the viewpoint of morphological and physiological characteristics important to their systematics. Points emphasized are: phylogeny of various lines of evolution in algae, relationships between algae and other parts of plant and animal kingdoms, algal geography and species of economic importance. Prerequisite, 220 or 311, or 20 credits in biology.

BOT

447 Phytoplankton Morphology and Taxonomy (5) A
Advanced discussion of phytoplankton morphology with emphasis on characteristics important to their taxonomy. Emphasis placed on cytology of the organisms, their life histories, adaptive morphological characteristics, and isolation and culture of phytoplankton organisms. Prerequisite, 445 or 446, or permission. (Offered alternate years; offered 1975-76.)

BOT

450 Marine Algal Ecology (5) A
Waaland
The marine environment in relation to the distribution of marine algae, zonation of benthic algae, interactions of algae and animals and the biological basis for phycogeography. Prerequisite, 445 or 446, or permission. (Offered alternate years; offered 1975-76.)

BOT

448 Terrestrial Plant Ecology (3) Sp
Del Moral
Relationships of populations to their environment; interactions between plants; theories of vegetation. Prerequisite, 10 credits in biological science.

BOT

451 Plant Ecology Laboratory (2) Sp
Del Moral
Laboratory, greenhouse, and field study; reports on original observations are required. Prerequisite, concurrent registration in 450.

BOT

454 Palynology and Quaternary Phytoogeography (5) A
Taskada
Study of former vegetation and environments by relating the fossil pollen record to ecological principles; fundamentals and applications of pollen-spore morphology and pollen analysis through lectures and practical experiences in the laboratory and field. Two full-day (Friday and Saturday) field trips required of all students. Prerequisite, 113 or 313, Biology 472, or permission.

BOT

462 Basidiomycetes (5) A
Stuntz
Structure and classification of the basidiomycetes. Prerequisite, 360 or permission.
Courses for Graduates Only

BOT 501 Tutorial in Botany (2-5, max. 10) AWSp
Small-group study and discussion, as a tutorial, 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.

BOT 520 Seminar (1) AWSp
Prerequisite, permission.

BOT 521 Topics in Plant Physiology (2, max. 10) AWSp
Bendich, Cleland, Halperin, Meese, Walker
Modern trends and methods in plant physiology. Prerequisite, permission.

BOT 522 Seminar in Morphology and Taxonomy (2, max. 10) AWSp
Blaser, Denton, Kruckeberg
Current research and trends in morphology and taxonomy of higher plants. Comparison of classical with modern approaches and concepts. Prerequisite, permission.

BOT 523 Selected Topics in Mycology (2, max. 10) AWSp
Stuntz, Whisler
Selected topics from all phases of mycology. Prerequisite, permission.

BOT 524 Topics in Algology (2, max. 10) AWSp
Norris, WAland
Selected topics from all phases of algology. Prerequisite, permission.

BOT 525 Topics in Plant Ecology (2, max. 10) AWSp
Del Moral, Tsukada
Selected topics from various phases of plant ecology. Prerequisite, permission.

BOT 526 Topics in Palynology (2, max. 6) AWSp
Tsukada
Discussion and review of literature in pollen structure, deposition in sediments, and paleoecology. Prerequisite, permission.

BOT 545 Marine Algology (6) S
Norris, WAland
Morphology, life histories, systematics, and ecology of marine algae, with emphasis on the local flora. Opportunities provided for students to learn basic morphological and physiological characteristics of marine algal phyla and to apply this knowledge in studying in the field and laboratory cultures. Prerequisite, 220 or permission. Consult Friday Harbor Laboratories bulletin for the year offered.

BOT 549 Advanced Algology (6) S
Norris, WAland
Very rich and varied marine algal flora of the region are studied, with emphasis on the experimental approach to ecological, developmental, physiological, and systematics problems, using local species. Opportunities for developing individual research problems. Offered at Friday Harbor Laboratories. Prerequisite, 545 or equivalent.

BOT 551 Field Ecology (3) Sp
Del Moral
Field studies of ecological processes and emergent ecosystem properties. Emphasis is on the significance of changes that occur during ecosystem development. Current ecological dogma tested under field conditions. Prerequisite, 450, which may be taken concurrently, or any ecology course beyond Biology 472; qualified seniors admitted by permission and petition to the Graduate School. (Offered alternate years; offered 1975-76.)

BOT 555 Marine Mycology (6) S
Whisler
Taxonomy and morphology of aquatic fungi with emphasis on marine forms, collection, and culture methods. Prerequisite, 220 or 360 or 20 credits in biology. Consult Friday Harbor Laboratories bulletin for the year offered.

BOT 570 Plant Metabolism (3) W
Meese
Metabolism of organic compounds, with emphasis on photosynthesis and cellular respiration. Prerequisites, 472, and Chemistry 232 or equivalent, and permission. (Offered alternate years; offered 1974-75.)

BOT 571 Plant Metabolism Laboratory (2) W
Meese
Prerequisite, concurrent registration in 570.

BOT 572 Water Relations (3) Sp
Walker
Permeability and water relationships, with special emphasis on influences affecting behavior of plants in the field. (Offered alternate years; offered 1975-76.)

BOT 573 Water Relations Laboratory (2) Sp
Walker
Prerequisite, concurrent registration in 572. (Offered alternate years; offered 1975-76.)

BOT 575 Problems in Algal Physiology (6) S
Metabolic activity of the algae. Prerequisites, 472 or 371, Chemistry 232, and permission. Consult Friday Harbor Laboratories bulletin for the year offered.
ARTS AND SCIENCES

BOT
577 Plant Growth and Development (3) Sp
Cleland
Control of growth, development, and differentiation in higher plants. Prerequisite, 472 or permission. (Offered alternate years; offered 1974-75.)

BOT
578 Plant Growth and Development Laboratory (2) Sp
Cleland
Experimental methods for studying plant growth and development. Must be accompanied by 577.

BOT
579 Environmental Control of Plant Growth and Development (3) W
Cleland
Effects of environment, light, temperature extremes, and water stress on the growth, development, and metabolism of plants. Prerequisite, 371 or 472. (Offered alternate years; offered 1975-76.)

BOT
600 Independent Study or Research (*)
AWSp

BOT
700 Master's Thesis (*)
AWSp

BOT
800 Doctoral Dissertation (*)

CHEMISTRY

Courses for Undergraduates

CHEM
100 Chemical Science (5) SpSp
Terminal survey course for nonscience majors. Not to be considered as a 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) AWSpSp
For nonscience and nonengineering majors who plan to terminate their study of chemistry with 101 or 102. Molecular theory, quantitative relationships in chemical processes, solutions, ionic equilibria, acids, bases, and salts. Chemistry of common metals and nonmetals. Students with strong high school background in chemistry are urged to take an exemption examination (consult Educational Assessment Center).

CHEM
102 General and Organic Chemistry (5) AWSpSp
Organic compounds; hydrocarbons, alcohols, aldehydes, ketones, ethers, acids, aromatics, fats and oils, proteins, and carbohydrates. Students who plan to take 231 should not take 102. Prerequisite, 101 or qualifying examination.

CHEM
105 Introduction to General Chemistry (3) A
For students without a full year of high school chemistry who plan to take 140 or 145. Basic introduction to chemistry for physical science, biological science, premedical, engineering majors who intend to take a year or more of college chemistry. Emphasis on quantitative reasoning. For students with high school chemistry, not more than 5 credits allowed from among 105, 101, and 140 or 145. (Last time offered: Summer Quarter 1975.)

CHEM
140 General Chemistry (4) AWSpSp
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 or Chemistry 101 or 105 and qualification for Mathematics 105.

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

CHEM
147H General Chemistry Honors Laboratory (3) W
Introduction to quantitative chemistry. Prerequisite, 150 or 155 concurrently and permission. 147H and 157H replace 151 and 221 in chemistry degree requirements.

CHEM
150 General Chemistry (4) AWSpSp
Continuation of 140. Prerequisite, 140 or 145.

CHEM
151 General Chemistry Laboratory (2) AWSp
Experiments illustrating quantitative relationships in chemistry. Prerequisite, concurrent registration in, or prior completion of, 150 or 155.

CHEM
155 General Chemistry (4) W
To follow 145. Parallels 150. Prerequisite, 145.

CHEM
157H General Chemistry Honors Laboratory (3) Sp
To follow 147H. Prerequisite, 147H.

CHEM
160 General Chemistry (6) AWSpSp
The chemistry of representative elements, metals, and nonmetals. Introduction to organic and nuclear chemistry. Prerequisite, 150 or 155.

CHEM
167H Honors—General Chemistry (4)
Elementary physical, quantitative, and qualitative chemistry with laboratory emphasis. Prerequisite, 157H.

CHEM
170 Qualitative Analysis (3) SpSp
Semimicroqualitative analysis for common cations and anions; separation and identification procedures. Prerequisites, 151 and 160 (170 may be taken concurrently if 160).}

CHEM
196, 196H Tutorial Study (1, max. 3)
For chemistry majors only. Discussion in small groups of aspects of chemistry of current interest to undergraduates. Prerequisites, permission of chemistry adviser and grade-point average of 3.00 for freshmen, 2.50 for sophomores. Not to be taken concurrently with 199.

CHEM
199, 199H Special Problems (1, max. 6)
AWSp
Problems relating to experimental chemistry. For chemistry majors only. Prerequisites, permission of chemistry adviser and a chemistry grade-point average above 3.00.

CHEM
221 Quantitative Analysis (5) AWSpSp
Volumetric and gravimetric. Prerequisites, 150 or 155, and 151 or strong high school laboratory preparation. Not intended for students who have completed 157H.

CHEM
231 Organic Chemistry (3) AWSpSp
For students planning two or three quarters of organic chemistry. Structure, nomenclature, reactions, and synthesis of the main types of organic compounds. Prerequisite, 150 or 155.

CHEM
232 Organic Chemistry (3) AWSpSp
Continuation of 231 for students planning only two quarters of organic chemistry. Prerequisite, 231.

CHEM
235 Organic Chemistry (3) WSpSp
Continuation of 231 for those desiring three quarters of organic chemistry. Further discussion of transformations of organic molecules, especially aromatic systems. Prerequisite, 231.

CHEM
236 Organic Chemistry (3) ASpSp
Continuation of 235 for those desiring three quarters of organic chemistry. Consideration of polynuclear compounds and natural products. Study of sugars, amino acids, and heterocycles. Prerequisite, 235.

CHEM
241 Organic Chemistry Laboratory (2)
AWSpSp
Usually to accompany 231. Preparation of representative compounds. Prerequisites, 231, which may be taken concurrently, and one laboratory course in chemistry.

CHEM
242 Organic Chemistry Laboratory (2)
AWSpSp
Usually to accompany 232 or 236. Preparations and qualitative organic analysis. Prerequisites, 232 or 235, which may be taken concurrently, and 241.

CHEM
336H 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 mechanism of organic reactions. Prerequisite, 160 or 155.

CHEM
336H Honors—Organic Chemistry (4) W
Continuation of 335H. Prerequisite, 335H.

CHEM
337H Honors—Organic Chemistry (4) Sp
Continuation of 336H. Prerequisite, 336H.

CHEM
346H Organic Chemistry Honors Laboratory (2) W
Usually to accompany 336H. Prerequisite, 336H, which may be taken concurrently.

CHEM
347H Organic and Qualitative Organic Honors Laboratory (2) Sp
Continuation of 346H. Usually to accompany...
CHEM 350 Elementary Physical Chemistry (3) WS
Survey of some major topics in physical chemistry. Prerequisites, two quarters of chemistry, Physics 116, and Mathematics 125 or 157.

CHEM 351 Elementary Physical Chemistry (3) SpS
Continuation of 350. Prerequisite, 350.

CHEM 401 Principles of Chemistry (3, max. 6) S
Primarily for high school teachers. Principles of chemistry, atomic and molecular nature of matter, periodic system, stoichiometry, chemical reactions, modern terminology and nomenclature.

CHEM 402 Techniques of Chemistry (2 credits in a given quarter or 3 credits in a given quarter) S
Primarily for high school teachers. Discussion and demonstration of fundamental techniques, determination of composition and structure, analysis and synthesis, separation and purification processes, electrochemical processes, use of stable and radioactive isotopes.

CHEM 410, 410H Radiochemical Techniques and Radioactivity Measurements (3) Sp
Introductory general service course for students planning further work in nuclear or tracer applications. Safety procedures, detection and measurement of nuclear radiations, radiochemical and tracer techniques. Prerequisites, 150 or 155, Mathematics 124 and Physics 116, or permission.

CHEM 414 Chemistry of the Main Group Elements (3) A
The elements and their compounds in relation to the periodic system. Prerequisite, senior standing; 351 or 457 recommended.

CHEM 415 The Chemical Bond (3) W
The nature of the chemical bond. Prerequisite, 455.

CHEM 416 Chemistry of the Transition Metal Elements (3) W
Prerequisite, senior standing; 457 or 351 recommended.

CHEM 418 Radiochemistry (3) W
Natural radioactivity, nuclear systems and reactions, radioactive decay processes, decay laws, statistical considerations, applications of radioactivity. Prerequisite, 455 or permission.

CHEM 426 Instrumental Analysis (3) Sp
Introduction to electrical and optical methods of analysis. Prerequisite, 221 or 157H.

CHEM 427 Advanced Quantitative Theory (3) A
Principles of analytical chemistry. Prerequisites, 221 or 157H, 232 or 236 or 337, and 457, or permission.

CHEM 455, 455H Physical Chemistry (3) AWS
Introduction to quantum chemistry, statistical mechanics, kinetic theory of gases. Prerequisites, 150 or 155, Mathematics 126, and college physics.

CHEM 456, 456H Physical Chemistry (3) AWS
Thermodynamics, phase equilibria, colligative properties of solutions, electrolytes, and electrochemistry. Prerequisites, 150 or 155, Mathematics 126, and college physics.

CHEM 457, 457H Physical Chemistry (3) Sp
Chemical kinetics, transport properties, molecular structure, the solid state, surfaces, and macromolecules. Prerequisites, 455 and 456.

CHEM 460 Physical Measurements in Chemistry (4) Asp
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, which may be taken concurrently, or permission.

CHEM 461 Physical Chemistry Laboratory (2-3) AWSp
Physical measurements in chemistry. Vacuum and high-temperature techniques, calorimetry, spectroscopic methods, electrical measurements. Prerequisites, 455, 457 or 351, or permission; 460 is recommended.

CHEM 462 Techniques of Synthetic Chemistry (2-3) Asp
Techniques of synthetic chemistry with examples from organic, inorganic, and biological chemistry. Vacuum line synthesis, low- and high-temperature techniques, high-pressure syntheses, photochemical reactions, radiochemical synthesis, gas phase reactions, etc. Chromatography and separation techniques. Prerequisite, 347H or 242, or permission.

CHEM 463 Separations and Analysis (2-3) AWSp
Techniques of spectroscopic analysis of structure, UV, IR, NMR, mass spectroscopy. Prerequisite, 460, which may be taken concurrently.

CHEM 498 Teaching Experience in Chemistry (1, max. 6) AWSp
Students are trained as assistants in laboratories and quiz sections. For chemistry majors, especially those planning graduate work. Prerequisites, permission, grade-point average above 3.00, and upper-division standing.

CHEM 499, 499H Undergraduate Research (*, max. 12) AWSp
For qualified chemistry majors in the bachelor of science curriculum, especially those planning graduate work. Prerequisites, permission and grade-point average above 3.00 in chemistry.

Courses for Graduates Only

CHEM 508 Advanced Inorganic Chemistry (3) Sp
Discussion of selected applications of nuclear magnetic resonance spectrometry, electronic, infrared, and Raman spectroscopy, magnetic-susceptibility measurements, Mössbauer spectrometry and isotope replacement studies in the understanding of structure and bonding in inorganic compounds.

CHEM 510 Current Problems in Inorganic and Nuclear Chemistry (2, max. 12) Sp
For doctoral candidates in inorganic chemistry. Current topics, e.g., acid-base theory; halogens; hydrides; groups III and IV; interstitial, chemical and high-temperature chemistry; inorganic free radicals.

CHEM 513 Advanced Nuclear Chemistry (2, max. 6) A
Nuclear reactions, fission, complex radioactive decay, low-level techniques, geochemistry, cosmochemistry, chemistry of the synthetic elements. Prerequisite, 418 or permission.

CHEM 520 Current Problems in Analytical Chemistry (2, max. 12) AWSp
For doctoral candidates in analytical chemistry. Current topics, e.g., electrochemistry, trace analysis, methods of data treatment, analytical instrumentation theory.

CHEM 526 Advanced Instrumental Analysis (3) Sp
Absorption and emission spectroscopy, polarography, potentiometry, and dielectric properties as applied to problems in analytical chemistry. Prerequisite, 426 or permission. (Offered alternate years; not offered 1974-75.)

CHEM 530 Advanced Organic Chemistry (3) A
Electronic mechanisms in organic chemistry. An introduction to the theory of organic reactions. Prerequisite, 337 or equivalent.

CHEM 531 Advanced Organic Chemistry (3) W
Discussion of the principal reactions of synthetic organic chemistry, with emphasis on practical methods. Transformation of functional groups. Prerequisite, 530 or permission.

CHEM 532 Advanced Organic Chemistry (3) Sp
Kinetics and equilibria as related to the mechanisms of organic reactions. Absolute rate theory; stereochemistry and the stereic course of reactions. Prerequisite, 531 or permission.

CHEM 540 Current Problems in Organic Chemistry (3, max. 16) AWSp
For doctoral candidates in organic chemistry. Discussions of topics of current interest and importance. See the department for instructor and topic during any particular quarter.

CHEM 550 Introduction to Quantum Chemistry (3) A
Origins and basic postulates of quantum mechanics; solutions to single particle problems; angular momentum and hydrogenic wave functions; matrix methods; perturbation theory; variational methods. Prerequisite, 455 or permission.

CHEM 551 Introduction to Quantum Chemistry (3) Sp
Electronic structure of many electron atoms and molecules; vibration and rotation levels of molecules; effects of particle exchange;
angular momentum and group theory; spectroscopic selection rules. Prerequisite, 550 or permission.

CHEM
552, 553 Statistical Mechanics (3,3) W,Sp 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 Modern experimental methods and fundamental theories of reaction rates. Role of vibrational excitation in unimolecular and biomolecular reactions. Energy transfer. Nonequilibrium systems and microscopic rate parameters. Prerequisite, 457 or 552, or permission.

CHEM
560 Current Problems in Physical Chemistry (3, max. 18) ASp For doctoral candidates in physical chemistry. A discussion of topics selected from active research fields. See the department for instructor and the topic during any particular quarter.

CHEM
581 Topics in Inorganic Chemistry (3, max. 18) AWSp Open only to students accepted for doctoral work in chemistry.

CHEM
583 Topics in Analytical Chemistry (3, max. 18) AWSp Open only to students accepted for doctoral work in chemistry.

CHEM
585 Topics in Organic Chemistry (3, max. 18) AWSp Open only to students accepted for doctoral work in chemistry.

CHEM
590 Seminar in General Chemistry (1, max. 18) AWSp

CHEM
591 Seminar in Inorganic Chemistry (1, max. 18) AWSp

CHEM
592 Seminar in Analytical Chemistry (1, max. 18) AWSp

CHEM
593 Seminar in Organic Chemistry (1, max. 18) AWSp

CHEM
594 Seminar in X-Ray Crystallography (1, max. 18) AWSp

CHEM
595 Seminar in Physical Chemistry (1, max. 18) AWSp

CHEM
600 Independent Study or Research (*) AWSp

CHEM
700 Master's Thesis (*) AWSp

CHEM
800 Doctoral Dissertation (*)

CLASSICS
Courses for Undergraduates

GREEK

GRK
101, 102, 103 Elementary Greek (5,5,5) A,WSp
101, 102: an intensive study of grammar, with reading and writing of simple Attic prose: 103: reading of selections from classical Greek literature.

GRK
201, 202 Attic Prose (3,3) A,W Selections from Attic prose, including Plato's Republic, Book I, Plato's Apology, and the orations of Lysias. Prerequisites, 103 for 201; 201 for 202.

GRK
203 Homer (3) Sp Selections from the Iliad or Odyssey. Prerequisite, 202.

GRK
207, 208 Grammar and Composition (2,2) A,W Systematic review of grammatical principles; exercises in prose composition. To be taken concurrently with 201 and 202.

GRK
209 Survey of Greek Literature (2) Sp Brief history of Greek literature, with an introduction to the materials and methods of classical scholarship. Prerequisite, 202.

GRK
300, 301 Greek Language, Accelerated (3,3) A,W Intensive introduction to Attic Greek. Not accepted as upper-division credit toward a major in Greek or Classics. Prerequisites, for 300, junior standing and permission; 300 for 301.

GRK
310, 311, 312 Advanced Grammar and Composition (1,1,1) A,WSp Prerequisite, 208.

GRK
401-402-403 Elementary Modern Greek (5-5-5) S
  Edmonson
Introduction to spoken modern Greek, with emphasis on conversational skills. The conventions of the vulgar written idiom are included with exercises in reading contemporary writers of demotic Greek. The conventions and antecedents of the artificial literary language (Katharevousa) are introduced but not explored in depth. Prerequisite, advanced standing.

GRK
413 The Pre-Socratic Philosophers (3) A
  McDaid
(Offered alternate years; offered 1974-75.)

GRK
414 Plato (3) W
  MacKay
(Offered alternate years; offered 1974-75.)

GRK
415 Aristotle (3) Sp
  MacKay
(Offered alternate years; offered 1974-75.)

GRK
422 Herodotus and the Persian Wars (3) A
  Bliquez
(Offered alternate years; offered 1975-76.)

GRK
424 Thucydides and the Peloponnesian War (3) W
  Bliquez
(Offered alternate years; offered 1975-76.)

GRK
426 Attic Orators (3) Sp
  Bliquez
(Offered alternate years; offered 1975-76.)

GRK
442, 443, 444 Greek Drama (3,3,3) A,WSp
  McDaid
(Offered alternate years; offered 1975-76.)

GRK
449 Greek Epic (3) A
  Roth
(Offered alternate years; offered 1974-75.)

GRK
451 Lyric Poetry (3) W
  Grummel
(Offered alternate years; offered 1974-75.)

GRK
453 Pindar: The Epinician Odes (3) Sp
  McDaid
(Offered alternate years; offered 1975-76.)

GRK
490, 490H Supervised Study (*, max. 18) AWSp
Special work in literary and philosophical texts for graduates and undergraduates.

GRK
499 Undergraduate Research (*, max. 18) AWSp

LATIN

LAT
101, 102, 103 Elementary Latin (5,5,5) A,WSp
  Grummel
101, 102: an intensive study of grammar, with reading and writing of simple Latin prose; 103: reading of selections from classical Latin literature.

LAT
201 Intermediate Latin: Introduction to Latin Literature (3) A
  Pascal
Readings in prose and poetry from various Latin authors. Prerequisite, two years of high school Latin or 103.

LAT
202 Intermediate Latin: Cicero and Ovid (3) W
  Pascal
Readings from the orations of Cicero and the elegiac verse of Ovid. Prerequisite, 201.
LAT 203 Intermediate Latin: Vergil (3) Sp
Selections from the first six books of the Aeneid. Prerequisite, 202.

LAT 206, 207, 208 Grammar and Composition (2,2,2) A,W,Sp
Systematic review of Latin vocabulary, forms, and grammatical principles; exercises in prose composition. To be taken concurrently with 201, 202, and 203. Prerequisites, two years of high school Latin or 103; 206 for 207; 207 for 208.

LAT 300, 301 Latin Language, Accelerated (3,3) A,W
Intensive introduction to classical Latin. Not accepted as upper-division credit toward a major in Latin or Classics. Prerequisites, for 300, junior standing and permission; 300 for 301.

Survey of Latin literature from its origins to the end of the second century A.D. 305: Republican. 306: Augustan Age. 307: Silver Age. Prerequisite, four years of high school Latin or 201.

LAT 310, 311, 312 Advanced Grammar and Composition (1,1,1) A,W,Sp
Grammar
Prerequisite, 208.

LAT 401 Medieval Latin (3) Sp
Pascal
Prerequisite, permission.

LAT 412 Lucanetus (3) A
Grammel
(offers alternate years; offered 1975-76.)

LAT 413 Cicero's Philosophical Works (3) W
Grammel
(Offered alternate years; offered 1975-76.)

LAT 414 Seneca (3) Sp
Grammel
(Offered alternate years; offered 1975-76.)

LAT 422 Livy (3) A
Vignoli
(Offered alternate years; offered 1974-75.)

LAT 423 Cicero and Sallust (3) W
(Offered alternate years; offered 1974-75.)

LAT 424 Tacitus (3) Sp
Harmon
(Offered alternate years; offered 1974-75.)

LAT 447 Roman Lyric (3) A
Vignoli
(Offered alternate years; offered 1975-76.)

LAT 449 Roman Elegy (3) W
Harmon
(Offered alternate years; offered 1975-76.)

LAT 451 Roman Satire (3) Sp
Vignoli
(Offered alternate years; offered 1975-76.)

LAT 457 Roman Drama (3) A
Pascal
(Offered alternate years; offered 1974-75.)

LAT 458 Roman Epic (3) W
Grammel
(Offered alternate years; offered 1974-75.)

LAT 459 Roman Pastoral (3) Sp
Grammel
(Offered alternate years; offered 1974-75.)

LAT 475 Improvement of Teaching Latin (3) S
Examination and evaluation of the various methods of teaching Latin; and audiovisual aids; testing materials; textbooks; relation of Latin to other languages; Latin derivatives in English vocabulary. Offered jointly with the College of Education as EDC&I 438.

LAT 476 Caesar for High School Teachers (3) S
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 the College of Education as EDC&I 439.

LAT 490, 490H Supervised Study (*, max. 18) W
Special work in literary and philosophical texts for graduates and undergraduates.

LAT 499 Undergraduate Research (*, max. 18) W

CLASSICS COURSES IN ENGLISH

CLAS 101 Latin and Greek in Current Use (3) A,WSp
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 knowledge of Latin or Greek required.

CLAS 210 Greek and Roman Classics in English (5) A,WSp
Bliquez, Edmonson, Grummel, Harmon, MacKay, McDiarmaid, Pascal, Roth, Vignoli
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,WSp
Bliquez
Study of the civic, religious, and social practices and institutions of everyday Greek and Roman private and public life, including the family, social classes, the courts and legal systems, religion and cult, military service and war, technology and the trades, money and banking, agriculture and rural life. Many lectures illustrated by slides.

CLAS 422 Greek Historians and Philosophers in English (3) Edmonson
Development of Greek historical, ethical, and political thought from mythical 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 Aristotle.

CLAS 426 Greek and Roman Epic in English (3) A Vignoli
Study of the Iliad, the Odyssey, the Aeneid, and selections from other ancient epics.

CLAS 427 Greek and Roman Tragedy In English (3) W
McDiarmaid
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) Sp
Pascal
Readings from the comedies of Aristophanes, Menander, Plautus, and Terence.

CLAS 430 Greek and Roman Mythology (3) A,WSp
Grammel, Harmon, Pascal, Vignoli
Principal myths found in classical and later literature.

CLAS 435 The Ancient Novel (3) Vignoli
Study of the origins, growth, and tradition of the romantic novel in Greek and Latin antiquity.

CLAS 440 Greek and Roman Critics in English (3) Grammel
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 criticism.

CLAS 445 Greek and Roman Religion and Culture (3) A
Harmon
Study of the religious life of the Greeks and the Romans, with emphasis upon cults, festivals, the priesthoods, sacrificial rites, and the ecstatic and mystic movements. Attention is given to personal piety, rituals of purification and healing, pagan regeneration, concepts of life beyond death, magic, astrology, and the conflict of religions in the Roman Empire. Illustrated by slides.

CLASSICAL ARCHAEOLOGY

CL AR 340 Pre-Classical Art and Archaeology (3) A Edmonson
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 the School of Art as ART H 340.

CL AR
341 Greek Art and Archaeology (3) W
Bilquez, Edmonson
Survey of the material remains and the developing styles in sculpture, vase painting, architecture, and the minor arts from the geometric to the Hellenistic periods, illustrated by slides. Principal sites and monuments, as well as techniques and methods of excavation, are examined in an attempt to reconstruct the material culture of antiquity. Offered jointly with the School of Art as ART H 341.

CL AR
342 Roman Art and Archaeology (3) Sp
Pascal, Vignoli
Roman architecture, painting, and sculpture, with emphasis on the innovations of the Romans in these areas, illustrated by slides. Offered jointly with the School of Art as ART H 342.

CL AR
442 Greek and Roman Pottery (3) A
Edmonson
Shapes, fabrics, and decorations from the Neolithic period to the sixth century A.D. Offered jointly with the School of Art as ART H 442. (Offered alternate years; offered 1974-75.)

CL AR
444 Greek and Roman Sculpture (3) W
Edmonson
History and development of Greek sculpture and sculptors, their Roman counterparts, and Roman portrait statues and sarcophagi. Emphasis on Greek sculpture of the fifth century B.C. Offered jointly with the School of Art as ART H 444. (Offered alternate years; offered 1974-75.)

CL AR
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 alternate years; offered 1974-75.)

Courses for Graduates Only

CLASSICS

CLAS
700 Master's Thesis (*)

CLAS
800 Doctoral Dissertation (*)

GREEK

GRK
520 Seminar (3, max. 27) AWSp
Bilquez, Edmonson, MacKay, McDermid, Roth
The courses numbered 580-589 are graduate reading courses. In them, students read extensively in texts appearing on the Ph.D. Greek reading list.

GRK
580 Greek Tragedy (3) A
(Offered alternate years; offered 1974-75.)

GRK
582 Herodotus and Thucydides (3) W
(Offered alternate years; offered 1974-75.)

GRK
584 Plutarch, Xenophon, Demosthenes (3) Sp
(Offered alternate years; offered 1974-75.)

GRK
585 Plato, "Republic" (3) A
(Offered alternate years; offered 1975-76.)

GRK
587 Aristotle, Politics or Ethics (3) W
(Offered alternate years; offered 1975-76.)

GRK
589 Aristophanes (3) Sp
(Offered alternate years; offered 1975-76.)

GRK
590 Supervised Study (*, max. 18) AWSp

GRK
600 Independent Study or Research (*)
AWSp

LATIN

LAT
520 Seminar (3, max. 27) AWSp
Grummel, Harmon, Pascal, Vignoli
The courses numbered 580-589 are graduate reading courses. In them, students read extensively in texts appearing on the Ph.D. Latin reading list.

LAT
580 Roman Rhetoric (3) A
(Offered alternate years; offered 1974-75.)

LAT
582 Augustan Poetry (3) W
(Offered alternate years; offered 1974-75.)

LAT
584 Survey of Latin Poetry (3) Sp
(Offered alternate years; offered 1974-75.)

LAT
585 The Civil Wars: Caesar, Cicero, Lucan (3) A
(Offered alternate years; offered 1975-76.)

LAT
587 Roman Comedy, Menander, and Petronius (3) W
(Offered alternate years; offered 1975-76.)

LAT
589 Prose of the Roman Empire (3) Sp
(Offered alternate years; offered 1975-76.)

LAT
590 Supervised Study (*, max. 18) AWSp

LAT
600 Independent Study or Research (*)
AWSp

CLASSICAL ARCHAEOLOGY

CL AR
511 Mycenaean Archaeology (3) A
Edmonson
The art, architecture, and culture of Greece in the late Bronze Age, with emphasis on recent archaeological and linguistic discoveries. (Offered alternate years; offered 1975-76.)

CL AR
513 Athenian Topography (3) W
Edmonson
Detailed consideration of the topography and monuments of ancient Athens from the beginning through the Roman period. (Offered alternate years; offered 1975-76.)

CL AR
515 Attic Epigraphy (3) Sp
Edmonson
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. (Offered alternate years; offered 1975-76.)

CLASSICAL LINGUISTICS

CL LI
501 Comparative Phonology of Greek and Latin (3)
Phonological developments of Greek and Latin from Indo-European to the classical periods of both languages.

CL LI
503 History of the Greek Language (3)
Roth
Morphological and syntactical development of the Greek language from Homer through the New Testament; the development of prose and poetic style.

CL LI
505 History of the Latin Language (3)
Roth
Morphological and syntactical development of the Latin language; the development of Latin as a literary language.

CL LI
506 Italic Dialects (3)
Roth
Principles and remains of the non-Latin languages and dialects of ancient Italy.

CL LI
508 Greek Dialects (3)
Non-Attic dialects of ancient Greek, based on a study of inscriptions and the literary remains.

CL LI
510 Mycenaean Greek (3)
Study of the Linear-B tablets found in Crete and on the Greek mainland.

COMMUNICATIONS

Courses for Undergraduates

COMMUNICATIONS

CMU
150 The Mass Media (5)
Ames, Pember, Samuelson, Simpson Yerxa
Organization, operation, and control of the mass media in America; social functions of mass communication; characteristics of media audiences. Open to nonmajors.

CMU
200 The Communication Process (5)
Bowen, Dervin, Samuelson, Stamm
Examination of the functions of communication. Open to nonmajors.

CMU
201 Communications Today (3)
Elementary course in the communications process and a survey of contributions of the various disciplines as applied to mass media, news, advertising, and editorial interpretations.
A critical study of language use. Open only to nonmajors.

CMU 202 History of the Press in America (3)
Study of the men and ideas that shaped the development of the press in America. Open only to nonmajors.

CMU 203 The Press in Contemporary America (3)
Study of responsibility of the mass media in relation to the political and economic spheres of society. Special emphasis on ethics of journalism. Open only to nonmajors.

CMU 220 Intercultural Communication (5) A Bowen, Fluchen
Introduction for undergraduate students to problems of communicating across cultures and subcultures. Study of cross-cultural communication in terms of specialized coding techniques, modes of self-perception, and symbolic representation of values. Examination of pragmatic situations of cross-cultural communication. Open only to nonmajors.

CMU 226 Introduction to Advertising (3)
Economic and social aspects; organizational structure; comparison of major media; and the elements of creating and producing advertising. Open only to nonmajors.

CMU 250 Survey of Radio and Television (3) Godfrey
History of the media, organization and regulation of the industry, commercial aspects, educational use, programming. Open only to nonmajors.

JOURNALISM

CMU 291 Photography (3) Caud
Elementary news photography, photo processing, and picture editing. Prerequisite, 150. Open only to majors.

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) Yerxa
Background and significance of international, national, and local newsworthy events. Primarily a discussion course. Open to nonmajors.

CMU 320 Legal Aspects of Communications (5) Pember, Simpson
Regulations governing publications in the mass media. Open to nonmajors.

CMU 321 News Writing (4) AWSp
Ams, Johnston, Pember, Simpson, Yerxa
Structure of news and feature stories. Prerequisites, 150, 200, 320, and reasonable proficiency in the use of the typewriter. Open to nonmajors by permission.

CMU 322 Reporting (4) AWSp
Shadel, Simpson, Yerxa
Reporting of contemporary news scene with special emphasis on national affairs. Open only to majors. Prerequisite, 321.

CMU 323 Special Reporting Topics (4, max. 12)
Application of reporting techniques to specialized areas of news coverage. Section of course may focus on science, legislative news, minority affairs, or another topic. Communications advising office may be consulted for schedule of topical offerings for each quarter. Open only to majors. Prerequisite, 322.

CMU 324 Critical Writing for the Mass Media (4) Johnson, Simpson, Yerxa
Interpretive, persuasive, and analytical writing for the mass media with emphasis on editorials; reviewing of books, films, the arts; concepts of editorial responsibility; a study of outstanding critics. Open only to majors. Prerequisite, 321.

CMU 325 Copy Editing (4) AWSp
Decision making in the newsroom. An analysis of criteria for selection and display of news. Training in the making of editorial judgments, writing of headlines, editing of copy, handling of photos, and dummying of pages. Open only to majors. Prerequisite, 321.

CMU 326 Magazine Article Writing (3) Daniel
Nonfiction writing for national magazines and specialized publications. Prerequisite, permission. Open to nonmajors.

CMU 327 Legislative Reporting (12) W Johnston
Full-time coverage of state legislature for a daily newspaper. Emphasis is on the writing of state legislature news for a daily newspaper. Prerequisites 321, 322, Political Science 482, and permission.

CMU 328 Reporting Minority Affairs (3) W Hollfield
Problems in advanced reporting designed to communicate minority views to the larger society. Open to nonmajors.

CMU 329 Reporting Minority Affairs Laboratory (3) W
Newswriting laboratory in problems of advanced reporting designed to communicate minority views to the larger society. Must be taken concurrently with 328. Open to nonmajors. Prerequisite, 321.

PUBLIC RELATIONS

CMU 338 Public Relations (3)
Principles and practice of public relations in business, industry, government, and social agencies, policies and conduct as fundamentals in good business relationships. Open to nonmajors.

CMU 339 Problems in Public Relations (3)
Group application of principles to the field problems of local business or agencies, with reports and recommendations. Prerequisite, 338. Open to nonmajors.

ADVERTISING

CMU 340 Introduction to Advertising (3) Bowen, Roller
Institutions and the major functional components of advertising. Advertising's role in the marketing mix. Open to nonmajors by permission; not open to students who have taken 226. Prerequisites, 150, 200, and Marketing 300 or permission.

CMU 341 Advertising Copywriting (5) Bowen
Development of an appreciation and understanding of the theory and methodology of writing advertising copy for newspapers, radio, television, and direct mail. Attention is also given to copy formats required by various media as well as an understanding of the relationships between graphics and written words. Open only to majors. Prerequisite, 340.

CMU 343 Layout and Production (3)
Theory and problems in the design and production of advertisements for printed media. Open only to majors. Prerequisites, 340 or 226.

CMU 345 Advertising Campaigns (5) Bowen, Roller
Advanced consideration of communication problems relevant to advertising efforts. Preparation of an advertising plan for a product or a service, including objectives, strategy, and tactics for copy, media, and research. Open to nonmajors by permission. Prerequisites, 341, 346, and 348, or permission.

CMU 346 Advertising Media Planning (3) Roller
Characteristics and evaluation of media and the writing of media plans for specific advertising campaigns. Emphasis is on the planning phase of media from a management point of view. Open only to majors. Prerequisite, 340.

CMU 348 Advertising Research (3) Bowen
Consideration of research problems and methods of investigation relevant to advertisers; emphasis on conceptualization of advertising problems in the broader context of communication processes and effects; review of existing research sources, but special emphasis on original research. Open only to majors. Prerequisite, 340.

RADIO-TELEVISION AND BROADCAST JOURNALISM

CMU 349 Radio and Television Advertising (5) Cranston
Principles of broadcast media as they apply to advertisers; planning a radio or television campaign; developing radio television commercials. Open to nonmajors by permission. Prerequisite, 340 or 370 or Marketing 411.

CMU 353 Radio and Television News Writing (3) Wike
Gathering, writing, editing, and programming news for the broadcast media, including visual
treatment for television and film. Open to nonmajors by permission. Prerequisite, 321 or 370.

CMU
354, 355 Television News Film Techniques (2,2)
Wike
Development of skills in the use of the motion-picture camera; a study of the use of film in news and public affairs programming; emphasis on writing for film purposes and developing editorial judgment. Prerequisite, 353 or permission.

CMU
356, 357, 358 News Broadcasting (3,3,2)
Wike
Preparation and presentation of news broadcasts; progression from editing radio news program to use of visuals and performance in television newscasts. Open only to majors. Prerequisite, 353.

CMU
360 Broadcasting Writing and Production (6)
Broughton
Writing and production for various broadcast formats, emphasizing audio communication processes.

CMU
361 Television Production (5)
Godfrey
Tools and crafts of production of television programs, culminating in closed-circuit presentation and recording of student-created programs subject to critical evaluation. Prerequisites, for majors, 150, 200, and permission; for nonmajors, permission.

CMU
365 Television Workshop Laboratory (2-4, max. 6)
Godfrey
Laboratory under on-air conditions at educational station, assignments and duties increasing in complexity as student's growth indicated. Open to nonmajors. Prerequisite, 361 and permission.

CMU
371 Radio Workshop Laboratory (3, max. 6)
Godfrey
Supervised practice in the various departments of the University’s FM radio station, KUOW. Open only to majors. Prerequisites, 360 and 370.

CMU
373 Television Writing (3)
Cranston
Principles and techniques of writing material for television production. Practice in writing programs, with consideration of camera, direction, and production problems. Open to nonmajors.

CMU
374 Advanced Television Writing (3)
Cranston
Development of an original television script of professional production caliber. Open to nonmajors. Prerequisite, 373.

CMU
377 The Documentary (3) ASp
Cranston
Historical development of the documentary. Background, aims, and creative aspects. Function of documentary in mass media. Open to nonmajors.

CMU
379 Seminar in Broadcast Problems (3)
Broughton, Cranston, Godfrey
Current problems of the broadcast industry, projected against basic legal, ethical, social, and economic principles of station operation. Open only to majors with senior standing.

Courses for Undergraduate and Graduate Students

CMU
400 Communications Theory (3)
Carte
Analysis of the factors affecting communication, and its results, including relevant research in psychology, sociology, linguistics, and anthropology, together with significant studies in mass communications. Open to nonmajors. Prerequisite, 200 or permission.

CMU
402 Government and Mass Communication (3)
Ames, Pember, Simpson, Yerza
Anglo-American concept of freedom of communication; its evolution under United States federal and state constitutions; present tension areas; judicial decisions; statutes and administrative regulations affecting publishing, broadcasting, etc. Open to nonmajors.

CMU
406 Social Control and the Mass Media (5)
Ames, Simpson
Analysis of relationships between the social structure, political power; and the mass media, and the influence of the media on popular culture. Open to nonmajors. Prerequisite, 200 or permission.

CMU
411 Mass Communications Research (5)
Dervin
Recent developments in the study of mass communications content and audience, with emphasis on the printed media. Open to nonmajors. Prerequisite, 150 or permission.

CMU
414 History and Communications (5)
Ames, Simpson
Growth and development of the press, with emphasis on journalism in the United States, its social, political, and ethical responsibilities. Open to nonmajors. Prerequisite, 5 or more credits in American history or permission.

CMU
443 The Social Functions of Advertising (3)
Bowen
Examination of the social and economic functions of advertising as an institution in contemporary society, with special attention to controls over advertising. Emphasis is on current issues. Open to nonmajors by permission; not open to graduate students in communications. Prerequisite, 340 or equivalent.

CMU
447 Communication and Consumer Behavior (5)
Bowen
Examination of behavioral science contributions to the understanding of consumer communication and purchasing behaviors; contributions from psychology, sociology, and anthropology. Emphasis is on the application of findings to the preparation and the placement of the advertising message. Open to nonmajors by permission. Prerequisites, 200, 340, and 348, or their equivalents.

CMU
449 Advertising Seminar (3)
Bowen, Cranston, Roller
Seminar in problems and procedures in advertising, incorporating presentations by industry professionals concerning current practices. Open only to majors. Prerequisites, 345, senior standing in the advertising sequence, and permission.

CMU
450 Broadcast Programming (3)
Godfrey
Critical study of the nature, range, and structure of broadcast programming and of the forces that shape it. Open to nonmajors who have completed 250.

CMU
459 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 nonmajors; not open to graduate students in communications. Offered jointly with the College of Education as EDC&I 450.

CMU
463 Television Workshop for Educators (5)
Godfrey
Working in University studios, under laboratory conditions involving production and 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 activities. Open only to nonmajors. Offered jointly with the College of Education as EDC&I 489.

CMU
470 Theory and Criticism of Broadcasting (3)
Broughton, Wike
Development of social, economic, and critical standards of broadcasting and the function of radio-television in the mass communication process. Open to nonmajors. Prerequisite, 150 or 250, or permission.

CMU
473 Television Drama Production Seminar (3)
Cranston
Production of a professional quality television dramatic program involving writing, acting, and videotaping. Open to students who have had 373 or 361 (for writers and producers), or Drama 351, 352, 353 (for actors). Offered jointly with the School of Drama as Drama 454. Prerequisite, permission.

CMU
474 The Educational Role of the Mass Media (2,2,5)
Ames
Critical study of the role the mass media have served in providing the individual with the information necessary for fulfillment of his or her major responsibilities as a citizen, as an economic unit, as a moral force, and as a cultural entity. Open only to nonmajors.

CMU
480 Propaganda (5)
Fitchen
Propaganda involving selective information
and involuntary exposure is analyzed, using specific techniques evaluated in class. Attention is given to aspects of propaganda within the United States and in foreign and international settings.

CMU 483 International Communication Systems (5) Fitchen
Provides detailed study of communications patterns and institutions in foreign areas. An interdisciplinary approach is utilized, and social and personal aspects of communicating across cultures are considered together with cultural influences on the practice of journalism and the operation of mass media. Intensive examinations are made of such areas as Asia and Western Europe. Prerequisite, 220 or equivalent or permission.

CMU 492H, 496H, 497H Honors Seminar in Communications (3,3,3) Ames
Analysis of the contributions to communications of the behavioral sciences (first quarter) and the humanities (second quarter), in preparation for the writing of an honors thesis in 297H. Open to nonmajors; not open to graduate students in communications. Prerequisite, senior honors standing.

CMU 498 Problems of Communications (1-5, max. 10) AWSpS
Research and individual study. Prerequisite, permission of Director and staff.

Courses for Graduates Only

CMU 500, 501 Seminar in Theory of Communication (5,5) Carter
Major points of view—general semantics, persuasion and effects, and communication systems. Examination of communication concepts in the empirical literature. Prerequisite, 400 or 508. Open to nonmajors.

CMU 502 Seminar in Government and Mass Communication (3) Pember, Simpson, Yerxa
Directed independent research into, and analysis of, legal problems in mass communication, institutional and media operations. Open to nonmajors. Prerequisite, 402.

CMU 565 Communication and Politics (3) Simpson
Study of the primary literature dealing with communication and American political behavior. Open to nonmajors. Prerequisite, 406.

CMU 566 Communication and Leisure (3) Simpson
Study of the mass media as popular entertainment, including analysis of content and audience gratification. Open to nonmajors. Prerequisite, 406.

CMU 577 Computer Applications in Communication Research (3)
Stamm
Potentialities of the computer and the use of the computer in the behavioral sciences. Prerequisites, elementary programming and elementary statistics. Open to nonmajors.

CMU 508, 509 Communication Research (5,5) A,W Carter, Dervin, Samuelson, Stamm
Development of the rationale and methods of behavioral science in the context of communication research and theory. Open to nonmajors. Prerequisites, 508 and statistics through analysis of variance for 509.

CMU 511 Seminar in Communication Research (3, max. 15)
Open to nonmajors. Prerequisites, 508 and permission.

CMU 512, 513, 514 Seminar in History and Communications (3,3,3) Ames, Pember, Simpson
Development of the historical approach to communications research. Study of historical method, bibliography, and criticism. Open to nonmajors.

CMU 550-551 Advanced Communication Methods (2-4)-(2-4, max. 6) Wilke, Yerxa
Directed individual projects in the design and organization of a complex mass communication, of a level of accomplishment suitable for professional quality print or broadcast media. Advanced techniques of research and production analysis and applied. Open to nonmajors. Prerequisite, bachelor's degree in communications or equivalent.

CMU 570 Seminar in the Theory and Criticism of Broadcasting (3) Broughton, Wilke
Evaluation and criticism of the function and operation of broadcasting in the mass communication process. Use of primary sources, including data gathering and analysis. Open to nonmajors. Prerequisite, 470.

CMU 580 Seminar in Public Opinion and Propaganda (3) Fitchen
Directed reading and research in the analysis of public opinion and propaganda. Open to nonmajors. Prerequisite, 480.

CMU 581 Seminar in International Communications (3) Edelstein
Analysis of public opinion and communication. Directed research in public opinion and communication. Open to nonmajors. Prerequisite, 580.

CMU 583 Regional Communication Systems (5) Edelstein, Fitchen
Analysis of communication problems of regional economic associations, and theory of political community, and examination of empirical research on regional communication. Special emphasis is given Western Europe and the North Atlantic area. Open alternate years with 585. Open to nonmajors. Prerequisites, 480, 485, or equivalent, or permission.

ARMS AND SCIENCES

CMU 584 Research Seminar in Regional Communication Systems (3) Edelstein, Fitchen
Directed research in communication factors in regional integration in a determined region of the world. Open to nonmajors. Prerequisite, 583. (Offered alternate years with 586.)

CMU 585, 586 Seminar in Comparative Communication Systems (3,3) W,Sp
Analysis and comparison of communications systems. Directed research in comparative systems and into the role of communications in national development. Prerequisite, 485. Open to nonmajors. (Offered alternate years with 583, 584.)

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)
Open to qualified graduate students by permission of Director and staff.

CMU 600 Independent Study or Research (*)
AWSpS

CMU 700 Master's Thesis (*)

CMU 890 Doctoral Dissertation (*)

COMPARATIVE AND FOREIGN AREA STUDIES

East Asia

GENERAL

COURSES FOR UNDERGRADUATES

EASIA 210 The Far East in the Modern World (5)
AW Palais, Taylor
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.

EASIA 499 Undergraduate Research (3-5, max. 15)
AWSp

ART H 301 Survey of Asian Art (5)

ART H 401 Oriental Ceramic Art (2)

ART H 417 Buddhist Painting of China and Japan (3)

ART H 418 Buddhist Sculpture of China and Japan (3)

311
ARTS AND SCIENCES

ART H
419 Chinese and Japanese Architecture (3)

C LIT
302 World Classics of the Orient (5)

DRAMA
477, 478, 479 History of Far Eastern Theatre and Drama (3,3,3)

DRAMA
495 Special Studies in the Theatre Arts of Asia (3, max. 9)

GEOG
313 East Asia (5)

HSTAS
211 History of Chinese Civilization (5)

HSTAS
212 History of Korean Civilization (5)

HSTAS
213 History of Japanese Civilization (5)

I BUS
450 East-West Economic Relations (4)

MUSAP
159 Private Instruction: Non-Western Instruments (2-3, max. 9)

MUSIC
316, 317, 318 Music Cultures of the World (5,5,5)

POLS
429 International Relations in the Far East (5)

POLS
432 American Foreign Policy in the Far East (5)

COURSES FOR GRADUATES ONLY

EASIA
500 Research Seminar in Asian Arts (3-5, max. 15) Sp
McKinnon, Rogers
Interdisciplinary inquiry into history, esthetics, and forms of Asian arts. Prerequisite, permission.

EASIA
600 Independent Study or Research (*) AWSp

ANTH
403 Traditional Chinese Society (5)

ART H
411 Early Chinese Paintings T’ang to Yüan (3)

ART H
412 Later Chinese Paintings: Yüan Through Ch’ing (3)

CHIN
361 Vernacular Chinese Literature in Translation (5)

CHIN
362 Chinese Literature in Translation: Middle and Early Modern Periods (5)

CHIN
363 Chinese Literature in Translation: Ancient Period (5)

CHIN
407 Chinese Reference Works and Bibliography (3)

C LIT
410 Literary Motifs (3-5, max. 10)

ECON
466 Economic History of China: 1840-1949 (5)

ECON
493 Economy of Modern China (5)

GEOG
336 Regional Geography of China (5)

GEOG
435 Problems in the Geography of China (5)

HSTAS
451 Chinese History: Earliest Times to 211 B.C. (5)

HSTAS
452 Chinese History: 221 B.C. to A.D. 906 (5)

HSTAS
453 Chinese History: A.D. 906 to A.D. 1840 (5)

HSTAS
454 History of Modern China (5)

HSTAS
476 Western Influences in Russian and Chinese Intellectual History (4)

MUSIC
497 Music of China (3)

PHIL
415 Chinese Philosophy (5)

PHIL
416 Neo-Confucianism (5)

POLS
414 Chinese Political Thought (5)

POLS
442 Government and Politics of China (5)

COURSES FOR GRADUATES ONLY

EASIA
521-532 Seminar: Introduction to the Interdisciplinary Study of China (5-5) W,Sp
Townsend

EASIA
530 Seminar on China (3, max. 6) Sp
Chan, Dull, Kapp
Problems of Chinese history. Prerequisite, permission.

ART H
511 Seminar in Chinese Art (3, max. 9)

GEOG
565 Research Seminar: China and Northeast Asia (3, max. 6)

HSTAS
551 Field Course in Chinese History, Pre-Sung Period (3-6)

HSTAS
552-553-554 Seminar in Chinese History, Pre-Sung Period (3-6)-(3-6)-(3-6)

HSTAS
561 Field Course in Chinese History, Sung to Modern (3-6) (Formerly 564.)

HSTAS
562-563-564 Seminar in Chinese History: Sung to Modern (3-6)-(3-6)-(3-6) (Formerly 547-548-549.)

HSTAS
571-572 Chinese History: Modern Period (3-6)-(3-6)

HSTAS
573-574-575 Seminar in Chinese History: Modern Period (3-6)-(3-6)-(3-6) (Formerly 556-557-558.)

POLS
532 The Chinese Political System (3)

POLS
533 Seminar on Contemporary Chinese Politics (3)

POLS
535 International Relations of Modern China (3-5)

JAPAN

COURSES FOR UNDERGRADUATES

EASIA
440 The Emergence of Postwar Japan (5) A
Hellman, Pyle, Yamamura
The making of modern Japan; World War II and surrender; American occupation; postoccupation rebuilding; emergence as an industrial power.

EASIA
441 Economic History of Japan to 1900 (5)
Hanley, Yamamura
Lecture-seminar on Japanese economic history from 700 to 1900. Includes analyses of the rise and disintegration of the shōei system, the rise of commerce, the development of the monetary system, changes in the living standard, demographic changes, and the early phases of industrialization. While social change is evaluated, the major emphasis is placed on economic analysis and empirical examination.

EASIA
451 Undergraduate Colloquium on Japan (5) W
Beckmann

ART H
416 Later Japanese Painting: Sixteenth to Nineteenth Centuries (3)

ART H
561 Early Japanese Painting: Twelfth to Sixteenth Centuries (3) (Formerly 564.)
COURSES FOR GRADUATES ONLY

HSTAS 416 Music Studies

HSTAS 437 Problems in the Geography of Japan (3 or 5)

HSTAS 421 History of Early Japan (5)

HSTAS 422 History of Tokugawa Japan (5)

HSTAS 423 History of Modern Japan (5)

HST 443 The United States and Japan: A Sense of the Past (5)

JAPAN 421 Japanese Literary Tradition in English (5)

JAPAN 422 Tokugawa Literary Tradition in English (5)

JAPAN 423 Modern Japanese Literature in English (5)

JAPAN 441 Studies in Japanese Poetry in English (5)

JAPAN 442 Studies in Japanese Prose in English (5)

JAPAN 443 Studies in Japanese Drama in English (5)

JAPAN 461, 462, 463 Readings in Modern Japanese Literature (3,5,3,5,3-5)

MUSIC 494 Music of Japan (3)

MUSIC 495 Music of Japan (3)

POL S 435 Japanese Government and Politics (5)

COURSES FOR UNDERGRADUATES

HSTAS 401 Introduction to Russian and East European Studies (5)

HSTAS 420 History of Korea (5,5)

KOR 320 Korean Literature in English (5)

MUSIC 426 Music of Korea (3)

RUS SIA COURSES FOR GRADUATES ONLY

HSTAS 481 Modern Korean History (3-6)

HSTAS 482-483-484 Seminar on Korean History (3-6)(3-6)(3-6)

HSTAS 585 Research Seminar: Modern Korea (3-6)

Russia and Eastern Europe

GENERAL

COURSES FOR UNDERGRADUATES

REEU 220 Introduction to Russian and East European Studies (5) W

Paul Geographic setting, ethnic composition, religious, cultural pattern, economic problems, social and political institutions of Eastern Europe in the past and the present.

REEU 378 Russia and Asia (3) Sp

Waugh Russian expansion into Central Asia. Russian and Soviet policies toward nationalities.

ARMS AND SCIENCES

REEU 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.

REEU 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.

REEU 417, 418, 419 Communist States of North-Central Europe (5,5,5) A,W,Sp

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.

REEU 499 Undergraduate Research (3-5, max. 15)

A,W,Sp For Russia and Eastern Europe majors. Prerequisite, permission.

HSTEU 447 Russian and East European Bibliography (5)

HSTEU 450 Ethnic History of Russia and East Europe (5)

COURSES FOR GRADUATES ONLY

REEU 500 Interdisciplinary Research Seminar (*) AW,Sp

Jackson, Thornto n 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, graduate standing or permission.

REEU 505 Seminar: Problems of Social and Political Development in Eastern Europe (3-6) Sp

Paul Research seminar dealing with selected problems of continuity and change in Eastern Europe. Prerequisites, graduate standing and some previous course work on Eastern Europe.

REEU 508 Seminar: Problems in the Study of Marxism (3-5, max. 15) W

Legters Investigation of the deeper and more complex historical and philosophical problems encountered in understanding Marxist thought of the nineteenth and twentieth centuries. Prerequisites, 401, 402, 403, or equivalent in other departments.
## ARTS AND SCIENCES

**RUSSIA COURSES FOR UNDERGRADUATES**

<table>
<thead>
<tr>
<th>REEU 510</th>
<th>Seminar in Soviet Literary Politics (5)</th>
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<tr>
<td>Examination of literary policies of the Soviet regime and their impact on Soviet belles-lettres. Prerequisites: HSTEU 445 or Political Science 441, Russian 421, or permission. Reading knowledge of Russian desirable.</td>
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**REEU 609** Independent Study or Research (*) AWSp

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**RUSSIA COURSES FOR GRADUATES ONLY**

| HSTEU 444 | Imperial Russia, 1700-1900 (5) |
| HSTEU 445 | Twentieth-Century Russia (5) |
| HSTEU 446 | Russian Historiography (5) |
| RUSS 320 | Russian Literature in English (5) |
| RUSS 420 | Early Twentieth-Century Russian Literature in English (5) |
| RUSS 421 | Contemporary Russian Literature in English (5) |
| RUSS 422 | Russian Plays in English (5) |
| RUSS 424 | Pushkin and Gogol in English (5) |
| RUSS 426 | Goncharov and Turgeniev in English (5) |
| RUSS 427 | Tolstoy in English (5) |
| RUSS 428 | Dostoevsky in English (5) |
| RUSS 429 | Chekhov and His Contemporaries in English (5) |
| RUSS 430 | Solzhenitsyn and Pasternak in English (5) |
| POL'S 420 | Foreign Relations of the Soviet Union (5) |
| POL'S 441 | Government and Politics of the Soviet Union (5) |

**EASTERN EUROPE COURSES FOR UNDERGRADUATES**

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<tr>
<td>Historical analysis of the ideological and social character of revolutionary movements, chiefly nationalist and communist, in Eastern Europe from 1848 to World War II.</td>
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<thead>
<tr>
<th>REEU 420</th>
<th>Reform and Revisionism in Eastern Europe (5) W Paul</th>
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<tbody>
<tr>
<td>Study of political and economic reform and experimentation in communist Eastern Europe, and the philosophical and theoretical bases of such reform. Some previous work in the area of Russian and East European studies recommended.</td>
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<tr>
<th>REEU 458</th>
<th>Undergraduate Colloquium on East Europe (5) Sp Boba, Sugar</th>
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<tr>
<td>Interdisciplinary study of Eastern Europe with emphasis on the historical period. Prerequisite, permission.</td>
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| GEOG 305 | Eastern Europe (5) |
| GEOG 405 | Problems of Eastern Europe (5) |
| HSTAM 426 | Origins of European States (5) |
| HSTEU 451 | Eastern Europe, 1772-1918 (5) |
| HSTEU 452 | Eastern Europe Since 1918 (5) |
| HSTEU 453 | History of the Balkans, 1400-Present (5) |
| CZECH 320 | Czech Literature in English (5) |
| POL'S 320 | Polish Literature in English (5) |
| SER'C 320 | Serbo-Croatian Literature in English (5) |
| MUSIC 318 | Music Cultures of the World (5) |
| POL'S 347 | Governments of Eastern Europe (5) |

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**COURSES FOR GRADUATES ONLY**

| ECON 595 | Soviet Economics (3) |
| GEOG 533 | Research Seminar: Soviet Union (3, max. 6) |
| HSTEU 541 | Medieval Russian History (3-6) |
| HSTEU 543 | Seminar on Medieval Russian History (3-6) |
| HSTEU 544 | Modern Russian History (3-6) |
| HSTEU 545-546-547 | Seminar on Modern Russian History (3-6) (3-6) (3-6) |
| HSTEU 548 | Field Course in Soviet History (3-6) |
| POL'S 520 | Seminar on the Foreign Policy of the Soviet Union (3) |
| POL'S 541 | The Soviet Political System (4) |
| POL'S 546 | Seminar in Problems of Soviet Politics (3) |
COURSES FOR UNDERGRADUATES

SASIA
200 South Asia Today (5) W

Introduction to major aspects of life in present-day India, Pakistan, Bangladesh, Ceylon, and Nepal. National and regional cultural, political, social, and economic features. Taught by specialists in the disciplines and areas involved.

SASIA
291 Hinduism (3) Sp

Variety and interrelatedness of contemporary Hindu religious phenomena; ritual behavior and practice, sects, ethics of action, and meditation; metaphysical presuppositions, cultural applications in art, music, and literature.

SASIA
472 Introduction to Buddhism (3) Sp

Ruegg
Basic doctrines: I. The Conditioned World; II. Its Origins; III. The Unconditioned World; IV. The Path Which Leads From One World to the Other and the Persons Who Use It. Prerequisite, permission.

SASIA
473 Readings in Buddhism (5, max. 15) Sp

Ruegg
Study of texts in the following sequence: The Heart of Sutra, The Diamond Sutra, selected passages from The Large Sutra on Perfect Wisdom. Prerequisite, permission.

SASIA
498 Undergraduate Colloquium on South Asia (3) Sp

Emphasized are topics involving the interrelationships of the various social science disciplines in the study of South Asian history and culture. Prerequisite, permission.

SASIA
499 Undergraduate Research (3-5, max. 15) AW/Sp

Potter

ANTH
316 South Asia (3)

ANTH
412 South Asian Social Structure (5)

ARCH
458 South Asian Architecture (3)

ART H
421 Art of India (3)

ECON
465 Economic History of South Asia (5)

HSTAS
201 Ancient Indian Civilization (5)

HSTAS
202 Modern Indian Civilization (5)

HSTAS
401 History of Ancient India (5)

HSTAS
402 History of Medieval and Mughal India (5)

HSTAS
403 History of Modern India to 1900 (5)

HSTAS
404 History of Twentieth-Century India (5)

HSTAS
405 Maharashtra in Indian History (5)

LING
404, 405, 406 Indic and Indo-European (3,3,3)

SOUTHEAST ASIA

SOUTHEAST ASIA

LING
420 Classical Indian Literature in English (5)

LING
421 Modern Indian Literature in English (5)

MUSIC
428 Music of India (3)

PHIL
286 Introduction to India's Philosophies (5)

PHIL
412 Indian Philosophy (3)

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

SASIA
310 Introduction to Interdisciplinary Study of South Asia (5)

Introduction to work done in the various disciplines focusing on South Asia.

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 Seminar on Modern Indian Politics (3)

COMPARATIVE LITERATURE

Courses for Undergraduates

C LIT
250 Introductory Studies in World Literature (3-5)

Basic concepts of literary study and the methods of comparative study. Materials from various national and linguistic cultures are examined. Contents vary. Consult Comparative Literature office for specific details each quarter the course is offered. Readings are in English.

C LIT
261, 262, 263 Modern African Literature (3-5, 3-5, 3-5) AW/Sp

Survey course in African literature from the colonial period to the present with specific references to the themes of nostalgia, rebellion, and humanism. Readings and discussion of, and reports on, representative works in prose, poetry, and drama. Among authors studied: Achebe, Mphahlele, Oyono, Paton, Senghor, Soyinka, Tutuola.

C LIT
300 World Classics of Western Europe (5) A

Great works of English, French, Italian, and Spanish poetry, drama, and fiction, from the Middle Ages to the twentieth century, read in English and taught by specialists in English and Romance literature.

C LIT
301 World Classics of Germany, Russia, and Scandinavia (5) W

Great works of Danish, German, Icelandic,
ARTS AND SCIENCES

Norwegian, Russian, and Swedish poetry, drama and fiction, from the Middle Ages to the twentieth century, read in English and taught by specialists in German, Scandinavian, and Slavic literature.

C LIT
302 World Classics of the Orient (5) Sp
Great works of Chinese, Japanese, and Korean literature and thought, read in English and taught by specialists in Asian literature. Content varies. Consult the Comparative Literature office each quarter for information concerning quarterly offerings.

C LIT
357 Literature and Film (3-5, max. 10)
Examination of 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. Consult the Comparative Literature office for specific details each quarter the course is offered. (Formerly 257.)

C LIT
396 Special Studies in Comparative Literature (3-5, max. 10)
Offered occasionally by visitors or resident faculty. Content varies. Consult the Comparative Literature office each quarter for information concerning quarterly offerings.

C LIT
400 Heroic Poetry (5) W
Ancient, medieval, and Renaissance epic poems, read in English. The Iliad, Odyssey, Metamorphoses, Aeneid, The Song of Roland, and Jerusalem Delivered.

C LIT
401 Modern European Drama (5) A
Selected plays, read in English, by Ibsen, Strindberg, Chekhov, Pirandello, Brecht, Camus, Durrenmatt, the absurdist, and others, representing naturalism, expressionism, theatricalism, and other movements that have shaped the modern European theater.

C LIT
410 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. Consult the Comparative Literature office for specific details each quarter the course is offered. Foreign-language texts are read in English translation.

C LIT
415 The Comic in Literature (5)
Study of masterpieces of comic literature emphasizing various modes and uses of the comic. Prerequisites, junior standing and at least 10 credits of literary study.

C LIT
430 Modern Greek Literature (3-5)
Modern Greek literature from the early nineteenth century to the present, with selected readings in translation from a number of writers. Special emphasis is placed on the transmission and adaptation of themes, images, and language from Homer, classical Greece, the Alexandrian poets, the Byzantine era, and folk literature, as they have been incorporated into vernacular works. It includes such authors as Palamas, Solomos, Cavafy, Seferis, and Kazantzakis. Prerequisite, junior standing.

C LIT
440 The Novel (3-5, max. 10)
Examination of the novel as a genre. Material varies with the individual faculty members who offer it, but, normally, the larger technical, social, and philosophical questions are illustrated through intensive study of novels by two or more writers from different national cultures. Non-English works may be read in translation; therefore, foreign-language knowledge is not necessarily required.

C LIT
450 Afro-Occidental Literary Relations (3-5, max. 10)
Examination of selected works of African literature, with particular attention being paid to some of the varied relations of influence and affinity existing between them and certain typical works of occidental literature, e.g., French and American. Course content varies. Consult the Comparative Literature office for specific details each quarter the course is offered. Knowledge of a foreign language is sometimes required.

C LIT
472 Studies in Narrative (3-5, max. 10)
Narrative styles and developments from antiquity to the present. Course content varies. Consult the Comparative Literature office for specific details each quarter the course is offered.

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)
AWSP
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 (5, max. 15)
To be offered occasionally by visitors or resident faculty. Consult the Comparative Literature office for specific details each quarter course is offered.

Courses for Graduates Only

Consult the Comparative Literature office for information on the quarter and year the courses below will be offered.

C LIT
500 Theories and Methods of Comparative Literature I (5, max. 15)
Lectures on comparative theory and practice from Vico to the present; seminar papers on comparative topics relevant to the student's fields of concentration.

C LIT
510 The Art of Translation (5, max. 10) W
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
515 Recent Trends in Literary Criticism (3)
Study of some of the recent trends in literary criticism; in particular, structural and philosophical approaches.

C LIT
522, 523 Existentialism and Literature: Form and Content (3, 3)
Study of the effects of existential and phenomenological thought on literary themes and techniques.

C LIT
525 The Baroque in Criticism and Literature (3-5, max. 15)
Investigation into the origins and history of the term as used in literary criticism, accompanied by a study of representative Baroque literature in various countries. Included are such works as Don Quixote, Phedre, and French, Spanish, Italian, and German poetry available in translation, but preferably to be read in the original.

C LIT
530 Comparative Study of French and German Courtly Epic (3)
Three major works of the German and French courtly epic, Erec, Perceval, and Tristan, are systematically compared.

C LIT
535 Poetic Forms (3-5, max. 15)
Seminar concerned with the evolution, dissemination, and function of metrical and stanzaic forms in various literatures. Course content varies. Consult Comparative Literature office for specific details each quarter the course is offered. Prerequisite, reading knowledge of one foreign language.

C LIT
540 Eighteenth-Century European Esthetics (3)
Analysis of important works of eighteenth-century estheticians in England, France, and Germany. Prerequisite, facility in reading either French or German.

C LIT
545 Studies in Renaissance and Baroque Epic Poetry (3)
Study of Renaissance and Baroque epic poetry, including works of Ariosto, Tasso, Spenser, Milton, and others. Prerequisite, reading knowledge of either French, Italian, Spanish, or Portuguese.

C LIT
546 Studies in the Renaissance (3-5, max. 10)
Examination of various aspects of Western European literature during the Renaissance. Course content varies. Consult Comparative Literature office for specific details each quarter the course is offered. Prerequisite, reading knowledge of at least one European language.
C L I T 547 Classical Tradition in Medieval and Renaissance Europe (3-5, max. 15) Intensive study of a single topic or genre. Course content varies. Consult Comparative Literature office for specific details each quarter the course is offered. Prerequisite, reading knowledge of Latin or Greek, and French or Italian.

C L I T 550 European Realism (3) Seminar study of works of European Realism (Balzac, Flaubert, Turgenev, Dostoevski, Tolstoy, the representative Victorians, and the writers of "poetic realism") in connection with various aesthetic doctrines and subsequent critical reappraisals.

C L I T 555 Studies in Irony (3) Seminar examining irony in literary, philosophical, and satirical masterpieces from the classical period to contemporary literature.

C L I T 560 Classical Rhetoric and Literature (3) Seminar exploring the influence and the importance of classical rhetoric in European literary works of the seventeenth and eighteenth centuries. Texts and examples chosen in English, French, Italian, and German literatures. Prerequisite, reading knowledge of French, Italian, or German.

C L I T 565 Studies in Nineteenth-Century Literature (3-5, max. 15) Seminar examining various aspects of nineteenth-century European literature. Course content varies. Consult Comparative Literature office for specific details each quarter the course is offered. Prerequisite, ordinarily, reading knowledge of one foreign language.

C L I T 570 Studies in the Novel (3-5, max. 15) Two two-hour seminars comparing two or more novels of varying national literatures. Course content varies. Consult Comparative Literature office for specific details each quarter the course is offered. Prerequisite, reading knowledge of one foreign language.

C L I T 571 Studies in the Lyric (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. Consult Comparative Literature office for specific details each quarter the course is offered. Prerequisite, reading knowledge of one foreign language.

C L I T 573 Studies in the Drama (3-5, max. 15) Examination of various aspects of the drama as a major literary genre, as approached from international and multilingual points of view. Course content varies. Consult Comparative Literature office for specific details each quarter the course is offered. Prerequisite, ordinarily, reading knowledge of one foreign language.

C L I T 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. Consult Comparative Literature office for specific details each quarter the course is offered. Prerequisite, ordinarily, reading knowledge of at least one foreign language.

C L I T 575 Intercultural Relationships in Literature (3-5, max. 15) Seminar or seminars examining significant relationships among the literatures of various national cultures during various historical periods. Course content varies. Consult Comparative Literature office for specific details each quarter the course is offered. Prerequisite, reading knowledge of one foreign language.

C L I T 576 Non-Western Literary Traditions (3-5, max. 15) Provides those with a background in Western literary criticism an awareness of features characterizing wholly separate, long, and strongly sustained critical traditions in other areas (e.g., China). Normally, translations are assigned for nonreaders of the foreign language or languages concerned. Course content varies. Consult Comparative Literature office for specific details each quarter the course is offered.

C L I T 580 Literary Relations (3-5, max. 15) Seminar that examines relationships or parallels between two, or among more than two, important writers from different national literatures. Course content varies. Consult Comparative Literature office for specific details each quarter the course is offered. Prerequisite, ordinarily, reading knowledge of one foreign language.

C L I T 581 Literature and Psychology (3-5, max. 10) Seminar exploring ideas, critical procedures, and problems in this interdisciplinary area. Though various psychological viewpoints are discussed, special attention is given to those concerned with unconscious mental processes. Course content varies. Consult Comparative Literature office for specific details each quarter the course is offered. Prerequisite, ordinarily, reading knowledge of one foreign language.

C L I T 585 Literature of Islam and Europe (3-5, max. 15) Seminar examining the mutual influences between Islamic literature and culture (chiefly Arabic and Persian) and European. Course content varies. Consult Comparative Literature office for specific details each quarter the course is offered. Prerequisite, ordinarily, reading knowledge of one foreign language.


C L I T 596 Special Studies in Comparative Literature (3-5, max. 15) To be offered occasionally by visitors or resident faculty. Course content varies. Consult Comparative Literature office for specific details each quarter the course is offered.

C L I T 600 Independent Study or Research (*) AWSpS

C L I T 700 Master's Thesis (AWSpS)

C L I T 800 Doctoral Dissertation (AWSpS)

DRAMA

DRAMA Courses for Undergraduates

DRAMA 101 Introduction to the Theatre (5) AWSp Introduction to the theatre as an art form with emphasis on the play in production. The role of the various theatre artists: actors, directors, designers, and playwrights. Required attendance at one or more performances. Lecture and discussion groups. Open to nonmajors.

DRAMA 102, 103 Play Analysis (3, 3) Descriptive analysis of plays, both modern and historical, to provide tools for the student to read a text critically and creatively.

DRAMA 121, 122, 123 Movement for the Actor (2, 2, 2) Movement for the actor based on Lecoq technique. 121: improvisation for development of sensory-motor skills. 122: re-education of muscular efforts and coordination. 123: use of masks for characterization. Prerequisite, acceptance for the Bachelor of Fine Arts program.

DRAMA 141, 142, 143 Voice Training for the Actor (3-3-3)AWSp 141: relaxation, limbering, and centering of the voice, 142, 143: vocal dramatic styles (Jacobean texts). Prerequisite, acceptance for the Bachelor of Fine Arts program.

DRAMA 151, 152, 153 Acting (3, 3, 3)AWSp Theory and practice of fundamentals. 151: development of fundamental aptitudes in acting (focus, recall, sense memory) through improvisation and basic scene work. 152: analysis and development of characterization. 153: advanced analysis, character rhythm, extended scene work. Prerequisites, 151 for 152; 152 for 153.

DRAMA 155, 156, 157 Acting (5, 5, 5)AWSp Acting for the professionally oriented student. 155: improvisation, the fundamentals of acting theory, practice. 156, 157: acting styles, Elizabethan. Prerequisite, acceptance for the Bachelor of Fine Arts program.

DRAMA 181, 182, 183 Play Analysis for the Actor (2, 2, 2)AWSp Play analysis from the point of view of the actor. 181: the principles of method and their imaginative integration for the actor. 182: application of analysis method to Elizabethan plays. 183: application to Jacobean plays. Prerequisite, acceptance for the Bachelor of Fine Arts program.

DRAMA 201 Introduction to Black Theatre (5) A Mobley Intensive lecture-laboratory course in the
theory and practice of Black theatre productions, with emphasis on the works of Black playwrights. Critical analysis of Black plays.

**DRAMA**

**202** Introduction to Black Theatre: Historical Plays (3) W Mooney

Intensive laboratory course in the theory and practice of Black theatrical productions, with emphasis on the works of Black playwrights. Prerequisites: 201 and permission.

**203** Introduction to Black Theatre: Contemporary Plays (3) Sp Melby

Continuation of 202. Prerequisites: 202 and permission.

**210, 211, 212** Theatre Technical Practice (2 or 4, 2 or 4, 2 or 4)

Criders, Lounsberry

Intensive lecture, laboratory course in basic techniques, scenery, lighting, costumes, and stage painting. 210: scene construction and scene painting. 211: costumes. 212: lighting and technical stage procedures. Crew work required in addition to scheduled class hours.

**221, 222, 223** Movement for the Actor (2,2,2) A, W, Sp

221: advanced mask work, comedy characterization, animal improvisation. 222: commedia dell'arte techniques, stage fencing. 223: advanced commedia. Prerequisite: completion of first year of the Bachelor of Fine Arts program.

**230** Introduction to Children's Drama (2) W Haaga, Valentinni

Survey of children's drama with an emphasis on philosophies and practices. Includes children's theatre, creative dramaturgy, and puppetry. Open to nonmajors.

**241, 242, 243** Voice Training for the Actor (3,3,3) A, W, Sp

Vocal dramatic styles: 241: Elizabethan. 242: Jacobean. 243: Moliere and Restoration. Prerequisite: completion of first year of the Bachelor of Fine Arts program.

**251, 252, 253** Acting (4,4,4) A, W, Sp

Roberts, White

Intensive course-sequence in acting with integrated laboratory work in movement and voice. Imagination, mime, scene analysis, and emphasis on realistic acting with introduction to styles and genres. Prerequisites: audition for 251; 251 for 252, 252 for 253, and Drama-Dance 101, 102, 103, which must be taken concurrently.

**255, 256, 257** Acting (5,5,5) A, W, Sp

255: Elizabethan and Jacobean styles. 256: restoration styles. 257: Moliere and commedia dell'arte. Prerequisite: completion of first year of the Bachelor of Fine Arts program.

**271, 272, 273** Seminar in Theatre and Drama (2,2,2)

Prerequisite, completion of first year of the Bachelor of Fine Arts program.

**274** Great Ages of the Western Theatre (5) A Lorenzen

History of the Western theatre and its drama to the present. Designed to acquaint the student with the magnitude and scope of the theatre as a vital part of the history of man and civilization. Lecture and discussion. Open to nonmajors.

**298** Theatre Production (1-2, max. 9)

AWSp

Laboratory course for students participating in School of Drama productions. Prerequisite, being cast in a production.

**316** Theatrical Makeup (2) A Wsp

Forrester

Basic principles, with intensive practice in application of makeup for use on proscenium and arena stages. Open to nonmajors.

**324** Children's Theatre (3)

Theory and techniques, play selection and analysis, and rehearsal procedures. Emphasis on directing.

**325, 326** Play Production (5,5) Sp, W

Forrester, Gray

325: fundamentals of scenery, lighting, and costume design and construction. 326: fundamentals of directing, especially for high school, with some acting. Open to nonmajors.

**331** Puppetery (3) A WSp

Valentinni

Introduction to puppetry; construction and use of simple puppets as a visual aid in education, recreation, and therapy.

**336** Drama in the Elementary School (3) A Silk

Theory and practice of fundamentals of play-acting as they relate to teaching children through improvisation and problem solving, emphasizing child development; correlation with language arts. Prerequisites, 151 and EDPSY 304, and permission.

**338** Creative Dramatics (3) A WSp

Haaga, Silk

Analysis of basic principles and techniques of the creative process in informal drama; observation of children and youth.

**351, 352, 353** Advanced Acting (4,4,4) A, W, Sp

Loper, White


**371, 372, 373** Special Studies (2,2,2) A, W, Sp

Ross

Specialized and individualized work related to the main curriculum of the third year of the Bachelor of Fine Arts program. Prerequisite, completion of two years in the Bachelor of Fine Arts program.

**374** History of the Greek Theatre and Its Drama (3) W Wolcott

Examination of the relationship of the physical theatre and the productions that took place within that theatre, with particular emphasis on the technical form, styles of acting, scenic elements, and the critical theories that influenced the theatre of the period. (Not offered 1975-76.)

**375** History of the Roman Theatre and Its Drama (3) W Lorenzen

See 374 for course description. (Not offered 1974-75.)

**376** History of the Medieval and Commedia Dell'arte Theatres and Their Drama (3) Sp Lorenzen

See 374 for course description. (Not offered 1974-75.)

**377** History of the European Renaissance Theatre and Its Drama (3) W Wolcott

See 374 for course description. (Not offered 1975-76.)

**379** History of the European Theatre and Its Drama: 1700-1875 (3) A Wolcott

See 374 for course description. (Not offered 1975-76.)

**401** Innovations in Drama (6, max. 12) S Wolcott

Intensive, practical seminar in theatre and drama, stressing innovations in content and teaching approach in various special fields—acting, directing, design, and theatre history and criticism. Emphasis on student participation in projects guided by a team of teachers, with a view to expanding the horizons of teachers and potential teachers beyond the conventional modes of thought about drama. For advanced undergraduates and graduates only. Prerequisite, permission. (Formerly 484.)

**402** English Summer Theatre School (9-12, max. 12) S White

The English Summer Theatre School is a foreign-study program offered to theatre students of serious purpose. The program includes: studio classes in movement, speech, period styles, tours, theatre parties, lectures, and rehearsal and performance. Prerequisite, permission.

**410, 411, 412** Advanced Theatre Technical Practices (3, max. 9; 3, max. 9; 3, max. 9) A WSp, AWSp

See 402.

**418** Apprenticeship, under faculty-staff supervision,
Drama 413 Advanced Scene Construction and Drifting (5) W
Dahlstrom, Forrester
Special problems in scene construction and rigging with laboratories in working drawings and scenic models. Prerequisites, 210 or equivalent.

Drama 414 Scene Design (3, max. 6) AW
Dahlstrom, Forrester
Theory, practice, and rendering of scene designs. Repeat of course involves intermediate designs, models, etc. Prerequisites 210, ART 109 and ART H 203, or equivalent.

Drama 415 Stage Costume Design (3, max. 6) ASp
Crider
Theory, practice, and rendering of costume designs for the theatre. Repeat of course involves intermediate designs. Prerequisites, 211, ART 109 and ART H 203 or equivalent; 411 for repeat of course.

Drama 416 History of Clothing and Costume (5) A
Crandall
Survey history of clothing and theatrical costume; emphasis on the dress of the audience and the actor in historic periods of theatrical activity. Prerequisites, 211 and ART H 203 or equivalent, or permission.

Drama 417 Advanced Stage Costume Construction (3) W
Crider
Techniques of costume construction, including study of fabrics, color, and fundamentals of pattern making and draping for historic clothing reconstruction. Prerequisite, 211 or permission.

Drama 418 Stage Lighting (3) Sp
Lounsbury
Theories and methods of lighting with emphasis on lighting plots. Laboratories consist of analysis of lighting instruments and control, color experiments, and basic circuits. Prerequisite, 212 or equivalent.

Drama 431 Fundamentals of Puppetry (2) Sp
Valentinetti
Puppetry as a theatre art; construction and use of puppets and marionettes for formal presentations; basic principles of playwriting and staging. Prerequisite, 331 or permission.

Drama 432 Advanced Puppetry (2, max. 4) AWP
Valentinetti
Projects and participation in formal theatre productions or field work in hospitals, clinics, and special schools. Prerequisite, 331 or permission.

Drama 435 Children's Theatre (3) W
Theory and technique, play selection and analysis, and rehearsal procedures. Practical experience in the laboratory. Prerequisite, 460.
DRAMA
495 Special Studies in the Theatre Arts of Asia (3, max. 9)
McKinnon, Visiting Artist
Fundamentals in the theory and practice of the theatre arts of Asia. The study of a given form or tradition of theatre art in any one quarter depends on the visiting artist and the idiosyncrasies of their choice.

DRAMA
496 Stage Costume Problems (2, max. 8)
Series of specialized courses directed to specific areas and problems of stage costume design and execution: accessories, textiles, wigs, and analysis of construction of historic clothing and/or specialized clothing. Prerequisites, 511, 415, and permission.

DRAMA
497 Theatre Organization and Management (2) Sp
Falls
Theoretical and practical examination of the professional theatre organization and management: legal structures, funding, business practices, and operational procedures. Open to non-majors.

DRAMA
498 Theatre Production (1-2, max. 9) A, W, Sp
Laboratory course for students participating in School of Drama productions. Prerequisite, being cast in a production.

DRAMA
499 Undergraduate Research (1-5, max. 15)
AW, Sp
Prerequisite, permission.

Courses for Graduates Only

DRAMA
501 Nature of Graduate Study in Drama (2) A
Lorenzen
Prerequisite, graduate standing.

DRAMA
510 Design Studio I (3 or 5, max. 13)
A, W, Sp
Three quarter sequential investigation of space, light, texture, and color in total theatre design, concurrently stressing 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) A, W, Sp
Artistic principles and techniques as a basis for creative work in theatre design. Studio work in composition, color, line, space, and light and shade. Reports and outside reading may be required.

DRAMA
513 Technical Direction (3, max. 9) A, W, Sp
Louburcy
Practical experience in mounting scenery for a current production. Prerequisites, 413 and permission.

DRAMA
517, 518, 519 Studies in Historic Design (3, 5, 5)
Conway, Crider, Dahlstrom
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.

DRAMA
520 Advanced Theatre Practicum (1-5, max. 15)
Graduate student apprenticeship with professional theatre shops—scenery, lighting, scene painting, or costume. Prerequisites, 513 or 514 or 515, and permission.

DRAMA
530 Seminar in Children's Drama (5) W
Siki
Critical study of philosophies and practices—past and present—of the children's drama movement in the United States; examination of current problems in children's drama education. Prerequisite, permission.

DRAMA
551-552-553 Seminar in Acting (2-2-2) A, W, Sp
Robertas, Siki
Seminar focuses on fundamentals of acting that relate to a child's "dramatic play"; 553 focuses on work with children. Concurrent registration required in 251, 252, 253, and a dance or movement course. Prerequisites, graduate standing and permission.

DRAMA
561 Directing Apprenticeship (5, max. 15)
AW, Sp
Sydow
Apprenticeship with professional director or association with thesis director. Prerequisite, graduate standing.

DRAMA
562 Advanced Directing Projects (3, max. 6)
AW, Sp
Prerequisites, 5 credits in 561 and 2 credits in 563 or equivalent, and permission.

DRAMA
563 Seminar in Directing (2, max. 12) A, W, Sp
Sydow
Seminar discussion on working problems of major productions in which the student is involved; examination of problems of the stage director on the advanced level. Prerequisite, graduate standing.

DRAMA
571, 572, 573 Problems in Theatre History Research (3, 3, 3) A, W, Sp
Lorenzen, Wolcott
Methods and techniques of research in theatre history. Relationship of theatre arts to other arts and society in major periods of theatre history. Prerequisites, 571 for 572; 572 for 573.

DRAMA
575, 576, 577 Seminar in Theatre History (3, 3, 3) A, W, Sp
Lorenzen, Wolcott
Prerequisites, 571, 572, 573.

DRAMA
585, 586, 587 Seminar in Drama (3, 3, 3)
A, W, Sp
Falls, Loper
Seminars inquiring into the relationships between scholarship, criticism, and the art. Prerequisite, permission. (Formerly 581, 582, 583.)

DRAMA
599 Advanced Studies in Theatre Arts (1-5, max. 10) A, W, Sp
Independent study of group study of specialized aspects of theatre arts. Prerequisites, graduate standing and permission.

DRAMA
600 Independent Study or Research (*) A, W, Sp

DRAMA
700 Master's Thesis (*) A, W, Sp

DRAMA-DANCE

Courses for Undergraduates

DRDNC
101, 102, 103 Dance Techniques I (3, max. 6) A, W, Sp
Basic foundation for all special dance techniques. Emphasis on flexibility, strength, balance, endurance, sensory perception, rhythmic awareness; introduction to basic vocabulary of ballet and modern dance techniques; form and style through structured technical work and improvisation. Prerequisites, 101 or permission for 102; 102 or permission for 103.

DRDNC
145 Introduction to Dance History and Literature (1) A, W, Sp
Boris
Historic survey of dance and development of specific dance forms together with a study of major dance literature.

DRDNC
201, 202, 203 Dance Techniques II (5, max. 15; 5, max. 10, 5, max. 10) A, W, Sp
Dance techniques at the intermediate level. Ongoing study in the history of dance is an integrated part of classwork as concerns specific dance styles when they are introduced into the sequential studio work. Prerequisites, 103 or permission for 201; 201 or permission for 202; 202 or permission for 203.

DRDNC
220 Pointe Technique (1, max. 6) A, W, Sp
Fundamentals of the technique of dancing on the toes (en pointe). Prerequisites, 103 or permission and concurrent registration in dance techniques course.

DRDNC
223 Men's Special Techniques (1, max. 6) A, W, Sp
Special techniques for the male dancer in both ballet and modern dance styles. Prerequisites, 103 or permission and concurrent registration in dance techniques course.

DRDNC
231 Folk/Ethnic Dances of Western Cultures (1, max. 6)
One-quarter course offerings of folk and ethnic dances of Western cultures, i.e., Irish, American, Spanish, Scandinavian, or Scotch. See Time Schedule for specific offering. Prerequisite, 103 or audition.

DRDNC
232 Folk/Ethnic Dances of Eastern Europe and Middle East (1, max. 6)
One-quarter course offerings of folk and ethnic dances of Eastern Europe and the Middle East, i.e., Greek, Balkan, Russian, African. See Time Schedule for specific offering. Prerequisite, 103 or audition.

DRDNC
233 Folk/Ethnic Dances of Eastern Cultures (1, max. 6)
One-quarter course offerings of folk and ethnic dances of Eastern cultures, i.e., Korean, Japanese, East Indian, Cambodian. See Time Schedule for specific offering.
Schedule for specific offering. Prerequisite, 103 or audition.

DRONC 301, 302, 303 Dance Techniques III (3-5, max. 15; 3-5, max. 10; 3-5, max. 10) A,W,Sp
Dance techniques at the advanced level. On-going study in the history of dance is an integrated part of classwork as concerns specific dance styles when they are introduced into the sequential studio work. Prerequisites, 203 or permission for 301; 301 or permission for 302; 302 or permission for 303.

DRONC 321 Variations From Repertory (1, max. 6)
Solo dances from existing dance repertory. Prerequisites, 203 or permission and concurrent registration in a dance techniques course.

DRONC 324 Partnering Techniques (1, max. 6) A,WSp
Union techniques for ballet and modern dance. Duets and Pat De Deux from existing dance repertory. Prerequisites, 203 or permission and concurrent registration in a dance techniques course.

DRONC 325 Pre-Classical Dance Forms (1, max. 6)
Court, social, and country dance forms originating in western Europe between the tenth and seventeenth centuries that serve as exemplary models of period form and style. Prerequisite, 103 or permission.

DRONC 326 Jazz Techniques (1, max. 6)
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 audition.

DRONC 327 Afro-American Styles (1, max. 6)
Study and practice of various dance styles currently developing in the United States, combining African and American dance forms and techniques. Prerequisite, 103 or audition.

DRONC 328 Popular Dance Styles (1, max. 6)
All forms of American social dance, contemporary and traditional. Prerequisite, 103 or audition.

DRONC 329 Tap and Soft-Shoe Techniques (1, max. 6) A,WSp
Study and practice of tap and soft-shoe techniques. Study of the history and development of modern tap dancing. Prerequisites, audition and permission.

DRONC 401, 402, 403 Dance Techniques IV (3-5, max. 10; 3-5, max. 10; 3-5, max. 10) A,W,Sp
Dance techniques at the advanced professional level. Prerequisites, 303 or permission for 401; 401 or permission for 402; 402 or permission for 403.

DRONC 465 Experimental Dance Workshop (3, max. 9) A,WSp
Workshop-laboratory designed to explore experimental approaches to dance. Prerequisite, permission.

ECON 200 Introduction to Economics (5) A,WSp
Introduction to economic reasoning. The development of the basic tools of economic theory and their application to contemporary problems. No more than 5 credits from 200 and 211 may be counted toward any degree.

ECON 201 Introduction to Microeconomic Theory (5) A,WSp
Study of the allocation of resources and the distribution of income with emphasis on a market system. Some basic theoretical tools are developed and used to analyze a variety of problems of current interest. Prerequisite, 200 or equivalent, or permission.

ECON 211 General Economics (3) A,WSp
Survey of basic principles of economics: determination of national income, price analysis, and allocation of resources. Primarily for engineering and forestry students. No credit if 200 has been taken.

ECON 250 American Economic History (5) A,WSp
Analysis of American economic growth and change interpreted as part of the general expansion of the North Atlantic economy. Stresses the historical background to contemporary American economic problems.

ECON 320 Current Economic Problems (5) S
Designed primarily for secondary school teachers of social studies with limited knowledge of economics. Emphasis on analysis of major economic problems and policies relevant to high school courses in contemporary social problems. Prerequisite, 200 or equivalent, or permission.

ECON 410 Introduction to Mathematical Economics I (5)
Introduction to mathematics as an economic tool and an aid in the development of logical thought. Introduction to differential and integral calculus, as well as sets, sequences, and mappings with applications to economics. No credit given if Mathematics 124 has been taken.

ECON 411 Introduction to Mathematical Economics II (5)
Introduction to functions of several variables with applications to economics. Partial derivatives, the implicit function theorem, theory of minima and maxima. Economic applications include the Slutsky equations of consumer theory and an elementary mathematical investigation of neoclassical production theory. Prerequisite, 410 or Mathematics 124.

ECON 412 Introduction to Mathematical Economics III (5)
Theory and application of linear algebra and matrix methods with special emphasis on problems originating in economic theory. Prerequisite, 411 or Mathematics 124.

ECON 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 the Department of Geography as Geography 416. Prerequisite, 300 or 400, or equivalent.

MONEY, BANKING, AND CYCLES

ECON 330 Money and Banking (5) S
Demand for, and supply of, money; the bank-
ing system and other financial institutions are studied, with attention to their role in inflation and recession. Prerequisites, 200 and 201, or permission.

ECON
421 Money, Credit, and the Economy (5) S Supply and the use of money, bank deposits, and bank reserves. Relationship of Treasury, Federal Reserve, and commercial bank policies, and the value of money. Factors generating flows of money income. Prerequisites, 300, 301 or equivalent, or permission.

GOVERNMENT REGULATION AND INDUSTRIAL ORGANIZATION

ECON
330 Government and Business (5) A/WSp Study of government and business relations, centering on (1) an analysis of market structures, conduct, and performance, and (2) the application of public policies designed to secure desired economic performance. Microeconomics is given a realistic institutional and empirical content. Special consideration is given to federal antitrust legislation and its application to mergers, business concentration, and restrictive business practices. Prerequisite, 200 or equivalent, or permission.

ECON
404 Industrial Organization and Price Analysis (5) A Study of selected market structures. Directed toward developing more precise predictive techniques and more adequate bases for analysis of public policy. Prerequisite, 300 or equivalent, or permission.

ECON

LABOR ECONOMICS

ECON
340 Labor Economics (5) A/WSp Analysis of labor markets with emphasis on factors determining the size of the labor force, unemployment, distribution of income between labor income and other shares, and related problems. Analysis of public policies, trade union activity, and collective bargaining upon the effectiveness of labor markets and the performance of the economy. Some attention is paid to the noneconomic aspects of trade union activity. Prerequisites, 200 and 201, or permission.

ECON
346 Economics of Health Care (3) Economic analysis of the health-care sector of economy: organization, demand and supply factors, pricing practices, financing mechanisms—public versus private, impact of third party, insurance and prepayment, health and economic development. Prerequisite, 200 or equivalent, or permission.

ECON
441 Union-Management Relations (5) Collective-bargaining process, with special reference to economic implications. Prerequisites, 201 and 340, or equivalent, or permission.

ECON
442 The American Labor Movement (5) Analysis in historical perspective of the American labor movement, its organizational structure, internal policies, and relation to economic policies. Comparison with labor movements in other countries. Prerequisite, 200 or 211, 340 or equivalent, or permission.

ECON
443 Labor Market Analysis (5) Factors that determine wage rates and employment levels in the firm, industry, and economy. Emphasis on the union in the labor market. Prerequisite, 300 or equivalent, or permission.

ECON
445 Income Distribution and Public Policy (5) Income distribution implications and economic effects of public policies toward unemployment, illness, industrial accidents, old age, poverty, and discrimination from age, sex, or race. Prerequisites, 200 and 201, or permission.

ECON
448 Economics of Labor and Human Resources (5) A/WSp Economic analysis of policy-related topics in human resources. Topics include labor demand and supply, education and occupation, wage structures and inequality, discrimination, and poverty. Prerequisite, equivalent of 400, or permission.

PUBLIC FINANCE

ECON
350 Public Finance (5) A/WSp 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, 201 or equivalent, or permission.

ECON
450 Theory of Public Finance and Fiscal Choice (5) Advanced treatment of the theory of taxation and public spending. Designed for undergraduates majoring in economics and for graduate students majoring in fields other than economics. Prerequisite, 300 or equivalent, or permission.

ECON
451 State and Local Public Finance (3) Analysis of state and local government revenue sources and consequences of their use. Includes taxation, user charges, debt finance, and intergovernmental fiscal relations. Emphasis on metropolitan area finance problems. Prerequisite, 201, 400 or equivalent.

ECON
452 Economic Approaches to Political Analysis Application of economic theory and methodology to political phenomenon. Emphasis on theory construction with application in the American context. Offered jointly with the Department of Political Science as Political Science 416. Prerequisites, 201, 400 or equivalent.

ECON
460 Economic History of Europe (5) Origins of the modern European economy; historical analysis of economic change and growth from medieval times that stresses the preconditions and consequences of industrialization. Offered jointly with the Department of History as HST 481. 200, 201 recommended.

ECON
462 Economic History of the United States to the Civil War (5) Systematic study of the changing pre-Civil War economic conditions and the consequences of these changes for the American society. Prerequisite, 201 or equivalent, or permission.

ECON
463 Economic History of the United States From the Civil War to the Present (5) Systematic study of the changing economic conditions since the Civil War and the consequences of these changes for the American society. Prerequisite, 201 or equivalent, or permission.

ECON

ECON

INTERNATIONAL TRADE

ECON
370 Introduction to International Economics (5) A/WSp International trade, commercial policy, and the balance of payments are studied in a theoretical context and used to examine current problems such as international monetary reform, trade and less-developed countries, and regional economic cooperation. Prerequisite, 201 or permission.

ECON
471 International Economics (5) Income and price theory applied to international trade and finance. Analysis of balance of payments adjustments and alternative international monetary and commercial policies. Role of foreign trade and investment in economic growth. Prerequisites, 300, 301, or permission.

COMPARATIVE SYSTEMS AND DEVELOPMENT

ECON
390 Comparative Economic Systems (5) Study of resource allocation, growth, and income distribution in capitalistic, market socialistic, and centrally planned economies. The theoretical models of these systems are developed and then illustrated by case studies of selected countries. Prerequisite, 201 or equivalent, or permission.
ECON 391 Economic Development (S)
Critical appraisal of theories and problems of growth with emphasis on the less-developed countries of the world today. Prerequisite, 201 or permission.

ECON 392 American Indian Economic Development Problems (S) W,S
Topics
Economic problems faced by native Americans. Primary emphasis is on the management of reservation resources, particularly those resources important on reservations in the northwestern United States. Secondary emphasis is on the study of the integration of Indian workers into the general labor force of the United States. Prerequisite, 200 or equivalent, or permission.

ECON 493 Economy of Modern China (S) Sp
Analytical survey of economic development of modern China, with special emphasis on the objectives, performance, and problems of the mainland Chinese economy under communism. Prerequisites, 200 and 201, or permission.

ECON 494 Economic Growth of Japan Since 1850 (S)
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. Prerequisite, permission; 200 and 201 recommended.

ECON 495 The Economy of Soviet Russia (S) Sp
Analytical survey of techniques of planning and resource allocation in the Soviet economy. Criteria for evaluating economic performance, growth, and efficiency. Prerequisite, 300 or equivalent, or permission.

STATISTICS AND ECONOMETRICS

ECON 281 Introduction to Economic Statistics (S) AWsp
Basic statistical concepts; characteristics of economic data; statistical analysis of economic data. Prerequisites, 200 and 201.

ECON 481 Economic Statistical Analysis (S)
Applications of statistical techniques to economic problems. Prerequisites, 201 and 281, or equivalent, or permission.

ECON 482 Advanced Economic Statistical Analysis (S)
Advanced applications of statistical techniques to economic problems. Prerequisite, 481 or equivalent, or permission.

GENERAL

ECON 408 Problems of Peace and Conflict Resolution (S)
Study of issues involved in conflict and in conflict resolution; application to international and other problems. Lectures, discussions, and readings in social psychology, political science, and economics. Offered jointly with the Department of Political Science as Political Science 408. Prerequisite, permission.

ECON 498 Honors Seminar (S) W
Honors and other superior students are given opportunity to develop research techniques, to pursue topics in breadth and depth, and to apply their tools of economic analysis to selected topics in economic theory and to current issues of national and international economic policy. To be taken in the senior year. Prerequisite, permission.

ECON 499 Special Topics: Undergraduate Theory (S)
Introduces to advanced undergraduate students current research going on in economic theory and its application to contemporary problems. Prerequisites, 300, 301, and permission.

ECON 501 Microeconomic Analysis II (S) Wsp
Theory of marginal productivity and the implied wealth distribution. The theory of capital and the implied resource allocation over time. Prerequisite, 500.

ECON 502 Microeconomic Analysis I (S) AW
Cheung, Silberberg
Elements of choice theory. Value and demand, cost and supply, and the implied resource allocation under different constraints of competition. Prerequisites, 300, 301, and 410, or Mathematics 124, or permission.

ECON 503 Microeconomic Analysis III (S) Wsp
Cheung, Parks
Theory of marginal productivity and the implied wealth distribution. The theory of capital and the implied resource allocation over time. Prerequisite, 500.

ECON 504 Microeconomic Analysis IV (S) AW
Sadat, Kochin
Recent developments. Prerequisite, 502 or permission.

ECON 505 Microeconomic Theory: Problems and Applications (S)
Seminar for graduate students who have completed the basic core sequence in price theory. Designed to test the student's analytic and problem-solving abilities by working systematically through a programmed set of readings and problems. The material includes both formal analytical techniques and applications of economic theory. Prerequisite, 501.

ECON 507 History of Economic Thought (S)
Classical and neoclassical economics with emphasis on the latter.

ECON 511 Advanced Microeconomic Theory: Selected Topics (3, max. 12) W
Seminar in advanced microtheory. Selected topics of special interest and significance. Prerequisites, 500, 501, 502, and 503.

ECON 512 Advanced Macroeconomic Theory: Selected Topics (3, max. 12)
Seminar in advanced macrotheory. Selected topics of special interest and significance. Prerequisites, 500, 501, 502, 503, and permission.

ECON 520 The Economics of Property Rights (S) Cheung
Application of standard economic theory to analyze various forms of property rights as constraints of competition; the costs associated with delineation and enforcement of rights; the costs of negotiating and enforcing contracts for right transfers; resource allocation and income distribution implied by different property right and transaction cost constraints. Prerequisites, 500, 501, or permission.

ECON 521 Property Rights and Economic Explanations (S)
Cheung
Derivation and testing of refutable hypotheses to interpret observable behavior through the use of standard economic principles and explicit specifications of the constraints of property rights and transaction costs. Prerequisites, doctoral candidate standing and permission.

ECON 555 Economics of Location (S)
Higgs
Application of economic theory in the explanation of spatial interrelationships, including the location of individual producers and consumers, spatial economic organization within regions and within cities, and locational aspects of economic growth. Prerequisites, 300 and 301.

GOVERNMENT REGULATION AND INDUSTRIAL ORGANIZATION

ECON 530 Government Regulation of Business (S)
Public policy in the United States with respect to industrial organization and business conduct. Recent issues in public control of business.

ECON 533 Price Policy and Industrial Organization (S) Sp
Crutchfield, McGee
Advanced analysis of market structures and industry performance; selected empirical studies; principles of conservation and benefit-cost analysis; issues in public policy. Prerequisite, 500 or permission.
ARTS AND SCIENCES

ECON 535. Economics of Natural Resources I (3) W
Brown, Crutchfield, Halvorsen
Programming, allocation, and utilization of natural resources; externalities; public investment criteria; technological relationships; alternative strategies of public decision making; benefit-cost analysis; case studies. Prerequisite, 435 or 500, or permission.

ECON 536. Economics of Natural Resources II (3) Sp
Brown, Crutchfield, Halvorsen
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 or 500, or permission.

LABOR ECONOMICS

ECON 541. Labor Economics (3)
Hashimoto
Selected topics in labor economics. Prerequisite, permission.

ECON 542. Labor Economics (3)
Gillingham, McCaffree, Rahm
Selected topics in labor economics. Prerequisite, permission.

ECON 546. Economic Studies of Health Care (3)
Kessel, Lagace, McCaffree
Analysis of economic studies of health care, including demand, manpower shortages, licensure price discrimination, optimum-size practices, cost indices and productivity, research, economic growth and health expenditures, and current national health policies. Offered jointly with the School of Public Health and Community Medicine as Health Services 546. Prerequisites, 400 or equivalent, and permission.

ECON 556. Seminar in Urban Economics (3)
Pollakowski
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 the Department of Geography as Geography 556. Prerequisites, 300, 301, or equivalent.

PUBLIC FINANCE AND TAXATION

ECON 550. Public Finance I (3) W
Halvorsen
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 or permission.

ECON 551. Public Finance II (3) Sp
Pollakowski
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; allocation and welfare consequences of inflationary finance. Prerequisites, 500, 502, and 550, or permission.

ECON 553. Economic Analysis and Government Programs (3) Sp
Applications of economic analysis to public enterprises and programs. Prerequisites, 400, 401, or equivalent.

ECON 555. Economic History

ECON 561. European Economic History (3) W
Morris, North, Thomas
Economic growth of the Western world since the decline of the Roman Empire. Prerequisites, 504 and permission.

ECON 562. American Economic History (3) Sp
Higgs, North, Thomas
Analytical methods; sources and reliability of data; consideration of some major issues in current research. Prerequisites, 500 and 504, or permission.

INTERNATIONAL TRADE

ECON 571. International Trade Theory I (3) W
Hadjimichalakis
Modern developments in general equilibrium theory and welfare economics, with relation to international trade. Prerequisite, permission.

ECON 572. International Trade Theory II (3) Sp
Hadjimichalakis
Problems of foreign trade and exchange controls, and international monetary policies. Prerequisite, permission.

ECON 594. Economic History and Economic Development (3) A
Higgs
See Economic History 504 for course description.

ECON 599. Theory and Practice of Economic Planning (3) W
Thornton
Theoretical issues and success criteria; models, techniques, and applications of planning in the allocation of economic resources. Prerequisite, permission. (Offered alternate years.)

ECON 591. Theoretical Issues in Economic Development (3) W
Thornton
Analysis of issues in economic development with application to the less-developed countries of the world today. Prerequisite, 504.

ECON 595. Soviet Economics (3) Sp
Thornton
Analysis of problems of economic measurement, economic development, resource allocation, planning and decentralization in the Soviet Union. Prerequisite, permission. (Offered alternate years.)

MATHEMATICAL ECONOMICS

ECON 511. Mathematical Economics Activity
Analysis (3) A
Hartman, Silberberg
Linear programming. Theory of convex bodies. Input-output models. Competitive equilibrium and Pareto optimum. Linear activity analysis of production and applications. Prerequisites, 412, 500, or permission.

ECON 514. General Equilibrium Analysis (3)
Bassett, Hadjimichalakis, Silberberg
Study of the existence, uniqueness, and stability of general equilibrium models under the assumptions of competition. Emphasis is on recent developments in the literature with consideration given to both positive and normative economics.

ECON 515. Special Topics in Mathematical Economics (3) Sp
Hartman
Seminar covers selected topics in mathematical economics. Emphasis is on providing access to existing literature, and on developing the logical thought and the techniques necessary if one is to contribute to the field. Prerequisite, permission.

ECON 517. Foundations of Economic Analysis (3) A
Bassett, Hartman, Silberberg
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) A
Miller, Parks, Silberberg
Study of empirical estimation techniques and related methodological problems.

ECON 581. Econometrics II (3) W
Parks, Rad
Advanced study of econometric methods and techniques. Prerequisites, 481, 482, and 580.

GENERAL

ECON 600. Independent Study or Research (*)
AWSp

ECON 700. Master's Thesis (*) AWSp

ECON 800. Doctoral Dissertation (*)

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.
ENGL 104-105 Introductory English (5-5) AWSp
AWSp
Emphasis upon writing and analysis of reading selections. For Educational Opportunity Program students only.

ENGL 106 Practical Forms of Writing (5)
Instruction in writing essay examinations, reports, reviews, and research papers. Prerequisites, 104, 105, or special placement.

ENGL 111 Writing About Literature (5) AWSp
Interpretive and critical writing, based upon selected works in fiction, drama, and poetry. Prerequisite, qualifying score on the Washington Pre-College Test.

ENGL 121, 122 Issues, Topics, and Modes (5,5)
AWSp, AWSp
Argumentative and persuasive writing, based upon reading drawn from a variety of sources—ancient and modern, informative and imaginative literature—arranged by themes of contemporary interest, to be announced in advance. Prerequisite, qualifying score on the Washington Pre-College Test.

ENGL 171, 172 College Writing (3,3) AWSp, AWSp
Development of writing skills. Students are encouraged to develop their own resources and to acquire new techniques for more meaningful and effective expression. Related readings in expository prose. Prerequisite, qualifying score on the Washington Pre-College Test for 171; 111, 121, 122, or 171 for 172.

LOWER-DIVISION COURSES

LITERARY INTERPRETATION AND ANALYSIS

Three introductory courses (211, 212, 213) investigating literary techniques and forms, why and how writers use them to convey thought and feeling, and practical criticism of a variety of material within each field. Not historical surveys, these courses draw primarily on nineteenth-and twentieth-century writings.

ENGL 211 Prose Fiction (5) AWSp
(Formerly 258.)
ENGL 212 Poetry (5) AWSp
(Formerly 257.)
ENGL 213 Drama (5) AWSp
(Formerly 259.)

VARIELTIES OF LITERATURE FOR GENERAL READERS

ENGL 221 Popular Fiction (5) AWSp
Investigation of themes, conventions, and world views of the western, the mystery, science fiction, current best sellers, magazine prose, and forms of pulp writing. Emphasis on these works like The Adventures of Sherlock Holmes, The Ox-Bow Incident, and The Virginian that remain perennially popular.

ENGL 222 The Writer as Social Critic (5) AWSp
Investigation of ways writers respond to social realities that seem to them unsatisfactory or unjust, and literary forms they adopt to embody their views and solutions, whether by analysis, satire, protest, propaganda, or dramatic characterization.

ENGL 223 Children's Literature Reconsidered (5) AWSp
Re-examination of works like Alice's Adventures in Wonderland, Grimm's Tales, Mother Goose, and Tom Sawyer in the light of their political, social, psychological, and moral implications, both in the past and at the present.

ENGL 231 Shakespeare (5) AWSp
Survey of Shakespeare's career as dramatist. Study of representative comedies, tragedies, romances, and history plays. (Formerly 324.)

ENGL 241 The Bible as Literature (5) AWSp
Introduction to the development of the religious ideas and institutions of ancient Israel, with selected readings from the Old Testament and New Testament. Emphasis on reading the Bible with literary and historical understanding. (Formerly 390.)

ENGL 251 Introduction to World Literature (5)
AWSp
Introduction to literature from various ages, languages, and cultures, representing different genres, by writers of major literary and historical significance.

ENGL 261 The Medieval Tradition in Literature (5) AWSp
Introduction to literature of medieval England, from the fifth to the fifteenth centuries. Some works are read in modern English translation; others (especially later works) are read in Middle English.

UPPER-DIVISION COURSES

ENGL 271, 272 Advanced Expository Writing (5,5) AWSp, AWSp
Practice in writing information and opinion papers to develop accurate, easy, and effective expression. Prerequisite, sophomore standing.

ENGL 274, 275, 276 Beginning Verse Writing (5,5,5) A, AWSp
Intensive study of the ways and means of making a poem. Prerequisite, sophomore standing.

ENGL 277, 278 Beginning Short Story Writing (5,5)
AWSp, AWSp
Introduction to the theory and practice of writing the short story. Prerequisites, sophomore standing for 277; 277 or permission for 278.

ARTS AND SCIENCES

ENGL 311 Chaucer's Canterbury Tales and other poetry, with attention to Chaucer's social, historical, and intellectual milieu. (Formerly 425.)

ENGL 312 Medieval and Renaissance Drama, Exclusive of Shakespeare (5) A
Works by such dramatists as Kyd, Marlowe, Jonson, Webster, Beaumont, Fletcher, and Ford, with some medieval liturgical plays, cycles, and moralities. (Formerly 322.)

ENGL 313 Renaissance Literature (5)
Poetry and prose by such writers as Wyatt, Surrey, Gascoigne, Spenner, Sidney, Marlowe, Drayton, Shakespeare, Lyly, Lodge, Nash, and Raleigh, with attention to the religious, intellectual, and literary contexts. (Offered alternate years.) (Formerly 321.)
ENGL 314 Shakespeare to 1603 (5) A,W,Sp
Shakespeare's career as dramatist before 1603 (including Hamlet). Study of history plays, comedies, and tragedies. (Formerly 325.)

ENGL 315 Shakespeare After 1603 (5) A,W,Sp
Shakespeare's career as dramatist after 1603. Study of comedies, tragedies, and romances. (Formerly 326.)

ENGL 321 English Literature of the Seventeenth Century (5) W
Poetry and prose by such writers as Donne, Jonson, Herrick, Marvell, Herbert, Crashaw, Vaughan, Dryden, Edward Taylor, Bacon, Browne, Burton, Hobbes, and Bunyan, with attention to the religious, intellectual, and literary contexts. (Formerly 331.)

ENGL 322 Milton (5) A,W,Sp
Milton's early poems and the prose: Paradise Lost, Paradise Regained, and Samson Agonistes, with attention to the religious, intellectual, and literary contexts. (Formerly 332.)

ENGL 323 English Drama, 1660-1800 (5) A
Restoration and eighteenth-century plays by Dryden, Wycherley, Etherege, Congreve, Goldsmith, Sheridan, and others. (Formerly 333.)

ENGL 324 Restoration Literature, 1660-1700 (5) W
Dryden and other satirists and playwrights, diarists, and essayists. (Offered alternate years.) (Formerly 335.)

ENGL 325 Early Eighteenth-Century Literature (5) A,W,Sp
Works by Swift and Pope and such other writers as Defoe, Addison, Steele, Gay, and Thomson. (Formerly 336.)

ENGL 326 Later Eighteenth-Century Literature (5) AW
Works by Johnson, Boswell, and representative dramatists, novelists, and poets. (Formerly 337.)

ENGL 327 English Novels: Eighteenth Century (5) A,W,Sp
Defoe, Richardson, Fielding, Smollett, Sterne, early Jane Austen, and representative minor novelists. (Formerly 417.)

ENGL 331 Romantic Poetry (5) A,W,Sp
Blake, Wordsworth, Coleridge, and their contemporaries. (Formerly 341.)

ENGL 332 Romantic Poetry (5) A,W,Sp
Byron, Shelley, Keats, and their contemporaries. (Formerly 342.)

ENGL 333 English Novels: Early and Middle Nineteenth Century (5) A,W,Sp
Austen, the Brontes, Dickens, Thackeray, and other representative novelists. (Formerly 418.)

ENGL 334 English Novels: Later Nineteenth Century (5) A,W,Sp
Elliot, Hardy, Conrad, and other representative novelists. (Formerly 419.)

ENGL 335 Victorian Poetry (5) A
Tennant, Browning, Arnold, Hopkins, and such other poets as Hardy, D. G. Rossetti, Meredith, Clough, Morris, Wilde, and Yeats. (Formerly 344.)

Nonfictional prose by such writers as Burke, Coleridge, Wordsworth, De Quincey, Carlyle, Mill, Arnold, Newman, and Ruskin. (Formerly 347.)

ENGL 341 Modern British Poetry (5) W,Sp
Hardy, Yeats, Elliot, Auden, and such other poets as Lawrence, Muir, Owen, Graves, Emerson, Thomas, Larkin, Hughes. (Formerly 348.)

ENGL 342 English Literature 1900-1930 (5) A,W,Sp
Works by Joyce, Yeats, Eliot, Lawrence, Forster, Woolf, and others. (Formerly 430.)

ENGL 343 English Literature Since 1930 (5) A,W,Sp
Works by such writers as Bowen, Orwell, Waugh, Cary, Snow, Murdoch, Auden, Thomas, Lessing, Pinter, Greene, Durrell, and Beckett. (Formerly 431.)

ENGL 351 American Literature: Beginnings to 1800 (5) W
Responses to the New World and literary strategies in the literature of the colonies and the early republic. Works by Taylor, Edwards, Franklin, and others. (Formerly 361.)

ENGL 352 American Literature: Early Nineteenth Century (5) A,W,Sp
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. (Formerly 362.)

ENGL 353 American Literature Later Nineteenth Century (5) A,W,Sp
Literary responses to an America propelled forward by accelerating and complex forces. Works by T. W. James, and such other writers as Whitman, Dickinson, Adams, Howells, Crane, Dreiser, and DuBois. (Formerly 363.)

ENGL 354 American Literature, 1914-45 (5) A,W,Sp
Works by such writers as Anderson, Lewis, Cather, O'Neill, Frost, Pound, Eliot, Cummings, Hemingway, Fitzgerald, Faulkner, Steinbeck, Hart Crane, Stevens, and Porter. (Formerly 434.)

ENGL 355 American Literature Since 1945 (5) A,W,Sp
Works by such writers as Ellison, Miller, Warren, Penn, Williams, Wright, Flannery, O'Connor, Salinger, Albee, Mailer, Vonnegut, Barth, Heller, Baldwin, Hawkes, Kesy. (Formerly 435.)

ENGL 356 American Poetry: Beginnings to 1917 (5) W
Poetry by Taylor, Whitman, Dickinson, and such others as Emerson, Poe, Bradstreet, Freneau, Bryant, Longfellow, Crane, Robinson. The lineage and characteristics of lyric and epic in America. (Formerly 364.)

ENGL 357 American Poetry Since 1917 (5) Sp
Works by such poets as Frost, Stevens, Williams, Pound, Moore, Eliot, Ransom, Cummings, Crane, Roethke, Bishop, and Lowell. (Formerly 365.)

ENGL 358 The Literature of Black America (5) A,W,Sp
Selected works by Afro-American writers, with emphasis on twentieth-century literature. (Formerly 369.)

ENGL 361, 362, 363 Types of Contemporary Poetry (5,5,5) A,W,Sp
(Formerly 413, 414, 415.)

ENGL 371 Modern European Literature In Translation (5) A,W,Sp
Fiction, poetry, and drama from the development of modernism to the present. Works by such writers as Mann, Proust, Kafka, Gide, Hesse, Rilke, Brecht, Sartre, and Camus. (Formerly 437.)

ENGL 372 Modern Jewish Literature In Translation (5) Sp
Survey of Jewish experience and its expression during the past hundred years. Typical writers studied are Sholom Aleichem, Peretz, Reisen, Babel, Kafka, I. B. Singer, Wizel, Grade, Halpern, and A. (Formerly 438.)

ENGL 374 Study Abroad Program (5) Sp
This course, for students in the Study Abroad program, relates major works of literature to the landscape and activities of its setting. (Formerly 301.)

ENGL 375 Women and the Literary Imagination (5) A,W,Sp
Study of women writers or ways various writers have portrayed woman's image, social role, psychology, etc.

ENGL 376 Women Writers (5) W,Sp
Study of the work of women writers in English and American literature.

ENGL 381 History of Literary Criticism (5) A,W,Sp
Survey of the classical sources (Plato, Aristotle, Longinus, Horace) and major writers of English criticism, such as Sidney, Johnson, Dryden, Pope, Johnson, Wordsworth, Coleridge, Arnold, Wilde, Richards, Leavis, and Trilling.

LANGUAGE COURSES

ENGL 391 English Grammar (5) A,W,Sp
Description of sentence, phrase, and word structures in present-day English. Open to sophomores. (Formerly 387.)

ENGL 392 Current English Usage (5) W
Principles for deciding what constitutes good English in an individual's speech and writing. (Formerly 388.)
ENGL 393 History of the English Language (5)
Evolution of English sounds, forms, structures, and word meanings from Anglo-Saxon times to the present. Open to sophomores. (Formerly 447.)

ENGL 394 English Prose Style (5) Sp
Analysis of the traits of language that contribute to the effects of writings in prose. (Formerly 449.)

ENGL 395 American Writers: Studies in Major Authors (5)
Concentration on one writer or a special group of American writers.

ENGL 396 British Writers: Studies in Major Authors (5)
Concentration on one writer or a special group of British writers.

ENGL 397 Topics in American Literature (5)
Exploration of a theme or special topic in American literary expression.

ENGL 398 Topics in British Literature (5)
Themes and topics of special meaning to British literature.

ENGL 399 Special Studies in Literature (5)
Concentration on a theme or topic in literature, not confined by national boundaries or historical periods. (Formerly 499.)

LITERARY HISTORY
Six courses (401-406) concerned with development of literary forms, subjects, and styles, with the associated intellectual tradition and social history. Students should have substantial preparation in the literature of the period.

ENGL 401 English Literature: Beginnings to 1500 (5)
Recommended preparation: 241, 251, 261, 311, 312 (any two); or equivalent reading.

ENGL 402 English Literature: 1500-1660 (5)
Recommended preparation: 312, 313, 314, 315, 321, 322 (any two); or equivalent reading.

ENGL 403 English Literature: 1660-1780 (5)
Recommended preparation: 313, 314, 315, 321, 322, 323, 324, 325, 326, 327 (any two); or equivalent reading.

ENGL 404 English Literature: 1780-1900 (5)
Recommended preparation: 311, 332, 333, 334, 335, 336 (any two); or equivalent reading.

ENGL 405 American Literature: Beginnings to 1900 (5)
Recommended preparation: 351, 352, 353, 356 (any two); or equivalent reading.

ENGL 406 Twentieth-Century British and American Literature (5)
Recommended preparation: 341, 342, 343, 354, 355, 357 (any two, preferably one of 341, 342, 343, and one of 354, 355, 357); or equivalent reading.

LITERARY TYPES AND GENRES

ENGL 411 Types of Dramatic Literature: Comedy (5) W
Analyses of dramatic structures. American, British, and European plays representing the kinds of comedy from classical to modern. (Formerly 410.)

ENGL 412 Types of Dramatic Literature: Tragedy (5) A
Analyses of dramatic structures. American, British, and European plays representing the nature of tragedy from classical to modern. (Formerly 411.)

ENGL 413 Romances and Folk Literature (5)
Medieval romance in its cultural and historical setting, with concentration on the evolution of Arthurian romance. (Offered alternate years.) (Formerly 423.)

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.) (Formerly 424.)

ENGL 415 Introduction to the Folktale Among Literate Peoples (5) A
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 the College of Engineering as Humanistic-Social Studies 471. Prerequisite, upper-division standing. (Formerly 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 the College of Engineering as Humanistic-Social Studies 472. (Formerly 472.)

ENGL 417 Utopias and Social Ideals (5) Sp
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. (Formerly 426.)

ADVANCED WRITING COURSES

ENGL 421 Special Studies in Expository Writing (5) WSp
Individual projects in nonfiction, including short biography, historical narrative, and opinion writing. Prerequisite, 271 or 272, or permission. (Formerly 451.)

ENGL 422, 423, 424 Advanced Verse Writing (5,5,5) A,WSp
Intensive study of ways and means of making a poem. Prerequisite, 274, 275 or 276 or permission. (Formerly 453, 454, 455.)

ENGL 425, 426 Advanced Short Story Writing (5,5) A,WSp,W,AWSp
Experience with the theory and practice of writing the short story. Prerequisites, 277, 278, or permission. (Formerly 457, 458.)

Experience in planning, writing, and revising a work of long fiction, whether from the outset, in progress, or in already completed draft. Prerequisite, permission. (Formerly 461, 462, 463.)

ENGL 430, 431 Playwriting (5,5) Sp,Sp
Experience in planning, writing, and revising a play, whether from the outset, in progress, or in already completed draft. (Formerly 374, 375.)

COURSES PRIMARILY FOR TEACHING CANDIDATES

ENGL 441 The Composition Process (5) Sp
Consideration of psychological and formal elements basic to writing and related forms of nonverbal expression and the critical principles that apply to evaluation. (Formerly 480.)

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 fluence, discursive and imaginative writing. (Formerly 481.)

ENGL 443 Current Developments in English Studies Conference (5)
(Formerly 482.)

ENGL 444 Special Topics in English for Teachers (3-5, max. 10)
(Formerly 483.)

CONFERENCES AND SEMINARS

ENGL 490, 491 Major Conference (3,3)
W,AWSp
Individual study by arrangement with instructor and approval of undergraduate chairman. For majors only.

ENGL 492H Major Conference for Honors (5) ASp
Individual study (reading, papers) by arrangement with instructor. Required of, and limited to, Honors seniors in English.

ENGL 493, 494 Advanced Writing Conference (3-5,3-5) A,WSp,W,AWSp
Tutorial arranged by prior mutual agreement between individual student and instructor. Revision of manuscripts is emphasized but new work may also be undertaken. Prerequisite, permission.

ENGL 499H Special Studies in Literature for Honors (5, max. 10) A,W
Themes and topics offering special approaches to literature. Required of, and limited to, Honors students.

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)
Study in detail of one or more systems of grammar besides traditional grammar. 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
547 Rhetoric (5)
ENGL
548 Twentieth-Century Literature (5)
ENGL
553 Current Rhetorical Theory (5)
Prerequisite, teaching experience.
ENGL
561 English Literature, Beginnings to 1500 (5)
Graduate survey for first-year graduate students.
ENGL
562 English Literature, 1500-1660 (5)
Graduate survey for first-year graduate students.
ENGL
563 English Literature, 1660-1780 (5)
Graduate survey for first-year graduate students.
ENGL
564 English Literature, 1780-1900 (5)
Graduate survey for first-year graduate students.
ENGL
565 American Literature, Beginnings to 1900 (5)
Graduate survey for first-year graduate students.
ENGL
566 Anglo-American Literature, Twentieth Century (5)
Graduate survey for first-year graduate students.
ENGL
580 Critical Approaches to Literary Texts (5)
Prerequisite, teaching experience.
ENGL
586 Graduate Writing Conference (5)
ENGL
599 Special Studies in Literature (5, max. 15)
ENGL
600 Independent Study or Research (*)
ENGL
700 Master’s Thesis (*)
ENGL
800 Doctoral Dissertation (*)
ENVIRONMENTAL STUDIES
Courses for Undergraduates
ENV S
210 Natural Processes in Ecosystems (5) W Fleming
Survey of climates and weather patterns, geological processes, natural selection, competition, predator-prey interactions, and dynamics of plant and animal communities. Intended for persons wishing to obtain a broad picture of the basic processes taking place in natural environments and of their implications for the kinds of manipulations and degradations of environments associated with human use of the land.
ENV S
498 Special Topics in Environmental Studies
2-5, max. 20
Lecture, seminar and/or team study with topics varying from quarter to quarter. Prerequisite, permission.
ENV S
499 Undergraduate Research (*)
Individual or team research of selected environmental topics. Prerequisite, permission.
GENERAL AND INTERDISCIPLINARY STUDIES
Course numbers under this heading are reserved by the Division of General and Interdisciplinary Studies for curriculum innovations. Descriptions of GIS course offerings are available during preregistration and in-person registration in the Office for Undergraduate Studies, C14 Padeford.
GENERAL STUDIES
G ST
220 Project-Oriented Study (1-5, max. 10) AWPSP
For freshmen and sophomores only. Maximum of 15 credits in project-oriented study (General Studies 220 and 350) may be counted toward a degree in the College of Arts and Sciences.
G ST
300H Honors Colloquium (Humanities) (2, max. 6)
Discussion of selected topics in a variety of subject matter fields. Topics and reading material vary from year to year. Open to juniors and seniors in the College of Arts and Sciences Honors Program. Prerequisite, permission.
G ST
302H Honors Colloquium (Science) (2, max. 6)
Discussion of selected topics in a variety of subject matter fields. Topics and reading material vary from year to year. Open to juniors and seniors in the College of Arts and Sciences Honors Program. Prerequisite, permission.
G ST
350 Project-Oriented Study (1-5, max. 15) AWPSP
For juniors and seniors. Maximum of 15 credits in project-oriented study (General Studies 250 and 350) may be counted toward a degree in the College of Arts and Sciences.
G ST
391 Supervised Study in Selected Fields (*)
OPEN (5)
Special supervised study in a field represented in the College of Arts and Sciences. Prerequisites, permission of supervisor of study and Office for Undergraduate Studies.
G ST
455, 456 Critical Problems of Our Culture (3-5,3-5)
Two interdisciplinary courses for seniors in which faculty from several departments discuss the critical problems of our culture as seen from their various specialties. Prerequisite, senior standing; juniors by permission.
G ST
492 Latin-American Studies Seminar (5)
Proseminar primarily for Latin-American studies majors, involving readings and research on a broad topic concerning Latin America. Prerequisite, senior standing in Latin-American studies major or permission.
G ST
493 Senior Study (1-5) AWPSP
For General Studies majors only. Prerequisites, permission of supervisor of study and Office for Undergraduate Studies.
## GENETICS

### Courses for Undergraduates

**GENET 351** Human Genetics: The Individual and Society (3) W Garstler, Stadler

Discussion of the genetic factors pertinent to problems confronting the individual and society. The genetic consequences of population structure and of environmental contamination, and the genetic components of disease, intelligence, and behavior are some of the topics discussed. This course is appropriate for non-science majors and is not recommended as a substitute for 451 for majors in biological sciences. Open for credit to all upper-division students who have not taken 451 or the equivalent.

**GENET 451** Genetics (4) AWSp Gallant, Hartwell, Roman, Sandler, Stadler

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 452** Advanced Genetics (3)

Discussion course designed to follow 451. For students with an interest in further examining selected topics in general genetics. Prerequisite, 451.

**GENET 451 Laboratory (2) Sp** Doermann

Intended for students who desire laboratory experience in the use of genetic materials. Prerequisites, Genetics 451 or equivalent and organic chemistry.

**GENET 479** Laboratory Problems in Medical Genetics (9) AWSp

Fiakow, Garstler, Motulsky

In-depth work on a selected laboratory problem in medical genetics. Intended primarily for junior and senior medical students. Prerequisites, Human Biology 449 and permission.

**GENET 499** Undergraduate Research (*) AWSp

Prerequisite, permission.

### Courses for Graduates Only

**GENET 501** Introduction to Research Materials (3, max. 9) AWSp

The student is assigned to one of the several research areas of the department to work with a research group for a quarter at a time. Prerequisite, graduate standing in the Department of Genetics or permission.

**GENET 520** Seminar (1, max. 15) AWSp

Prerequisite, permission.

**GENET 531** Problems in Human Genetics (2) W Motulsky

Advanced course in human genetics emphasizing modern aspects and research methods. Prerequisite, 451 or permission. (Offered alternate years; offered 1975-76.)

**GENET 551** Mutation and Recombination (3) A

First course in a three-quarter sequence in molecular genetics. Contributions of research with micro-organisms to an understanding of the molecular basis of mutation and recombination: life cycles, mutation rate, mutagenesis, structure of DNA molecules, fine-structure genetics, enzymology and genetics of recombination, DNA transformation. Prerequisite, 451 or permission.

**GENET 552** Information Transfer (3) W

Current understanding of the molecular mechanisms involved in the replication of genetic material and transfer of genetic information into RNA and protein molecules: enzymology and genetics of DNA replication by bacteria and viruses, organization and replication of DNA in chromosomes and cytoplasmic organelles of the cells of higher organisms, replication of RNA viruses, genetics and biochemistry of protein synthesis, the genetic code, messenger RNA transcription from DNA, enzymology of RNA synthesis. Prerequisite, 551 or permission.

**GENET 553** Regulation of Gene Expression (3) Sp

Current understanding of mechanisms of gene expression: physiology of messenger RNA synthesis and decay, control of translation, processing of proteins, genetics and biochemistry of regulation of bacterial operons and bacterial virus development, ribosome biogenesis, genesis of antibody diversity. Prerequisite, 552 or permission.

**GENET 554** Topics in Genetics (2, max. 6) AWSp

Current problems and research methods. Prerequisite, permission.

**GENET 555** Bacteriophage Experiments (4) Doermann

Sequence of laboratory experiments to familiarize student with current molecular methods of investigating genetic structure, replication, recombination, and mutation in virulent bacteriophages. Prerequisite, permission.

**GENET 556** Bacteriophage Genetics (2) Sp Doermann

Inheritance mechanics of bacteriophages and structure and function of their apparatus are discussed. Molecular models derived from genetic data are emphasized. Prerequisite, permission.

**GENET 560** Chromosomal Behavior (3) W Sandler

Properties of meiotic chromosomes with special emphasis on recombination and segregation. Prerequisite, permission. (Offered alternate years; offered 1975-76.)

**GENET 561** Cytogenetics (3) W Roman

Discussion of cytological investigations of normal and aberrant chromosomal behavior, with particular reference to the structure of the chromosome and its response to mutagenic agents. Prerequisite, permission. (Offered alternate years; offered 1974-75.)

**GENET 562** Regulation Genetics (3) Sp Feltenstein

Mathematical and experimental approaches to the genetics of natural populations, especially as they relate to evolution. Prerequisite, permission.

**GENET 583** Methodology in Biochemical Genetics (2) A Hall

Experiments and discussion sections on modern research techniques used in biochemical genetics. Prerequisite, permission.

**GENET 584** Genetic and Biochemical Analysis by Electron Microscopy (1-5) Practical application of electron microscopic methods for determining cellular and macromolecular structure, with emphasis on genetic systems. Prerequisite, permission.

**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 also 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) AWSp

Major concepts and methods in the field; analysis of selected problems and types of regions. Honors sections available for honors students by permission.

**GEOG 200** Introduction to Human Geography (5) W Velikogna


### INTRODUCTION TO FIELDS IN GEOGRAPHY

**GEOG 205** Man’s Physical Environment (5) AWSp Romanowski

Survey of character and location of different types of land forms, climates, soils, vegetation, minerals, and water resources; their significance to human occupancy.

**GEOG 207** Economic Geography (5) AWSp Boyer, Boyer, Krume, Thomas

Introductory analysis of the spatial order and changing locational patterns of man and his economic activities. Emphasis placed on concepts and theories pertaining to primary, sec-

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ECONOMIC ARTS

GEOG 227 Historical Geography of Black America (3) W
Eichenbaum, Morrill
Study of the historical process of Afro-American migration and segregation in Afro-American settlement patterns in the United States; study of theories of the human use of space as related to Afro-American migration and settlement.

GEOG 235 Geography of the Lesser-Developed World (5) Sp
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 (2) AWSp
Sherman, Youngman
Categories of maps and aerial photographs and their special uses; map reading and interpretation.

GEOG 277 Geography of Cities (5) Sp
Survey of the spatial and functional orderliness of cities; their location, distribution, function, and spread. Particular emphasis on current urban problems—sprawl, city decline, and metropolitan transportation.

GEOG 287 The Structure of Political Regions (5) A
Jackson
Spatial organization of political activity; a survey of contemporary political regions, both state and national, with special emphasis on the political organization of the Puget Sound lowland.

INTERMEDIATE AND ADVANCED COURSES

GEOG 300 Advanced Regional Geography (5) Sp
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. Prerequisite, 100 or upper-division standing.

SYSTEMATIC FIELDS

GEOG 303 Perspectives on Man and Nature (5) Jackson
Introduces the main theses of man's relationship to nature as expressed in Western and Asian geographic thought; emphasizes the sources of man-environmental dualism and dialectic leading to contemporary ecological discussion in geography. Serves as an introduction to the history of geographic thought. Prerequisites, 100, 205, or permission.

GEOG 315 Agricultural Geography (5) Romanowski
Survey of the physical, social, and economic elements comprising agriculture and their variation in time and space. Prerequisite, 207 or permission.

GEOG 325 Historical Geography of America (3) A

GEOG 342 Geography and Inequality in the United States (3) Sp
Morrill
Geography of social and economic inequality. Analysis of the spatial distribution of wealth and poverty and the possible causes. Geographic and other aspects of the alleviation of poverty. The geography of racial and ethnic discrimination, from Indian reservations to ghettos, as well as religious and age discrimination.

GEOG 350 Urban and Regional Analysis (3) A
Krumme
Spatial organization of the economy; methodology in the study of location of economic activities and their spatial interrelations; economic regionalization.

GEOG 370 Conservation of Natural Resources (5) ASp
Principles and practices in effective utilization of resources; public policies relating to conservation.

GEOG 375 Political Geography (5) A
Jackson, Veelkonja
Study of the spatial variations and interrelationships of political activities and systems.

GEOG 415 Agricultural Systems and Regions (3) Romanowski
Provides the student with a deeper understanding of the operation 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 supervised field work. The timing of field trips is arranged by the class. Prerequisite, 315 or permission.

GEOG 416 Urban Economics (5)
Application of economic analysis to urban trends, problems, and prescriptions, such as changing urban form and function, urban public finance, housing and renewal, poverty and race, transportation, and environmental problems. Offered jointly with the Department of Economics as Economics 416. Prerequisite, Economics 300 or 400, or equivalent.

GEOG 444 Geography of Water Resources (3 or 5) W
Marrs
Analysis and appraisal of water resources in land and industrial development; problems and policies of river basin planning with emphasis on the Pacific Northwest. Lectures, 3 credits; independent study, 2 additional credits with permission.

GEOG 448 Geography of Transportation (3) W
Ullman
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 Transportaton (3 or 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. Lectures, 3 credits; independent study, 2 additional credits. Prerequisite, 207 or permission.

GEOG 450 Theories of Location (3 or 5) W
Beyers, Krumme, Morrill
Classical and neoclassical theories of location of agricultural, residential, industrial, and recreational activities, spatial equilibrium conditions for individuals, organizations, sets of activities, urban land use and settlement patterns, and associated networks focusing on the effect of transportation and transport costs. Course represents, in part, the history of thought in theoretical economic geography. Prerequisite, 207 or permission.

GEOG 452 Location and Behavior (3 or 5) Sp
Krumme
Principles governing individual and organizational behavior in space. Emphasis is placed on
the interdependence of economic and noneconomic goals, aspirations, and other stimuli and constraints as they affect economic location and interaction decisions in urban and industrial settings. Behavioral frameworks are investigated as to their explanatory power for the analysis of spatial decision-making processes. Prerequisite, 450 or permission.

**GEOG 465 Regional Planning and Development (3 or 5) Sp Thomas**

Emphasis placed primarily on the process of implementing regional development policies in economically advanced and lesser-developed countries. Resultant changes that occur in the distribution and structure of economic activities and settlement patterns are also studied and evaluated. Lectures, 3 credits; independent study, 2 additional credits with permission. Offered jointly with the Department of Urban Planning as Urban Planning 466.

**GEOG 475 Problems in Political Geography (5) W Jackson, Vellkonja**

Selected problems of spatial patterns and dynamic relationships. Geographical problems of regional, national, and international organization. Prerequisite, 375 or permission.

**GEOG 477 Urban Location and Structure (3) A Ulman**

Analysis of urban and other agglomerated settlements in terms of nature, economic base, site and situation, distribution, supporting areas, and new trends in metropolitan form and arrangements.

**GEOG 478 Urban Spatial Patterns (3) W Boyce**

Analysis of intraurban land-use patterns and structure; particular attention to locational theories pertaining to population, land-use lattices, rents, gradients, and normative spatial relationships. Prerequisite, upper-division standing.

**GEOG 498 Undergraduate Seminar in Economic Geography and Regional Science (3) Krumme**

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 selection of predominantly local and regional empirical research subjects. Seminar format. Prerequisite, permission.

**REGIONAL FIELDS**

**GEOG 302 The Pacific Northwest (3) AWSp Bayers**

Survey of the economy of the Pacific Northwest in the light of factors of location, resources, resource-oriented industries, and resource policies. An introduction to regional studies on a local scale.

**GEOG 304 Western Europe (5) A Fleming**

Analysis of the physical and socioeconomic characteristics of western Europe. Contempo-

**GEOG 305 Eastern Europe (5) W Romanowski, Vellkonja**

Analysis of the physical, historical, and socioeconomic characteristics of eastern Europe.

**GEOG 307 Australia and New Zealand (5)**

Pastoral and agricultural development; industrial potential; urbanization; immigration and trade policies; external economic and political relations.

**GEOG 313 East Asia (5) W Kakiuchi**

Nature and geographic setting of Far Eastern civilization with reference to 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**

RussianSoviet landscape as it has been affected by migration and settlement, urbanization, collectivization, industrialization, and the growth of a transport network.

**GEOG 336 Regional Geography of China (5) W 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. Prerequisite, 100 or permission.

**GEOG 402 United States (5) Sp Boyce, Eichenbaum**

Spatial pattern of economic and social life in America—how it evolved, the role of the environment and resources; problems of regional inequality in development.

**GEOG 404 Problems in the Geography of Western Europe (3 or 5) Sp Fleming**

Emphasis on problems stemming from contemporary political and socioeconomic changes under way in Europe. Topics include urbanization, regional development, economic integration and patterns of trade. Lectures, 3 credits; independent study, 2 additional credits with permission.

**GEOG 405 Problems of Eastern Europe (5) A Romanowski, Vellkonja**

Analysis of selected geographical aspects of Eastern Europe. Natural and human resource base, social and political organization. Their relationships and interdependence. Prerequisite, 305 or permission.

**GEOG 433 Soviet Resource Use and Management (5)**

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)**

Analysis of regional and political structures; resources, economic activities, and problems of development; overseas and internal relationships.

**GEOG 435 Problems in the Geography of China (5) A Chang**

Origins and development of Chinese civilization in its geographic base and areal spread; political China and the Chinese sphere; physical base and resources; problems of agriculture, population, industrialization, urbanization, transportation, and contemporary development; communist China.

**GEOG 437 Problems in the Geography of Japan (3 or 5) Sp Kakiuchi**

Regional structure of Japanese urban, industrial, and agricultural geography. Analysis of contemporary patterns considering cultural and physical factors and selected aspects of their historical development. Lectures, 3 credits; independent study, 2 additional credits with permission.

**GEOG 438 Soviet Regions and Regionalization (3 or 5) Sp Jackson**

Evaluation of prerevolutionary and Soviet efforts to determine a basis for subdividing Russia into regions, together with an analysis of contemporary Soviet regions and their economic development. Lectures, 3 credits; independent study, 2 additional credits with permission.

**CARTOGRAPHY**

**GEOG 350 Principles of Cartography (5) ASp Sherman, Youngmann**

Map scales, grid systems, symbolism, and map reproduction. Laboratory experience in application of these principles to map design and construction.

**GEOG 361 Experimental Cartography (5) A Sherman**

Application of, and experimentation with, cartographic techniques and materials. Problems of relief representation, mapping of quantitative data, and their relation to reproduction processes. Prerequisite, 360.

**GEOG 363 Aerial Photographs as Source Materials (3) A Sherman**

Training in the use of aerial photographs as source materials in map compilation and other geographic purposes. Prerequisite, 360.

**GEOG 365 Introduction to Computer Cartography (3 or 5) W Youngmann**

Introduction to the origins, development, and methods of automated cartography. Experiments with a user-oriented package of computer mapping programs capable of performing most thematic mapping operations. Requires normal use of the Computer Center with special emphasis on the CALCOMP plotter.
line-printer, and cathode-ray tube (CRT) display. Students who have taken General Engineering 115 or Engineering 141 can take 365 for 3 credits. Prerequisites, 360 and a computer programming course, or permission.

GEOG 430 Map Projections (3) W
Veress
Classification of projections, theory of distortion. Projection from ellipsoid to sphere. Theory of conformal projections (Lambert, Mercator, stereographic). Equal area projections. Polyconic and other projections. Offered jointly with the Department of Civil Engineering as CETC 430. Prerequisite, permission.

GEOG 450 Field Research (6, max. 12)
Development and application of skills essential to geographic field investigations: (1) training in the use of field techniques and base materials; (2) evaluation of these in various projects of research situations; (3) analysis and interpretation of field data; and (4) presentation of results of field investigations.

GEOG 499 Special Studies (*, max. 15) A W Sp
Supervised reading programs, undergraduate and graduate library and field research; special projects for undergraduate Honors students. Prerequisites, senior class, graduate standing, and permission.

Courses for Graduates Only

GEOG 500 Contemporary Geographic Thought (3, max. 6) AW
GEOG 501 Geographic Analysis (3)
GEOG 502 Professional Writing in Geography (*, max. 6) Sp
GEOG 503 Research Seminar: Eastern Europe (3, max. 6) Sp
GEOG 504 Research Seminar: Western Europe (3, max. 6) Sp
Fleming, Velikonja
GEOG 505 Research Seminar: China and Northeast Asia (3, max. 6) W Sp
Chang
GEOG 506 Research Seminar: Southeast Asia (3, max. 6) AW
GEOG 508 Research Seminar: Historical Geography of Anglo-America (3, max. 6)
GEOG 509 Research Seminar: Japan (3, max. 6) W
Kakuchi
GEOG 510 Research Seminar: Settlement and Urban Geography (3, max. 9) W
Boyce, Ullman
GEOG 520 Research Seminar: Cartography (3, max. 6) Sp
Sherman, Youngmann
GEOG 526 Research Seminar: Quantitative Methods in Geography (3, max. 6) W
Morrill
GEOG 527 Information Systems for Planning and Research (3) A
Horwood
Computer programming technology and data systems design for large-scale data inputs. Machine editing, data manipulation, and information retrieval. Laboratory problems adapted to specialized interests of students. No previous computer programming experience required. Offered jointly with the Department of Civil Engineering as CETC 527 and with the Department of Urban Planning as Urban Planning 527.

GEOG 528 Automated Mapping and Graphing (3) W
Horwood
Computer applications to statistical and areal analysis. Laboratory problems adapted to specialized interests of students. Offered jointly with the Department of Civil Engineering as CETC 528 and with the Department of Urban Planning as Urban Planning 528. Prerequisites, basic statistics and 527 or permission.

GEOG 529 Computer Applications to Urban and Regional Analysis (3) Sp
Horwood
Simulation models and automated systems for the study of land use and related economic and demographic data. Machine methods of planning analysis and feedback review. Laboratory projects. Offered jointly with the Department of Civil Engineering as CETC 529 and with the Department of Urban Planning as Urban Planning 529. Prerequisite, 528 or permission.

GEOG 533 Research Seminar: Soviet Union (3, max. 6) AW
Jackson
GEOG 538 Research Seminar: Geography of Transportation (3, max. 6) Ullman
GEOG 539 Research Seminar: Utilization of Water Resources (3, max. 6)
GEOG 540 Research Seminar: Industrial Geography (3, max. 6) Sp
Beyers, Krumme
GEOG 542 Research Seminar: Social and Population Geography (3, max. 6) W
Morrill, Velikonja
Prerequisite, graduate standing.

GEOG 550 Research Seminar in Location Theory (3) W
Beyers, Krumme
Discussion of selected research-oriented topics in classical, neoclassical, and behavioral location theory. Theoretical problems of locational analysis. Relationships between location theory and regional development and planning concepts. Location concepts for urban analysis. Prerequisite, permission.

GEOG 552 College Teaching of Geography (2, max. 6) A W Sp
General instructional strategies, including expository and inquiry approaches, together with use of media. Explanation in geography and geographic theory and principles as the basis of instructional sequencing. Prerequisites, appointment as a teaching assistant in the Department of Geography and permission. (Not offered 1975-76.)
GEOG

GEOG 556 Seminar in Urban Economics (3) W Pollokowski
The 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 the Department of Economics as Economics 556. Prerequisites, Economics 300, 301, or equivalent.

GEOG 566 Regional Planning Seminar (3) Thomsen
Regional planning and development theories and methodologies. Critical evaluation of regional planning in selected economically advanced and less-developed countries. Offered jointly with the Department of Urban Planning as Urban Planning 566. Prerequisites, 466 and graduate standing.

GEOG 567 Research Seminar: Geography and Development (3, max. 6) A Thomas
Offered jointly with the Department of Urban Planning as Urban Planning 567. (Formerly 530.)

GEOG 570 Research Seminar: Natural Resources Analysis (3, max. 6) W Prerequisite, graduate standing.

GEOG 575 Research Seminar: Political Geography (3, max. 6) Velikanja

GEOG 577 Research Seminar: Internal Spatial Structure of Cities (3, max. 9) A Sp Boyce Prerequisite, 478 or permission.

GEOG 600 Independent Study or Research (*) A WSP

GEOG 700 Master's Thesis (*) A WSP

GEOG 800 Doctoral Dissertation (*)

GEOLOGICAL SCIENCES

Courses for Undergraduates

GEOL 101 Physical Geology (3) A WSP
Survey of the physical systems that give the earth its form. Emphasizes the dynamic nature of interior and surface processes and their relevance to mankind and stresses the value of rocks and earth forms in the understanding of past events. A course with laboratory for non-science majors.

GEOL 105 Geology and the Human Environment (5) W Dunne
Beginning course relating geology to an awareness of and understanding of contemporary environmental problems. Topics include survey of geologic equilibria, geologic hazards, and earth resources and their relationship to man's activities and his environment. Specific environmental problems and possible approaches to solutions are emphasized. Includes laboratory, discussion sections, and field trips.

GEOL 105 History and Ancient Environments of Life (5) Sp Renzberger, Wheeler
Introduction to the evolution of life and its environments as documented in the rocks through geologic time, three billion years ago to the present.


GEOL 205 Introduction to Geological Sciences (5) AW
Introduction to geology, with laboratory, for science majors, with emphasis on the physics, the chemistry, and the history of the earth. Not open to students who have taken 101. Prerequisite, a background in physics, chemistry, and mathematics is desirable.

GEOL 301 Introduction to Field Geology (5) S Introduction to methods of geologic field study. Taught from off-campus field camp during September. Registration is Summer Quarter. Prerequisite, major standing in geological sciences or geological oceanography, or permission.

GEOL 308 Geology of the Northwest (5) SpS
Geologic history of Washington, Oregon, and Idaho. Emphasis on use of geologic principles in interpreting evidence found in landscape and rocks. Prerequisite, 101 or 205, or equivalent.

GEOL 311 The Earth's Surface (4) A Dunne, Porter Dynamic role of physical geologic processes operating at the earth's surface in the development of surface features and environments. Climatic control of processes and the effect of climatic variations on landscape evolution; human effects and environmental management are stressed.

GEOL 320 Mineralogy (5) AW Christensen, McCallum
Introduction to mineralogy, including elementary crystallography (lattice 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, Chemistry 101 or 140.

GEOL 321 Principles of Petrology (5) Sp Evans
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.

GEOL 340 Structural Geology (5) Sp Cowan Interpretation of rock structures and their genesis. Prerequisite, 321 or permission.

GEOL 341 The Earth's Interior (3) W Bostrom, Stuiver
Introduction to geophysics of solid earth, including thermal processes, seismology, and earth structure, the earth's gravity and magnetism, tectonics, geochronology, and the origin and chronologic development of the earth.

GEOL 361 Surface Deposits and Fossils (5) W Whitney Basic concepts of stratigraphy and paleontology and the interpretation of geologic history.

GEOL 401, 402 Field Course (*, max. 15) *, max. 15) Off-campus field work in general geology, emphasizing geologic mapping and report writing. No more than 15 credits in 401, 402 combined will be allowed. Prerequisite, major in geological sciences with senior standing or permission.

GEOL 405 Interpretation of Geophysical Data (5) Sp Bostrom Interpretation of geophysical data, including signal separation utilizing harmonic analysis and linear operators. Individual data may be used by arrangement with instructor. Prerequisites, 341 and calculus to level of partial differential equations. Course is complementary to Geological Sciences 450.

GEOL 406 General Seismology (5) Bostrom Ray theory analysis applied to an inhomogeneous earth; travel time analysis; observational seismology, instruments, quantitative measurement of earthquakes; properties of earth's interior; tectonic significance of earthquakes. Prerequisite, 341.

GEOL 411 Fluvial Geomorphology (3) Sp Dunne Hydraulic and dynamic characteristics of streams, morphology of drainage basins, landscape evolution by stream sculpture and deposition, and climatic implications of changes in stream regimen. Prerequisite, senior standing.

GEOL 414 Photogeology (3) W Porter Geologic interpretations of aerial photographs with emphasis on solving field problems. Prerequisites, 340, 461, or equivalent. (Offered odd-numbered years.)

GEOL 415 Principles of Glaciology (4) A LaChapelle, Porter, Raymond, Stuiver, Untersteiner, Washburn Structure and properties of snow and ice: snow metamorphism, avalanches, heat and mass balance of valley 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 the Geophysics Program as Geophysics 415. Prerequisites, upper-division standing and permission.

ARTS AND SCIENCES

GEOL 340 Structural Geology (5) Sp Cowan Interpretation of rock structures and their genesis. Prerequisite, 321 or permission.

GEOL 341 The Earth's Interior (3) W Bostrom, Stuiver
Introduction to geophysics of solid earth, including thermal processes, seismology, and earth structure, the earth's gravity and magnetism, tectonics, geochronology, and the origin and chronologic development of the earth.

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Interpretation of glacial history through study of sediments and landforms, with emphasis on climatic implications, chronology, and correlation. Prerequisite, senior standing or permission.

Physical and biological evidence, both terrestrial and marine, for cyclic climatic change during the late Cenozoic, emphasizing regional stratigraphic patterns, dating, and correlation. Growth and dissipation of Quaternary ice sheets and alpine glaciers, as indicated by the geologic record. Use of this data to evaluate theories on causes of glacial ages and potential for predicting future climatic variations. Offered jointly with the Quaternary Research Center at Quaternary Studies 417.

Glacial Geology
Porter, Washburn
Prerequisite, 103 or Biology 101 of 210. (Offered even-numbered years.)

Evolution and classification of the major groups of mammals from the Mesozoic to the present. Prerequisite, 437 or equivalent. (Offered odd-numbered years.)

Advanced Structural Geology (5) A
Mach
Analysis in space and time; genetic interpretation; principles of geotectonics. Prerequisite, 340 or equivalent.

Stress and Deformation of Geological Materials (3) Sp
Blacic
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.)

Advanced Structural Geology (5) A
Mach
Analysis in space and time; genetic interpretation; principles of geotectonics. Prerequisite, 340 or equivalent.

Techniques in Geophysics (3) A
Boatrom
Introduction to geophysics of the solid earth, outlining instruments, techniques, and interpretation. Prerequisite, senior standing in geology or permission.

Interpretation of Geologic History (5) W
Wheeler
Regional and interregional integration of physical geology and biostratigraphy as basis for geologic history of North America. Prerequisites, 430 and 461, or equivalent.

Rock and Mineral Analysis (5) W
Grisesen
Survey of analytical methods employed in geochemistry, emphasizing the theoretical basis for various techniques and their limitations. With laboratory. Prerequisites, 320, 321, Chemistry 160, or equivalent.

Elements of Geochemistry (4) A
Grisesen
Introduction to the interpretation and understanding of geological processes from the chemical standpoint. Prerequisite, senior standing in geological sciences or permission.

Introduction to Geological X-ray Analysis (3) W
Grisesen
Introduction to the routine analysis of geologic materials by the methods of X-ray diffraction and fluorescence spectroscopy, with laboratory. Prerequisite, senior standing or permission.

History of Geology (3)
Study of the contribution of individuals to the evolution of geological concepts. Prerequisite, senior standing in geological sciences or permission.

Mineral Industry Economics (3) 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. Prerequisites, 205, Mining Engineering 322, or permission. Offered jointly with the Department of Mining, Metallurgical, and Ceramic Engineering as Mining Engineering 481.

Economic Geology of Igneous and Metamorphic Rocks (5) W
Cheney
Description and origin of fuels, water resources, and metallic and nonmetallic ore deposits indigenous to regoliths, sediments, and sedimentary rocks. Prerequisite, senior standing in geological sciences or permission. (Offered even-numbered years.)

Economic Geology of Igneous and Metamorphic Rocks (5) W
Cheney
Description and origin of metallic and nonmetallic ore deposits formed in igneous and metamorphic rocks or by igneous and metamorphic processes. Prerequisite, senior standing in geological sciences or permission.

Economic Field Geology (4) Sp
Cheney
Four-to-five-day trip to neighboring mining region for field inspection of ore deposits. Two weekend trips to map mineralized areas. Lectures on geological and geochemical techniques of mineral exploration and mapping. Prerequisite, 487 or permission.

Undergraduate Thesis (3) AWSp
The thesis must be submitted at least one month before graduation. Prerequisites, senior standing and permission.

Undergraduate Research (*, max. 5) AWSp
Prerequisite, permission.

Courses for Graduates Only

Advanced Studies in Geomorphology and Pleistocene Geology (*, max. 10) AWSp
Porter, Washburn

Seminar in Geomorphology (*) AWSp
Porter, Washburn

Seminar in Pleistocene Research (2) AWSp
Porter, Washburn
GEOL 513 Quaternary Stratigraphy of the Western Hemisphere (3)
Quaternary stratigraphy of North and South America, Antarctica, and Greenland. Emphasis on glacial record of North America and on nonglacial record of selected areas throughout the hemisphere. Offered alternate years jointly with the Quaternary Research Center as Quaternary Studies 513.

GEOL 514 Quaternary Stratigraphy of the Eastern Hemisphere (3)
Quaternary stratigraphy of Europe, Africa, Asia, and Pacific islands. Emphasis is on European glacial record and on nonglacial record of South Asia and Africa. Offered jointly with the Quaternary Research Center as Quaternary Studies 514.

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.

GEOL 518 Advanced Problems in Periglacial Processes (3) A
Washburn
In-depth examination of various cold-climate geomorphic processes and their results, especially those related to frost action. Prerequisite, 418 or equivalent. (Offered even-numbered years.)

GEOL 520 Advanced Studies in Crystallography, Mineralogy, and Petrology (*) A WSp

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 alternate years.)

GEOL 522 Metamorphic Processes (5) W
Misch
Deformation and crystallization, migmatization, and mobilization. Prerequisite, 425 or equivalent. (Offered alternate years.)

GEOL 525 Theoretical Metamorphic Petrology (4) A
Evans
Theoretical treatment of metamorphic mineral assemblages and metamorphic processes. Prerequisite, 425, Chemistry 456, or equivalent.

GEOL 526 Theoretical Igneous Petrology (4) W
McCullam

GEOL 527 Rock-Forming Minerals (3) A
Evans, 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 530 Seminar in Advanced Invertebrate Paleontology (*, max. 9) A
Mallory

GEOL 531 Stratigraphic Paleontology (5) Sp
Mallory
Principles of stratigraphic paleontology and chronologic biostratigraphy. Prerequisites, 430, 461, or equivalent. (Offered odd-numbered years.)

GEOL 533 Paleocology of Invertebrates (5) Sp
Mallory
Properties of fossil populations and interpretation of habit and habitat in the geologic past. Prerequisites, 321, 430, or permission. (Offered odd-numbered years.)

GEOL 533 Seminar in Invertebrate Paleontology (3, max. 9) A WSp
Renberger
Advanced topics in vertebrate evolution, morphology, classification, function, ecology, and stratigraphy. Subject to be chosen by class at beginning of quarter. Prerequisite, advanced standing in paleontology, vertebrate zoology, or physical anthropology.

GEOL 540 Advanced Studies in Structural Geology (*) A WSp
McCree, Miich

GEOL 544 Structure of Europe (5) Sp
Misch
Structural evolution and geotectonics of Europe. (Offered alternate years.)

GEOL 546 Structure of Asia and West Pacific Rim (5) Sp
Misch
Structural evolution from Central Asia to West Pacific: geotectonic principles. (Offered alternate years.)

GEOL 547 Literature on Structural Geology (3 or 5) W
Misch
Selected readings and seminars on Cordilleran structure.

GEOL 549 Structural Analysis of Tectonites (4) Sp
Blacic
Fundamentals 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, 445. (Offered odd-numbered years.)

GEOL 550 Studies in Geophysics (*, max. 9) A WSp
Bostrom, Christensen, Crosson

GEOL 553 Physical Properties of Earth Material (3) Sp
Christensen, Crosson
Composition of rocks; mechanical, thermal, magnetic, and electrical properties of rocks; tensor properties of crystals; measurement of rock properties at high pressures and temperatures. Offered jointly with the Geophysics Program as Geophysics 553. Prerequisite, Aeronautics and Astronautics 567 or equivalent.

GEOL 560 Advanced Studies in Stratigraphy (*) A WSp
Mallory, Wheeler

GEOL 565 Paleozoic Stratigraphy (5) Sp
Wheeler
North American Paleozoic stratigraphy as a basis for interpretation of regional and interregional geologic episodes. (Offered even-numbered years.)

GEOL 568 Mesozoic Stratigraphy (5) Sp
Wheeler
North American Mesozoic stratigraphy as a basis for interpretation of regional and interregional geologic episodes. (Offered odd-numbered years.)

GEOL 570 Advanced Studies in Geochemistry (*) A WSp
Evans, Gresens, McCallum

GEOL 571 Engineering Geology (3) W
Coombs
Geologic principles as applied to large engineering projects. Emphasis is on the physical properties of rocks and their relation to contemplated engineering structures.

GEOL 573 Application of Microprobe Techniques (4) W
Evans

GEOL 576 Geochronometry (4) A
Stuiver
Principles, methods, and applications of dating rocks and organic materials.

GEOL 580 Advanced Studies in Sedimentology (*) A WSp
Stewart, Whetten

GEOL 582 Seminar in Sedimentology (2) W
Stewart, Whetten
Lectures, discussions, and readings on selected problems of current interest.

335
GEOL 585 Advanced Studies in Economic Geology (*) AWSp
Cheney, Coombs

GEOL 587 Advanced Economic Geology (4) A Cheney
Origin of metallic ores with emphasis on geochemistry and isotopic geology; four-to-five-day field trip to mining region. Prerequisites, 472 or equivalent, and 486 or 487. (Offered odd-numbered years.)

GEOL 590 Seminar (*) AWSp

GEOL 600 Independent Study or Research (*) AWSp

GEOL 700 Master's Thesis (*) AWSp

GEOL 800 Doctoral Dissertation (*)

GEOPHYSICS

GPHYS 403 Geophysics: The Earth (3) A
Description of the earth and its interior, including knowledge derived from study of the earth's gravity, magnetism, and heat flow as well as from the field of seismology. Discussion of the unifying concepts of plate tectonic theory toward understanding of the earth's outer structure. Quantitative approaches to problems using the techniques of potential theory. Eigenfunction expansions, spherical harmonic analysis, and Laplace transform theory are applied to problems related to the earth's gravity field, earth tides, and heat flow in the earth. Prerequisite, Mathematics 238 or equivalent.

GPHYS 404 Geophysics: The Ocean (3) A
Introduction to geophysical fluid dynamics. An overview of fluids in geophysics with emphasis on the ocean and ice. A nonrigorous development of the equations of motion with examples drawn from dynamical oceanography. Prerequisite, Mathematics 238 or equivalent.

GPHYS 405 Geophysical Continuum Mechanics (3) V

GPHYS 406 Geophysics: The Atmosphere (3) Sp
Structure and composition of the atmosphere, atmospheric radiation, use of meteorological data, humidity and cloud processes, structure and dynamics of large scale weather systems. Offered jointly with the Department of Atmospheric Sciences as Atmospheric Sciences 406. Prerequisite, 404 or permission.

GPHYS 407 Geophysics: Space (3) Sp
Survey of various phenomena occurring in the outer regions of the earth's atmosphere, the ionosphere, the magnetosphere, and the Van Allen radiation belts. Behavior of charged particles in the geomagnetic field and simple concepts of plasma and magnetohydrodynamic waves. Prerequisite, Physics 323 or equivalent.

GPHYS 415 Principles of Geology (4) A Lachappelle, Porter, Raymond, Swiver, Untersteiner, Waisburn
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 the Department of Geological Sciences as Geological Sciences 415. Prerequisites, upper-division standing and permission.

GPHYS 501 Earth Potential Fields (3) A
Booker, Lister
Application of potential theory to the interpretation of magnetic and gravity anomalies. Heat flow and interpretations. Global tectonics. Prerequisite, 403.

GPHYS 502 Geophysics of Solids (3) W Blace, Merrill
Introduction to the applications of solid-state physics to geophysics. The origin and the properties of remnant magnetization in rocks. Equations of state and the composition of the mantle. Defects in solids and their roles in tectonophysics. Prerequisite, permission.

GPHYS 503 Elements of Seismology (3) Sp
Croston, S. Smith
Propagation of elastic waves and techniques of determining the properties of the deep interior of the earth. The nature of earthquakes and their relation to geologic processes. Prerequisite, 405.

GPHYS 504 Geophysical Data Collection and Analysis (3) W 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 session includes problem solving on computer-based processing system. Prerequisite, permission.

GPHYS 505 Geophysical Inverse Theory (3) Sp
Booker
Introduction to the mathematical techniques for estimating properties of physical systems, such as the earth or atmosphere, from data that is insufficient for a precise specification of the system. Emphasis is on the concept of the resolving power of data sets. The ideas developed are quite general and have a wide range of applicability in the field of data interpretation. Prerequisites, 504 and permission.

GPHYS 510 Physics of Ice and Snow (3) A Hobbs
Structure of the water molecule. Crystallographic structures of ice. Electrical, optical, thermal, and mechanical properties of ice. Growth of ice from the vapor and liquid phases. Physical properties of snow. Offered jointly with the Department of Atmospheric Sciences as Atmospheric Sciences 510. Prerequisite, permission.

GPHYS 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 sheets. Theories of ice ages. Offered jointly with the Department of Atmospheric Sciences as Atmospheric Sciences 511. Prerequisite, 510 or permission.

GPHYS 512 Glaciology II: Dynamic Glaciology (3) Sp Raymond
Rheology of ice. Internal deformation and sliding of glaciers. Thermal regime of glaciers. Steady flow, dynamic response to changing climate, and surges. Deformation and drift of sea ice. Snow and avalanche dynamics. Offered jointly with the Department of Atmospheric Sciences as Atmospheric Sciences 512. Prerequisites, 510, 511, or permission.

GPHYS 513 Glaciology III: Structural Glaciology (3) A Raymond, Untersteiner
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 relationship between structures and bulk physical properties. Offered jointly with the Department of Atmospheric Sciences as Atmospheric Sciences 513. Prerequisites, 510, 511, 512, or permission.

GPHYS 514 Field Glaciology (6) Sp Lachappelle, Raymond, Untersteiner
Structure and metamorphism of snow cover. Energy exchange at melting snow and ice surfaces. Deformation and flow of glaciers. Climatology and mass budgets. Glacier features: Emphasis on instrumentation, field techniques, and data analysis. Offered jointly with the Department of Atmospheric Sciences as Atmospheric Sciences 514. Prerequisite, 510 or 512 or permission.

GPHYS 530 Seminar (1-2) AWSp
Review of current literature in geophysics and graduate student research with faculty participation. Prerequisite, graduate standing.

GPHYS 531 Structure of the Upper Atmosphere (3) A Leovy
Structure of atmosphere above the tropopause. Roles of photochemistry, diffusion, and escape in determining composition. Absorption and emission of radiation, and thermal structure. Formation and properties of the ionosphere. Offered jointly with the Department of Atmospheric Sciences as Atmospheric Sciences 531. Prerequisite, Physics 320.

GPHYS 535 Introduction to Plasma in Geophysics (3)
Kinetic theory of ionized gases, phase space distribution, magnetohydrodynamics of conducting fluids, transport processes, configuration-space instabilities in the magnetosphere, charged particle trajectories in nonuniform fields, geomagnetic trapping in radiation belts, electromagnetic and hydrodynamic waves in
anisotropic media, velocity-space instabilities, propagation in the ionosphere and magnetosphere. Prerequisite, graduate standing or permission.

GPHYS 536 Geomagnetism (3) W

GPHYS 537 Magnetosphere I (3) Sp
Parka
Formation by interaction of solar wind with geomagnetic field. Trapped particles. Electromagnetic waves in anisotropic plasma. Dynamic disturbances and plasma instabilities. Prerequisite, 535 or permission.

GPHYS 538 Magnetosphere II (3) A
Parka
Plasma waves. Propagation of very low frequency and hydromagnetic waves in the magnetosphere. Interactions between plasma waves and particles. Prerequisite, 537.

GPHYS 539 Dynamics of the Upper Atmosphere (3) Sp
Leovy
Properties of the ionosphere, electromagnetic wave propagation, the dynamics of the ionosphere. Offered jointly with the Department of Atmospheric Sciences as Atmospheric Sciences 539. Prerequisite, Atmospheric Sciences 542 or permission.

GPHYS 551 Advanced Potential Theory and Applicable (3) A
Crosby
Fundamental existence theorems of potential theory, geopotential and the physical surfaces of the earth, special topics in physical geodesy; statistical methods, integral equation techniques, and celestial mechanics; implications with regard to the mass distribution in the earth. Prerequisites, 501, 502 and Mathematics 569 or equivalent.

GPHYS 552 Theoretical Seismology (3) W
Crosson
Wave motion in uniform and layered elastic solids, dispersion, surface waves, modal analysis; inhomogeneous and anisotropic media; effects of anelasticity, gravity, and curvature, eigenvariations of the earth. Prerequisite, Aeronautics and Astronautics 546.

GPHYS 553 Physical Properties of Earth Material (3) Sp
Christensen, Crosson
Composition of rocks; mechanical, thermal, magnetic, and electrical properties of rocks; tensor properties of crystals; measurement of rock properties at high pressures and temperatures. Offered jointly with the Department of Geological Sciences as Geological Sciences 553. Prerequisite, Aeronautics and Astronautics 567 or equivalent.

GPHYS 554 Earth Rotation and Tidal Forces (2) Sp
Burrom
Causes and consequences of changes in the rotation of the earth.

GPHYS 571 Gravity and Geomagnetic Interpretation (3) A
Lewis
Fundamental 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 the Department of Oceanography as Oceanography 571. Prerequisites, Mathematics 324, Physics 323, or equivalents or permission.

GPHYS 572 Geodynamics (3) A
Lister
Qualitative discussion of the processes that cause crustal movement, viewed on a global scale, and the techniques used to investigate these processes. Prerequisite, permission.

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 the Department of Oceanography as Oceanography 573. Prerequisite, permission.

GPHYS 574 Tectonophysics (3) A
Boucot
The physics of rock deformation, theory of brittle and ductile behavior, techniques of experimental rocks deformation at high temperature, and pressure with applications to flow processes in the mantle and crust. Prerequisite, permission.

GPHYS 580 Special Topics in Geophysics (2-6, max. 12) Sp
Intensive treatment 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, graduate standing or permission.

GPHYS 600 Independent Study or Research (*)
AWSp

GPHYS 700 Master's Thesis (*)
AWSp

GPHYS 800 Doctoral Dissertation (*)

GERMANIC LANGUAGES AND LITERATURE

Courses for Undergraduates

GERM 101, 102, 103 First-Year German (5,5,5) A,W,AWSp,AWSp
The methods and objectives are primarily audiolingual, with emphasis on speaking and listening. Secondary objectives are reading and writing.

GERM 111, 112, 113 First-Year German (5,5,5)
AWSp,AWSp,AWSp
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.

GERM 121, 122 First-Year Reading German (5,5) AWSp
Special beginning course devoted exclusively to the reading objective; 122 continuation of 121. For graduate students only.

GERM 123, 124, 125 German for the Elementary School (3,3,3) A,W,AWSp
Training in basic German grammar, pronunciation, and intonation with practical techniques for using German in the elementary classroom; organization of study units, songs, dialogues, and dramatizations. Open to those with little or no background in German.

GERM 130 Conversational German Through Films (2, max. 6) AWSp
Conversational German in everyday situations, based on a widely acclaimed German film series. Of special use to travelers. Stress is on oral German, with conversation practice in small groups. Although the series progresses through the year, beginners may enroll in any quarter.

GERM 201 Basic Second-Year German (5) AWSp
Readings and oral practice in German, plus grammar review. Prerequisite, 103 or equivalent.

GERM 202 Intermediate Second-Year German (5) AWSp
Continuation of 201. Prerequisite, 201 or equivalent.

GERM 203 Advanced Second-Year Reading (3)
AWSp
Introduction to classics of German literature. Majors and minors take concurrently with 207. Prerequisite, 202 or equivalent.

GERM 207 Advanced Second-Year Conversation (2)
AWSp
Discussion of general topics to develop oral fluency. Prerequisite, 202 or equivalent.

GERM 211 Basic Second-Year Reading (5) A
Primary emphasis is placed on the reading skill. The active reproduction of German is de-emphasized. Prerequisite, 113 or equivalent.

GERM 212 Intermediate Second-Year Reading (5)
AWSp
Readings in German history and culture. Students may do supervised work in readings relating to his own discipline. Prerequisite, 211 or equivalent.

GERM 213 Advanced Second-Year Reading (3) ASp
Readings in contemporary German history and culture. Students may do readings relating to his own discipline. Prerequisite, 212 or equivalent.

GERM 230 Conversational German (5) A
Intensive. For participants in the German House and in special summer programs only. Prerequisite, 103 or equivalent.
### ARTS AND SCIENCES

**GERM 260 Lower-Division Scientific German (5)**  
Students in the sciences may substitute 260 for 212. Prerequisite, 211 or equivalent.

**GERM 261 Advanced Scientific German (3) Sp**  
Concentration on the further development of a general science vocabulary. In addition, students read texts relating specifically to their own scientific disciplines. Prerequisite, 260 or equivalent.

**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. For majors and minors only.

**GERM 301, 302, 303 Grammar and Conversation (3,3,3) A,W,Sp**  
Materials used aim not 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; primarily for majors and minors. 301: emphasizes phonetics and vocabulary; 302 and 303: stress conversation and composition. Prerequisite, 15 credits in second-year German or equivalent.

**GERM 307 Third-Year Composition (5)**  
For participants in special summer programs only. Not open for credit to those who have had 301, 302, 303.

**GERM 310 Introduction to Twentieth-Century Literature (3)** A  
Critical analysis, interpretation, and comparison of individual works by twentieth-century writers. Short stories, poems, and one play by Kafka, Zweig, Walser, Borchert, Boll, Aichinger, Trakl, Rilke, Heym, Brecht, Frisch, and others. Prerequisite, 15 credits in second-year German or equivalent.

**GERM 311 Introduction to the German Novel (3)** WS  
Critical analysis, interpretation, and comparison of the theory and development of the German novel in the nineteenth century. Prerequisite, 15 credits in second-year German or equivalent.

**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.

**GERM 330 Conversational German (5) S**  
For participants in the special summer programs only. Not open for credit to those who have had 301, 302, 303. Prerequisite, 207 or permission.

**GERM 401, 402 Grammar and Composition (3,3)** A,W  
Primarily for majors and minors. Prerequisite, 301, 302, and 303.

**GERM 403 Applied Linguistics (3) Sp**  
Linguistics in its ramifications and applications to teaching. Prerequisite, third-year German or permission.

**GERM 404 History of the German Language (3) Sp**  
From early Germanic to the present. Open to junior majors. (Offered Summer Quarter 1976.)

**GERM 405 Linguistic Analysis of German (3) A,W,Sp**  
Barrack, Voyles  
Prerequisite, third-year German, or permission. (Offered Summer Quarter 1974.)

**GERM 407 Advanced Composition (5, max. 10)**  
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**  
D. Behler, Hertling, McLean  
410: German Romanticism; literature from 1800 to 1830 with esthetic and historical consideration of works by Novalis, Brentano, Eichendorff, Heine, Kleist, Buchner, E. T. A. Hoffmann, Grillparzer, and others. 411: Nineteenth Century Realism; literature from 1830 to 1890, with esthetic and historical consideration of works by Keller, Hebbel, Meyer, Stifter, Fontane, and others. 412: The Twentieth Century; literature from 1890 to 1945, with esthetic and historical consideration of works by Hauptmann, Kaiser, Brecht, Kafka, Mann, Rilke, Trakl, Studler, Stramm, van Hoddis, and others. Prerequisite, for either 410, 411, or 412, 15 credits in third-year German or permission.

**GERM 413, 414, 415 Survey of Older German Literature and Culture (5,5,5) A,W,Sp**  
Ammerlahn, Dunnhaup, Hertling, Hruby  
413: Mediaeval Literature; German literature from 750 to 1400, with esthetic and historical consideration of works from the Carolingian and Cluniac Periods, the Court Epic, the Heroic Epic, the Spielmannsepik, the Minnesang, the poetry of the epigones who followed the Age of High Chivalry, the German Mystics, and the Ackermann aus Bohmen. 414: Literature of the Sixteenth, Seventeenth, and Early Eighteenth Centuries; esthetic and historical consideration of works by Erasmus, Luther, Hans Sachs, the Historia von Dr. Faustius, Baroque poetry, and the literature of the early Enlightenment. 415: Literature of the Eighteenth Century; esthetic 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.

**GERM 430 Advanced Conversational German (5, max. 10)**  
For participants in special summer programs only. Not open for credit to those who have had 401, 402, 403. Prerequisite, 330 or permission.

**GERM 473 Teaching of College-Level German**  
(1, max. 9) A,W,Sp  
For conversation proctors in 130.

**GERM 479 Special Topics in the Teaching of Foreign Languages (3, max. 9)**  
Intensive workshop for inservice and preservice teachers of all foreign languages on some aspect of foreign-language teaching methodology. Prerequisite, foreign-language teaching experience or participation in a previous foreign-language methods course.

**GERM 490 Contemporary German Literature (3)**  
A Interpretation of selected works by contemporary German authors. A senior colloquium for majors. Prerequisite, permission.

**GERM 491 Studies in German Poetry (3)**  
W. McLean  
Introduction to various methods of interpretation and to their practical application. For senior majors. Prerequisite, permission.

**GERM 492 History of Germanic Philology (3)**  
A Introduction to the works of outstanding scholars in the field of Germanics. For senior majors. Prerequisite, permission.

**GERM 495 Preservice in German Literature (3, max. 15)**  
Special topics, the subject matter and depth of which are not included in other literature courses in the program, and which are to be arranged through cooperative consultation between students and faculty. Prerequisite, 15 credits in third-year German or permission.

**GERM 497 Studies in German Literature**  
(1-5, max. 15) A,W,Sp

**COURSES IN ENGLISH**

**GERM 339 The Early Hesse in English (3)**  
Allard  
In-depth study of Hermann Hesse prior to the impact of World War I and Jungian psychology on his life and work. Primary emphasis is placed on his earlier novels and poetry as they relate to German romanticism and to the subsequent development of his literary motifs.

**GERM 430 Friedrich Nietzsche in English (3)**  
D. Behler  
Concerned with the analysis of Friedrich Nietzsche's chief works and the discussion of his position within modern German literature and thought.

**GERM 431 Franz Kafka in English (3)**  
South  
Intensive study of the short stories and novels of Franz Kafka in English translation; emphasis on philosophical relevance and esthetic significance.
GERM 342 Thomas Mann in English (3) E. Behler
Intensive study of some of Thomas Mann's theoretical writings, short stories, and novels, interpreted within the wider context of German literature and philosophy at the turn of the century.

GERM 343 The Theme of God's Death in German Thought in English (3) E. Behler
Course devoted to the discussion of the great controversies about the traditional concept of God, pantheism, atheism, and nihilism, which mark German thought and literature since the late eighteenth century and throughout the nineteenth century.

GERM 344 The Late Hesse in English (3) Allard
Omits an in-depth study of the major novels of Hermann Hesse. Hesse's works are discussed within the framework of the European intellectual tradition and with regard to their present popularity in the United States. The crisis of human individuality in a technological world is the major philosophical focus of the course.

GERM 345 Bertolt Brecht in English (3) McLean
Brecht's life and work, particularly his plays and writings on the theatre, and some poems and short prose pieces to provide additional perspective on his life and work as a whole. The development of his writing and of his ideas and attitudes.

GERM 346 The Contemporary German Novel in English (3) Allard
Selections from the modern German novel representative of the concern with the human condition, of social criticism, and of experimentation with new forms of prose writing.

GERM 347 German Mysticism in English (3) Allard
Historical survey of the quest for the mystical in German literature and philosophy from the Middle Ages to the twentieth century.

GERM 348 Love and Adventure in German Courtly Literature in English (3) Hruby
Study of medieval literary, social, and intellectual trends from 1150 to 1250 as reflected in representative works of that period, such as poetry of the Minnesanger and courtly epic.

GERM 349 Goethe in English (3) Ammerlahn
Study and interpretation of selected major works (especially Faust) of Goethe, whose literary, philosophical, and scientific achievements are examined as integral parts of his quest for meaning, wholeness, and universality, and whose impact on Western thinking is traced up through Thomas Mann and C. G. Jung.

GERM 350 The Image of Woman in German Literature in English (3) D. Behler
The image of woman as a reflection of the prevailing social attitudes on various periods of German literature.

GERM 370 Man's Quest for Meaning in Contemporary Thought in English (3) E. Behler
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.

Courses for Graduates Only

GERM 500 Methods and Ideologies of German Literary Criticism (3) W South
(Offered 1974-75.)

GERM 501 Bibliography (3) A

GERM 502 History of German Criticism (3) W E. Behler

GERM 503 Modern Poetry (3) A Rey
(Offered 1975-76.)

GERM 506 German Syntax and Semantics (3) WS Allard, Voyles
Advanced structural analysis of German grammar, with special emphasis on the application of descriptive techniques. (Offered Summer Quarter 1975.)

GERM 510, 511, 512 German Civilization (3,3,3) A, WS, Sp
Esthetic and historical presentation of modern German civilization with due emphasis on its cultural, political, and social aspects. Prerequisites: permission. (Offered in consecutive Summer quarters; 510 offered Summer Quarter 1974.)

GERM 513 Germany Since 1918: Study in German Fiction and Thought (3) Sp8
German intellectual life since 1918. A study in German fiction and thought in relation to cultural, political, and social aspects of the period. (Offered Summer Quarter 1974.)

GERM 515 Romanticism (3) Sp D. Behler

GERM 516 Nineteenth-Century Drama (3) W South

GERM 517 Nineteenth-Century Prose (3) W Galt, Herlingle

GERM 518 Twentieth-Century Literature (3) Sp Rey

GERM 520 Contemporary German Literature (3)

GERM 521 Seminar in the Literature of the Reformation and Renaissance (3) Hruby
(Offered 1974-75.)

GERM 522 Seminar in Baroque (3) Dünnhaupt
(Offered 1974-75.)

GERM 524 Seminar in Eighteenth-Century Literature (3) E. Behler
(Offered 1975-76.)

GERM 525 Seminar in Romanticism (3) E. Behler
(Offered 1975-76.)

GERM 526 Seminar in Nineteenth-Century Drama (3) South
(Offered 1974-75.)

GERM 527 Seminar in Nineteenth-Century Prose (3) Herlingle
(Offered 1975-76.)

GERM 528 Seminar in Twentieth-Century Literature (3) Allard
(Offered 1975-75.)

GERM 531 Lessing (3) A South

GERM 534 Storm and Stress: Goethe, Schiller (3) A Ammerlahn

GERM 535 Classicism: Goethe, Schiller (3) W Ammerlahn

GERM 540 Development of German Poetry From the Late Nineteenth Century to the Present (3) McLean
Development of German poetry from Rilke, Hofmannsthal, and George through Trakl, Benn, the Expressionists and the Dadaists, Brecht, and Enzenberger, to such contemporaries as Eich, Heine, et al., the concrete poets, Celan, and Bachmann. (Offered 1974-75.)

GERM 541 Twentieth-Century German Drama (3) Rey
Selection from modern German drama representative of the concern with the human condition, of social criticism, and of experimentation with the new dramatic forms. (Offered 1974-75.)

GERM 542 Storm and Stress and Classicism: Revolution and Resignation (3) Ammerlahn
Analysis of the important theoretical and creative writings of the Storm and Stress period culminating in German classicism, tracing this development in the context of the cultural and historical setting, and showing the significance for the future course of German history and civilization. (Offered 1975-76.)

GERM 543 Social Criticism in Twentieth-Century German Prose (3) Ammerlahn
Studies of selected modern German novels and short novels by representative authors, dealing with the social and political problems of Germany. (Offered 1974-75.)

GERM 554 Seminar in Goethe (3) Ammerlahn
(Offered 1974-75.)
ARTS AND SCIENCES

GERM 550 Gothic (3) Barrack, Voyles (Offered 1975-76.)

GERM 552 Old High German (3) Voyles (Offered 1975-76.)

GERM 555 Old Saxon (3) Voyles (Offered 1974-75.)

GERM 556 Middle High German (3) W Hruby

GERM 557 Middle High German Literature I (3) Sp Hruby

GERM 558 Middle High German Literature II (3) Hruby

GERM 560 Modern Dialects (3) Barrack, Voyles (Offered 1974-75.)

GERM 564 Early Middle High German Literature (3) Hruby

GERM 565 Seminar in Courtly Epe (3) Hruby

GERM 566 Late Middle High German Narrative (3) Hruby

GERM 567 Late "Minnesang" (3) Hruby

GERM 568 Seminar in Heroic Epe (3) Hruby

GERM 569 Didactic and Religious Medieval Literature (3) Hruby

GERM 570 Nietzsche (3) E. Behler

GERM 572 Seminar in Heine (3) Comprehensive study of the literary importance and the philosophical, political, and social thought of Heinrich Heine, with emphasis on his prose works.

GERM 573 Philosophy in German Literature (3) E. Behler

GERM 574 Introduction to Methods of Teaching German (3) Rabara

GERM 575 Teaching Advanced German Language and Literature on Secondary Level (3) Sp South

GERM 576 Modern Methods and Materials in Teaching German (3) W Sp South

GERM 577 Principles of Second-Language Learning (3) Galt, Rabara

GERM 578 Theory and Practice of Foreign Language Curriculum Development in Germany (3) Hruby

GERM 580, 581 Seminar in the Modern Period of German Literature (1-5, 1-5) Prerequisite, permission. (Offered 1975-76.)

GERM 582 The Faust Theme in German Literature (3) Sp Ammerlahn Seminar deals primarily with Goethe's Faust, Parts I and II. (Offered 1975-76.)

GERM 590 German Mysticism of the Late Middle Ages (1-5) E. Behler (Offered 1974-75.)

GERM 591 German Idealism and Its Relationship to Literature (1-5) E. Behler (Offered 1974-75.)

GERM 592 German Existentialism and Its Relationship to Literature (1-5) E. Behler (Offered 1974-75.)

GERM 595 Seminar in Germanic Philology (1-5)

GERM 596, 597 Seminar in German Literature (1-5, 1-5)

GERM 600 Independent Study or Research (*) AWSpS

GERM 700 Master's Thesis (*) AWSpS

GERM 800 Doctoral Dissertation (*) AWSpS

HISTORY

Course for Undergraduates

SOC S 150 Afro-American History (5) ASp
Examination of the Negro and his role in history, both in Africa and the Americas.

GENERAL HISTORY

Courses for Undergraduates

HST 111 The Ancient World (5) A Ferrill, C. Thomas
History of the origins of Western civilization to the fall of Rome.

HST 112 The Medieval World (5) Bacharach, Mother
Survey of the political, economic, social, and intellectual history of the Middle Ages. Not open to students who have taken 301.

HST 113 The Modern World (5) Sp Bridgman, Pinkney
Survey of the political, economic, social, and intellectual history of modern Europe. Not open to students who have taken 302 or 303.

HST 205 Survey of Intellectual History (5) AWKinds of questions asked and the methods used in the field of intellectual history, with focus on one or two of the major concepts of the Western intellectual tradition (reason, being, nature, God, honor; etc.) tracing its transformation from classical times to the near present. The reading is mainly in primary sources.

HST 215 The History of the Atomic Bomb (3) Hankins
History of the atomic bomb from the beginning.

340
of nuclear physics to the security hearing of J. Robert Oppenheimer. The course includes a study of 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 scientist 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 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 299H 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 mythology and legend and the nature of history.

HST 301 Early Modern European History: 1450-1648 (5) A Bridgman, Emerson, Griffiths, Levy
Political, social, economic, and cultural history from the late Renaissance to the Peace of Westphalia.

HST 302 Modern European History: 1648-1815 (5) W Bridgman, Emerson, Hankins, Lyle, 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) Sp Bridgman, Emerson, Pinkney, Sugar
Political, social, economic, and cultural history from the fall of Napoleon to the present.

HST 307 History of Christianity (5) W Treadgold
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 to avoid the controversial aspects of the topic is made, but the necessity of founding argument on knowledge is stressed.

HST 308 History of Modern Christian Theology (5) Sp
Survey of the major trends in Christian theology since the Reformation, covering the period to 1800 and concentrating on the nineteenth and twentieth centuries. Special focus given to the impact of historicism and higher criticism on liberal and conservative theology and to the efforts of Barth and Bultmann to overcome the inherited framework of liberal Protestantism.

HST 311 Science in Civilization: Antiquity to 1600 (5) A Hankins
From preclassical antiquity to the end of the Middle Ages, stressing the growth of scientific ideas, the cultural context in which they take shape, and their relationship to other movements of thought in the history of civilization.

HST 312 Science in Civilization: Science in Modern Society (5) W Hankins
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: An Interdisciplinary Study (5) A Bridgman
Interdisciplinary study of war and society, viewing the problem from six different perspectives: historical, social, and natural scientific, humanistic, personal experience, and policy option.

HST 351 History of Africa to 1800 (5) A Griffeth
History of sub-Saharan Africa from antiquity to 1800. The peopling of the continent; the Iron Age in Africa; growth of centralized political institutions; stateless societies; Islamic penetration; the African slave trade.

HST 352 History of Africa Since 1800 (5) W 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 practices. The following historical periods are surveyed: the ancient Near East, Greece, Rome, Islam, Africa, Latin America, and North America.

HST 362 The Endlag of Slavery in History: A Comparative Study (5) Pressly
Focus is on many of the societies in which chattel slavery was formally abolished, beginning in the late eighteenth century and continuing in the nineteenth and twentieth centuries: the northern United States, Haiti, Jamaica, Canada, Russia, the southern United States, Cuba, Brazil, Zaria (northern Nigeria), and some mid-Eastern and Far Eastern countries. In particular, two aspects of those societies are investigated: the circumstances and the manner in which slavery was abolished; and the condition and situation, after emancipation, of the former slaves and the former masters, and the descendants of each group.

HST 391H-392H Colloquium in the History of Ideas (5-5)
Discussion of selected topics in the history of ideas; writing of an interpretive essay.

ARTS AND SCIENCES

HST 411 Origins of Modern Science: The Physical Sciences (5) Hankins
History of the physical sciences seen through an intensive study of key periods in their development. Emphasis on the nature of scientific revolutions and the role of individual scientists. Prerequisite, one introductory course in a physical science.

HST 412 Science and the Enlightenment (5) Hoss
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: A Sense of the Past (5) Sp Butow
The confrontation between Japan and the United States from Perry to MacArthur with emphasis on the period from 1905 to 1945. Prerequisite, permission.

HST 450 History of West Africa From A.D. 1000 to the Present (5) W Griffeth
States of the Western Sudan to 1600; the trans-Atlantic slave trade; the Fulbe jihads; the coastal peoples and European penetration; colonial rule and the West African nationalist response; political independence and economic dependency in the contemporary period.

HST 451 History of East and Central Africa From Antiquity to the Present (5) Sp 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 nationalist developments to the present.

HST 452 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, Afrikaner, 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 461 History of the Near East: 622-1300 (5) A Bachrach
The Arab countries from the emergence of Islam.

HST 462 History of the Near East: 1300-1789 (5) W Bachrach
The Arab countries to the accession of Sultan Selim III.
ARTS AND SCIENCES

HST

463 History of the Near East Since 1789 (5)
Sp
Bacharach
The Arab countries from the westernizing reform movements to the present.

HST

465 Numismatics Seminar (3)
Bacharach
Introduction to the use of numismatic evidence for political, economic, and cultural history. Prerequisite, permission.

HST

469 Introduction to Modern Jewish History (5)
Selective problems in modern Jewish history, 1789-1948.

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 the Department of Economics as Economics 460. Economics 200, 201 recommended.

HST

493H-492H Historical Method (5-5) W,Sp
The purposes, materials, and techniques of historical scholarship. Theory, practice, and criticism.

HST

493, 494 History of Historical Writing (5,5)
W,Sp
Great historians relate their visions of the present to the past, and the measure of their greatness commonly is the extent to which their contemporaries and successors see that past through their eyes. To understand what the great historians, from the ancients to the present, have accomplished, we need to have a knowledge of their intellectual background as well as of their writings. The course consists of lectures on background, passages from historical writings, and discussion.

HST

495 The Teaching of Black, Chicanos, and Indian History in the High School and the College (3)
Exploration of the challenge, the principles, the present opportunities, and the unresolved issues involved in the introduction of Black, Chicanos, and Indian history into current high school and college curricula. Designed for present and future teaching of American history.

HST

496 Senior Seminar (3-5, max. 15)
Each seminar examines a different subject or problem. A list of the seminars and their instructors is available in the Department of History office. Students must have the permission of the instructor of the seminar in which they plan to enroll.

HST

499 Undergraduate Research (1-5, max: 15)
AWSp

Courses for Graduates Only

HST

511 History of Science (3-6)
Hankins

HST

Hankins

HST

524 British Empire History (3-6)
Bell

HST

543 American Diplomacy and the World Crisis, 1931-41 (3-6)
A
Butow
Field course in diplomacy of World War II, with emphasis on the confrontation between the United States and the Axis powers. Prerequisite, permission.

HST

544-545 Seminar in American Diplomacy and the World Crisis, 1931-41 (3-6)-(3-6)
W,Sp
Butow
Diplomacy of World War II with emphasis on the confrontation between the United States and the Axis powers. Prerequisite, permission.

HST

551 Field Course in African History (3-6) W,Sp
Systematic examination of key historical writings and interpretive controversies in African history, with special attention to the growth of multidisciplinary approaches to historical reconstruction and the evaluation and use of oral historical data. Prerequisites, reading knowledge of one of the following: French, German, Portuguese, Arabic, or other African language.

HST

561 Islamic History (3-6)
Bacharach
Field course. Introduction to advanced study in the major periods and problems of Islam. Bibliographical guidance is stressed.

HST

562 Ottoman History (3-6)
Sugar
Field course. Introduction to the major periods and problems of Ottoman history, 1300-1914, by acquainting the student with the major works in at least two languages. An attempt is made to teach some use of Ottoman materials. A minor problem is investigated in detail by every student. Prerequisite, knowledge of at least one major language besides English, e.g., French, German, Russian, or other.

HST

563 Modern Near East (3-6)
Bacharach
Field course introducing the student to the major periods and problems of Near Eastern history, 1798 to the present. Prerequisite, permission.

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. in history.

HST

591 Historiography: Ancient and Medieval European (3) A

HST

592 Historiography: Early Modern European (3) W

HST

593 Historiography: Early Modern European and American (3) Sp

HST

594-595 Seminar in Philosophy of History (3-6)-(3-6)

HST

598 Methods of Historical Research (5)
Bestor
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 supplements the lectures and written exercises.

HST

600 Independent Study or Research (*)
AWSp

HST

700 Master's Thesis (*) AWSpS

HST

800 Doctoral Dissertation (*) AWSpS

HISTORY OF THE AMERICAS

Courses for Undergraduates

HSTAA

201 Survey of the History of the United States (5) AWSp
Supplies the knowledge of American history that any intelligent and educated American citizen should have. The objective is to make the student aware of his heritage of the past and more intelligently conscious of the present.

HSTAA

301 Foundations of American Civilization (5)
A
Johnson
Founding of Anglo-Saxon society in the western hemisphere, with attention to the earliest colonial establishments, the growth of a new culture, independence, and the organization of the American Union.

HSTAA

311 American Civilization: The First Century of Independence (5) W
Pease, Pease, 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)
Sp
Burke, Pease, Pease
Emergence of modern America, after the Civil War; interrelationships of economic, social, political, and intellectual developments.

HSTAA

351 American Constitutional History: Foundations to 1800 (3)
Bestor
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.
HSTAA
352 American Constitutional History: Nineteenth Century (3) W  
Bestor  
Fundamental decisions of the Supreme Court under Marshall and Taney, democracy, sectionalism, and slavery; the Civil War and Reconstruction; the Supreme Court and economic concentration.

HSTAA
353 American Constitutional History: Twentieth Century (3) Sp  
Bestor  
The Constitution and social legislation from the Progressive Era to the Great Depression; the New Deal and its challenge to the Supreme Court; the shift of focus from economic issues to civil rights in recent constitutional interpretation.

HSTAA
381 Latin America: The Early Colonial Period (5) A  
Alden, Solberg  
Discovery and founding of Spanish and Portuguese empires in the New World and their development until the eighteenth-century reorganizations.

HSTAA
382 Latin America: Late Colonial and Early National Periods (5) W  
Alden, Solberg  
Imperial revolt, the struggle for independence; the founding of new nations.

HSTAA
383 Modern Latin America (5) Sp  
Solberg  
Analysis of economic problems, political and social changes, and intellectual trends in major Latin American republics since the late nineteenth century.

HSTAA
401 American Revolution and Confederation (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
402 The Colonial Mind (5)  
Review of the main currents of the colonial American mind, with special reference to Puritanism, the formation of a colonial mentality, and the relationship between colonial thought and institutions.

HSTAA
409 American Social History: The Early Years (5)  
Holl  
Survey of American society and institutions from the colonial era through the Civil War, with special attention to reform, labor, immigration, education, law enforcement, and the city.

HSTAA
410 American Social History: The Modern Era (5)  
Holl  
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) Sp  
Pressey  
Conflicting interests, ideologies, and ways of life in the United States from the 1840s to the 1870s.

HSTAA
412 The Westward Movement, 1776-1840 (5)  
Carstensen  
The westward movement in the United States, 1776 to 1840; land policy and land distribution, Indian policy and Indian removal, the migrations, economic development, political evolution, and cultural advances, the westering experience, and the shaping of American institutions.

HSTAA
413 The Westward Movement, 1840-1910 (5)  
Carstensen  
The westward movement in the United States, 1840-1910; land policy and land distribution, Indian policy and Indian removal, the migrations, economic development, political evolution, and cultural advances, the westering experience, and the shaping of American institutions.

HSTAA
420 The American Disinherited (3) W  
Flint  
Survey of major groups that have not shared in the American dream, and the clash of that dream with reality. Special emphasis is given poverty, alienation, discrimination, and other forces that produced the disinherited. The course analyzes reactions, specific periods, and issues when the disinherited became objects of local and national concern. Prerequisite, any course in the history of the United States since 1865.

HSTAA
425 American Urban History Before 1870 (3)  
Flint, Holl  
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.

HSTAA
426 American Urban History Since 1870 (3)  
Flint, Holl  
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; relationships between the changing physical city and the factors that gave the design its substantive form.

HSTAA
429 The History of American Penology and Criminology (3)  
Holl  
Studies in the social and intellectual history of American penology and criminology, including a study of Beccaria, Howard, Toqueville, Brockway, Osborne, the Pennsylvania and Auburn penal systems, the rise of the reformatories, the emergence of the new penology in the Progressive era, and the professionalization of penology and criminology in modern times. Open to juniors and seniors.

HSTAA
430 American Criminology and Penology Seminar (3-6)  
Burke, Pease  
Seminars and research focusing on developments in criminology and penology in the twentieth century. Prerequisite, permission.

HSTAA
431 American Politics and Society Since 1920 (5)  
Burke, Pease  
Politics, social, economic, and intellectual developments in the United States from 1920 to the present. Not open to students who have taken 450.

HSTAA
432 History of Washington and the Pacific Northwest (5)  
Carstensen, Saum  
Exploration and settlement; economic development; growth of government and social institutions; statehood.

HSTAA
443 Black Americans, 1877-1933: From Reconstruction to the New Deal (5)  
Bestor  
Study of Black Americans from Reconstruction to the New Deal with special emphasis on their institutional and social life, and the impact of society upon their development.

HSTAA
444 Black Americans Since 1933: From the New Deal to the Present (5)  
Bestor  
Study of Black Americans from the New Deal to the present, with special emphasis on their institutional and social life, and the impact of society upon their development.

HSTAA
451 Constitutionalism in America: Seventeenth and Eighteenth Centuries (5)  
Alden  
Studies of the English constitutional heritage and of the making of the American Constitution and Bill of Rights. Students attend the lectures in 351 and work with the primary historical documents in preparing papers for presentation to a discussion section, meeting for two additional hours each week. Prerequisite, 10 credits in American history. Credit cannot be received for both 351 and 451.

HSTAA
452 Constitutionalism in America: Nineteenth Century (5) W  
Bestor  
Study of constitutional issues in the United States from the establishment of the government under the new Constitution of 1787 until the end of the nineteenth century: basic decisions of Marshall and Taney, the slavery crisis, Reconstruction, and the constitutional enshrinement of laissez-faire. Students attend the lectures in 352 and also work with the primary historical documents in preparing papers for presentation to a discussion section, meeting for two additional hours each week. Credit cannot be received for both 352 and 452. Prerequisite, 10 credits in American history.

HSTAA
453 Constitutionalism in America: Twentieth Century (5) Sp  
Bestor  
Study of constitutional issues in the United
ARTS AND SCIENCES

States since the beginning of the twentieth century; the Progressive Era; the New Deal; desegregation, civil rights, apportionment, separation of church and state, and other contemporary constitutional issues. Students attend the lectures in 335 and prepare papers based on primary historical documents for presentation to a discussion section, meeting for two additional hours each week. Credit cannot be received for both 335 and 435. Prerequisite, 10 credits in American history.

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 1700 (5)
Burke, Pressly
Comparative study of aims and accomplishments of four major reform movements in the United States: Jeffersonian democracy, Jacksonian democracy, Progressivism, the New Deal.

HSTAA 458 History of American Education to 1865 (5)
Burgess
Development of American education in cultural context: colonial period, influence of enlightenment, and common school movement. Offered jointly with the College of Education as EDEPS 494.

HSTAA 459 History of American Education Since 1865 (5)
Burgess
Development of American education in cultural context: progressive education, recent criticism, continuing issues and trends. Offered jointly with the College of Education as EDEPS 495.

HSTAA 461 Diplomatic History of the United States 1776-1877 (5)
Fowler
Foreign policy of the United States government. Emphases upon wars, territorial expansion, and the peculiarities of the American position in world politics.

HSTAA 462 Diplomatic History of the United States 1877-1953 (5)
Fowler
Foreign policy of the United States government, from the emergence of the United States as a great power through the presidency of Harry S. Truman.

HSTAA 481 The History of Mexico: 1517 to the Present (5)
Alden, Solberg
Political, social, and economic history of Mexico from its discovery by the Spanish to the present.

HSTAA 482 The History of Brazil: Colonial Period to the Present (5)
Alden
Colonial foundations; the first and second empires; the old and new republics; current problems; prospects for the future.

HSTAA 483 The River Plate Republics and Chile: Colonial Period to the Present (5)
Solberg
Analyzes political history, economic development, social change, and intellectual trends in Argentina, Uruguay, Paraguay, and Chile. It also considers the relations of these countries with the United States and Europe and with each other.

HSTAA 485 Social Revolution in Twentieth-Century Latin America: A Comparative Approach (3)
Solberg
Analyzes and compares twentieth-century Latin America's three major social revolutions: Mexico (1910-20), Bolivia (1952-64), 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. Relationships between the United States and revolutionary and post-revolutionary governments are carefully considered.

Courses for Graduates Only

HSTAA 501 American History: Early (3-6) W
Johnston

HSTAA 503-504 Seminar in American History: Early (3-6) W, Sp
Johnston

HSTAA 509-510 Seminar in American Urban History (3-6) W, Sp
Flint, Holl
Concentration on bibliography and research problems in urban history. Research project chosen in consultation with the instructor. Readings in various areas of urban history and development.

HSTAA 511 American History: Civil War (3-6)
Pressly

HSTAA 512 American History: Western (3-6) A
Carstensen

HSTAA 513-514-515 Seminar in American History: Western (3-6) A, W, Sp
Carstensen

HSTAA 521 American History: Writings and Interpretations, 1770-1870 (4-6) A
Burke, Fowler, Pease, Pressly

HSTAA 522 American History: Writings and Interpretations, Since 1870 (4-6) W
Burke, Fowler, Pease, Pressly

HSTAA 524 American Social History Before 1860 (3-6)
Holl
Field course. Survey of major problems and literature in American social history before 1860.

HSTAA 525 American Social History After 1860 (3-6)
Holl
Field course. Survey of major problems and literature in American social history after 1860.

HSTAA 531 American History: Twentieth Century (3-6) A
Burke

HSTAA 532-533-534 Seminar in American History: Recent Period (3-6)-(3-6)-(3-6) A, W, Sp
Burke, Pease

HSTAA 554 American History: Intellectual (3-6)
Saum

HSTAA 555-556 Seminar: American Intellectual History (3-6)-(3-6)
Saum
Develops research and writing competence in American intellectual history. Prerequisite, permission.

HSTAA 561 History of American Foreign Policy (3-6)
Fowler

HSTAA 562-563 Seminar in American Diplomatic History (3-6)-(3-6)
Fowler

HSTAA 581 Latin American History: Colonial Period (3-6) W
Alden

HSTAA 582 Latin American History: National Period (3-6) Sp
Alden, Solberg

HSTAA 583-584-585 Seminar in Latin American History (3-6)-(3-6)-(3-6) A, Alden, Solberg
Problems of historical research in the history of Latin America from colonial beginnings to the present.

HSTAA 586-587 Seminar in Comparative Colonial History (3-6)-(3-6)
Alden

ANCIENT AND MEDIEVAL HISTORY, INCLUDING BYZANTINE

Courses for Undergraduates

HSTAM 201 Ancient History (5) W
Ferrill, Thomas
Development and characteristics of ancient Greek civilization from the Bronze Age to the Roman conquest. Greek origins are placed in the context of the development of the ancient Near East.

HSTAM 202 Ancient History (5) Sp
Ferrill, Thomas
Political, social, economic, and cultural develop-
HSTAM

331 Early Middle Ages (5)
Ferrill
The Dark Ages, feudalism, emergence of the medieval order of civilization, and the development of Romanesque Europe.

332 Central Middle Ages (5)
Mother
Europe in the central Middle Ages: culture of cathedrals and universities, formation of national states, development of urban society.

333 Late Middle Ages (5)
Disintegration of the medieval order under the impact of the national state, the secularization of society, and the decline of the church. Movements of reform and revolution. The culture of late Gothic Europe.

334 Medieval Culture (5)
Selective study in literature, art, music, philosophy, and religion of Europe during the Middle Ages.

401 Early Greece (3)
Ferrill, Thomas
Study of the political, institutional, and cultural history of early Greece, with emphasis on the origins of Greek civilization.

402 Greeks in the Age of Pericles (3)
Edmonson, Thomas
Study of the political, institutional, and cultural history of classical Greece, with special emphasis on the legacy of Greece to Western civilization.

403 Alexander the Great and the Hellenistic Age (3)
Edmonson, Thomas
Political, social, economic, and cultural history of the Greco-Oriental world from Alexander to the Roman conquest, with special emphasis on the change from city-state to world-state and the fusion of Greek and Oriental cultures.

405 Topics in Ancient History (3, max. 6)
Katz, Ferrill
An umbrella course that makes it possible to treat a special topic in the history of the ancient world during the period from the Bronze Age to the fall of the Roman Empire. One topic is studied in depth during the quarter. Prerequisite, permission.

411 The Early Roman Republic (3)
Ferrill
Political, social, economic, and cultural history, with emphasis on the development of the constitution and territorial expansions.

412 The Late Roman Republic (3)
Ferrill
Political, social, and cultural history, with special emphasis on the period of Cicero and Caesar.

413 The Early Roman Empire (3)
Ferrill
Political, social, economic, and cultural history, with emphasis on the Julio-Claudians.

414 The Late Roman Empire (3)
Ferrill
Political, social, economic, and cultural history, with emphasis on the decline of ancient civilization.

421 The Byzantine Empire (5)
Boba, Katz
Political, institutional, and cultural history of the Eastern Roman Empire from the fourth to the fifteenth centuries, with emphasis on its relations with the Latin West and the Slavic and Moslem areas.

426 Origins of European States (5)
Boba
From tribe to nation. Analysis of political, social, and cultural developments leading to the formation of territorial states in Europe. Prerequisites, some courses in medieval history, or permission.

431 Topics in Medieval History, 500-1000 (5)
Boba, Mother
Study in depth of one or more topics in the history of Europe during the early Middle Ages. Prerequisite, a course in medieval history.

432 Topics in Medieval History, 1000-1250 (5)
Boba, Mother
Study in depth of one or more topics in the history of Europe during the High Middle Ages. Prerequisite, a course in medieval history.

433 Topics in Medieval History, 1250-1500 (5)
Study in depth of one or more topics in the history of Europe during the Later Middle Ages. Prerequisite, a course in medieval history.

441 Church and State in the Middle Ages (5)
Boba, Mother
Changing theories and realities of relationship between religious and secular elements of medieval civilization.

442 Central Europe in the Middle Ages (5)
Boba
Origins and medieval history of Germany, Austria, Bohemia, and Poland, considered as a region within the sphere of Western European civilization.

451 Medieval Italy (5)
Mother
Italy, from the barbarian invasions to the Renaissance, considered in the framework of European and Mediterranean cultures.

452 The Early Renaissance (1300-1450) (3)
Griffith
Growth of a Humanist culture in the Italian city-state in contrast with the Gothic values of the waning Middle Ages.

ARTS AND SCIENCES

453 The High Renaissance (1450-1560) (3)
Griffith
Climax of the Humanist tradition and the expansion of European culture.

Courses for Graduates Only

HSTAM

501 Greek History (3-6)
Edmonson, Thomas
Problems in the history of the Athenian constitution.

511 Roman History (3-6)
Ferrill

512-513 Seminar in Ancient History
Ferrill, Thomas
Detailed study of special topics in ancient history. Prerequisite, permission.

521 Byzantine History (3-6)
Boba, Katz

530 Early Middle Ages (3-6)
Boba
Field course. Survey of early European history through the times of tribal migrations and invasions from Asia. Problems and methods of research. Prerequisite, permission.

531 Medieval European History (3-6)
Mother

532, 533, 534 Medieval European Seminar
(3-6, 3-6, 3-6) A, W, Sp
Prerequisites, a reading knowledge of French or German and Latin.

HISTORY OF ASIA

Courses for Undergraduates

HSTAS

201 Ancient Indian Civilization (5)
Conlon
Introductory course dealing with the religious, literary, philosophical, political, social, and economic history of India from earliest times to the Muslim invasion.

202 Modern Indian Civilization (5)
W Conlon
Introductory course dealing with the Islamic impact, British conquest, and contemporary India. Emphasis on the rise of nationalism, social organization, and contemporary life and history.

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.
ARTS AND SCIENCES

HSTAS 212 History of Korean Civilization (5) Palais
Survey of Korean civilization from earliest times to the present. Course explores various aspects of the development of Korean society and culture in terms of government organization, social and economic change, literature, and art.

HSTAS 213 History of Japanese Civilization (5) Pyle
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.

HSTAS 402 History of Medieval and Mughal India (5) Conlon
Medieval India; emphasis on forms of political organizations and economic life, social organizations, and cultural developments.

HSTAS 403 History of Modern India to 1900 (5) Conlon
Modern India; emphasis on forms of political organizations and economic life, social organizations, and cultural developments. Prerequisite, 202 or permission.

HSTAS 404 History of Twentieth-Century India (5) Conlon
Analysis of the problems in the fields of social life, international and domestic politics, education, economics, and other areas that confront India today and may determine her future.

HSTAS 405 Maharashtra in Indian History (5) Conlon
Regional approach to medieval and modern Indian history through examination of the history of Maharashtra in western India. The rise of the Marathas; British rule; political and economic modernization; religious and social life; problems of contemporary society. Prerequisite, 403 or permission.

HSTAS 421 History of Early Japan (5) A 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) W Pyle
Feudal development prior to 1600; establishment of the Tokugawan political structure, and the social, economic, and cultural history of the period from 1600 to 1868.

HSTAS 423 History of Modern Japan (5) Sp 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 451 Chinese History: Earliest Times to 221 B.C. (5) A Dull
Preimperial China.

HSTAS 452 Chinese History: 221 B.C. to A.D. 906 (5) W Dull
Development of the imperial Chinese state.

HSTAS 453 Chinese History: A.D. 906 to A.D. 1840 (5) Sp Dull
The Wu, Tai, Sung, Yuan, and early Ch'ing periods.

HSTAS 454 History of Modern China (5) Kapp
China from approximately 1800 to the present, with major emphasis on political and intellectual history since 1895. The focus is on the processes of modernization and revolution, and on the relationship between them.

HSTAS 476 Western Influences in Russian and Chinese Intellectual History (4) Treadgold
Comparative analysis of stages of Western impact on Russian (1462-1917) and Chinese (1582-1949) thought previous to the proclamation of Marxism-Leninism as the official ideology.

HSTAS 481, 482 History of Korea (5,5) W,Sp Palais
Survey of Korean history from earliest times to the modern period. Prerequisite, permission.

Courses for Graduates Only

HSTAS 501 Indian History (3-6) Conlon
Prerequisite, permission.

HSTAS 521 Modern Japanese History (3-6) Pyle
Field course. Prerequisites, 422, 423, or permission.

HSTAS 522 Japan as a World Power, 1895-1945 (3-6) Butow
Field course. Prerequisite, permission.

HSTAS 523, 524 Seminar in Modern Japanese History (3-6,3-6) Pyle
Prerequisite, permission.

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) Sp 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)-(3-6)-(3-6) 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 dynasty to the modern period in order to give students bibliographical and other assistance in preparing for examinations in this field of history.

HSTAS 562-563-564 Seminar in Chinese History: Sung to Modern (3-6)-(3-6)-(3-6) A,W,Sp Chan
Professional writing seminar in Chinese history from Sung to modern times. Prerequisite, reading knowledge of Chinese.

HSTAS 571-572 Chinese History: Modern Period (3-6)-(3-6) W,Sp
Field course in modern Chinese history, emphasizing extensive reading in the secondary literature on modern China. Course provides firm foundations for preparation of graduate field examinations and for future research and teaching. Readings are organized around major problems of interpretation in Chinese history since 1800. A portion of 572 is devoted to preparation of seminar papers on significant topics. Prerequisite, 454 or permission.

HSTAS 573-574-575 Seminar in Chinese History: Modern Period (3-6)-(3-6)-(3-6) A,W,Sp
Research seminar in modern Chinese history. Training in the materials and methods of research, and preparation of extended research papers. Prerequisites, 571-572 or permission and reading knowledge of Chinese.

HSTAS 581 Modern Korean History (3-6) Sp Palais
Field course. Prerequisite, 470 or permission.

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) A Palais
Advanced instruction in problems and methods of research in Korean history. No foreign language required. Prerequisite, permission.
MODERN EUROPEAN HISTORY

Courses for Undergraduates

HSTEU 271, 272, 273 European Political and Social History (5,5,5) A,W,Sp
Costigan
England from the earliest times to the present, stressing the origins of American institutions and social patterns.

HSTEU 379 The Vikings (3) Flatin
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 the Department of Scandinavian Languages and Literature as Scandinavian 370.

HSTEU 371 Intellectual History of Modern England (3) Levy
Relates the changes in political theory, philosophy, science, and literature to the historical events of the period 1500 to the present.

HSTEU 380 History of Scandinavia to 1521 (3) Beijbom, Hildeman
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 the Department of Scandinavian Languages and Literature as Scandinavian 380.

HSTEU 381 History of Scandinavia to 1809 (3) Beijbom, Hildeman
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 the Department of Scandinavian Languages and Literature as Scandinavian 381.

HSTEU 382 History of Scandinavia From 1809 to the Present (3) Sp Beijbom, Hildeman
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 the Department of Scandinavian Languages and Literature as Scandinavian 382.

HSTEU 401 The Reformation (3) Griffits
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 The Reformation (3) Griffits
Effects of theology on the politics of the sixteenth century, with special emphasis on the changes of the original thought occasioned by the Reformation crisis.

HSTEU 405 European Intellectual History: Eighteenth Century (5) A Kilcup
Development of the social sciences, moral theory, political theory, and religious thought in eighteenth-century Europe. Rationalism, empiricism, utilitarianism, and the sources of idealism. Prerequisite, at least one course in the history of modern Europe.

HSTEU 406 European Intellectual History: Nineteenth Century (5) W Kilcup
Selected topics in intellectual history up to 1860. The philosophical consequences of the French Revolution, the development of idealism, conservatism, romanticism, and early socialist theory: Positivism, the problems of historicism, new forms of Christian apologetics, utilitarianism in decline, liberalism as philosophy, the early Marx. Prerequisite, at least one course in the history of modern Europe.

HSTEU 407 European Intellectual History: Twentieth Century (5) Kilcup
Selected topics in the intellectual history of the late nineteenth and early twentieth centuries. The aftermath of Darwinism, the problems of methodology in modern social science, historicism and moral relativism, irrationalism in philosophy and social theory, revisionism in secular and orthodox religions. Prerequisite, at least one course in modern European history.

HSTEU 411 Europe: 1814-70 (5) Bridgman, Emerson, Lytle, Pinkney, Sugar
Development of Europe during the age of Metternich, the revolutions of 1848, and the emergence of new national states.

HSTEU 412 Europe: 1870-1914 (5) Bridgman, Emerson, Sugar
Impact of population increase and technological change on European society; stresses and strains in European life and outlook.

HSTEU 413 Europe: 1914-45 (5) Bridgman, Emerson
Politics and society of Europe in the age of the concentration camp.

HSTEU 414 Europe Since 1945 (5) Ulman
Political, economic, and military developments in Europe under the impact of the Cold War.

HSTEU 421 France, 1429-1789 (5) Lytle, Pinkney
Political and cultural history, from Joan of Arc to the eve of the French Revolution. (Villon, Rabelais, Montaigne, Moliere, Voltaire, Rousseau, de Tocqueville.)

HSTEU 422 The French Revolution and Napoleon: 1789-1815 (5) Lytle, Pinkney
Transformation of France under the Revolution of 1789; the Reign of Terror and Napoleon; the impact of the revolution and Napoleon upon Europe.

HSTEU 423 France Since 1815 (5) Lytle, Pinkney
Political, economic, and social history since the Congress of Vienna. Special emphasis laid upon the continuity of the revolutionary tradition.

HSTEU 430 Germany 1000-1648 (5) Bridgman
Survey of the society, economy, and political problems of central Europe from the late Middle Ages to the Treaty of Westphalia.

HSTEU 431 Germany 1648-1914 (5) Bridgman, Emerson
Survey of the society, economy, and political problems of central Europe from the Thirty Years War to World War I, with particular emphasis on the nineteenth century.

HSTEU 432 Germany 1914-45 (5) Bridgman, Emerson
Politics and society from the collapse of the Bismarckian empire to the collapse of Hitler's empire.

HSTEU 435 World War I (5) Bridgman
Political, institutional, cultural, and military history of World War I, with special emphasis on the impact of the war on European society.

HSTEU 438 Modern Russian Intellectual History (5) Elliston, Treadgold
Development of Russian social and political thought and philosophy from the seventeenth century to the Revolution of 1917.

HSTEU 441 Medieval Russian Chronicles (5) A 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; 443 recommended. (Offered alternate years; offered 1974-75.)

HSTEU 442 Russian Culture to the Era of Peter the Great (5) Waugh
Emphasis on the development of Kievan 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. (Offered alternate years; offered 1973-76.)

HSTEU 443 Kievan and Muscovite Russia: 850-1700 (5) A Waugh
Development of Russia from earliest times to the reign of Peter the Great. Prerequisites, HST 111 and 112, or permission.

HSTEU 444 Imperial Russia: 1700-1900 (5) W Treadgold, Waugh
Development of Russia from Peter the Great to Nicholas II. Prerequisites, 443 or HST 111 and 112, or permission.

HSTEU 445 Twentieth-Century Russia (5) Sp Elliston, Treadgold
Russia and the USSR from Nicholas II to the present. Prerequisites, 444 or HST 111, 112, and 113, or permission.
ARTS AND SCIENCES

HSTEU

446 Russian Historiography (5) Sp
Prerequisites, 441 or 442 or HST 111 and 112, or permission.

HSTEU

447 Russian and East European Bibliography (5) W
Boja
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 Ethnic History of Russia and East Europe (5) WS
Boja
Survey of races and ethnic groups in stages of acquiring national identity and political consciousness. Emphasis on processes of assimilation and alienation.

HSTEU

451 Eastern Europe: 1772-1918 (5) A
Sugar
Poland, Czechoslovakia, Hungary, Rumania, Yugoslavia, Bulgaria, and Albania, from the first partition of Poland to the end of World War I.

HSTEU

452 Eastern Europe Since 1918 (5) W
Sugar
Poland, Czechoslovakia, Hungary, Rumania, Yugoslavia, Bulgaria, and Albania, from the end of World War I to the present. Prerequisite, 451 or permission.

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 eleventh to the seventeenth centuries.

HSTEU

464 The Jews in Spanish History (3 or 5)
Ullman
Role of the Sephardic Jews in Spanish politics, economy, and culture, emphasizing the medieval Golden Age and the Inquisition.

HSTEU

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.

HSTEU

472 England in the Seventeenth Century (5)
Levy
Political, administrative, and social history from the accession of James I to the Glorious Revolution.

HSTEU

473 England in the Eighteenth Century (5)
Cottigian
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) W
Bell
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)
Bell, Cottigian
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)
Cottigian
Growth of Irish national feeling in the nineteenth century through the home rule and Sinn Fein movements; establishment of the Irish Free State and the Republic of Eire; background of the Irish literary renaissance; establishment of Northern Ireland.

Courses for Graduates Only

HSTEU

501 Renaissance and Reformation (3-6)
Griffiths

HSTEU

502-503-504 Seminar in the Renaissance and Reformation (3-6)-(3-6)-(3-6) A,W,Sp
Griffiths

HSTEU

515 Modern European Intellectual History (3-6) A
Kilcup
Readings and discussions on selected problems in eighteenth- and nineteenth-century intellectual history. Prerequisites, reading knowledge of French and permission.

HSTEU

516-517 Seminar: European Intellectual History (3-6)-(3-6) A,W
Kilcup
Seminar on modern European intellectual history, chiefly in the eighteenth century. Prerequisites, permission and a reading knowledge of French, Italian, or German.

HSTEU

521 Modern European History: France (3-6)
Lyle, Pinkney

HSTEU

522-523-524 Seminar in French History (3-6)-(3-6)-(3-6) A,W,Sp
Lyle, Pinkney

HSTEU

531 Modern European History: Germany (3-6) W
Bridgman, Emerson

HSTEU

532-533-534 Seminar in Modern European History: Germany (3-6)-(3-6)-(3-6) A,W,Sp
Bridgman, Emerson

HSTEU

540 Medieval Russian Documents (3-6) W
Waugh
Introduction to the study of documentary sources for medieval Russian history; the methods and application of diplomatics, with an introduction to paleography and codicology. Prerequisites, reading knowledge of Russian and 443 or permission; 441 recommended. (Offered alternate years; offered 1974-75.)

HSTEU

541 Medieval Russian History (3-6) W
Waugh
Prerequisites, 443 or permission and reading knowledge of Russian.

HSTEU

543 Seminar in Medieval Russian History (3-6) Sp
Waugh
Prerequisite, reading knowledge of Russian. (Offered alternate years; offered 1975-76.)

HSTEU

544 Modern Russian History (3-6) A
Treadgold

HSTEU

545-546-547 Seminar in Modern Russian History (3-6)-(3-6)-(3-6) A,W,Sp
Ellison, Treadgold
Seminar in modern Russian history. Prerequisite, reading knowledge of Russian.

HSTEU

548 Field Course in Soviet History (3-6) Sp
Elison
Specialized course for graduate history students in the scholarly literature of Russian history since 1917. Intended for graduate students preparing for M.A. or Ph.D. field examination in Russian history of the Soviet period.

HSTEU

551 History of Eastern Europe: 1772-1939 (5)
Sugar
Study of the East-Central European region: Poland, Czechoslovakia, Hungary, Rumania, and the Balkan countries, from their rebirth to World War II. Prerequisite, reading knowledge of German, French, Russian, or one East European language.

HSTEU

552 History of Eastern Europe: 1939 to the Present (5)
Sugar
Prerequisite, reading knowledge of one major European or one East European language.

HSTEU

553-554-555 Seminar in Modern East European History (3-6)-(3-6)-(3-6) A,W,Sp
Sugar
Study and research involving special methods dealing with the histories of the East European countries in the modern period.
HOME ECONOMICS

Courses for Undergraduates

H EC
110 Food and Nutrition (5)
Meal management and food preparation with emphasis on nutritive and economic values. For nonmajors. Not open to students who have had 300.

H EC
125 Textiles (3)
King
Relationship of raw materials, their properties, structural characteristics, and finishes utilized to textile production to quality and cost. Consideration of production and marketing practices. Textile legislation affecting consumer needs and choices.

H EC
134 Clothing (5)
Murdoch, Shigaya
Economic and aesthetic aspects of clothing selection and construction.

H EC
148 The Home, Its Equipment, and Management (3)
Wilson
Management of resources to achieve family goals. Principles of management, kitchen and laundry planning, work simplification, wiring, and selection and care of household equipment.

H EC
223 Textile Analysis (2)
King
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. Prerequisite, 125, which may be taken concurrently.

H EC
231 Clothing Selection (2)
Sociological, psychological, economic, and aesthetic aspects of clothing for the individual. Not open to students who have had 134.

H EC
234 Costume Design (5)
Shigaya
Principles of drafting and flat pattern techniques applied to design and construction of wool garments. Prerequisites, 125, 134, and ART 109 or equivalent.

H EC
240 Home Furnishing (3)
Schroeder
Study of the house and its furnishings for present-day living. Not open to freshmen or to students who have taken 347.

H EC
300 Nutrition (2)
Importance of food to the maintenance of health; nutritive values and human needs; ways of meeting requirements. For upper-division nonmajors. Not open to students who have taken 110.

H EC
307 Nutrition (5)

H EC
314 Foods I (5)
Martinsen
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.

H EC
316 Demonstration Techniques (3)
Principles and techniques of food and equipment demonstrations; food photography; recipe development. Prerequisite, 314 or permission.

H EC
317 Foods II (3)
Martinsen
Study of new food products, food additives, and convenience food items. Some time is spent on origins of food patterns of various cultures, food buymanship, and characteristics of certain wines and spirits. Prerequisite, 314.

H EC
319 Nutrition and Nursing (4)
A Martinsen
Basic principles of nutrition and their relationship to the nursing profession. Chemistry and metabolism of the nutrients essential for the maintenance of health; normal nutrition needs of individuals at various age levels; environmental influences on nutrition; assessment of nutritional status; nutritional values of foods; dietary selections as appropriate in the nutritional component of medical treatment. Prerequisites, Conjoint 317-318, and organic chemistry.

H EC
320 Nutrition and Dental Health (4)
Monsen, Worthington
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, Conjoint 317-318, and organic chemistry, or permission.

H EC
321 Applied Design (2)
Functional and decorative phases in the development of needlework and their application to contemporary design and textile art. Illustrated by a unique collection of historic lace. Prerequisites, 134 and ART 109 or equivalent, or permission.

H EC
322 Applied Design (2)
History of European national costume and embroidery as source material for modern design. Illustrated by rich collection of authentic folk costumes. Prerequisites, 134 and ART 109 or equivalent, or permission.

H EC
329 Weaving: Basic Structural Design (3)
Brockway, Wilson
Weaving as an art form; fundamentals of loom design and operation; experimental problems in basic fabric structure. Prerequisites, permission and junior standing.

H EC
334 Costume Design (3)
Katz
Designing as interpreted by techniques of draping, appropriate for silk and synthetic fabrics. Study of economic factors involved in clothing production at various price levels. Prerequisite, 234.

H EC
338 Analysis of Procedures in Clothing (3)
Katz
Emphasis is on developing quick, professional, and innovative skills in handling new materials and fabrics. As prospective teachers of clothing, students gain experience appropriate to current socioeconomic environmental factors and to differing age groups. Prerequisite, 134.

H EC
347 Home Furnishing (5)
Schroeder
Analysis of problems of shelter and furnishing with relation to today's family living. Field trips and individual laboratory problems. Prerequisites, 125 and ART 109 or 129, and upper-division standing.

H EC
348 Home Management (3)
Wilson
Principles of management, with emphasis on decision making and resource allocation in the home and the community; experimental problems in time and energy expenditure; home care and maintenance; meal management and other related areas. Prerequisites, 148, 307, 314, 347, and 354.

H EC
350 Managing Family Finances (3)
Ball
Use of financial resources to achieve family goals. Changes in income and in prices of consumer goods in relationship to family budgeting. Consumer credit, savings, insurance, so-
ARTS AND SCIENCES

cial security, investments, taxes, trusts, and wills.

H EC 354 Family Economics and Finances
Hall
Economic and social conditions affecting the consumer. Use of financial resources to achieve family goals. Family budgeting, credit, savings, insurance, taxation, investments, trusts, and wills. Not open to students who have taken 350. Prerequisites, Economics 200 and Junior standing.

H EC 356 Family Relationships (3)
Stone
Principles underlying good family relationships, adjustment of the family in a changing society. Prerequisite, upper-division standing.

H EC 372 Quantity Food Service Preparation (5)
Principles of large-quantity food preparation. Cost control for food services. Laboratory work in selected food services. Prerequisite, 314 or permission.

H EC 380 Field Work In Apparel Manufacturing
Program of part-time employment planned in advance with the instructor to provide on-the-job training correlated with periodic reports and evaluation of experience. Prerequisites, senior standing and permission.

H EC 405 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, 307, 314, inorganic and organic chemistry.

H EC 406 Recent Developments in Nutrition (3)
Review of nutrition in the light of recent developments; interpretation of current research; special needs of various age groups.

H EC 407 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, 307 and organic chemistry, or permission.

H EC 408 Diet Therapy (3) Sp

H EC 409 Food and People (3) A
Monsen
Economic, cultural, and social determinants of food patterns. Problems of population and food supply. Meaning of food to different peoples. An ecological approach to malnutrition as a major world problem. Programs of national and international scope designed to combat malnutrition. Prerequisites, 307 or 15 credits of social science and upper-division standing.

H EC 410-411 Clinical Diet Therapy (3-3) A,W Monsen
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 490. Prerequisites, senior standing in clinical dietetics or 407, and Biochemistry 405, or permission.

H EC 415 Experimental Foods (3) W
Illustrating scientific principles by subjective and objective testing of foods. Individual research problems. Prerequisite, 314 or permission.

H EC 425 Advanced Textiles (3)
Brockway
Textiles testing as a tool in measuring fabric performance; methods of quality control; textile legislation and standards. Economic factors affecting worldwide production and distribution of textile products. Consumers as a force affecting research and textile technology. Prerequisites, 125, 225, organic chemistry, and Economics 200 or equivalent.

H EC 429 Advanced Weaving (3)
Experimental problems, creative techniques in designing decorative textiles; cloth analysis and design; library investigations of historic and contemporary contributions to textile arts. Prerequisite, 359 or equivalent.

H EC 432 History of Costume and Textiles (4)
Yerina
Fabrics and costumes of ancient civilizations and medieval European countries with consideration of their respective cultural origins. Prerequisites, HIS 111 and 112, or equivalent, junior standing in fine arts or permission.

H EC 433 History of Costume and Textiles (4)
Yerina
Continuation of 432 from the Renaissance to the present. Prerequisite, 432.

H EC 434 Costume Design (3)
Shigaya
Principles of designing and tailoring outer garments. Analysis of methods and comparative costs of custom and ready-to-wear garments. Prerequisites, 234, 338 or 334, and permission.

H EC 435 Advanced Costume Design (5) A
Shigaya

H EC 437 Socio-Psychological Aspects of Clothing (3)
Yerina
Clothing as a reflection of culture and societal value concepts. Emphasis on theory, motivation, behavioral patterns. Prerequisites, 432, 433, or equivalent from other disciplines; 10 credits from sociology or anthropology or psychology, including Psychology 345.

H EC 438 Cultural Aspects of Clothing (3)
Schroeder
Surveys the use and significance of dress and adornment in primitive, folk, and national groups outside the realm of Western society. Emphasis on patterns of behavior related to technology, aesthetics, modesty, ritual, and communication. Attention given to the production and design of textiles that are used for clothing, and to changes in both design and significance of dress due to westernization.

H EC 439 History of Textile Design (3)
Yerina
Chronological development of design in Western textiles. Includes study of motifs, production techniques and materials, and sociocultural influences on development and changes in design. Prerequisites, 125, ART H 201, 202, 203, or permission.

H EC 444 Clothing for the Handicapped (3) Sp
Murdock
Exploration of clothing needs of persons with mental, physical, and emotional impairments, with solutions to some of the problems. Includes psychological aspects of clothing; analysis of specially designed clothing; sources of supply and adaptation of readily-made garments; examination of recent research in the field; and a review of selected professional organizations and community agencies concerned with the handicapped. Prerequisites, upper-division standing and permission.

H EC 447 Advanced Home Furnishing (3)
Schroeder
Individual projects in specific fields of furnishings, laboratory problems. Prerequisites, permission, or 347, and upper-division standing.

H EC 454 Consumer Economics (3)
Hall

H EC 456 Advanced Family Relationships (3)
Stone
Advanced study of family relationships, with special emphasis on the family and its members as part of the community and on community resources serving the family. Application of concepts from the behavioral sciences to the family. Prerequisites, 356 or teaching experience, and upper-division standing.

H EC 457 Child Nutrition and Care (3)
C Mayo
Role of nutrition in human growth and development, with emphasis on prenatal, neonatal, preschool, and school-age periods. Food habits and physical, mental, and emotional health. Familiarity of teachers with parents and children in a nutrition clinic under supervision of a pediatrician. Prerequisites, 300 or 307, or permission.
H EC 462 Improvement of Teaching: Home Economics (3, max. 6) Identification of goals, concepts, and generalizations in home economics units at the secondary level with emphasis on teaching techniques, evaluation, and use of resources. Prerequisite, teaching experience in home economics or permission.

H EC 472 Quantity Food Service Purchasing (3) Market organization, buying procedures, payment and credit; food selection and care; inspection of merchandise. Prerequisites, 314 and 372.

H EC 473 Quantity Food Service Organization and Management (5) Sp Organization and administration in food service institutions. A study of types of institutions, work planning, personnel direction, quality and cost controls, sanitation, budget analysis, professional ethics, executive qualifications. Prerequisite, 372.

H EC 475 Quantity Food Service Equipment (3) Equipment requirements and flow of work in institutions. Institution kitchens and serving units; equipment selection, operation, and care; repair and depreciation records. Prerequisite, 473.

H EC 480 Special Problems in Family Economics (*, No more than 10 credits in the 480 series may be applied toward any one degree.) AWSp Individual study and research in family economics. Prerequisite, permission.

H EC 481 Special Problems in Institution Administration (*, No more than 10 credits in the 480 series may be applied toward any one degree.) AWSp Individual study and research in institution administration. Prerequisite, permission.

H EC 482 Special Problems in Home Economics Education (*, No more than 10 credits in the 480 series may be applied toward any one degree.) AWSp Individual study and research in home economics education. Prerequisite, permission.

H EC 483 Special Problems in Family Relationships (*, No more than 10 credits in the 480 series may be applied toward any one degree.) AWSp Individual study and research in family relationships. Prerequisite, permission.

H EC 484 Special Problems in Costume Design (*, No more than 10 credits in the 480 series may be applied toward any one degree.) AWSp Individual study and research in costume design. Prerequisite, permission.

H EC 485 Special Problems in Textiles (*, No more than 10 credits in the 480 series may be applied toward any one degree.) AWSp Individual study and research in textiles. Prerequisite, permission.

H EC 486 Special Problems in Foods (*, No more than 10 credits in the 480 series may be applied toward any one degree.) AWSp Individual study and research in foods. Prerequisite, permission.

H EC 487 Special Problems in Home Furnishing (*, No more than 10 credits in the 480 series may be applied toward any one degree.) AWSp Individual study and research in home furnishing. Prerequisite, permission.

H EC 488 Special Problems in Home Management (*, No more than 10 credits in the 480 series may be applied toward any one degree.) AWSp Individual study and research in home management. Prerequisite, permission.

H EC 489 Special Problems in Nutrition (*, No more than 10 credits in the 480 series may be applied toward any one degree.) AWSp Individual study and research in nutrition. Prerequisite, permission.

H EC 490 Clinical Dietetic Experience (1-2, max. 10) AWSp * Buegel, Fontana Opportunity for the student in clinical dietetics to participate in the delivery of nutritional care to individuals and groups in a variety of health-care facilities under the supervision of a clinical instructor. Taken concurrently with 407, 410-411, 457, and EDC&I 328. A minimum of three hours each week for ten weeks by arrangement. Prerequisite, enrollment in the clinical dietetic program.

H EC 491 Clerkship in Clinical Dietetics (4) WSp * Buegel, Fontana Opportunity for senior students in clinical dietetics to participate in the delivery of nutritional care to individuals and groups and to develop increased professional competency. The faculty, clinical instructors, and students select appropriate clinical experiences in a community health-care facility. Sixteen hours of supervised clinical experience each week for ten weeks by arrangement. Prerequisites, senior standing in the clinical dietetic program and completion of sequential course work.

H EC 492 Advanced Clerkship in Clinical Dietetics (10) Sp * Buegel, Fontana Opportunity for the senior student in clinical dietetics to apply and extend clinical skills. Under the direction of a clinical instructor, the student is responsible for planning, directing, implementing, and evaluating the delivery of nutritional care to individuals, and/or groups in a community care 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 491.

H EC 494 Workshop in Home Economics Education (316) ** Current problems in home economics education. Prerequisites, EDC&I 327 and EDC&I 375, or equivalent.

H EC 495 Senior Honors Thesis (2 or 3, min. 6 and max. 6) AWSp For undergraduate home economics honors students only. Requires 6 credits taken over a minimum of two quarters.

Courses for Graduates Only

H EC 505 Effects of Nutrition and Environment on Mental and Physical Development (3) Sp Mottsen Consideration of various 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, with emphasis on the biochemical, structural, and psychological alterations made by these parameters. Prerequisites, biochemistry and physiology.

H EC 506 Clinical Nutrition in Normal and Handicapping Conditions of Children (6) In an interdisciplinary clinical setting application of principles of advanced nutritional needs of normal infants, children, adolescents, and pregnant women and the nutrition and feeding problems of mentally retarded and multihandicapped children. Participation in clinics conducted by interdisciplinary teams, in preclinical and postclinical conferences in clinical and developmental feeding assessment. Under supervision each student is assigned responsibility for nutrition care of selected patients. Prerequisites, graduate standing in foods and nutrition and permission.

H EC 507 Seminar in Nutrition (1-3, max. 9) Library research and seminar on selected topics in recent developments in the field of nutrition. Prerequisite, 407 or equivalent.

H EC 509 Evaluation of Nutritional Status (3) Monsen Dietary, clinical, and biochemical-biophysical components in the assessment of nutritional status. Interrelationships of nutrients and effects of varying levels of nutrient intake. Critical appraisal of nutritional status surveys. Experimental design and dietary methodology. Prerequisites, 407, 408, Biochemistry 405, or equivalent.

H EC 510 Community Nutrition (3) Survey of major nutritional problems facing American communities, with special emphasis on the problems of pregnancy and childhood. Practical approaches to nutrition education and the dynamics of changing food habits. Program planning and exposure to available resources for interdisciplinary services. Current programs in the United States and other countries. Prerequisites, 457 or equivalent, 509, or permission.

H EC 511 Field Work in Public Health Nutrition (2-12, max. 12) Observation and participation in community agency nutrition programs. Prerequisite, permission.
LANG 200 Introduction to Linguistics (5) A WSp
Branfield, Newmeyer, Saporta, Selinker
Introduction to the scientific study of language; language and writing; phonological and grammatical analysis; language change; related disciplines.

LANG 281 Language and Human Behavior (5) Sp
Dale
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; not offered 1974-75.)

LANG 353 Linguistics and Society (3) A
Newmeyer
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.

LANG 400 Survey of Linguistic Method and Theory (3) A WSp
Branfield, Saporta
Background and scope of modern linguistics; language of the world; language analysis; relation to other disciplines. Not open to students who have had 200.

LANG 401 Linguistics and Related Disciplines (3) Dale, Pope
Designed to provide students in linguistics (and other fields) with an exposure to some of the major approaches to the study of language.

LANG 404, 405, 406 Indic and Indo-European (3,3,3) Voyles
Reading of simple Sanskrit texts with emphasis on structure of Sanskrit and its comparison with other Indo-European languages. Introduction to principles of comparative linguistics.

LANG 431 Linguistics and the Teaching of Reading (3) Sp
Shapiro
Examination of the areas of interaction between linguistics and the teaching of reading. Phonetic and phonological bases of reading: the psycholinguistic nature of reading; structure of orthographic systems; reading and developmental psycholinguistics; linguistic models of reading pedagogy. Prerequisite, course in reading or linguistics.

LANG 441 Linguistics and Poetic Language (3) W
Branfield
Relationship between linguistic structures, linguistic universals, and the poetic uses of language; linguistic description in the analysis of literature. Prerequisite, 400 or permission.

LANG 443 Philosophy and Linguistics (3) A
Smirnov
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 the Department of Philosophy as Philosophy 443. Prerequisite, permission.

LANG 445 Teaching English as a Foreign Language (3) W
Selinker
Linguistic analysis as a basis for the teaching of English as a foreign language; language as rule-governed behavior. Prerequisite, 400.

LANG 447 Language Development (3) A
Dale
The study of first-language acquisition and use by children. Emphasis on theoretical issues and research techniques. Offered jointly with the Department of Psychology as Psychology 457. Prerequisite, senior or graduate major standing.

LANG 449 Second-Language Learning (3) Sp
Selinker
Survey of issues related to second language learning; learning to read in a second language, learning the linguistic aspect, and learning the subject matter. Prerequisite, 200 or 400.

LANG 451, 452, 453 Phonology (3,3,3) A WSp
Braine
Detailed study of speech sounds, mechanisms of their production, and structuring of sounds in languages: practical experience with a wide variety of languages; field techniques. Offered jointly with the Department of Anthropology as ANTH 451, 452, 453. Prerequisite, 200 or 400, which may be taken concurrently, or permission.

LANG 454 Methods In Comparative Linguistics (3) W
Voyles
Method and theory of comparative linguistics in relation to anthropological research. Prerequisite, 400 or permission.

LANG 455 Areal Linguistics (3, max. 6) A
Voyles
Linguistic analyses of the languages of a selected area. Offered jointly with the Department of Anthropology as ANTH 455.

LANG 461, 462, 463 Syntax (3,3,3) WSpA
Newmeyer
Study of the structuring of meaningful elements in language; generative views of grammar. Offered jointly with the Department of Anthropology as ANTH 461, 462, 463. Prerequisite, 200 or 400, which may be taken concurrently, or permission.

LANG 464 Phonetic Transcription (244) S
Smirnov
Practice in the transcription and analysis of phonological data from non-Indo-European languages. Prerequisite, permission. (Offered Summer Quarter only.)

LANG 465 Problem Solving in Phonology (5) S
Voyles
Training in practical solutions to phonological problems from a variety of languages. Prerequisite, permission.

LANG 466 Problem Solving in Grammar (5) S
Voyles
Training in practical solutions to grammatical problems from a variety of languages. Prerequisite, permission.
LING 467 Grammatical Exercises (2,4) S
Practice in eliciting, recording, and analyzing grammatical data of a non-Indo-European language. Prerequisite, 466, which may be taken concurrently. (Offered Summer Quarter only.)

LING 471 Survey of Linguistic Theories (5) S

LING 472 Linguistic Analysis (5) S

LING 473 Informant Techniques (5) S
Guided practice in analyzing the phonology and grammar of a non-Indo-European language. Prerequisites, 471 and 472, which may be taken concurrently.

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 Proseminar (3) A
Introduction to bibliography and research in linguistics.

LING 501, 502, 503 Linguistic Analysis Laboratory (3,3,3)

Sklifman
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.

LING 504 Indo-European Comparative Phonology (2) A
Sound systems of the principal families of Indo-European and the relation of these to a hypothetical parent tongue. Prerequisite, 406 or permission. (Offered alternate years; offered 1974-75.)

LING 505, 506 Indo-European Comparative Grammar (2,2) WSp
Systematic treatment, with extensive surveys of individual language groups. Prerequisite, 504.

LING 514, 515, 516 Seminar in Comparative Linguistics (2,2,2) A,WSp
Advanced problems emphasizing work with languages having few or no written records. Prerequisite, 406 or permission.

LING 519 Mathematical Models of Grammar (3) Sp
Brame
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.

LING 534 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
Sklifman
The principles of dialect deviation as related to linguistic structure and usage. Prerequisite, 452 or permission.

LING 550, 551, 552 Advanced Phonology (3,3,3) A,WSp
Braine
Problems in phonological theory, generative phonology, phonological change. History of phonological analysis. Prerequisites, 451, 452, 453. (551, 552 not offered 1974-75.)

LING 553 Analysis of Linguistic Structures (3, max. 6) Sp
Banfield
Syntactic and/or phonological analysis. Language varies. Offered jointly with the Department of Anthropology as ANTH 553. Prerequisite, permission.

LING 551, 552, 563 Advanced Syntax (3,3,3) A,WSp
Brame, Newmeyer
Intensive investigation of the historical background of, and recent developments in, transformational syntax. Prerequisites, 461, 462, 463. (563 not offered 1974-75.)

LING 565 Contrastive Linguistics (3) Sp
Seligker
The attempt to look across linguistic systems for comparable and contrastive classes and subclasses. Problems of subcategorization and universal grammar. Three conceptually distinct models: structural, transfer grammar, generative. Prerequisites, 452, 463.

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. (Offered alternate years; offered 1975-76.)

LING 579 Comparative Altai Linguistics (3) W
Comparative phonology and morphology of Mongol and Turkic and other related languages. Offered jointly with the Department of Asian Languages and Literature as ASLING 579. Prerequisite, permission.

LING 590 Problems in Linguistics (3, max. 12) A,WSp
Banfield, Shapiro
For advanced students of linguistics, dealing with significant research problems in the field. Prerequisite, permission.

LING 599 Linguistics Colloquium (1, max. 6) AWSp
Biweekly seminar attended by faculty and graduate students to discuss research in progress and topics of general interest. Attendance is required for a minimum of three quarters during the student's residence. Prerequisite, permission.

LING 600 Independent Study or Research (*) AWSp

LING 700 Master's Thesis (*) AWSp

LING 800 Doctoral Dissertation (*) AWSp

MATH 100, 102 Algebra (5,5) AW,WSp
Similar to the first three terms of high school algebra. For Educational Opportunity Program students. Assumes no previous experience in algebra. (Not open to regularly admissible students who have completed two years of college-preparatory mathematics with C or better grades.)

MATH 101 Intermediate Algebra (0) AWSp
Similar to third semester of high school algebra. Available only through Evening and Extension Credit Programs upon payment of a separate fee. Prerequisite, one year of high school algebra and prerequisite to 104, 105, 114.

MATH 104 Plane Trigonometry (0) AWSp
Trigonometric functions, identities, equations, inverse functions, graphs, logarithms, and solution of triangles. Available only through Evening and Extension Credit Programs upon payment of a separate fee. Prerequisites, 101 or equivalent and one year of plane geometry.

MATH 105 Elementary Functions (5) A,WSp
Elementary functions with emphasis on the general nature of function, polynomial and rational functions, exponential and logarithmic functions and trigonometric functions. Prerequisites, one and one-half years of high school algebra and qualifying test, or 101 or equivalent.

MATH 106 Introduction to Finite Mathematics (3) A,WSp
Brief introduction to logic, set theory, probability, and elements of matrix algebra. Intended primarily for students in the biological and social sciences and in business administration. Credit may not apply toward a major in mathematics. Prerequisite, one and one-half years of high school algebra, or 101 or equivalent.

MATH 114 Elementary Computer Programming (3) A,WSp
Programming and coding of problems for automatic digital computers. Flow charts, loops, subroutines. Codes written are executed by machine. Prerequisite, one and one-half years of high school algebra or equivalent; 101 and 105 or equivalent recommended.
MATH 124, 125, 126 Calculus With Analytic Geometry (3,5,5) A,W,Sp,AwSp,A,Wsp Plane analytic geometry, differentiation of algebraic and transcendental functions, definite and indefinite integrals, technique of integration, vector, vector-valued functions, infinite series. Applications. No more than 5 credits from among 124, 134H, and 157 may be counted toward any degree. Prerequisites, 105 or qualifying test, and trigonometry for 124; 124, 134H or 125 or 135H or 126.

MATH 134H, 135H, 136H Calculus With Analytic Geometry (3,5,5) A,W,Sp Honors sections of 124, 125, 126. No more than 5 credits from among 124, 134H, and 157 may be counted toward any degree. Prerequisites, four years of high school mathematics including one year of calculus, and permission.

MATH 157 Elements of Calculus (4) A,W,Sp Elementary treatment of the differential and integral calculus of simple functions. Intended for students who wish only a brief course in calculus. Prerequisite, one and one-half years of high school algebra or 101 or equivalent.

MATH 170, 171 Theory of Arithmetic (3,3) A,W,Sp Numerals and systems of numeration; concept of a set; relations and their properties; systematic development of the integers, rational numbers; real numbers and their properties. Ordinarily, credit not available toward a major in mathematics. Elementary education majors are required to take 170. Prerequisites, one year of high school algebra, one year of geometry, and either third-semester high school algebra or Philosophy 120 or equivalent for 170; 170 for 171.


MATH 224 Intermediate Analysis (3) A,W,Sp Rigorous treatment of the foundations of single-variable calculus. Limits, continuity, the completeness property of the real numbers and some of its consequences, theorems on differentiation and Riemann integration. Infinite series. Prerequisite, 126 or 136H.

MATH 234H, 235H, 236H Advanced Calculus (3,3,3) A,W,Sp Honors courses covering the material of 238, 324, 325, 326, and selected other topics. Prerequisites, 136H or permission for 234H; 234H for 235H; 235H for 236H.

MATH 238 Elements of Differential Equations (3) A,W,Sp Elementary methods of solution of first-order equations, linear equations of second and higher order, power series solutions. Prerequisite, 126 or 136H.

MATH 301 Elementary Number Theory (3) A,W,Sp Brief introduction to some of the fundamental ideas of elementary number theory. Prerequisite, 126 or 136H.


MATH 305 Introduction to Mathematical Logic (3) Sp Formal principles of inference and definition. Propositional inference and inference involving quantifiers. Applications to elementary mathematical theories and to the axiomatic method are stressed. Prerequisites, 126, or 105 and Philosophy 120.

MATH 324, 325, 326 Advanced Calculus I, II, III (3,5,5) A,W,Sp,A,Wsp,A, Wsp Functions of several variables, partial derivatives, the gradient, extremal problems, multiple integrals, transformations and mappings, implicit function theorem, line and surface integrals, vector analysis, differential forms, theorems of Green, Gauss, and Stokes, uniform convergence. Deals with n dimensions throughout. Prerequisites, 224 and either 302 or 205 for 324, 303 recommended; 324 for 325; 325 for 326.

MATH 327 Advanced Calculus (3) A,W,Sp Functions of several variables, partial derivatives, the gradient, extremal problems, line integrals, double integrals, Green's theorem. Not recommended for mathematics majors. Prerequisite, 126 or 136H. Not open for credit to students who have taken 324.

MATH 328 Advanced Calculus (3) A,W,Sp Implicit function theorem, Lagrange multipliers, surfaces and surfaces integrals, vector analysis in three dimensions, theorems of Gauss and Stokes. Not recommended for mathematics majors. Prerequisite, 327 or 324. Not open for credit to students who have taken 325.

MATH 334 Principles of Digital Computers and Coding (3) A,W,Sp High-speed digital computation, number systems, machine components, programming, operation. Prerequisites, 114 and 125 or 134H.

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, 236H or 325, or permission.

MATH 402, 403, 404 Introduction to Modern Algebra (3,5,5) A,W,Sp Algebraic systems: elementary theory of groups, rings, and fields; polynomials; topics in linear algebra; reductions of forms. Prerequisites, 236H 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.


MATH 411, 412 Introduction to Modern Algebra for Teachers (3,3) A,W Development of number systems of elementary algebra: groups, rings, integral domains and fields; polynomials. Restricted to teaching majors, and not open for credit to students who have taken 402, 403. Prerequisites, 205 or 302 for 411; 411 for 412.

MATH 420 History of Mathematics (3) W Survey of the development of mathematics from its earliest beginnings through the first half of the twentieth century. Prerequisites, 224, and 403 or 412.

MATH 424, 425, 426 Fundamental Concepts of Analysis (3,3,3) A,W,Sp Sets, real numbers, topology of metric spaces, normed linear spaces, multivariable calculus from an advanced viewpoint. Prerequisites, 325 or 236H, and 303 or permission for 424; 424 or 425; 425 for 426.

MATH 427 Topics In Applied Analysis (3) A,W,Sp Some elementary functions of a complex variable, Cauchy integral formula and applications, Taylor and Laurent series, conformal mapping. Prerequisite, 234H or 324 or 327.

MATH 428, 429 Topics In Applied Analysis (3,3) W,Sp,A Sp Orthogonal functions and boundary value problems, calculus of variations. Prerequisites, 234H or 235H or 327, and 236.

MATH 438 Principles of Differential Equations (3) A,W,Sp Linear systems, existence of solutions, solution by series, special functions. Prerequisite, 236H or 224; 238 and 302 recommended.

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, 324 or 327, and 302 or permission, for 441; 441 for 442; 442 for 443.


MATH 464 Numerical Analysis I (3) A,W,Sp Selected topics from among: principles of numerical analysis, classical interpolation and approximation formulas, finite differences and difference equations. Prerequisites, 238, 324 or 327, and 374.
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 496H Honors Seminar (*, max. 9) AW,Sp
Problem seminar for senior honors students and first-year graduate students. Prerequisite, permission.

MATH 497 Special Topics in Mathematics for Teachers (2-5, max. 15)
Study of selected areas of mathematics. Designed for the improvement of teachers of mathematics. Offered jointly with the College of Education as EDC56 478.

MATH 498 Special Topics in Mathematics (2-5, max. 15) AW,Sp
Reading and lecture course intended for special needs of advanced students. Prerequisite, permission. (Offered when demand is sufficient.)

PROBABILITY AND STATISTICS

MATH 281 Elements of Statistical Method (3) AW,Sp
Elementary concepts of probability. Binomial and normal distributions. Basic concepts of testing hypotheses and estimation. Application to binomial and normal distribution. Chi-square tests. Linear regression theory. For nonmajors only. No more than 6 credits from among 281, 391, 392, Quantitative Science 281, and Psychology 302 may be counted toward any mathematics degree. Prerequisite, 105.

MATH 391 Elementary Probability (3) AW,Sp
Sample space, random variables, laws of probability. Combinatorial probabilities. Distributions: binomial, normal; expectation, variance. No more than 6 credits from among 281, 391, 392, Quantitative Science 281, and Psychology 302 may be counted toward any mathematics degree. Not intended for nonteaching majors in mathematics or the physical sciences or those desiring more than one quarter of probability. Not open for credit to students who have taken 391. Prerequisite, 327 or 234H.

MATH 392 Elements of Statistics (3) AW,Sp
Basic concepts of testing hypotheses and of estimation (interval and point). Binomial, normal tests, and estimates. No more than 6 credits from among 281, 391, 392, Quantitative Science 281, and Psychology 302 may be counted toward any mathematics degree. Not intended for nonteaching majors in mathematics or the physical sciences. Prerequisite, 391.

MATH 394 Probability (3) AW
Sample spaces; basic axioms of probability; combinatorial probability; conditional probability and independence; binomial, Poisson and normal distributions. Prerequisite, 224 or 136H.

MATH 395 Probability (3) WSp
Random variables; expectation and variance; laws of large numbers; normal approximation and other limit theorems; multidimensional distributions and transformations. Prerequisite, 394.

MATH 396 Probability (3) Sp
Characteristic functions and generating functions; recurrent events and renewal theory; random walk. Prerequisite, 395.

MATH 482, 483 Statistical Inference (3,3) AW, W, Sp
Introduction to sampling and general theory of statistical inference; general theory of estimation and hypothesis testing; multivariate theory and correlation. Prerequisites, 395 for 482; 482 and 303 for 483.

MATH 484 Distribution-Free Inference (3) Sp
Distribution-free methods in estimation and testing; Chi-square theory. Prerequisite, 483.

MATH 485 Analysis of Variance (3) Sp

MATH 491, 492 Introduction to Stochastic Processes (3,3) A, W
Random walks, Markov chains, branching processes, Poisson process, point processes, birth and death processes, queuing theory, stationary processes. Prerequisites, 396 for 491; 491 for 492.

Courses for Graduates Only

MATHMATICS

MATH 501, 502, 503 Mathematical Logic (3,3,3) A, W,Sp
Theory of formal systems. Formal development of number theory. Completeness and incompleteness, decidability, and undecidability. The theorems of Gödel, Henkin, Church, Rosser, and Tarski. Selected topics from axiomatic set theory, recursive function theory, theory of models, or advanced theory of formal systems. Prerequisites, 403 or equivalent for 501; 501 for 502; 502 for 503.

MATH 504, 505, 506 Modern Algebra (3,3,3) A, W,Sp
Theory of groups, rings, integral domains, and fields; polynomials; vector spaces, Galois theory, and theory of ideals. Prerequisite, 404 or equivalent for 504; 504 for 505; 505 for 506.

MATH 507, 508 Foundations of Mathematics (3,3)
Set
Fundamental concepts and methods of mathematics; the axiomatic method; the logical foundations of mathematics. Prerequisite, 507 for 508.

MATH 510 Seminar in Algebra (*, max. 5) AW,Sp
Prerequisite, permission.

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, Lattice 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 set functions; real valued 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
Compactness theorems. Lebesgue integration and limit theorems. Fubini theorem, Lebesgue spaces, Fourier transform theory. Prerequisites, 427, 428, 429, or permission.

MATH 528, 529 Hilbert Space Operators (3,3) W,Sp
Spectral theory for bounded Hermitian operators, statement 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) AW,Sp
Prerequisite, permission.

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 Operators in Hilbert Space, Group Representations, Fourier Series and Integrals, Topological Linear Spaces, Potential Theory, and Numerical Analysis.

MATH 534, 535, 536 Complex Variable (3,3,3) A, W,WS,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) W,Sp
Phase plane; analysis of critical points (nodes, saddle points, foci); theory of oscillations, limit cycles, Poincare-Bendixon theory; topological methods, fixed-point theorems. Prerequisites, 324 (or 236H) and 438 for 538; 538 for 539. (Offered alternately with 578, 579; offered 1973-74.)

MATH 541, 542, 543 Special Topics in Applied Mathematics (3, max. 9; 3, max. 9, max. 9) A, W,Sp
Such topics as mathematical quantum theory, fluid mechanics, optimization and operations research, and control theory are covered.
MATH 544, 545, 546 Differential Geometry (3,3,3) A,W,Sp
544: differential analysis in R^n, inverse function theorem, vector fields. Stokes' theorem, existence theorems concerning differential equations. Prerequisite, graduate standing or permission. 545, 546: differentiable manifolds, differential forms, differential geometry in the large. Prerequisites, 544 for 545; 545 for 546.

MATH 547, 548, 549 Functional Analysis (3,3,3) A,W,Sp

MATH 550 Seminar in Geometry (*, max. 5) A,W,Sp
Prerequisite, permission.

MATH 551, 552, 553 Special Topics in Geometry (3-3, max. 9) 2-3, max. 9) A,W,Sp
In recent years the following subjects have been covered: Riemannian Geometry. Differentiable manifolds, Complex Manifolds, Geometry of Convex Bodies.

MATH 557, 558, 559 Special Topics in Numerical Analysis (3, max. 9) 5, max. 9) A,W,Sp
Such topics as linear systems, approximation theory, or the numerical solution of differential equations are covered.

MATH 561, 562, 563 General Topology (3,3,3) A,W,Sp
Theory of sets, metric spaces, topological spaces; compactness and other covering properties; function spaces; polyhedra; dimension theory. Prerequisites, 400, which may be taken concurrently, and 426 for 561; 561 for 562; 562 for 563.

MATH 564, 565, 566 Algebraic Topology (3,3,3) A,W,Sp
Classical and modern approaches; complexes and their homology theory; applications. Fixed points, primary obstruction; products and Poincaré duality; axiomatic approach, covering spaces. Prerequisites, 506 for 564; 564 for 565; 565 for 566.

MATH 569 Partial Differential Equations (3) Sp

MATH 570 Seminar in Topology (*, max. 5) A,W,Sp
Prerequisite, permission.

MATH 571, 572, 573 Special Topics in Topology (2-3, max. 9) 2-3, max. 9) A,W,Sp
Special topics from general and algebraic topology.

Classification, existence, uniqueness, and boundary value problems for partial differential equations. Green's function and associated integral equations. Prerequisite, 426 or 527.

MATH 578, 579 Special Functions (3,3) 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; offered 1974-75.)

MATH 585 Numerical Mathematics (3) Numerical solution of linear algebraic systems, algebraic eigenvalue problems, ordinary and partial differential equations. Offered jointly with the Computer Science Group as Computer Science 585. Prerequisites, 303, 438, and programming with a procedure-oriented language.

MATH 586 Numerical Mathematics (3) Continuation of 585. Selected topics in numerical mathematics. Offered jointly with the Computer Science Group as Computer Science 586. Prerequisite, 585 or permission.

MATH 600 Independent Study or Research (*) A,W,Sp

MATH 700 Master's Thesis (*)

MATH 800 Doctoral Dissertation (*)

PROBABILITY AND STATISTICS

MATH 521, 522, 523 Probability (3,3,3) A,W,Sp
Measure theory and integration, independence, laws of large numbers, Fourier analysis of distributions, central limit problem and infinitely divisible laws, conditional expectations, martingales. Prerequisite, 426.

MATH 581, 582, 583 Advanced Theory of Statistical Inference (3,3,3) A,W,Sp
Elements of decision theory; Neyman-Pearson theory; randomized tests; maximum likelihood statistics; confidence regions; distribution-free statistics; linear hypotheses; analysis of variance; block design. Prerequisites, 482 and 483 or permission for 581; 581 for 582; 582 for 583.

MATH 590 Seminar in Probability and Statistics (*, max. 9) A,W,Sp
Prerequisite, permission.

MATH 591, 592, 593 Special Topics in Statistics (3, max. 9) 3, max. 9) 3, max. 9) A,W,Sp
In recent years, the following subjects have been covered: Advanced Probability Theory, Stochastic Processes, Distribution-Free Inference, Game and Decision Theory, Advanced Theory of Estimation (including Sequential Estimation).

MATH 600 Independent Study or Research (*) A,W,Sp

MATH 700 Master's Thesis (*) A,W,Sp

MATH 800 Doctoral Dissertation (*)

MUSIC

MUSIC Courses for Undergraduates
Courses primarily for nonmajors (see also Ensembles).

MUSIC 100 University Singers (1, max. 12) A,W,Sp
Eichenberger

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,W,Sp
Clarks
Studies in listening with emphasis on the changing components of Western art music. Illustrated lectures, laboratory section meetings, and presentations by guest artists.

MUSIC 121 The Orchestra (2) A,W,Sp
McInerney, Sokol
Development of the orchestra and its literature.

MUSIC 122 Orchestral Music: Seventeenth and Eighteenth Centuries (2) A Sokol

MUSIC 123 Symphony Music: Nineteenth Century (3) W Sp
Sokol

MUSIC 124 Symphony Music: Contemporary (3) Sp
Sokol

MUSIC 128 The Concerto (2) A Sokol

MUSIC 130, 131, 132 Basic Musicianship (3,3,3) A,W,Sp
Lundquist
Examination of the processes of music from cross-cultural vantage point, primarily African, Latin American, and Afro-American. Development of improvisatory techniques, performance on variety of musical instruments, use of musical notation, development of analytical and score-writing techniques, development of aural perception ability. Prerequisite, permission. (Last time offered: Spring Quarter 1975.)

MUSIC 185 The Concert Season (4) W Bergsm
Sampling of different musical events on campus, which may include orchestra, chamber music opera, non-Western music, mixed media, other. Analysis of selected works; when possible, preview with performers. Attendance required at one evening concert weekly.
MUSIC
300 Music of Greater Mexico (3)
Garfias
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
Garfias
316: music of India, Southeast Asia, Indonesia. 317: Africa, Western Europe, North and South America. 318: Eastern Europe, Middle East, Central Asia, Far East.

MUSIC
319 Afro-American Music (5)
Garfias
Survey course centering on Black music in the United States, but also clarifying the relationship of this music to the music of other Afro-American cultures as well as to their African roots.

MUSIC
329 Chamber Music (2) W
McInnes
Survey of literature for ensembles.

MUSIC
330 Music in the United States (3) W
Clarke
Contribution of music to the development of American culture.

MUSIC
331 History of Jazz (3) A,W,Sp
Braz, Garfias, Smith
Development of jazz in the United States, from its beginnings to its present trends.

MUSIC
336 Jazz Arranging (3) A
Smith
Writing in jazz style for various instrumental combinations. Prerequisite, permission.

MUSIC
339 Opera (5) W
Troy
Contributions of music, text, and staging; study of representative works concentrating on problems of combining these elements into a composite work of art.

MUSIC
385 Music in Theatre (3)
Bergsma
Survey of the interaction between musical form and function in relation to various kinds of theatre, from liturgical drama to film and multimedia.

MUSIC
386 Multi-Media Music (3) A
Demeter
Survey tracing the development of multimedia music since 1950 (experimental combinations of music with other art forms in unfamiliar circumstances).

MUSIC MAJORS
Permit of undergraduate adviser required for all courses except Music 100.

MUSIC
100 University Singers (1, max. 12) A,W,Sp
Eichenberger

MUSIC
101 University Symphony Orchestra (1, max. 15) A,W,Sp
Krachmalnick

MUSIC
102 University Band (1, max. 12) W,Sp
Bissell

MUSIC
103 Chamber Music (1, max. 12) A,W,Sp

MUSIC
104 Pleno Ensemble (1, max. 12) A,W,Sp
Gleiser

MUSIC
105 Brass Ensemble (1, max. 12) W,Sp
Bissell

MUSIC
106 Woodwind Ensemble (1, max. 12) A,W,Sp
Grosman, Leuba, McColl, Skowronek, Storch, Welke

MUSIC
107 Opera Workshop (1, max. 12) A,W,Sp
Rotinbub

MUSIC
White
Development of proficiency in the use of tape recorders for original recordings, dubbing, and mixing; experience in the setting up and use of the electronic music synthesizer for the composition of electronic music. Each student produces tape-recorded examples of electronic music.

MUSIC
110, 111, 112 First-Year Theory (3,3,3) A,W,Sp
Study of basic musical concepts and terminology through a program of listening, analysis, and keyboard practice. To be taken concurrently with 113, 114, 115.

MUSIC
113, 114, 115 Ear Training (1,1,1) A,W,Sp
To be taken concurrently with 110, 111, 112.

MUSIC
119 Music Fundamentals (2) A,W,Sp
For majors in elementary education.

MUSIC
136 Basic Keyboard (1, max. 6) A,W,Sp
For music majors only.

MUSIC
137, 138, 139 Class Instructions: Voice (1,1,1) A,W,Sp
For music majors only.

MUSIC
191 Composition (2, max. 6) A,W,Sp
Beale, Bensoeuf, Bergsma, Dorsey, Keichley, Smith, Tufts
One-half-hour private lesson and a one-hour laboratory session each week. Intended to develop skill in creative musical expression.

MUSIC
201 Wind Sinfouletta (1, max. 12) A,W,Sp
Welke

MUSIC
202 Jazz Improvisation (1, max. 6) W,Sp
Smith
Improvisational techniques in the jazz style for instrumentalists, with priority given to woodwind performers.

MUSIC
203 Marching Band (1, max. 5) A
Bissell

MUSIC
204 Percussion Ensemble (1, max. 12) A,W,Sp
Shrader

MUSIC
205 Non-Western Ensemble (1, max. 12) A,W,Sp
Garfias

MUSIC
206 Jazz Ensemble (1, max. 12) A,W,Sp
Brazil

MUSIC
207 University Oratorio Chorus (1, max. 12)
A,W,Sp
Eichenberger
Choral ensemble that performs major works with orchestra.

MUSIC
208 University Laboratory Band (1, max. 12)
A,W,Sp
Large ensemble performance practices in the jazz idiom.

MUSIC
209 Recorder Ensemble (1) Sp
Prerequisite, 241.

MUSIC
210, 211, 212 Second-Year Theory (3,3,3) A,W,Sp
Beeb, Beele, Dorsey, Keichley, Tufts
Practical writing and analytic experience in diatonic and chromatic harmony as it was used during the eighteenth and nineteenth centuries. To be taken concurrently with 213, 214, 215. Prerequisites, 112 and 115.

MUSIC
Irvin, Troy
To be taken concurrently with 210, 211, 212.

MUSIC
216, 217, 218 Introductory Composition (2,2,2) A,W,Sp
Beebe
For students not majoring in composition. Prerequisite, 112.

MUSIC
220, 221, 222 String Techniques I (1,1,1) A,W,Sp
Justlila
Violin, viola, cello, string bass.

MUSIC
223, 224, 225 String Techniques II (1,1,1) A,W,Sp
Justlila

MUSIC
226, 227, 228 Woodwind Techniques (1,1,1) A,W,Sp
Welke

MUSIC
229, 230, 231 Brass Techniques (1,1,1) A,W,Sp
Bissell
229: trumpet. 230, 231: lower brass.

MUSIC
232 Percussion Techniques (1) A
Shrader
**ARTS AND SCIENCES**

**MUSIC**

233 Music Theatre Technique (1) A
    Rosinbom
    Stage department and dramatic movement for singers.

236 Secondary Piano (2, max. 6) AWSp
    For music majors only.

237 Class Instruction: Voice (2, max. 6) AWSp
    For music majors only.

240 Guitar Techniques I (1) AWSp

241 Recorder Techniques I (1) W

250 Guitar Techniques II (1) Sp
    Prerequisite, 240 or permission.

291 Composition (2, max. 6) AWSp
    Beale, Benshoof, Bergma, Dorsey, Kechley, Smith, Tufts
    One half-hour private lesson and a one-hour laboratory session per week. Prerequisite, 191.

309 Advanced Music Theatre Technique (1) W
    Rosinbom
    Dramatic interpretation of musical style as represented by the major opera composers since Mozart. Prerequisite, 233.

310 Modal Counterpoint (3) A
    Babb
    Sixteenth-century style. To be taken concurrently with 313. Prerequisites, 212 and 215.

311 Tonal Counterpoint (2) W
    Benshoof
    Basic techniques of Baroque counterpoint and introduction to the fugue. To be taken concurrently with 314. Prerequisites, 212 and 215.

312 Contemporary Idioms (3) Sp
    Analytical studies of present-day composition techniques with emphasis on contrapuntal qualities. Prerequisites, 212 and 215.

313, 314 Music Before 1750 (3.3) A,W
    Clarke, Harman, Terry
    313: before 1600. 314: 1600-1750. To be taken concurrently with 310, 311. Prerequisites, 212, 215 for 313; 313 for 314.

323, 324, 325 Accompanying (2,2,2) AW,WSp
    O'Doan
    Study and performance of music of different types and periods for voice or instruments in combination with the piano.

326, 327, 328 Repertoire (1,1,1) A,W,Sp
    Eichberger, Hokin, Kind
    For applied music majors.

334 Band Arranging (2) W
    Welke
    Prerequisite, 212.

336 Jazz Arranging (2) A
    Smith
    Writing in jazz style for various instrumental combinations.

337 History of Chamber Music (3) A
    McInnes

338 Keyboard Performance Practices (2)
    Kind
    Survey of musical ornamentation in France, Spain, England, Italy, and Germany from 1600 to 1800, with special reference to the harpsichord. Prerequisite, permission.

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.

379 Junior Recital (1) AWSp
    For participants in the Bachelor of Music program only.

380, 381, 382 Conducting (1,1,1) A,W,Sp
    Eichberger, Krachmalnick, Sokol, Welke
    Prerequisite, 280.

391 Composition (2, max. 6) AWSp
    Beale, Benshoof, Bergma, Dorsey, Kechley, Smith, Tufts
    One half-hour private lesson and a one-hour laboratory session each week. Prerequisite, 291.

400 Medieval Music: To 1400 (3) A
    Harman
    Gregorian chant through Machaut and Landini. (Not offered 1974-75.)

401 Early Renaissance Music: 1400-1525 (3)
    W
    Harman
    Dunstable through Josquin. (Not offered 1974-75.)

402 Late Renaissance Secular Music: 1525-1630 (3) A
    Harman
    The madrigal in Italy, England, and Germany. The Chanson, Jnneequin through Lassus. (Not offered 1974-75.)

403 Late Renaissance Sacred and Instrumental Music: 1525-1630 (3) W
    Harman
    Latin church music, Willaert through G. Gabrieli; early Reformation church music, Walther through Gibbons; instrumental music, Caberet, the English virginal school, and Sweelinck. (Not offered 1975-76.)

404 Keyboard Music: 1630-1770 (3) A
    Terry
    Forms and styles: Frescobaldi through J. S. Bach and C. P. E. Bach.

406 Keyboard Music: 1850-1920 (3) Sp
    Irvine
    Liszt through Debussy. (Not offered 1974-75.)

407 Baroque Solo Song (3)
    Monody and cantata, Caccini through Handel. (Not offered 1974-75.)

408 The German Lied (3) A
    Terry
    Schubert through Strauss. (Not offered 1975-76.)

409 French Art-Song: 1850 to the Present (3)
    Terry
    Faure through Poulenc. (Not offered 1974-75.)

410 Chamber Music: 1600-1770 (3) W
    Harman
    Frescobaldi through Bach. (Not offered 1974-75.)

411 Chamber Music: 1770-1830 (3)
    Haydn through Schubert. (Not offered 1974-75.)

412 Chamber Music: 1830-1920 (3) Sp
    Schumann through Ravel. (Not offered 1974-75.)

413 Orchestral Music: 1620-1750 (3) W
    Harman
    Corelli through the Mannheim School. (Not offered 1975-76.)

414 Orchestral Music: 1750-1850 (3) A
    Irvine
    Haydn through Berlioz.

415 Orchestral Music: 1850-1920 (3) W
    Irvine
    Liszt through Elgar; the National Schools and the Impressionists.

416 Choral Music: 1600-1770 (3) Sp
    Harman
    Monteverdi through Handel. (Not offered 1975-76.)

417 Choral Music of Bach (3) Sp
    Terry
    The cantatas and larger works. Choral compositions of Bach's immediate predecessors.
MUSIC 418 Choral Music: 1770-1850 (3) A
Terry
Large works for chorus and orchestra. Haydn through Berlioz. (Not offered 1974-75.)

MUSIC 419 Choral Music: 1850 to the Present (3) Sp
Terry
Selected choral masterpieces. Brahms through Britten. (Not offered 1974-75.)

MUSIC 420 Opera: 1600-1750 (3) Sp
Gluck through Bellini. (Not offered 1975-76.)

MUSIC 421 Opera: 1750-1850 (3) Sp
Troy
Wagner through Verismo. (Not offered 1975-76.)

MUSIC 422 Opera: 1850-1920 (3) A
Troy
Wagner through Puccini.

MUSIC 423 Music in the Twentieth Century (3) Sp
Clarke
Western art music from Debussy to the present, emphasizing techniques adapted from other arts, sciences, and literatures. (Not offered 1974-75.)

MUSIC 424 Conspectus of the History of Music to 1760 (5) W
Harman, Troy
Concentrated course in Renaissance, Baroque, and preclassical music. Intended primarily for senior transfers and graduates.

MUSIC 425 Conspectus of the History of Music From 1760 (5) Sp
Irvin, Troy
Concentrated course in classical, nineteenth- and twentieth-century music. Intended primarily for senior transfers and graduates.

MUSIC 426 Music of Korea (3)
Prerequisites, 316, 317, 318.

MUSIC 427 Music of Africa (3)
Music of the different ethnic groups of Africa and their influence on each other. Prerequisites, 316, 317, 318.

MUSIC 428 Music of India (3)
Prerequisites, 316, 317, 318.

MUSIC 429 Introduction to Ethnomusicology (3) A
Garfias

MUSIC 430 Organology (3) W
Kauffman
Systematic study of musical instruments, involving the history, acoustical phenomena, and physical typologies of instruments from around the world, with emphasis on non-Western music. Prerequisite, 429.

MUSIC 431 The Curriculum in Music Education (2) Sp
Prerequisite, student teaching.

MUSIC 432 The General Music Class (3) Sp
Reeder
The teaching of music and its literature in non-performing classes on the junior and senior high school level. Prerequisite, 340.

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 434, 435, 436 Pedagogy (2, 2.2) A, W, Sp
Harris, Heinitz, Hokanson, Moore
Principles of effective studio teaching; survey and evaluation of teaching materials.

MUSIC 437 Harmonic Analysis (3)

MUSIC 438 Psychology of Music (3) A or W
Carlton
Study of human response to musical phenomena, with particular emphasis on perception, learning, measurement, and functional applications.

MUSIC 439 Music of Indonesia and the Philippines (3)
Prerequisites, 316, 317, 318.

MUSIC 440 Music in Early Childhood (3) A
Identification and selection of appropriate objectives, materials, teaching strategies and evaluation techniques used in music teaching from nursery school through grade 3, with consideration of various methods (e.g., Kodaly, Orff, etc.) 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., Kodaly, Orff, etc.) for later childhood development in music. Prerequisite, 340.

MUSIC 442 Instrumental Curriculum: Methods and Materials (3) A
Justila
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.

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.

MUSIC 450 University Chorale (1, max. 12) A WSp
Eichenberger

MUSIC 451 Madrigal Singers (1, max. 12) A WSp
Kechley

ARTS AND SCIENCES

MUSIC 479 Senior Recital (1) A WSp

MUSIC 480 Sinfonietta (1, max. 6) A WSp
Krachmalnick

MUSIC 481 Chamber Music (1, max. 6) A WSp
Prerequisites, graduate standing.

MUSIC 482 Opera Theatre (2, max. 6) A WSp
Krachmalnick, Rosinbum
Preparation for participation in public performance of roles in chamber opera.

MUSIC 483 Collegium Musicum (1, max. 6) A WSp
Kind

MUSIC 484 Problems in Twentieth-Century Ensemble (1, max. 6) A WSp
Bergman, Smith
Exploration of notation and performance problems in today's music; preparation for public performance.

MUSIC 486 Modal Counterpoint (3) W
Babb
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 (2, max. 12) A WSp
Beals, Benchoff, Bergman, Dorsey, Kechley, Smith, Tutu
One half-hour private lesson and a one-hour laboratory session each week. Prerequisite, 391.

MUSIC 492, 493 Opera Direction and Production (4,4) A WSp
Roehm
Practical experience with problems of the theater. Prerequisite, 492 for 493.

MUSIC 494 Music of Japan (3)
The music of Japan from earliest known record until 1700. Prerequisites, 316, 317, 318.

MUSIC 495 Music of Japan (3)
The music of Japan from 1700 to the present. Prerequisites, 316, 317, 318.

MUSIC 496 Special Topics in Music Education (1-3, max. 10) S
Special studies designed to reflect contemporary emphases and concerns in the music education profession.

MUSIC 497 Music of China (3)
The music of China from the earliest times to the present. 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
499 Undergraduate Research (*, max. 6)
AWSp

Courses for Graduates Only

MUSIC
500 Methods of Musical Research (3) AWSp
Irvine
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, Keachley
501: chant to middle Baroque. 502: high Baroque through nineteenth century. 503: impressionists to present.

MUSIC
504 Seminar in Medieval Music (3, max. 6) Sp
Harman
Prerequisite, 400. (Not offered 1974-75.)

MUSIC
505 Seminar in Renaissance Music (3, max. 6)
A
Harman
Prerequisite, one or more courses from 401, 402, and 403. (Not offered 1974-75.)

MUSIC
506 Seminar in Baroque Music (3, max. 6) W
Terry
Prerequisite, one or more courses from 404, 407, 410, 413, 416, 417, or 420.

MUSIC
507 Seminar in Rococo and Pre-Classical Musics 1700-1760 (3, max. 6) Sp
Harman
Prerequisite, one or more courses from 404, 410, 413, 420. (Not offered 1974-75.)

MUSIC
508 Seminar in the Viennese Classical Period: 1760-1830 (3, max. 6) Sp
Terry
Prerequisite, one or more courses from 405, 411, 414, 418, or 421. (Not offered 1975-76.)

MUSIC
509 Seminar in Nineteenth-Century Musics: 1830-90 (3, max. 6) A
Irvine
Prerequisite, one or more courses from 406, 408, 409, 412, 415, 419, or 422. (Not offered 1975-76.)

MUSIC
510 Seminar in Music Since 1890 (3, max. 6) W
Clarke
Prerequisite, one or more courses from 406, 408, 409, 412, 415, 419, 422, or 423. (Not offered 1974-75.)

MUSIC
511 Seminar in Field and Laboratory Methods (3)
Kaufman
Study of the methodology of research in ethnomusicology along with practical experience in recording and processing field and laboratory materials. Prerequisite, 429.

MUSIC
512 Seminar in Ethnomusicology (3)
Kaufman
Study of methodological procedures in ethnomusicology applied to specific research problems.

MUSIC
513 Historiography (3) W
Prerequisite, 500. (Not offered 1974-75.)

MUSIC
514 Systematic Musicology (3) A
Carlson
Use of the scientific method and empirical research procedures in musical investigation.

MUSIC
515 Medieval Notation: To 1400 (3) Sp
Harman
Gregorian chant through the Married School. (Not offered 1975-76.)

MUSIC
516 Renaissance Notation: 1400-1600 (3) W
Harman
Dunstable through De Rore; lute and keyboard tablatures. Prerequisite, 401. (Not offered 1974-75.)

MUSIC
517 Seminar in Musical Styles (3, max. 6) W
Clarke
Investigations into the stylistic criteria for specific composers and groups of composers. (Not offered 1975-76.)

MUSIC
518 Aesthetics (3) W
Esthetic theories; practical aspects of esthetics in relation to music criticism, composition, and performance.

MUSIC
519 Seminar: Editing of Early Music (3, max. 6) A
Terry
The study of performance practices through the editing of vocal and instrumental music of the seventeenth and early eighteenth centuries. Problems of ornamentation, bowing, figured bass, notation, etc. Collaborative student preparation and conducting of old scores. (Not offered 1975-76.)

MUSIC
520 Seminar in American Music (3, max. 6) Sp
Clarke
Research in the life, works, and times of composers in the United States from colonial days to the present. (Not offered 1975-76.)

MUSIC
521 Selected Topics in Musical Perception (3)
Carlson
Specialized problems in the aural perception of musical sounds in context. May be repeated for credit. Prerequisite, 438.

MUSIC
522 Contemporary Contrapuntal Technique (3) A
Keachley
A study of the art of invention, canon, and fugue in the twentieth century, from both analytic and practical viewpoints.

MUSIC
523 Music and Society (3) A
Shrader

MUSIC
524 Seminar in Music Education (3) W
Cooper
Special problems in the teaching and supervision of music in the elementary grades. Prerequisites, one year of teaching experience.

MUSIC
525 Seminar in Music Education (3) W
Jussila
Special problems in the teaching and administration of music in the secondary school and junior college. Prerequisites, one year of teaching experience.

MUSIC
526, 527, 528 History of Theory (3,3,3)
A, W,Sp

MUSIC
529 Practicalities in Teaching Elementary Music Methods (3) Sp
Cooper
Elementary music education curriculum, methods, and materials. Prerequisites, 524 and teaching experience.

MUSIC
530 Seminar in Musical Learning (3, max. 6)
Carlson
Study of learning research as it relates to nonverbal musical learning. Prerequisite, 438.

MUSIC
531 Experimental Design in Musical Research (3)
Carlson
Experimental and quasi-experimental research designs and the application of experimental research methods to the investigation of problems in music teaching and learning, performance, and theoretical studies. Prerequisites, 514, and Psychology 303 or EDPSY 490.

MUSIC
532 Opera Direction and Production (4 or 6, max. 12) AWSp
Rostinburn
Practical experience with problems of the opera theatre.

MUSIC
533, 534, 535 Preceptorial Reading in Ethnomusicology (5,5,5) A, W,Sp
Garfias, Kaufmann
Graduate course dealing with basic literature in ethnomusicology; laboratory and listening sections meeting concurrently, 533 with 316; 534 with 317; and 535 with 318.

MUSIC
536 Transcription and Analysis (3)
Kaufman
Study of practice in different notational analytical systems used in non-Western music. Prerequisite, 471.

MUSIC
537 Seminar on Opera (3, max. 6) Sp
Troy
Seminar on music history, providing a complement to history of opera series (420, 421, and 422.) Prerequisite, or more courses from 420, 421, or 422, or permission.
MUSIC
M 559 Master's Recital (2, max. 4) AWSp
   Public performance for students in the Master of Music program.

MUSIC
M 580, 581, 582 Advanced Conducting (2,2,2)
   A,W,Sp
   Krachmalmck

MUSIC
M 583 Advanced Choral Conducting (3, max.
   27) AWSp
   Eichenberger

MUSIC
M 590 Doctoral Recital (3-9, max. 18) AWSp
   Public performance for students in the Doctor of Musical Arts program.

MUSIC
M 591 Graduate Composition (*) AWSp
   Beale, Benshoof, Bergsma, Dorsey,
   Keckley, Smith, Tufts

MUSIC
M 595, 596, 597 Practicum in Systematic
   Musicology (2,2,2) A,W,Sp
   Currie
   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 systematic research methodology by permitting the student to participate in actual systematic research activity. Required of all doctoral students in systematic musicology; open to all second-year graduate students in music. May be repeated for credit. Prerequisite, 514, which may be taken concurrently.

MUSIC
M 600 Independent Study or Research (*)
   AWSp

MUSIC
M 700 Master's Thesis (*) AWSp

MUSIC
M 800 Doctoral Dissertation (*) AWSp

MUSIC APPLIED

Courses for Undergraduates

Courses 140 through 159 are private instruction primarily for majors not specializing in performance. Also available to qualified non-majors. Prerequisites, examination and permission.

MUSAP
M 140 Private Instruction: Piano (2-3, max. 9)
   AWSp

MUSAP
M 141 Private Instruction: Violin-Viola (2-3,
   max. 9) AWSp
   McInnes, Sokol, Zsigmondy

MUSAP
M 142 Private Instruction: Voice (2-3, max. 9)
   AWSp
   Curtis-Verna, Harris, Lishner, Mesler

MUSAP
M 143 Private Instruction: Violoncello (2-3,
   max. 9) AWSp
   Heinitz

MUSAP
M 144 Private Instruction: Double Bass (2-3,
   max. 9) AWSp
   Harnett

MUSAP
M 145 Private Instruction: Organ (2-3, max. 9)
   AWSp
   Eichinger

MUSAP
M 146 Private Instruction: Flute (2-3, max. 9)
   AWSp
   Skowronek, Welke

MUSAP
M 147 Private Instruction: Oboe (2-3, max. 9)
   AWSp
   Storch

MUSAP
M 148 Private Instruction: Clarinet (2-3, max. 9)
   AWSp
   McColl, Welke

MUSAP
M 149 Private Instruction: Bassoon (2-3, max. 9)
   AWSp
   Grossman

MUSAP
M 150 Private Instruction: Saxophone (2-3,
   max. 9) AWSp
   Brazil

MUSAP
M 151 Private Instruction: Horn (2-3, max. 9)
   AWSp
   Leuba, Welke

MUSAP
M 152 Private Instruction: Trumpet (2-3, max.
   9) AWSp
   Cummings, Welke

MUSAP
M 153 Private Instruction: Trombone (2-3, max.
   9) AWSp
   Dempster

MUSAP
M 154 Private Instruction: Tuba (2-3, max. 9)
   AWSp
   Leuba, Welke

MUSAP
M 155 Private Instruction: Harp (2-3, max. 9)
   AWSp
   Vokolek

MUSAP
M 156 Private Instruction: Percussion (2-3, max.
   9) AWSp
   Shrader

MUSAP
M 157 Private Instruction: Harpsichord (2-3,
   max. 9) AWSp
   Kind

MUSAP
M 158 Private Instruction: Viola da Gamba (2-3,
   max. 9) AWSp
   Heinitz

MUSAP
M 159 Private Instruction: Non-Western
   Instruments (2-3, max. 9) AWSp

   Courses 160 through 178 are for music majors specializing in performance.

MUSAP
M 160 Private Instruction: Piano (3-4, max. 12)
   AWSp
   Gelzman, Hokanson, Moore, O'Doan,
   Siki

MUSAP
M 161 Private Instruction: Violin-Viola (3-4,
   max. 12) AWSp
   McInnes, Sokol, Zsigmondy

MUSAP
M 162 Private Instruction: Voice (3-4, max. 12)
   AWSp
   Curtis-Verna, Harris, Lishner, Mesler

MUSAP
M 163 Private Instruction: Violoncello (3-4,
   max. 12) AWSp
   Heinitz

MUSAP
M 164 Private Instruction: Double Bass (3-4,
   max. 12) AWSp
   Harnett

MUSAP
M 165 Private Instruction: Organ (3-4, max. 12)
   AWSp
   Eichinger

MUSAP
M 166 Private Instruction: Flute (3-4, max. 12)
   AWSp
   Skowronek, Welke

MUSAP
M 167 Private Instruction: Oboe (3-4, max. 12)
   AWSp
   Storch

MUSAP
M 168 Private Instruction: Clarinet (3-4, max.
   12) AWSp
   McColl, Welke

MUSAP
M 169 Private Instruction: Bassoon (3-4, max.
   12) AWSp
   Grossman

MUSAP
M 170 Private Instruction: Saxophone (3-4, max.
   12) AWSp
   Brazil

MUSAP
M 171 Private Instruction: Horn (3-4, max. 12)
   AWSp
   Leuba, Welke

MUSAP
M 172 Private Instruction: Trumpet (3-4, max.
   12) AWSp
   Cummings, Welke

MUSAP
M 173 Private Instruction: Trombone (3-4, max.
   12) AWSp
   Dempster

MUSAP
M 174 Private Instruction: Tuba (3-4, max. 12)
   AWSp
   Leuba, Welke

MUSAP
M 175 Private Instruction: Harp (3-4, max. 12)
   AWSp
   Vokolek

MUSAP
M 176 Private Instruction: Percussion (3-4, max.
   12) AWSp
   Shrader

MUSAP
M 177 Private Instruction: Harpsichord (3-4,
   max. 12) AWSp
   Kind

ARTS AND SCIENCES

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ARTS AND SCIENCES

MUSAP
178 Private Instruction: Viola da Gamba (3-4, max. 12) AWSp
Heinlitz

Courses 240 through 259 are private instruction primarily for majors not specializing in performance. Also available to qualified non-majors. Prerequisites, examination and permission.

MUSAP
240 Private Instruction: Piano (2-3, max. 9) AWSp
Geissmar, Hokanson, Moore, O'Doan, Siki

MUSAP
241 Private Instruction: Violin-Viola (2-3, max. 9) AWSp
McInnes, Sokol, Zsigmondy

MUSAP
242 Private Instruction: Voice (2-3, max. 9) AWSp
Curit-Verna, Harris, Lishner, McEimer

MUSAP
243 Private Instruction: Violoncello (2-3, max. 9) AWSp
Heinlitz

MUSAP
244 Private Instruction: Double Bass (2-3, max. 9) AWSp
Harnett

MUSAP
245 Private Instruction: Organ (2-3, max. 9) AWSp
Eichinger

MUSAP
246 Private Instruction: Flute (2-3, max. 9) AWSp
Skowronek, Welke

MUSAP
247 Private Instruction: Oboe (2-3, max. 9) AWSp
Storch

MUSAP
248 Private Instruction: Clarinet (2-3, max. 9) AWSp
McColl, Welke

MUSAP
249 Private Instruction: Bassoon (2-3, max. 9) AWSp
Grossman

MUSAP
250 Private Instruction: Saxophone (2-3, max. 9) AWSp
Brazil

MUSAP
251 Private Instruction: Horn (2-3, max. 9) AWSp
Leuba, Welke

MUSAP
252 Private Instruction: Trumpet (2-3, max. 9) AWSp
Cummings, Welke

MUSAP
253 Private Instruction: Trombone (2-3, max. 9) AWSp
Dempster

MUSAP
254 Private Instruction: Tuba (2-3, max. 9) AWSp
Leuba, Welke

MUSAP
255 Private Instruction: Harp (2-3, max. 9) AWSp
Vokolek

MUSAP
256 Private Instruction: Percussion (2-3, max. 9) AWSp
Shrader

MUSAP
257 Private Instruction: Harpsichord (2-3, max. 9) AWSp
Kind

MUSAP
258 Private Instruction: Viola da Gamba (2-3, max. 9) AWSp
Heinlitz

MUSAP
259 Private Instruction: Non-Western Instruments (2-3, max. 9) AWSp

Courses 260 through 278 are for music majors specializing in performance.

MUSAP
260 Private Instruction: Piano (3-4, max. 12) AWSp
Geissmar, Hokanson, Moore, O'Doan, Siki

MUSAP
261 Private Instruction: Violin-Viola (3-4, max. 12) AWSp
McInnes, Sokol, Zsigmondy

MUSAP
262 Private Instruction: Voice (3-4, max. 12) AWSp
Curit-Verna, Harris, Lishner, McEimer

MUSAP
263 Private Instruction: Violoncello (3-4, max. 12) AWSp
Heinlitz

MUSAP
264 Private Instruction: Double Bass (3-4, max. 12) AWSp
Harnett

MUSAP
265 Private Instruction: Organ (3-4, max. 12) AWSp
Eichinger

MUSAP
266 Private Instruction: Flute (3-4, max. 12) AWSp
Skowronek, Welke

MUSAP
267 Private Instruction: Oboe (3-4, max. 12) AWSp
Storch

MUSAP
268 Private Instruction: Clarinet (3-4, max. 12) AWSp
McCull, Welke

MUSAP
269 Private Instruction: Bassoon (3-4, max. 12) AWSp
Grossman

MUSAP
270 Private Instruction: Saxophone (3-4, max. 12) AWSp
Brazil

MUSAP
271 Private Instruction: Horn (3-4, max. 12) AWSp
Leuba, Welke

MUSAP
272 Private Instruction: Trumpet (3-4, max. 12) AWSp
Cummings, Welke

MUSAP
273 Private Instruction: Trombone (3-4, max. 12) AWSp
Dempster

MUSAP
274 Private Instruction: Tuba (3-4, max. 12) AWSp
Leuba, Welke

MUSAP
275 Private Instruction: Harp (3-4, max. 12) AWSp
Vokolek

MUSAP
276 Private Instruction: Percussion (3-4, max. 12) AWSp
Shrader

MUSAP
277 Private Instruction: Harpsichord (3-4, max. 12) AWSp
Kind

MUSAP
278 Private Instruction: Viola da Gamba (3-4, max. 12) AWSp
Heinlitz

Courses 340 through 359 are private instruction primarily for majors not specializing in performance. Also available to qualified non-majors. Prerequisites, examination and permission.

MUSAP
340 Private Instruction: Piano (2-3, max. 9) AWSp
Geissmar, Hokanson, Moore, O'Doan, Siki

MUSAP
341 Private Instruction: Violin-Viola (2-3, max. 9) AWSp
McInnes, Sokol, Zsigmondy

MUSAP
342 Private Instruction: Voice (2-3, max. 9) AWSp
Curit-Verna, Harris, Lishner, McEimer

MUSAP
343 Private Instruction: Violoncello (2-3, max. 9) AWSp
Heinlitz

MUSAP
344 Private Instruction: Double Bass (2-3, max. 9) AWSp
Harnett

MUSAP
345 Private Instruction: Organ (2-3, max. 9) AWSp
Eichinger
### MUSAP

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<td>346</td>
<td>Private Instruction: Flute (2-3, max. 9)</td>
<td>AWSp Skowronek, Welke</td>
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<td>347</td>
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</tr>
<tr>
<td>353</td>
<td>Private Instruction: Trombone (2-3, max. 9)</td>
<td>AWSp Dempster</td>
</tr>
<tr>
<td>354</td>
<td>Private Instruction: Tuba (2-3, max. 9)</td>
<td>AWSp Leuba, Welke</td>
</tr>
<tr>
<td>355</td>
<td>Private Instruction: Harp (2-3, max. 9)</td>
<td>AWSp Yokolek</td>
</tr>
<tr>
<td>356</td>
<td>Private Instruction: Percussion (2-3, max. 9)</td>
<td>AWSp Shrader</td>
</tr>
<tr>
<td>357</td>
<td>Private Instruction: Harpsichord (2-3, max. 9)</td>
<td>AWSp Kind</td>
</tr>
<tr>
<td>358</td>
<td>Private Instruction: Viola da Gamba (2-3, max. 9)</td>
<td>AWSp Heinitz</td>
</tr>
<tr>
<td>359</td>
<td>Private Instruction: Non-Western Instruments (2-3, max. 9)</td>
<td>AWSp</td>
</tr>
</tbody>
</table>

Courses 360 through 378 are for music majors specializing in performance.

### MUSAP

<table>
<thead>
<tr>
<th>Course Number</th>
<th>Course Description</th>
<th>Instructor(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>360</td>
<td>Private Instruction: Piano (3-4, max. 12)</td>
<td>AWSp Geismar, Hokanson, Moore, O'Doan, Siki</td>
</tr>
<tr>
<td>361</td>
<td>Private Instruction: Viola-Viola (3-4, max. 12)</td>
<td>AWSp Melknes, Sokol, Zsigmondy</td>
</tr>
<tr>
<td>362</td>
<td>Private Instruction: Voice (3-4, max. 12)</td>
<td>AWSp Curtis-Verna, Harris, Lishner, Mesler</td>
</tr>
<tr>
<td>363</td>
<td>Private Instruction: Violoncello (3-4, max. 12)</td>
<td>AWSp Heinitz</td>
</tr>
<tr>
<td>364</td>
<td>Private Instruction: Double Bass (3-4, max. 12)</td>
<td>AWSp Harnett</td>
</tr>
<tr>
<td>365</td>
<td>Private Instruction: Organ (3-4, max. 12)</td>
<td>AWSp Eichinger</td>
</tr>
<tr>
<td>366</td>
<td>Private Instruction: Flute (3-4, max. 12)</td>
<td>AWSp Skowronek, Welke</td>
</tr>
<tr>
<td>367</td>
<td>Private Instruction: Oboe (3-4, max. 12)</td>
<td>AWSp Storch</td>
</tr>
<tr>
<td>368</td>
<td>Private Instruction: Clarinet (3-4, max. 12)</td>
<td>AWSp McColl, Welke</td>
</tr>
<tr>
<td>369</td>
<td>Private Instruction: Bassoon (3-4, max. 12)</td>
<td>AWSp Grossman</td>
</tr>
<tr>
<td>370</td>
<td>Private Instruction: Saxophone (3-4, max. 12)</td>
<td>AWSp Brazil</td>
</tr>
<tr>
<td>371</td>
<td>Private Instruction: Horn (3-4, max. 12)</td>
<td>AWSp Leuba, Welke</td>
</tr>
<tr>
<td>372</td>
<td>Private Instruction: Trumpet (3-4, max. 12)</td>
<td>AWSp Cummings, Welke</td>
</tr>
<tr>
<td>373</td>
<td>Private Instruction: Trombone (3-4, max. 12)</td>
<td>AWSp Dempster</td>
</tr>
<tr>
<td>374</td>
<td>Private Instruction: Tuba (3-4, max. 12)</td>
<td>AWSp Leuba, Welke</td>
</tr>
<tr>
<td>375</td>
<td>Private Instruction: Harp (3-4, max. 12)</td>
<td>AWSp Yokolek</td>
</tr>
<tr>
<td>376</td>
<td>Private Instruction: Percussion (3-4, max. 12)</td>
<td>AWSp Shrader</td>
</tr>
<tr>
<td>377</td>
<td>Private Instruction: Harpsichord (3-4, max. 12)</td>
<td>AWSp Kind</td>
</tr>
<tr>
<td>378</td>
<td>Private Instruction: Violoncello (3-4, max. 12)</td>
<td>AWSp Heinitz</td>
</tr>
</tbody>
</table>

Courses 340 through 459 are private instruction primarily for majors not specializing in performance. Also available to qualified non-majors. Prerequisites, examination and permission.
ARTS AND SCIENCES

MUSAP
455 Private Instruction: Harp (2-3, max. 18)
AWSp Vokolek

MUSAP
456 Private Instruction: Percussion (3-3, max. 18)
AWSp Shrader

MUSAP
457 Private Instruction: Harpsichord (2-3, max. 18)
AWSp Kind

MUSAP
458 Private Instruction: Viola da Gamba (2-3, max. 18)
AWSp Heinitz

MUSAP
459 Private Instruction: Non-Western Instruments (2-3, max. 18)
AWSp Courses 460 through 478 are for music majors specializing in performance.

MUSAP
460 Private Instruction: Piano (3-4, max. 18)
AWSp Geltsman, Hokanson, Moore, O'Doan, Sili

MUSAP
461 Private Instruction: Violin-Viola (3-4, max. 18)
AWSp McInnes, Sokol, Zsigmondy

MUSAP
462 Private Instruction: Voice (3-4, max. 18)
AWSp Curtis-Verna, Harris, Lishner, Mesler

MUSAP
463 Private Instruction: Violoncello (3-4, max. 18)
AWSp Heinitz

MUSAP
464 Private Instruction: Double Bass (3-4, max. 18)
AWSp Harnett

MUSAP
465 Private Instruction: Organ (3-4, max. 18)
AWSp Eichinger

MUSAP
466 Private Instruction: Flute (3-4, max. 18)
AWSp Skowronek, Welke

MUSAP
467 Private Instruction: Oboe (3-4, max. 18)
AWSp Storch

MUSAP
468 Private Instruction: Clarinet (3-4, max. 18)
AWSp McColl, Welke

MUSAP
469 Private Instruction: Bassoon (3-4, max. 18)
AWSp Grossman

MUSAP
470 Private Instruction: Saxophone (3-4, max. 18)
AWSp Brazil

MUSAP
471 Private Instruction: Horn (3-4, max. 18)
AWSp Leuba, Welke

MUSAP
472 Private Instruction: Trumpet (3-4, max. 18)
AWSp Cummings, Welke

MUSAP
473 Private Instruction: Trombone (3-4, max. 18)
AWSp Dempster

MUSAP
474 Private Instruction: Tuba (3-4, max. 18)
AWSp Leuba, Welke

MUSAP
475 Private Instruction: Harp (3-4, max. 18)
AWSp Vokolek

MUSAP
476 Private Instruction: Percussion (3-4, max. 18)
AWSp Shrader

MUSAP
477 Private Instruction: Harpsichord (3-4, max. 18)
AWSp Kind

MUSAP
478 Private Instruction: Viola da Gamba (3-4, max. 18)
AWSp Heinitz

Courses for Graduates Only

Courses 560 through 578 are for graduate performance majors.

MUSAP
560 Private Instruction: Piano (3, max. 27)
AWSp Geltsman, Hokanson, Moore, O'Doan, Sili

MUSAP
561 Private Instruction: Violin-Viola (3, max. 27)
AWSp McInnes, Sokol, Zsigmondy

MUSAP
562 Private Instruction: Voice (3, max. 27)
AWSp Curtis-Verna, Harris, Lishner, Mesler

MUSAP
563 Private Instruction: Violoncello (3, max. 27)
AWSp Heinitz

MUSAP
564 Private Instruction: Double Bass (3, max. 27)
AWSp Harnett

MUSAP
565 Private Instruction: Organ (3, max. 27)
AWSp Eichinger

MUSAP
566 Private Instruction: Flute (3, max. 27)
AWSp Skowronek, Welke

MUSAP
567 Private Instruction: Oboe (3, max. 27)
AWSp Storch

MUSAP
568 Private Instruction: Clarinet (3, max. 27)
AWSp McColl, Welke

MUSAP
569 Private Instruction: Bassoon (3, max. 27)
AWSp Grossman

MUSAP
570 Private Instruction: Saxophone (3, max. 27)
AWSp Brazil

MUSAP
571 Private Instruction: Horn (3, max. 27)
AWSp Leuba, Welke

MUSAP
572 Private Instruction: Trumpet (3, max. 27)
AWSp Cummings, Welke

MUSAP
573 Private Instruction: Trombone (3, max. 27)
AWSp Dempster

MUSAP
574 Private Instruction: Tuba (3, max. 27)
AWSp Leuba, Welke

MUSAP
575 Private Instruction: Harp (3, max. 27)
AWSp Vokolek

MUSAP
576 Private Instruction: Percussion (3, max. 27)
AWSp Shrader

MUSAP
577 Private Instruction: Harpsichord (3, max. 27)
AWSp Kind

MUSAP
578 Private Instruction: Viola da Gamba (3, max. 27)
AWSp Heinitz

NEAR EASTERN LANGUAGES AND LITERATURE

Courses for Undergraduates

ARABIC

ARAB
101-102, 103 Elementary Arabic (5-5,5)
AWSp Heer, Ziadah

101-102: 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) AWSp
Introduces the student to the colloquial language used in the Arab countries of the East-
ERN MEDITERRANEAN REGION, EMPHASIZING THE LANGUAGE OF EVERYDAY CONVERSATION OF THE EDUCATED CITY DWELLER, WITH CONTINUING EMPHASIS ON GRAMMAR AND SYNTAX. PREREQUISITES: 101 FOR 201; 201 FOR 202; 202 FOR 203.

ARAB 402 MAQAMAT (ASSEMBLIES): HAMADHANA, HARIZ (3) W

READING OF SEVERAL MAQAMAT (ESSAYS IN RHYMED PROSE) OF AL-HAMADHANI AND AL-HARIZI. EXAMINATION OF THEIR PROSE GENRE AS A WHISP. PREREQUISITES, 203 OR EQUIVALENT. OFFERED ALTERNATE YEARS.

ARAB 404 QURAN AND TAFSIR (3) A

ZIADEH

READING OF VARIOUS SECTIONS FROM THE QUR'AN WITH THE RELEVANT EXEGETICAL WRITINGS ON RELIGIOUS, PHILOSOPHICAL, AND GRAMMATICAL POINTS. PREREQUISITES, 203 OR EQUIVALENT. OFFERED ALTERNATE YEARS.

ARAB 405 HADITH AND LAW (3) W

ZIADEH

SELECTED READING FROM THE TRADITIONS (HADITH) OF MUHAMMAD, AND FROM WORKS ON JURISPRUDENCE AND LAW BASED ON THE HORTZ TEXTS. PREREQUISITES, 203 OR EQUIVALENT. OFFERED ALTERNATE YEARS.

ARAB 406 ISLAMIC POLITICAL THOUGHT (3) SP

ZIADEH

READINGS FROM THE MAIN POLITICAL THINKERS: AL-BUKHARI, AL-MAWADI, AND IBN KHALDUN. PREREQUISITES, 203 OR EQUIVALENT. OFFERED ALTERNATE YEARS.

ARAB 411 DESERT POETRY: PRE-ISLAMIC AND UMAYYAD (3) A

HEER, MACKAY, ZIADEH

READING AND ANALYSIS OF SELECTED POEMS FROM PRE-ISLAMIC AND UMAYYAD TIMES. PREREQUISITES, 203 OR EQUIVALENT. OFFERED ALTERNATE YEARS.

ARAB 412 URBAN POETRY: THE NEW 'ABBASID POETRY (3) W

HEER, MACKAY, ZIADEH

READING OF THE NEW POETRY OF THE 'ABBASID PERIOD AND STUDYING OF THE SOCIAL AND POLITICAL FACTORS THAT GAVE RISE TO THEM: AL-MUTANABBI AND AL-MA'ARIRI. PREREQUISITES, 203 OR EQUIVALENT. OFFERED ALTERNATE YEARS.

ARAB 413 MODERN POETRY (3) SP

HEER, ZIADEH

STUDY OF THE NEOCLASSICAL POETRY OF THE NINETEENTH AND TWENTIETH CENTURIES, AND THE DEVELOPMENT OF MODERN VERSE. PREREQUISITES, 203 OR EQUIVALENT. OFFERED ALTERNATE YEARS.

HEBR 421 ADVANCED POST-BIBLICAL HEBREW: AGADIC NARRATIVE (3) A PODET

ADVANCED READINGS IN THE HEBREW MEDIEVAL NARRATIVE, CONCENTRATING ON THE AGADIC LITERATURE OF THE MIDRASH AND TALMUD. ORAL PRACTICE INCLUDED. PREREQUISITE, 203 OR EQUIVALENT.

HEBR 422 ADVANCED POST-BIBLICAL HEBREW: NARRATIVE OF THE HASKALA (3) W PODET

ADVANCED READINGS IN THE NARRATIVE OF THE HASKALA, LEADING INTO THE MODERN PERIOD. ORAL PRACTICE INCLUDED. PREREQUISITE, 203 OR EQUIVALENT.

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)

AW,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; 441 FOR 442; 442 FOR 443. (OFFERED ON DEMAND.)

HEBR 451, 452, 453 CLASSICAL HEBREW LITURGY: SIDDUR, MAZKOR, HAGGADOT (3,3,3)

AW,SP PODET

READING OF THE CLASSICAL LITURGY, INCLUDING A STUDY OF ITS DEVELOPMENT AND CHANGES. REFORMS AND MODERN VARIATIONS IN THE LITURGY. PREREQUISITES, 203 OR PERMISSION FOR 451; 451 FOR 452; 452 FOR 453. (OFFERED ALTERNATE YEARS.)

HEBR 490 SUPERVISORY STUDY (1-6, MAX. 18) A/W/SP CLEAR

SUPERVISED SPECIAL WORK IN LITERARY TEXTS FOR GRADUATES AND UNDERGRADUATES. PREREQUISITE, 203 OR EQUIVALENT.

HEBR 499 UNDERGRADUATE RESEARCH (1-6, MAX. 18) A/W/SP

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ARTS AND SCIENCES

AKKADIAN

AKKAD

401, 402, 403 ELEMENTARY AKKADIAN (3,3,3)

AW/SP CLEAR

INTRODUCTION TO THE AKKADIAN LANGUAGE (ASSYRIAN AND BABYLONIAN). GRADED READINGS IN LATE AKKADIAN FROM HISTORICAL, LEGAL, AND LITERARY TEXTS. PREREQUISITES, HEBREW OR ARABIC 203 OR EQUIVALENT FOR 401; 401 FOR 402; 402 FOR 403. (OFFERED EVERY THIRD YEAR.)
ARTS AND SCIENCES

AKKAD
421, 422, 423 Intermediate Akkadian (3,3,3)
A, W, Sp
Clear
Readings in Akkadian Gilgamesh and Creation epics, historical descriptions. Introduction to the cuneiform script. Prerequisites: 403 for 421; 421 for 422; 422 for 423. (Offered every third year.)

ARAMAIC
ARAM
401 Biblical Aramaic (3) A
Clear
Introduction to biblical Aramaic (Ezra, Daniel). Selections from Targumim. Prerequisite, Hebrew 203 or equivalent. (Offered alternate years.)

ARAM
411 Aramaic Epigraphy (3) Sp
Clear
Readings in the Aramaic inscriptions and the Elephantine Papyri. Prerequisite, Hebrew 203 or equivalent. (Offered alternate years.)

UGARITIC
UGAR
401, 402, 403 Ugaritic Language and Literature (3,3,3) A, W, Sp
Clear
Readings in the Ugaritic texts from Ras Shamra. Epic, Mythological, and other texts. Prerequisite, intermediate knowledge of a cognate language (Akkadian, Arabic, Aramaic, Hebrew). (Offered every third year.)

PERSIAN
PERSAN
401-102, 103 Elementary Persian (5-5,5)
A, W, Sp
Loraine
Beginning course in pronunciation, conversation, grammar, and graded reading.

PERSAN
201, 202, 203 Intermediate Persian (5,5,5)
A, W, Sp
Loraine
Introduction to Persian literature, with continuing emphasis on grammar and syntax. Prosody taught, using the numerous short verses in various metres in the Gulistan as models. Prerequisites, 103 for 201; 201 for 202; 202 for 203.

PERSAN
401 Sa'di (3) A
Loraine
Selected readings from the Gulistan, Busitan, 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
Loraine
Selections from various authors, chiefly up to Hafiz. This course introduces examples of the ghazal, mainly as an important literary type; it also gives an outline of the 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
Loraine
Selected readings from the Shahnama. The course introduces the particular style and vocabulary of the epic and illustrates the legendary careers of certain well-known heroes. Prerequisite, 203 or equivalent. (Offered alternate years.)

PERSAN
411 Systat-nama (3) A
Loraine
The "Book of Government" of Nizam al-Mulk, drawn on the full range of traditional Persian wisdom and thus links itself to the Qabunanma and the works of Sa'di. Prerequisite, 203 or equivalent. (Offered alternate years.)

PERSAN
412 Rumi (3) W
Loraine
Selected readings from the Mathnawi and poems from the Diwan-i Shams-i Tabriz. Students are introduced to Rumi's unique style of anecdote, illustration, and didactic. Prerequisite, 203 or equivalent. (Offered alternate years.)

PERSAN
413 Hafiz (3) Sp
Loraine
Selected poems from the Divan. Prerequisite, 203 or equivalent. (Offered alternate years.)

PERSAN
490 Supervised Study (1-6, max. 18) A/W, Sp
Andrews
Special work in literary texts for graduates and undergraduates. Prerequisite, 203 or equivalent.

PERSAN
499 Undergraduate Research (1-6, max. 18) A/W, Sp
TURKISH
TKISH
101-102, 103 Elementary Turkish (5-5,5)
A, W, Sp
Andrews
Introduction to modern Turkish. Pronunciation and conversation, grammar and composition, graded reading. Latin characters used throughout.

TKISH
201, 202, 203 Intermediate Turkish (5,5,5)
A, W, Sp
Andrews
Introduction to modern Turkish literature. Prerequisites, 103 for 201; 201 for 202; 202 for 203.

TKISH
400 Introduction to Ottoman Turkish (3) A
Andrews
Introduction to Turkish in Arabic characters to cover the peculiar grammatical and syntactical problems of Ottoman. Prerequisite, 203, Arabic 101 or Persian 103.

TKISH
401 Tanzimat Poetry and Prose (3) A
Andrews
Readings from the poetry and prose of the Tanzimat period. Prerequisite, 400 or permission. (Offered alternate years.)

TKISH
403 Early Ottoman Historians (3) W
Andrews
Readings in the early Tevarih-i Ali Osman. Prerequisite, 400. (Offered alternate years.)

TKISH
403 Ottoman Travelers and Geography (3) Sp
MacKay
Introduction to the geographic literature of Ottoman Turkish: readings from traditional cosmographies, travel journals, sailing instructions (portulans), ambassadorial and secret service reports, etc. Prerequisite, 400. (Offered alternate years.)

TKISH
411 Classical Ottoman Historians (3) A
Andrews
Readings in the high classical narrative histories of Kemal Paszade, Hoca Sa'duddin and other sixteenth- and seventeenth-century historians. Prerequisite, 400. (Offered alternate years.)

TKISH
412 Ottoman Lyric Poetry (3) W
Andrews
Introduction to classical Ottoman poetry, including rhyme, meter, and rhetoric, through readings in Ottoman lyrics. Prerequisite, 400. (Offered alternate years.)

TKISH
413 Ottoman Epic and Narrative Poetry (3) Sp
Andrews
Readings in major Ottoman epic and narrative poetry. Prerequisite, 400. (Offered alternate years.)

TKISH
490 Supervised Study (1-6, max. 18) A/W, Sp
Andrews
Special work in literary texts for graduates and undergraduates. Prerequisite, 203 or equivalent.

TKISH
499 Undergraduate Research (1-6, max. 18) A/W, Sp
NEAR EASTERN COURSES IN ENGLISH
N E
210 Introduction to Islamic Civilization and Culture (5) A
Andrews, Clear, Beer, Loraine, MacKay, Ziaedeh
Background and foundations of Islam; development of Islamic culture, with emphasis on the intellectual, literary, esthetic, and associative aspects; the impact of the West and resulting modern problems.

N E
220 Ancient Near Eastern Culture (5) W
Clear
Ancient Near Eastern civilizations, with emphasis on the culture and civilization of the Northwest Semites.

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 quarterly.

N E
420 Islamic Religious Literature in English (3)
Beer
Readings in Islamic theology and mysticism.

N E
422 Islamic Philosophical and Scientific Literature in English (3)
Beer
Readings in philosophy, the physical sciences, and medicine.

366
Courses for Graduates Only

ARAB


Heer, Ziadeh

Designed for graduate students with some proficiency in a Near Eastern Language who plan to embark upon a second Near Eastern language, Arabic. The student is expected to participate fully in the elementary Arabic course; however, the student's work, wherever possible, is supervised by his or her major language instructor who, in consultation with the instructor of elementary Arabic, assigns supplementary work designed to accelerate the student's ability to use Arabic in conjunction with their 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.

474 Arabic as a Second Near Eastern Language: Second Year (3, max. 9)

Heer, Ziadeh

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, wherever 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.

476 Independent Study or Research (*) A,W,Sp

HEBREW


Podet

Designed for graduate students embarking upon the study of Hebrew as their second Near Eastern language, this series is organized in the same manner as Arabic 471, 472, and 473, and the prerequisites are analogous.

474 Hebrew as a Second Near Eastern Language: Second Year (3, max. 9)

See Arabic 474 for course description. Prerequisites, above elementary knowledge of one Near Eastern language (not Hebrew), elementary knowledge of Hebrew, and graduate standing.

476 Independent Study or Research (*) A,W,Sp

NEAR EAST

520 Seminar on Near Eastern Civilization and Thought (3, max. 27)

530 Seminar on Near Eastern Literature (3, max. 27)

Prerequisite, reading knowledge of Arabic, Persian, or Turkish.

600 Independent Study or Research (*) A,W,Sp

PERSSAN


Loraine

Designed for graduate students embarking upon the study of Persian as their second Near Eastern language, this series is organized in the same manner as Arabic 471, 472, and 473, and the prerequisites are analogous.

520 Independent Study or Research (*) A,W,Sp

TURKISH

471, 472, 473 Turkish as a Second Near Eastern Language (3,3,3) A,W,Sp

Andrews

Designed for graduate students embarking upon the study of Turkish as their second Near Eastern language, this series is organized in the same manner as Arabic 471, 472, and 473, and the prerequisites are analogous.

600 Independent Study or Research (*) A,W,Sp

OCEANOGRAPHY

Courses for Undergraduates

101 Survey of Oceanography (5) A,W,Sp

Origin and extent of the oceans; nature of the sea bottom; causes and effects of currents and tides; animal and plant life in the sea. Intended for nonmajors.

102 Man and the Ocean (3) A

Designed to study in more detail the benefits and the scientific problems created by man's activities' impinging on the oceanic environment. Topics include the problems of, and potential for, the extraction of food, fresh water, inorganic minerals, gas, and oil from seawater or the sea floor; the ocean as a sink for such wastes as heavy metals, pesticides, radioactive materials, gases, etc. Prerequisite, 101 or permission.

103H Survey of Oceanography—Honors (5) Sp

Origin and extent of the oceans; nature of the sea bottom; causes and effects of currents, waves, and tides; animal and plant life in the sea. Not intended for oceanography majors. Prerequisites, College of Arts and Sciences Honors Program and permission.

110, 111, 112 Lectures in Oceanography (1,1,1) A,W,Sp

Lectures intended for oceanography majors. Students who might major in oceanography can learn more about the field. May be entered any quarter.
OCEAN 101H Physic- Division Tutorial—Honors (6) R Research with a departmental program. Prerequisites, College of Arts and Sciences Honors Program and permission.

OCEAN 201 Introduction to Field Oceanography (6) T Introduction to methods of oceanographic field study. Students work in the laboratory and at sea; they must be prepared to go on overnight field trips scheduled on weekends. Routine seagoing operations and basic observational procedures are examined. Prerequisites, sophomore standing in oceanography or a related science, or permission.

OCEAN 203 Introduction to Oceanography (5) Sp Description of the oceans and their relation to man; physical, chemical, biological, and geological aspects of the sea; areal distribution and seasonal cycles of properties; currents; factors affecting populations. Intended for science majors. Prerequisite, sophomore standing in a science curriculum, or permission.

OCEAN 280H Introduction to Oceanography—Honors (5) Sp 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.

OCEAN 360 Methods and Instruments in Oceanography (3) Sp The oceanographic environment: design and maintenance requirements for shipboard and for overside equipment. Modern sensing techniques and sampling considerations, the fundamentals of popular telemetry and recording methods; navigation. Calibration and stability of instruments; the effects of pressure and water stability; unattended instrument platforms. Prerequisite, 402 or 418.

OCEAN 380H Upper-Division Tutorial—Honors (6) R Research under faculty supervision. Prerequisites, junior standing in College of Arts and Sciences Honors Program and permission.

OCEAN 388 Oceanography for Science Teachers (5) S Survey of marine science for secondary school teachers. Emphasis on material that can be adapted for use in the high school. Prerequisites, 20 credits in natural sciences and permission.

OCEAN 401, 402 General Physical Oceanography I, II (5,5) A,W,Wsp Physical properties and processes; theories and methods involved in ocean currents, waves, and tides. Not open to physical oceanography majors. Prerequisites, for 401, one year of chemistry, one year of physics, Mathematics 126; 401 for 402.

OCEAN 405 General Geological Oceanography (5) Sp Shorelines and nearshore sedimentation; structure and morphology of the continental terrace and deep-sea floor; sediment types and distribution; marine geological methods and applications. Not open to majors in geological oceanography. Prerequisites, 402 or 419, which may be taken concurrently, and Geological Sciences 205.

OCEAN 415 Fundamentals of Underwater Acoustics (3) A T Vibrating strings, bars, and membranes: plane and spherical acoustic waves; transmission and reflection at boundaries. Prerequisites, 402 or 418, Mathematics 126 or 136H, or permission.

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 telemetering. Prerequisite, 415.

OCEAN 417, 418 Physical Oceanography I, II (5,5) A,W Geophysical 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 studies; eddy fluxes; estuaries. Prerequisites, for 417: Mathematics 427, which may be taken concurrently, Physics 223, Chemistry 160, or permission; for 418: 417 and Mathematics 428, which may be taken concurrently.

OCEAN 419 Ocean Tides and Waves (5) Sp Theory of surface waves; wave forecasting, transformation of waves in shallow water, wave forces. Tidal theory: analysis and prediction of tides and tidal currents. The course includes laboratory and computer simulation. Prerequisite, 418 or permission.

OCEAN 421 Chemical Oceanography (3) AW 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 (2) Sp Physical-chemical aspects of high-ionic-strength solutions as related to seawater, kinetics, thermodynamics, and heterogeneous equilibria are included. Prerequisites, 421 and Chemistry 350, 351, or permission.

OCEAN 423, 424 Chemical Oceanography Laboratory (2,2) A,W,Sp,W Laboratory problems in the analytical and physical chemistry of seawater and marine materials. Prerequisites, for 423: 421, Chemistry 221; for 424: 422 and 423; 422 and 424 may be taken concurrently with 421 and 422, respectively.

OCEAN 433 Biological Oceanography Organisms and Processes (3) Sp Marine organisms with emphasis on bacteria, the microscopic plants, the protozoa, and smaller animals; biological processes affecting the sea. Recommended for nonbiologists. Prerequisites, 401 or 417 and Biology 101-102, or permission.

OCEAN 434 Biological Oceanography: Organisms and Environments (3) W Organisms of the plankton, nekton, and benthos; their adaptations to ocean environments and their relationships to each other. Prerequisites, 401 or 417, and 20 credits in biological sciences, or permission.

OCEAN 435 Biological Oceanography: Quantitative Aspects (3) Sp Quantitative distribution in time and space of pelagic and bottom organisms in the open ocean and on the shelf; rates of processes. Prerequisite, 433 or 434, or permission.

OCEAN 443 Regional Oceanography (3) Sp Application of modern methods to the comprehensive description of selected areas of the oceans. Prerequisite, advanced senior standing.

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, Quantitative Science 281 or permission.

OCEAN 450 Geological Oceanography (5) A Shore processes; structure and morphology of the continental and deep-sea floor; marine sedimentary deposits and stratigraphy; geologic history of ocean basins and seawater. Prerequisites, major in geological oceanography or Geological Sciences 401-417 (or concurrent registration), or permission.

OCEAN 451 Geochemistry of Marine Sediments (2) W Study of chemical aspects of the more abundant minerals in marine sediments; their origin or mode of formation; their isotopic and chemical composition; their rate of 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 (3) Sp Introduction to theoretical and experimental techniques used in studying erosion, transportation, and deposition of sediment. Analysis of sediment samples, initial motion of sediments, bed-load motion, suspension of sediment by turbulent flows, erosion and deposition of sediment by turbulent flows, mass movement of sediments, and applications of sediment transport theory to problems of geological interest. Prerequisite, 402 or permission.

OCEAN 453 Sedimentary History of the Ocean Basins (2) Sp Synthesis of introduction to chemical, physical, and biological processes of sedimentation and to marine geophysics, in terms of the historical record of sediments and the geological development of the ocean basins. Prerequisites, 450, 451, 452, or concurrent registration in same.

OCEAN 454 Biologic Sediments I (3) A Ecology and systematics of plant and animal groups; contribution to neogene marine sediments. Emphasis on microfossils. Prerequisites, 433 or 434, and 435, 450 or Geological Sciences 321 or 430, or permission.
OCEAN 455 Biogenic Sediments II (3) W
Survey of silicate micro-organisms and micro-fossils with emphasis on their geological and geographical occurrences and their application to deep-sea stratigraphy. Prerequisite, 454 or permission.

OCEAN 456 Acoustic and Seismic Techniques (2) W
Acoustic data-taking techniques; analysis and interpretation of acoustic bathymetry and seismic reflection and refraction data. Prerequisite, 415 or permission.

OCEAN 457 Marine Sedimentation (3) Sp
Origin, transportation, and deposition of marine sediments; marine sedimentary environments; physical aspects of marine sedimentary processes. Prerequisite, 402 or permission.

OCEAN 458 Chemical Aspects of Marine Sediments (3) W
Survey of minerals in marine sediments: their origin or mode of formation, their isotopic and chemical composition, their rate of deposition, their chemical alteration after deposition, their distribution and relative importance in the major sedimentary cycle. Prerequisite, Chemistry 160.

OCEAN 460 Field Experience in Oceanography (1-4, max. 6) AWSp
Work ashore and on research vessels; design of experiments; cruise planning; chemical, physical, biological, geological, and geophysical analyses; preparation of reports. One or more cruises may be required. Prerequisite, permission.

OCEAN 462 Applications of Oceanography (2) W
Analysis of special cases involving application of oceanography to practical problems. Prerequisite, a physical or biological science major or permission.

OCEAN 471, 472 Scientific Perspectives on the Marine Environment (2,2) A
Descriptions of marine environments and the regional and seasonal variations in their characteristics. Scientific principles and the magnitude of natural processes. Constraints imposed by the environments upon technology and social management. Offered jointly with the Institute for Marine Studies as Institute for Marine Studies 471, 472. Prerequisites, permission for 471; 471 for 472.

OCEAN 480H Undergraduate Research—Honors (6) S
Independent research. Prerequisites, 180H or 380H, and permission.

OCEAN 485 Topics in Oceanography (2) A
Series of weekly lectures on oceanographic topics, including physical and chemical properties of water, motions, life in the sea, geological features, data collection and analysis, etc. For nonmajors. Prerequisite, upper-division standing in science.

OCEAN 488H Field Experience—Honors (2-6, max. 6) AWSp
Participation in extended oceanographic field operations on a research vessel; data analysis and reduction, report preparation. Prerequisites, 380H or 480H, and permission.

OCEAN 489H Undergraduate Thesis—Honors (1-6, max. 6) AWSp
Theoretical or experimental contribution to oceanography. Prerequisites, 480H and permission.

OCEAN 499 Undergraduate Research (1-12, max. 24) AWSp
Research on assigned topics that may involve laboratory work, field work, or literature surveys. Prerequisite, permission.

Courses for Graduates Only

OCEAN 505 Current Problems in Geological Oceanography (1)
Discussion of research topics that are currently being investigated within the department. Prerequisite, permission.

Methods for solving problems in physical oceanography. Prerequisite, a major in a physical science.

OCEAN 514 Seminar in Physical Oceanography (1, max. 9) AWSp
Discussion of selected problems of current interest in physical oceanography. Prerequisites, 402 or 419, and permission.

OCEAN 515 Waves (4) A
Application of marine hydrodynamics principles to wave motion in oceans. Prerequisite, 513. (Offered only in even-numbered years.)

OCEAN 516 Ocean Circulation (2) W
Hydrodynamic theories concerning origin and characteristics of major ocean currents. Prerequisite, 513. (Offered only in even-numbered years.)

OCEAN 517 Oceanography of Inshore Waters (5) Sp
Theories and techniques of 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 only in odd-numbered years.)

OCEAN 518 Seminar on Dynamical Oceanography (1, max. 9) AWSp
Selected problems of current importance concerning the dynamics of the ocean. Concen­trates on those topics that are considered fundamental, of central importance to most of the areas of applications.

OCEAN 519 Interaction of the Sea and Atmosphere (5) Sp
Interchange of heat, water, and energy; study of budgets and of mechanisms of exchange. Prerequisites, 418, Atmospheric Sciences 462. (Offered only in even-numbered years.)

OCEAN 520 Seminar (0) AWSp

OCEAN 521 Seminar on Chemical Oceanography (*, max. 9) AWSp
Lectures, discussions, and readings on selected problems of current interest. Prerequisite, permission.

OCEAN 523 Advanced Problems in Chemical Oceanography (1-4, max. 10) AWSp
Field and laboratory work on selected problems of current interest. Prerequisites, 424 and permission.

OCEAN 524 Marine Chemical Thermodynamics (3) A
Application of chemical thermodynamic principles to the study of chemical processes and chemical reactions in the oceans. Thermodynamics of seawater (pressure, temperature, and volume changes), thermodynamics of multicomponent systems, general equilibrium theory, pressure and temperature effects on chemical equilibria, equilibrium models and calculation of complex equilibria. Prerequisites, Chemistry 455, 456, 457, 460, or permission.

OCEAN 525 Marine Chemical Dynamics (3) A
Application of reaction rate theory to the study of chemical processes not at equilibrium in the oceans. Nonequilibrium conditions in natural waters, transient states, basic kinetic theory, reaction rates at the air-sea and sediment-water interfaces, uptake and cycling rates of chemical species by biological systems. Prerequisites, 421, 422, Chemistry 455, 456, 457, 460, or similar background.

OCEAN 530 Marine Primary Productivity (3) Sp
General concepts of marine phytoplankton production; laboratory and field studies; critical examination of special problems. Not open to students who have taken 534, Prerequisites, 433 or 434, and 435, and permission.

OCEAN 531 Seminar in Biological Oceanography (*, max. 9) AWSp
Lectures, discussions, and work on selected problems of current interest. Prerequisite, permission.

OCEAN 532 Marine Microbiology (1-4) Sp
Ecology and biochemistry of marine bacteria. Prerequisites, Microbiology 400 and permission.

OCEAN 533 Zooplankton Ecology (3 or 6) S
Identification of plankton animals; evaluation of sampling methods; rate measurements on selected species; work on ecological problems. Prerequisite, permission. (Offered for 6 credits only in even-numbered years at Friday Harbor Laboratories.)

OCEAN 534 Phytoplankton Ecology (6) S
Contemporary problems in marine phytoplankton investigations. Evaluation of methods used in field and laboratory studies. Prerequisite, permission. (Offered only in even-numbered years at Friday Harbor Laboratories.)
ARTS AND SCIENCES

OCEAN 535 Advanced Plankton Ecology (3) W
Methods of sampling and analysis of standing stock as affected by the ecology of plankton.

OCEAN 536 Benthos Ecology (3) Sp
Distributions, abundances, and interrelationships of the organisms of the ocean floor; methods of sampling and analysis. Prerequisite, permission.

OCEAN 537 Environmental Physiology of Marine Microalgae (4) A
Culture and nutrition of marine unicellular algae; use of algal cultures for the study of problems in biological oceanography. Prerequisite, permission.

OCEAN 538 Identification and Structure of Marine Benthic Communities (2) Sp
Sampling gear and sampling techniques; qualitative and quantitative methods for identification and ordination of communities; structure of benthic communities: biomass, productivity and benthos/fish relationships; historic review of benthos research. Prerequisite, permission.

OCEAN 540 Seminar in Geometrology (1-3) A WSp
Lectures and discussions on selected problems in the applications of statistics in earth science. Prerequisite, Quantitative Science 383.

OCEAN 544 Statistical Models in Oceanography (3) W
Multivariate analysis: regression, trend surface analysis, factor analysis, discriminant functions, and Bayesian models in oceanography. Prerequisite, Quantitative Science 383 or permission.

OCEAN 548 Topics in Physical Oceanography (1-4, max. 9) A WSp
Lecture series on topics of major importance in physical oceanography.

OCEAN 550 Seminar on Geological Oceanography (+, max. 9) A WSp
Lectures, discussions, and field and laboratory work on selected problems of current interest. Prerequisite, permission.

OCEAN 551 Marine Sediments (2) Sp
Topics in interpreting environmental significance of marine sediments. Prerequisite, permission.

OCEAN 553 Research Techniques in Marine Geochemistry (2) A
Analytical techniques and instruments applicable to problems of marine geochemistry. Prerequisite, Chemistry 351.

OCEAN 554 Research Techniques in Marine Geology (3) A
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.

OCEAN 555 Marine Geochemistry (3)
Topics in geochemistry of the oceans and marine sediments. Prerequisites, Chemistry 351 and permission.

OCEAN 556 Advanced Marine Geology (+, max. 9) A WSp
Advanced study of marine geology; concepts supporting or at variance with accepted hypotheses; discussion of recent advances. Prerequisite, permission.

OCEAN 560 Fluid Mechanics of Erosion and Sediment Transport (3) W
Advanced study of the erosion, deposition, and transportation of sediments by turbulent flows. Emphasis on the use of theoretical fluid mechanics to formulate and solve problems of bed load and suspended load transport of sediments, erosion, and deposition of sediments, erodible boundary-layer problems, turbidity currents, beach erosion. Prerequisites, 452, 511, and permission.

OCEAN 561 Seminar on Geological Fluid Mechanics (3) Sp
Reading and discussion of topics of current interest in geological fluid mechanics. Course work includes a report on a specialized topic. Prerequisite, permission.

OCEAN 570 Simulation Analysis of Marine Systems (5) Sp
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, Biology 472, FORTRAN, Mathematics 126, Quantitative Science 382, or permission.

OCEAN 571 Gravity and Geomagnetic Interpretation (3) A
Fundamental 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 the Geophysics Program as Geophysics 571. Prerequisites, Physics 323 or equivalent, Geological Sciences 450, or permission.

OCEAN 573 Terrestrial Magnetism (3) Sp
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; palaeomagnetic techniques and results. Offered jointly with the Geophysics Program as Geophysics 573. Prerequisite, Geophysics 453.

OCEAN 600 Independent Study or Research (*) A WSp

OCEAN 700 Master's Thesis (*) A WSp

OCEAN 800 Doctoral Dissertation (*)

PHILOLOGY

Courses for Undergraduates

PHIL 100 Introduction to Philosophy (5) A WSp
Introduction to major philosophical questions relating to such matters as ethics, the existence of God, the foundations of knowledge, and the nature of reality. The number and nature of the problems studied and the works read vary with the instructor.

PHIL 113 Philosophy and Racial Conflict (5)
Study of some of the intellectual causes of racial conflict. Relations between racial and international conflicts are examined.

PHIL 120 Introduction to Logic (5) A WSp
Elementary symbolic logic. Analysis of deductive arguments and definitions of such logical concepts as implication, validity, and consistency. The relationship of logical symbolism to language.

PHIL 160 A Historical Introduction to the Philosophy of Science (5)
'Claverbaugh
Study of the historical development of selected concepts from science and from the philosophy of science.

PHIL 200 Types of Philosophy (5)
'Siegle
Introductory philosophy. The content of the course is entirely at the discretion of the instructor.

PHIL 201 Practical Reasoning (3)
'Thomson
Basic course employing a new nonsymbolic approach to logic and decision making. Topics include ways to develop one's thought in a clear, logical fashion, ways to analyze and evaluate the reasoning of others, ways to make decisions rationally. Taught in direct application to realistic cases.

PHIL 230 Philosophic Issues in World Affairs (2)
Philosophical examination of international political power and of the different ideologies contending on the world stage. Particular attention to liberal capitalism, imperialism, fascism, Stalinism, and socialism.

PHIL 231 Philosophy of Human Rights (2)
Examination of historical and contemporary arguments for and against the existence of human rights.

PHIL 240 Introduction to Ethics (5)
'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 judgments. Consideration of such topics as free will and responsibility, ethical relativism, and the problem of evil. (Formerly 215.)

PHIL 250 Introduction to Epistemology (3) Marks, Small
Introduction to some of the problems involved in general philosophical accounts of knowledge or in philosophical accounts of our knowledge of certain kinds of statements (e.g., statements about the external world, a priori statements, statements about the past, statements about other minds).

PHIL 253 Introduction to the Philosophy of Language (5) Small
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.

PHIL 260 Introduction to Philosophy of Science (3) Clatterbaugh, Crocker
Examination of formal languages, the nature of probability, the problem of induction, and determinism.

PHIL 267 Introduction to Philosophy of Religion (5) Dietrichson, Mish'ulam
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 269 Introduction to Philosophical Studies (5) Intensive analysis of selected philosophical problems for students who have shown a special aptitude and interest in philosophy. Prerequisite, one course in philosophy.

PHIL 286 Introduction to India's Philosophies (5) Potter
Survey of major tendencies in recent Indian thought in the light of their origins in classical Indian philosophy. Readings in such writers as Nagarjuna, Samkara, Gandhi, Aurobindo.

PHIL 320 History of Ancient Philosophy (5) A Clatterbaugh, Cohen
The pre-Socratics: 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 Ockham. Prerequisite, 320 or permission.

PHIL 322 History of Modern Philosophy (5) W Clatterbaugh, Coburn
Examination of selected metaphysical and epistemological issues raised by philosophers in the modern classical period, seventeenth and eighteenth centuries. The philosophers studied vary from year to year, but always include Descartes.

PHIL 325 History of Nineteenth-Century Philosophy (5) Burke
The post-Kantian idealism, Schopenhauer and Hegel and the revival of materialism in Feuerbach, Marx, and Engels. Some consideration of Kierkegaard and Nietzsche. Prerequisite, 322 or permission.

PHIL 326 History of Recent Philosophy (5) Sp Marks
Survey of the main problems in philosophical analysis from the English Realist reaction against Idealism to the present.

PHIL 332 History of Modern Political Philosophy (5) Burke
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) W Richman
Study of the philosophy of Marx and the Marxist tradition with attention to the philosophical method and foundation of Marxism.

PHIL 340 History of Ancient Ethics (3) W Richman
Development of moral thought from Socrates through the Stoics. Particular emphasis on the ethical writings of Plato and Aristotle. Prerequisite, one previous course in philosophy.

PHIL 342 History of Modern Ethics (3) Sp 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 previous course in philosophy.

PHIL 347 Philosophy in Literature (3) Study of philosophical ideas expressed in works of literature.

PHIL 348 Philosophy in the Romantic Poets (2) Study of the philosophical ideas implicit in the great poetry of the Romantic period.

PHIL 363 Introduction to the Philosophy of Mind (3) Theories of the nature of mind, the relationship between mind and body, the self, memory, the unconscious, introspection, and knowledge of other minds. Prerequisite, one previous philosophy course.

PHIL 370 Intermediate Logic (5) A Keyt, Kirk

PHIL 372 Introduction to Set Theory (5) Lorch, Hilbert
Historical development and basic concepts of set theory. Set theoretical paradoxes and their proposed solutions.
PHIL 433 Philosophy of Aristotle (3) Cohen, Key
Study of the Aristotelian system with emphasis on two major works. Prerequisite, 320 or permission.

PHIL 434 Philosophy of Thomas Aquinas (3) Bolter
Examination of the major philosophical positions of Thomas Aquinas in the theory of knowledge, metaphysics, and ethics. Prerequisite, 321 or permission.

PHIL 435 British Empiricism (3) Marks, Thomas
Development of empiricism in the writings of Locke, Berkeley, and Hume. Detailed attention to the application of empiricist views of the origin and nature of ideas to the problems of substance, self, nature, causation, mathematics, and induction. Prerequisite, 322 or permission.

PHIL 437 Philosophy of Hume (3) Marks, Richard
Study of the principles and methods employed by Hume in elaboration of his system of philosophy, comprising his analyses of knowledge, the passions, and morals. Prerequisite, 322 or permission.

PHIL 438 Philosophy of Kant (3) Dietrichson
Systematic study of The Critique of Pure Reason. Prerequisite, 322 or permission.

PHIL 439 The Later Philosophy of Wittgenstein (3) Coburn, Marks
Detailed study of topics in the later philosophy of Wittgenstein. Particular attention is directed to the Philosophical Investigations. Prerequisite, 322 or permission.

PHIL 440 Advanced Ethics (3) Richard
Critical examination of the concepts and judgments of value, including an analytical treatment of the questions of good and bad, right and wrong, and obligation. Prerequisite, 240 or permission.

PHIL 443 Philosophy and Linguistics (3) Small
Study of some of the connections between recent linguistics and philosophy, primarily of philosophical problems that arise in the attempt to understand current linguistic theories and the implications of linguistic theories for philosophy. Offered jointly with the Department of Linguistics as Linguistics 443. Prerequisite, permission.

PHIL 445 Philosophy of Art (3) Small
Critical examination of characteristic accounts of the nature of art, artistic activity, the aesthetic 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)
Historical development of aesthetics, emphasizing such major figures as Plato, Aristotle, Plotinus, Hume, Kant, and Hegel. Prerequisite, 100 or 445, or permission.

PHIL 447 Philosophy of Literature (3) Michalov

PHIL 450 Epistemology (3) Kirk, Richard
Problems in the theory of knowledge. The nature, possibility, criteria, and limitations of knowledge; critical evaluation of subjectivism and realism, dogmatism and skepticism, intuitionism, pragmatism, empiricism, rationalism, and positivism; theories of meaning, truth, and perception; synthesis of various positions around the scientific method. Prerequisite, 230.

PHIL 453 Philosophy of Language (5)
Kirk, Small
Theories of meaning, reference, predication, and related concepts. Typical authors include Frege, Russell, Strawson, and Austin. Prerequisite, 120 or permission.

PHIL 455 Metaphysics (3) Crocker
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) Cross, Crocker
Critical study of different theories about the nature of scientific theory. Topics include the relation of theory to observation, the use of mathematics in history such as Plato, St. Augustine, Hegel, Marx, Spengler, Toynbee.

PHIL 461, 462 Philosophy of Man and Culture I, II (3,3)
Habermas
Treatment of philosophical questions and concepts pertaining to the collective production and appropriation of culture: explanation 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 invariance (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) Thom
Exposition and examination of current efforts at formulating proper conceptual foundations for psychology and neuropsychology, with special attention to recent functionalist theories. Prerequisite, 363 or permission.

PHIL 464 Philosophical Psychology (3)
Philosophic analysis of relations between mental events and their expression, especially their linguistic expression. Prerequisite, 100 or 326 or 463.

PHIL 465 Philosophy of History (5)
Analyses of basic concepts employed in historical interpretation, and some of the principal philosophers of history such as Plato, St. 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) Dietrichson
Critical examination of three approaches to religion: reason, intuition, and faith. Prerequisite, one history of philosophy course or 267, or permission.

PHIL 469 Existentialist Philosophy (3) Dietrichson
Critical examination of major ideas in Kierkegaard's philosophy and in Sartre's or Heidegger's philosophy. Prerequisite, 322 or 325 or 326, or permission.

PHIL 470 Advanced Logic (5) W. Keyt

PHIL 472, 473, 474 Logical Theory I, II, III (3,3,3)
Kirk, Luckan
Selected topics in the philosophy of mathematics, the philosophy of logic, set theory, automata theory, recursion theory, proof theory, and model theory. Content varies from year to year. The courses in this sequence may be taken independently of one another.

PHIL 480H Honors—Philosophical Studies (3, max. 6)
Seminar on advanced topics. The reading materials vary from year to year. For selected junior and senior honors students only.

PHIL 484 Reading in Philosophy (1-5, max. 15)
AWA
Reading of approved philosophical works. (The name of the staff member with whom research will be done must be indicated in registration.) Prerequisite, permission.

PHIL 490 Undergraduate Seminar (4)
Intensive study on some philosophical problem, intended to prepare undergraduate majors for graduate work. Prerequisite, permission.
Courses for Graduates Only

PHIL 514 Seminar on Legal Philosophy (3, max. 12) Siegel

PHIL 520 Seminar on Ancient Philosophy (3, max. 12) Cohen, Keys

PHIL 521 Seminar on Medieval Philosophy (3, max. 12) Butler

PHIL 522 Seminar on Modern Philosophy (3, max. 12) Clapperton

PHIL 526 Seminar on Recent Philosophy (3, max. 12) Keys, Marks

PHIL 540 Seminar on Ethics (3, max. 12) Keys, Richman

PHIL 545 Seminar on the Philosophy of Art (3, max. 12)

PHIL 550 Seminar on Epistemology (3, max. 12) Crocker

PHIL 556 Seminar on Metaphysics (3, max. 12) Coburn

PHIL 563 Seminar on the Philosophy of Mind (3, max. 12) Thomas

Prerequisites, at least two courses related to philosophy of mind or permission.

PHIL 565 Seminar on the Philosophy of History (3, max. 12)

PHIL 567 Seminar on the Philosophy of Religion (3, max. 12) Dietrichson

PHIL 570 Seminar on Logic (3, max. 12) Kirk

PHIL 584 Reading in Philosophy (1-4, max. 12) AWP

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 on Indian Philosophy (3, max. 12) Potter

Prerequisite, 412.

PHIL 587 Contemporary Analytic Philosophy (3, max. 12) Marks, Richman

PHIL 600 Independent Study or Research (*) AWP

Prerequisite, permission of the graduate adviser.

PHIL 700 Master's Thesis (*) AWP

PHIL 800 Doctoral Dissertation (*) AWP

PHYSICAL AND HEALTH EDUCATION

PHYSICAL EDUCATION: DANCE

Courses for Undergraduates

PEDNC 278 Intermediate Folk Dance (3)

Prerequisite, PE 127 or permission.

PEDNC 282 Fundamentals of Rhythm (2) 2p

Understanding of fundamental rhythm concepts and their application in the development of technique and style in basic dance forms.

PEDNC 283 Contemporary Dance (2) W Skinner

Understanding of fundamental rhythm concepts and their application in the development of technique and style in contemporary dance forms.

PEDNC 309 The School Dance Program: Secondary (2)

Practice in basic skills in folk, square, and social dancing; methods and opportunity for presentation; source materials; organization of coeducation dance program. Prerequisite, 282.

PEDNC 310 Traditional Dance Forms (3) A Dance and rhythmic activities appropriate for older children; folk and ethnic dance, American traditional dances, and creative forms of dance.

PEDNC 311 Rhythmic Activities for Small Children (2) 2p Skinner

Activities suited to the kindergarten and primary child. Educational value, significance in child growth and development, and methods of presentation.

PEDNC 355 Dance Composition (2, max. 6) AWP Skinner

Practice in modern dance; analysis of choreography; creative work. Prerequisite, permission.

PEDNC 364 History of Dance (3) W

Survey of the function and form of dance from primitive culture in its present art form, with emphasis on Western civilization.

HEALTH EDUCATION

Courses for Undergraduates

H ED 250 Contemporary Health Concepts (2) AWP

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 292 First Aid (2) AWP

Student may meet requirements for both Standard and Advanced American Red Cross First Aid certification.

H ED 330 Safety and Accident Prevention (2)

Pertinent problems and programs in accident prevention. Special consideration is given to home, industrial, institutional, recreational, and transportation safety.

H ED 350 Foundations of Health Behavior (2) Wsp

Biosocial influences on the health of the individual, including physical and emotional responses to health and disability. Emphasis is on the health problems of the school and college population. Prerequisite, 250.

H ED 351 School Health Programs (3) A

Overview of the school health program, including underlying principles and legal responsibilities, with emphasis on health services, health instruction, and healthful school living. Interrelationships with other community health agencies are also considered. Prerequisite, 350.

H ED 352 Health Implications of the School Environment (3) W

Implications for health instruction of school policies, procedures, facilities, and personnel. Prerequisite, 351.

H ED 353 Theory and Practice of Health Education (3) Sp Cooley

Application of motivation and learning concepts to health education. Prerequisite, 352.

H ED 481 Human Sexuality and Education (3) A 5p

Scientific exploration of physiological, psychological, and cultural aspects of sexual development. Expression, problems, and adjustment of youth and adults. Basic concepts underlying sex education. Prerequisite, permission.

H ED 498 Special Studies in Health Education (2-6, max. 6) AWP

Prerequisite, permission.

H ED 499 Undergraduate Research (3, max. 6) AWP

Prerequisite, permission.

Courses for Graduates Only

H ED 503 Seminar in Health Education (3, max. 9) Prerequisites, 453, 465 or permission.
ARTS AND SCIENCES

H ED 508 Administrative Relationships in the Health Education Program (3) Sp Decision making, management theory, and interagency programs.

H ED 590 Research Analysis and Design In School Health Education (3) W Review and analysis of research pertinent to school health programs. Emphasis is given to research design, procedures, and interpretation. Prerequisite, Biostatistics 472 or EDPSY 490.

H ED 600 Independent Study or Research (4) A WS p

H ED 700 Master's Thesis (4) A WS p

PHYSICAL EDUCATION

Courses for Undergraduates

101 Through 199

Courses designated II, III, or IV carry prerequisites of I, II, or III, respectively, or evidence of proficiency equivalence in that activity; level I courses are for beginners only. Auditors are not allowed to take 100-level courses.

PE 100 Adapted Swimming (1)
For physically limited students who need an individually designed program. Prerequisite, permission.

PE 101 Aquatic Art (1)
Prerequisites, well-coordinated front crawl, back crawl, breaststroke, front dive, and underwater swimming.

PE 103 Skin Diving (1)
Prerequisite, 102 or 108 or equivalent.

PE 104 Springboard Diving (1)
Prerequisites, ability to swim fifty yards and to tread or float for five minutes.

PE 105, 107, 108, 109 Swimming I, II, III, IV (1,1,1,1)
Level II for students who can swim twenty-five feet but not fifty yards. Level IV prerequisite, ability for fifty yards' crawl and reasonable proficiency on side and back.

PE 110 Swimming V: Intercollegiate (1)
Prerequisite, permission.

PE 112 Water Polo (1) A WS p
Prerequisite, 108 or equivalent.

PE 114, 115 Canoeing I, II (1,1)
Prerequisite, ability to swim fifty yards and to swim, tread, or float for fifteen minutes. Following hour must be for travel time. Fee charged.

PE 117 Crew I (1)
Prerequisite, 107 or equivalent.

PE 119 Crew V: Intercollegiate (1)
Prerequisite, permission.

PE 120 Sailing I (1)
Must have hour following class free for travel time. Prerequisite, ability to demonstrate water safety.

PE 123, 124, 125 Contemporary Dance I, II, III (1,1,1)
Concepts and techniques of dance as a modern art form. Prerequisites, 123 for 124; 124 for 125, or permission.

PE 127 International Folk Dance (1)

PE 128 Korean Dance (1)

PE 129 Jazz Dance (1)

PE 130 Social Dance I (1)

PE 132 Adapted Activities (1)
For students with physical problems and disabilities. Prerequisite, permission.

PE 133, 134 Archery I, II (1,1)

PE 136, 137 Badminton I, II (1,1)

PE 139 Baseball V: Intercollegiate (1)
Prerequisite, permission.

PE 140 Basketball II (1)
Prerequisite, ability to play official basketball.

PE 142 Basketball V: Intercollegiate (1)
Prerequisite, permission.

PE 143, 144, 145 Bowling I, II, III (1,1,1)
Fee charged.

PE 146 Boxing I (Men) (1)

PE 147 Conditioning (1)

PE 148, 149 Fencing I, II (1,1)

PE 150 Field Sports I (1)

PE 152 Football V: Intercollegiate (1)
Prerequisite, permission.

PE 153 Golf I (1)
Following hour must be free for travel time. Fee charged.

PE 155 Golf V: Intercollegiate (1)
Prerequisite, permission.

PE 156, 157 Gymnastics I, II (1,1)
For women: modern gymnastics floor exercise, balance beam, vaulting, uneven bars, tumbling, and trampoline. For men: floor exercise, pommel horse, rings, vaulting, parallel bars, horizontal bars, tumbling, and trampoline.

PE 159 Gymnastics V: Intercollegiate (1)
Prerequisite, permission.

PE 160 Handball I (1)

PE 163 Judo I (1)

PE 167, 168 Mountain Climbing I, II (1,1) S,S
Fee charged.

PE 169, 170, 171 Riding I Horsemanship, II and III English Saddle (1,1,1)
Fee for lessons; insurance recommended.

PE 173, 174 Skating—Ice I, II (1,1)
Fee for lessons and skates; insurance recommended.

PE 175 Ski Conditioning (1)

PE 176, 177, 178 Skating I, II, III (1,1,1)
Fee for lessons and transportation; insurance recommended.

PE 179 Skating V: Intercollegiate (1)
Prerequisite, permission.

PE 180 Soccer (1)

PE 182 Softball II (1)
Prerequisite, ability to play official softball.

PE 183 Special Activities (1)
Prerequisite, permission.

PE 184 Squash I (1)

PE 187, 188, 189 Tennis I, II, III (1,1,1)

PE 191 Tennis V: Intercollegiate (1)
Prerequisite, permission.

PE 192 Track I (1)

PE 193 Track V: Intercollegiate (1)
Prerequisite, permission.

PE 194 Volleyball I (1)

PE 195 Volleyball V: Intercollegiate (1)
Prerequisite, permission.

PE 196 Weight Training (1)

PE 198 Wrestling I (Men) (1)

PE 199 Wrestling V: Intercollegiate (1)
Prerequisite, permission.
PE 201 Meaning and Modification of Movement (2)
Assessment and interpretation of personal movement skill and activity preference. Course designed for nonmajors.

PE 203 Effort Management and Stress Reduction (3) A WSp
Woods
Recognition and management of residual muscular tension through relaxation; theories, implications, techniques, laboratory, and discussion.

PE 204 Figure and Posture Control (2) A Sp
Effects of exercise on weight, contour, and condition; postural adjustments for efficiency in the movement skills of daily living. Laboratory, lecture, and discussion.

PE 205 Basic Biomechanics for Nursing (2) A WSp
Mechanical analysis of movement tasks, with emphasis on conservation of energy and prevention of muscular strain and injury. Laboratory sessions include manipulation of patients. Prerequisite, Conjoint (Medicine) 316.

PE 210 Performance Precision and Choreographic Principles in Gymnastics (2, max. 4) Sp
Techniques beyond the introductory level, with optional emphasis on floor exercise or apparatus. Prerequisite, 157 or permission.

PE 216 Scuba Diving (2) A WSp
Scientific principles and techniques of SCUBA (Self-Contained Underwater Breathing Apparatus) diving, based on marine physics, physiology, and medical requisites to a safe exposure in an underwater environment. Fee charged. Prerequisites, swim underwater (no fins) one pool length (twenty-five yards); tread water for ten minutes; medical examination.

PE 225 Survey of American Folk Dances (2)
Folk dance forms characteristic of the United States; traditional dances and emergence of modified forms; performance, analysis, and interpretation.

PE 230 Power Volleyball (2)
Performance and analysis of advanced skills and strategies. Prerequisite, 194 or permission.

PE 239 Introduction to Movement Analysis (4) A WSp
Lawson, Waltz
Exemplary topics in the study of human movement, including behavioral, experiential, and interpretive perspectives.

PE 271 Field Sports (2) A
Renick
Strategy, interaction, and movement effectiveness in field sports.

PE 290 Officiating (2) A Sp
Techniques of officiating for men: football, basketball, track and field, swimming, tennis, volleyball, softball, and speedball.

PE 294 Life Saving (2) A WSp
Prerequisite, ability to swim 440 yards (American Red Cross certification possible).

PE 299 Water Safety Instruction Course (2) WSp
(WSI certification) Designed to prepare students for employment as teachers or administrators in aquatic programs. Prerequisites, 294 and American Red Cross lifesaving certificate.

PE 301 Socialization of Movement Activities (6) A W Landers
Processes of social influence and their relationship to an individual's movement and sport performance. Socialization via sport and socialization into sport roles. Prerequisites, Psychology 100 and Sociology 110. (Last time offered: Winter Quarter 1977.)

PE 302 Movement Activities in Society and Culture (4) A Sp
Play, dance, games, and sports with reference to groups, roles, values, and interaction. Prerequisite, Sociology 110. (Last time offered: Winter Quarter 1977.)

PE 304 Officiating (2, max. 4) A WSp
Techniques of officiating, opportunity for women's national and local ratings.

PE 312 Physical Fitness Activities for Children (2½) S
Movement activity that contributes to physical fitness and motor efficiency; performance standards as related to physical growth and development levels; criteria and techniques for evaluation of physical performance of children.

PE 314 Movement Exploration for Children (3)
A
Theory and techniques of movement exploration among goals, and flow variables as elements of movement organization.

PE 316 Structure of Movement Activities for Children (3) W

PE 320 Conditioning and Physical Fitness (2) Sp
Critical analysis of conditioning techniques and programs, considering elements of fitness, biomechanical principles of exercise, and specificity of movement performance requirements. Prerequisite, 332.

PE 325 Growth and Motor Development (4) A WSp
Small
Factors influencing the physical growth and the development of movement skills during infancy, childhood, and adolescence. Interrelationships of motor and other aspects of development.

PE 331, 332 Human Kineecenergetics (8,5) A W, WSp
Doollittle, Hutton, Miller
Maturational and functional explanations of human movement potential; interaction among structural patterning, mechanisms, regulatory processes, and external physical forces; reciprocal effects of moving and potential for movement. Prerequisites, for 331: 250, Zoology 118, 119 or 208, Biological Structure 301; 331 for 332.

PE 335 Athletic Training and Conditioning (2) W
Prerequisite, Health Education 292 or permission.

PE 340 Administration of Intramural Sports (3) A

PE 350 Learning and Movement Performance (5) A WSp
Purdy
Interrelationships among perceptual mechanisms, individual characteristics and tasks, organizational and situational variables as related to the learning of movement skills. Prerequisite, Psychology 100.

PE 359 Workshop in Gymnastics (3) S
Hughes
Lectures, practice, and supervised teaching in gymnastics. Prerequisite, permission.

PE 365 Applied Movement Learning (4) A WSp
Fox, Peek
Relationships among goals, content, and process in the teaching of movement skills. Prerequisite, 350.

PE 366 Practicum (1, max. 3) A WSp
Fox, Hughes, Renick
Prerequisites, 365 and permission.

PE 368 Analysis of Movement Performance (3, max. 12) A WSp
Analysis of efficient and effective movement performance patterns within specific performance contexts.

PE 370 Coaching of Football (2) Sp

PE 371 Coaching of Basketball (2) A

PE 372 Coaching of Track and Field (2) W

PE 373 Coaching of Baseball (2) Sp

PE 410 Social Correlates of Movement Forms and Patterns (3) A Sp
Play, dance, games, and sports with reference to groups, roles, values, and interaction. Prerequisites, 290 and Sociology 110.

PE 412 Sport in the United States (3) W
Morford
Relations of sport to American culture, with emphasis on issues, problems, and trends.

PE 413 Athletics in The Ancient World (3) A
Morford
Role and significance of games and physical activities in ancient societies, with special em-
phasis on Greek athletics and Roman spectacles.

PE 414 Rise of Sport (3) Sp
Morford
Study from the historical perspectives of the interrelationship of sport and culture from the age of chivalry to the age of international Olympianism.

PE 420 Movement Development Analysis (3) A
Small
Interrelationships among physical growth, motor development, and psychosocial development of children; includes laboratory experience in observing, analyzing, and interpreting behavior of children. Prerequisite, 325.

PE 434 Exercise and Cardiopulmonary Irregularities (3) S
Doolittle, Hutton
Problems, limitations, and benefits of exercise in the alleviation of cardiopulmonary handicaps, with particular attention to the middle-aged population. Prerequisite, 331 or human anatomy, physiology, and physiology of exercise, or permission.

PE 436 Adapted Activities (3) Sp
Woods
Study of activities suited to the interests, capacities, and limitations of students with handicaps. Prerequisite, 332, 330 or permission.

PE 438 Developmental Motor Activities for the Exceptional Child (3) A Sp
Woods
Principles of developmental motor activities and their application in the education of the exceptional child. Prerequisites, 325 and 332, or permission.

PE 450 The School Physical Education Program (3) W Sp
Peek
Problems of organization and conduct. Prerequisites, 363 and 460.

PE 455 Measurement and Evaluation in Physical Education (4) A W
Fox
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.

PE 460 Perspectives in Physical Education (3) A W
Traditional views of physical education examined with reference to research findings and dynamics of program change. Prerequisites, 250, 301, 302, 325, 332, 350.

PE 470 Social Psychology of Sport and Human Movement (4) Sp
Landers
The relationship between selected social processes and sport and human movement experiences, including social structure and process as it affects sport, or as it is, in turn, affected by sport and human movement experiences. Prerequisites, 301, 302, or permission. (Last time offered: Winter Quarter 1977.)

PE 478 Programs in Elementary Physical Education (3) Sp
Progress and problems in modern programs. Offered jointly with the College of Education as EDC&I 425. Prerequisites, 314, 316, EDC&I 324.

PE 480 Biomechanics (3) A
Miller
Experimentation with the integration of the physical laws of the universe and the structure and function of the human body with the requirements of various movement tasks. Prerequisite, 332 or permission.

PE 485 Philosophical Perspectives of Human Movement (3) Sp
Renick
The mind-body dichotomy and selected philosophical positions in human movement study, including investigation of contemporary issues in sport, athletics, and physical education.

PE 490 Contemporary Perspectives in the Study of Human Movement (3) A
Waltz
Consideration of ways in which inquiry in the arts and sciences of human movement can be approached. Prerequisite, senior standing or permission.

PE 493 Problems in Athletics (3) W Sp
Landers, Morford
Place of interschool athletics in education. Control, finance, eligibility, safety measures, publicity, and public relations. Qualifications and duties of coaches, managers, and officials. Prerequisites, 450 and 460.

PE 498, 499H Special Studies in Physical Education (2-3, max. 6) W A Sp S A W S Sp S
Prerequisite, permission.

PE 499, 499H Undergraduate Research (2-3, max. 6) W A W Sp A W Sp
Prerequisite, permission.

Courses for Graduates Only

PE 501 Seminar on Human Movement Studies (3, max. 9) W A Sp
Examination of selected topics in human movement study. Specific content variable with current developments in the field and with interests of the instructor. Prerequisite, permission.

PE 502 Issues in Physical Education (3, max. 9) A Sp
Lawson
Issues, problems, and trends in physical education and other movement-centered programs: relationship of changes in direction or focus to emergent knowledge; social, political, or other factors. Prerequisite, graduate student standing in physical education or permission.

PE 506 The Curriculum in Physical Education (3) Sp
Lawson
Selection and organization of program content in relation to characteristics and needs of pupils and local conditions. Prerequisite, 460 or permission.

PE 507 Supervision in Physical Education (3) B
Functions, supervisory organization, evaluation, workshops, in-service education, application of democratic leadership to specific program and personnel problems. Prerequisites, 450 and 460, or permission.

PE 510 The Structure and Strategies of Sports and Games (6) W Sp
Definitions, classification systems, characteristics, and theories of games and sports; particular emphasis on structural and strategic theories in lieu of social, psychological, and cultural theories.

PE 520 Advanced Growth and Motor Development (3) W Small
Studies in movement development, focused on analysis of physical growth, motor development, and interrelationships among modifying variables. Designed to prepare students for research in developmental aspects of motor performance. Prerequisite, 325 or permission.

PE 540 Physiological Bases of Physical Conditioning (3) A W Sp
Doolittle
Investigation of principles of overload, specificity and progression, together with the underlying physiological mechanisms as they relate to physical condition of the organism as movement stress. Prerequisite, 332 or permission.

PE 553 Neurophysiological and Behavioral Correlates of Movement (3) Sp
Hutton
Neuroanatomical and neurophysiological mechanisms governing skeletal muscle and pattern of movement, including consideration of plasticity and modification of motor control systems. Prerequisite, 352 or permission.

PE 555 Neurophysiological and Behavioral Correlates of Movement (3) Sp
Hutton
Cross-disciplinary approach to selected topics pertinent to the study of movement behavior (e.g., volitional movement, visuomotor interrelations and perception, drugs and motor performance, proprioceptions, and feedback). Prerequisites, 332, 552, Zoology 118 or 208, or permission.

PE 563 Advanced Learning and Movement Performance (3) Sp
Purdy
Interrelationships among situational and conditional variables as related to learning and performance of movement skills, emphasis on practice factors. Prerequisite, 350 or permission.

PE 590 Research in Human Movement (3) A W
Research procedures appropriate to the solution of human movement problems. Prerequisite, statistics or permission.

PE 591 Research Seminar (3, max. 9) W A Sp
Problems and procedures in research unique to...
specific areas of specialization in human movement study and physical education. Content variable: physical education programs, kinesiodynamics, learning and movement performance, sociocultural correlates of movement, movement experience, and aesthetics. No more than 3 credits in any one area. Prerequisites, 590 and permission.

**PHYS**

121 Mechanics (4) AWSpS
Basic principles of mechanics. Prerequisites, one year of high school physics or permission, concurrent or previous Mathematics 124 or 134.

122 Electromagnetism and Oscillatory Motion (4) AWSpS
Basic principles of electromagnetism, the mechanics of oscillatory motion. Prerequisites, 121, concurrent or previous Mathematics 125 or 135.

123 Waves (4) AWSpS
Electromagnetic waves, optics, and waves in matter. Prerequisites, 122, concurrent or previous Mathematics 126 or 136.

131, 132, 133 General Physics Laboratory (1,1,1) AWSpS, AWSpB, AWSpD
Experimental topics in physics for science and engineering majors. Prerequisites, 121 and 131 for 132; 122 and 132 for 133.

207 The Physics of Music (3)
The nature of sound; vibrations; traveling and standing waves; response of the ear to sound; production of musical sounds.

210, 211, 212 Intermediate Physics for Teachers and Students in Liberal Arts (5,5,5) A,WSp
Individualized self-paced study of wave phenomena, light, electromagnetism, atomic physics, structure of matter and selected topics in relativity, nuclear phenomena, and quantum physics, depending on the background and preparation of the student. Not open for credit to students who have completed courses in the 121 sequence or higher. Prerequisites, at least two quarters of physics such as 101-102; 110, 111; or 114, 115.

221 Quantum Physics (3) AWSpS
Introduction to the physics of atoms, molecules, and nuclei; elementary quantum physics. Prerequisites, 123, concurrent or previous Mathematics 126 or 136.

222 Statistical Physics (3) WSpS
Heat, thermodynamics, and the statistical description of matter. Prerequisites, 221, which may be taken concurrently, and Mathematics 126 or 136.

223 Elementary Mathematical Physics (3) SpS
Applications of mathematics to physics, particularly as illustrated by classical mechanics. Prerequisites, 123 and Mathematics 238.

231, 232 Electric Circuits Laboratory (3,3) WSp
Basic linear elements in DC, AC, and transient circuits; solid-state and vacuum-tube devices; electrical measurements. Prerequisites, 123, Mathematics 126 or 136 for 231; 231 for 232.

321, 322, 323 Electromagnetism (3,3) A,WSp
Charges at rest and in motion; dielectric and magnetic media; electromagnetic waves; rela-
tivity and electromagnetism; physical optics. Prerequisites, 123, Mathematics 328, which may be taken concurrently, for 321; 321 for 322; 322 for 323.

**PHYS 324, 325 Quantum Mechanics (3,3) A,W**
Introduction to nonrelativistic quantum mechanics. Prerequisites, 221, Mathematics 327 for 324; 324 for 325. Mathematics 205 or 302 recommended.

**PHYS 327 Introduction to Nuclear Physics (3) WS**
Nuclear structure including nuclear reactions, fission, particle accelerators, and nuclear instrumentation; applications of nuclear phenomena in atomic and nuclear physics. Not open for credit to students who have completed 422. Prerequisite, 221 or permission.

**PHYS 331 Optics Laboratory (3) Sp**
Optical and spectroscopic measurements. Prerequisite, 323, which may be taken concurrently.

**PHYS 400 Basic and Modern Physics (11) S**
Review of the fundamental and modern developments in physics with suggestions for lecture demonstrations and laboratory. Primarily for summer institute students. Prerequisite, permission.

**PHYS 401, 402, 403, 404H, 402H, 404H Special Problems (3,3,3) A,W,Sp;S**
Supervised individual study. Prerequisite, permission.

**PHYS 407, 408, 409 Physics for Teachers (5,5,5) A,W,Sp**
Basic physics, providing background and perspectives needed for teaching new elementary science materials such as AAAS, ESS, SCIS, etc. Intended for in-service elementary teachers or graduate students preparing for elementary (or secondary nonscience) teaching. Not applicable as credit toward a physics degree. Prerequisite, permission.

**PHYS 421 Atomic and Molecular Physics (3) A**
Survey of the principal phenomena of atomic and molecular physics. Prerequisites, 323 and 325, or permission.

**PHYS 422 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.

**PHYS 423 Solid State Physics (3) Sp**
Survey of the principal phenomena of solid state physics. Prerequisites, 323 and 325, or permission.

**PHYS 424, 425, 426 Mathematical Physics (3,3,3) A,W,Sp**
424: advanced classical mechanics. 425, 426: mathematical techniques of particular use in physics, including partial differential equations. Prerequisites, 323 and 325, or permission for 425, 426 for 426.

**PHYS 427 Applications of Physics (1-5, max. 12)**
Current applications of physics to problems in the sciences and technology.

**PHYS 428 Selected Topics in Physics (1-3, max. 12)**

**PHYS 431, 432, 433 Modern Physics Laboratory (3,3) A,W,Sp**
431, 432: measurement in modern atomic, molecular, and solid state physics. Prerequisites, 30 credits in physics or permission. 433: techniques in nuclear and elementary particle research. Prerequisite, 327 or 422, or permission.

**PHYS 440 Basic Concepts of Physical Science (3)**
Deals with the nature and origin of some of the basic concepts of the physical sciences. Not open to science or engineering majors. Prerequisite, junior standing.

**Courses for Graduates Only**

**PHYS 505, 506 Analytical Mechanics (3,3) A,W**
Topics from mechanics and applied mathematics, including variational principles, Lagrange's equations, Hamilton's equations, and canonical transformations.

**PHYS 513, 514, 515 Electromagnetism and Relativity (4,4,4) A,W,Sp**
Properties of electric and magnetic fields in free space and material media; boundary-value problems; radiation from accelerated charges and electromagnetic waves; the theory of special relativity leading to a relativistic formulation of electromagnetism and particle dynamics.

**PHYS 517, 518, 519 Quantum Mechanics (4,4,4) A,W,Sp**
Physical and historical basis for quantum theory; solutions of the Schrödinger wave equation for discrete and continuous energy eigenvalues; representation of physical variables as operators and matrix formulation of quantum mechanics; theory of angular momentum; identical particles; elementary collision theory; various approximation methods for solution of the Schrödinger equation.

**PHYS 520 Seminar in Physics, History, and Society (*) Sp**
Lectures and discussions on subjects of interest in physics that are not included in conventional courses. Emphasis is on relationships between physics and other disciplines and activities. Prerequisite, graduate standing or permission.

**PHYS 524, 525 Thermodynamics and Statistical Mechanics (3,3) A,W**
Statistical mechanical basis for the fundamental thermodynamical 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, 529 Current Problems in Physics (1,1,1) A,W,Sp**
Introduction to current research topics for beginning graduate students.

**PHYS 530 Physics Colloquium (*) A,W,Sp**
Prerequisite, permission.

**PHYS 531 Seminar on High Energy Physics (*) A,W,Sp**
Prerequisite, permission.

**PHYS 532 Seminar on Atomic Collisions and Spectroscopy (*) A,W,Sp**
Prerequisite, permission.

**PHYS 533 Seminar on Relativistic Astrophysics (*)**
Prerequisite, permission.

**PHYS 534 Seminar on Magnetic Resonance and Solid State Physics (*) A,W,Sp**
Prerequisite, permission.

**PHYS 535 Seminar on Nuclear Physics (*) A,W,Sp**
Prerequisite, permission.

**PHYS 536 Seminar on Low Temperature and Solid State Physics (*) A,W,Sp**
Prerequisite, permission.

**PHYS 537 Seminar on Theoretical Physics (*) A,W,Sp**
Prerequisite, permission.

**PHYS 538 Seminar on Cosmic Ray Physics (*) A,W,Sp**
Prerequisite, permission.

**PHYS 539 Seminar on Problems of Physics Education (*) A,W,Sp**
Prerequisite, permission.

**PHYS 541 Survey of Elementary Particle Physics (3)**
Survey of topics in elementary particle physics. Intended for the nonspecialist having a background in quantum mechanics. Prerequisite, 519.

**PHYS 542 Survey of Nuclear Physics (3)**
Survey of topics in nuclear physics. Intended for the nonspecialist having a background of quantum mechanics. Prerequisite, 519.

**PHYS 543 Atomic and Molecular Physics Survey (3)**
Survey of topics in atomic and molecular physics. Intended for the nonspecialist having a background of quantum mechanics. Prerequisite, 519.

**PHYS 544 Solid State Physics Survey (3)**
A survey of solid state physics. Intended for the nonspecialist having a background of quantum mechanics. Prerequisite, 519.
PHYS
550, 551 Atomic Physics (3,3)
Theory of atomic structure and spectra; atomic and molecular beams; resonance techniques; atomic collisions; topics of current interest. Prerequisite, 519; 550 for 551.

PHYS
555 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
550, 561, 562 Theoretical Nuclear Physics (3,3)
Nuclear structure, scattering, reactions, and decays in terms of elementary properties of nucleons and current theoretical models. Prerequisite, 519.

PHYS
554, 555 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
556 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
557, 558, 559 Theory of Solids (3,3,3) A,W,Sp
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, 566.

PHYS
576 Selected Topics in Experimental Physics (*)
Prerequisite, permission.

PHYS
578 Selected Topics in Theoretical Physics (*)
Prerequisite, permission.

PHYS
600 Independent Study or Research (*)
Study or research under the supervision of individual faculty members. Prerequisite, permission.

PHYS
800 Doctoral Dissertation (*)
Prerequisite, permission of Supervisory Committee Chairman.

POLITICAL SCIENCE

Courses for Undergraduates

GENERAL

POL S
101 Introduction to Politics (5) A,Wsp
Basic themes and enduring problems of politics (power, authority, conflict, legitimacy, etc.), as revealed through one of the major foci of politics, such as international relations, developing areas, urban politics, comparative European politics, political philosophy, or American politics generally. Primarily for prospective majors.

POL S
102 American Government and Politics (5) A,Wsp
Analysis and evaluation of the values, the institutions, the processes, and the policies of the American political system in the context of contemporary problems. Primarily for nonmajors.

POL S
203 Introduction to International Relations (5) A,Wsp
Analysis of the world community, its politics, and government.

POL S
204 Introduction to Political Science (5) A,Wsp
Survey of the four major subfields of political science (political philosophy, comparative politics, international relations, American politics), each presented by faculty specializing in that area; accompanied by a comprehensive overview of the discipline as a whole. Primarily for prospective majors. Political Science 101, 201, or 202 recommended.

POL S
205 Preparatory Seminar in Political Analysis (5, max. 10) A,Wsp
Intensive study of the basic concepts and the principles of one of the four major subfields of political science (political philosophy, comparative politics, international relations, American politics). Limited to twenty students. Prospective majors only. Prerequisite, permission.

POL S
210 Ethnic Minorities and American Politics (5) A,Wsp
Roles of ethnic groups in American politics; the situation of minorities in urban society; sources of tension and frustration; historical relationship of Blacks to the political process; protest as political action; urban services and urban politics; the effect of national politics and policies on urban minorities.

POL S
311 The Future of American Minorities (5) A,Wsp
Exploration of the alternatives open to different minority groups in the United States; their development and place in American politics, the possibilities of community formation, integration, separatism, competitive economic structures, coalitions, etc. Prerequisite, 210 or permission.

POL S
313 Women and Patriarchal Politics (5) Sp
Analysis of political theory, historical and contemporary, including writings of the women's liberation movement on the political role of women in society. Emphasis is on empirical studies of the "apolitical" woman, and on the process of political socialization in various cultural contexts. Field research on women's participation in political decision making.

POL S
398H 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 S
405 Seminar on Politics (5, max. 10)
Intensive reading and research in selected problems or fields of political analysis. Prerequisite, permission.

POL S
499 Individual Conference and Research (2-5, max. 10) A,Wsp
Open to qualified majors in the senior year. No more than one registration in 499 under the same instructor is permitted. A second registration with a different instructor may be permitted only in very exceptional cases and with departmental approval. Prerequisite, permission.

POLITICAL THEORY AND PUBLIC LAW

POL S
302 Field Experience in Politics (5, max. 10) A,Wsp
Chandler, Lamare, Meranto
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
311 Theories of Modern Government (5) A,Wsp
The principal political ideas of recent times with particular reference to their significance for democracy and liberal values. An introduction intended especially for nonmajors.

POL S
312 Radicalism in American Politics (5) W
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, nationalism, libertarianism, etc.) are discussed. The relationship of radical to "ordinary" politics is explored, as is the more general implication for American society of the radical challenge. Prerequisite, an introductory course in political science.

POL S
362 The Supreme Court in American Politics (5) A
Scheingold
Introductory public law course that examines the interplay of constitutional law and American politics with particular attention to the role of the Supreme Court in the formulation and implementation of public policy in such matters as criminal law enforcement, civil rights, political expression, and economic regulation.
POL S
411 The Western Tradition of Political Thought: Ancient 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 equivalent.

POL S
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.

POL S
413 Contemporary Political Thought (5) Sp Developments from the eighteenth century to the present as a basis for contemporary philosophies of democracy, communism, and fascism. Prerequisite, 411 or equivalent.

POL S
414 Chinese Political Thought (5) Sp Theories of the Oriental state as exhibited in the writings of statesmen and philosophers. Offered alternate years; offered 1975-76.

POL S
415 The Theory of Political Society (5) A Cassinelli The nature of political society, its institutions, and its beliefs. Analyses of the concepts of government, law, community, values, power, authority, stability, and change.

POL S
416 Economic Approaches to Political Analysis (5) W Application of economic theory and methodology to political phenomena. Emphasis on theory, construction, with application in the American context. Offered jointly with the Department of Economics as Economics 452. Prerequisites, Economics 201, 400, or equivalent.

POL S
418 American Political Thought (5) W Major thinkers and movements from the colonial period to the present.

POL S
419 Contemporary American Political Thought (5) Critical evaluation of contemporary prescriptions in the light of established ideas, recent empirical findings, and alternative theories of political change.

POL S
460 Introduction to Constitutional Law (5) ASp 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) W Cases and literature bearing on protection of constitutionally guaranteed private rights, with particular reference to the period since 1937.

POL S
464 The Politics of Criminal Justice (5) A Scheingold Investigation of the political forces and value choices associated with the enforcement of criminal law. Distribution of resources among participants in the criminal justice system (e.g., police, attorneys, defendants, and judges). Understanding and evaluation of the interaction of criminal justice processes with the political system. Prerequisite, junior or senior standing.

POL S
465 Law and Public Policy (5) W 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.

GOVERNMENT, POLITICS, AND ADMINISTRATION

POL S
350 Government and Interest Groups (5) Sp Gotfried Agrarian, labor, professional, business, and ethnic interest in politics; impact on representative institutions and governmental processes. Prerequisite, 101 or equivalent.

POL S
351 The American Democracy (5) ASp Bone, Gotfried Selected aspects and problems of contemporary American government: parties and politics; the Presidency; Congress; the role of the Supreme Court; civil rights and civil liberties. Prerequisite, 101 or equivalent or junior standing.

POL S
360 The American Constitutional System (3) A Fundamental principles; function, evolution, and unwritten constitution; recent tendencies.

POL S
370 Government and the American Economy (5) W Government regulation, promotion, and services affecting such principal interest groups as business, agriculture, and consumers; the independent regulatory agencies, public ownership, government corporations, and the cooperative movement.

POL S
450 Political Parties and Elections (5) A Bone Theories of American parties, campaigns and voting behavior; party leadership; political socialization and participation. Political Science 101 recommended.

POL S
451 The Legislative Process (5) W Bone Organization and procedure of Congress; state legislative politics; lobbying; legislative roles; the theory and practice of representative government. Prerequisite, 101 or 102 or permission.

POL S
452 Political Processes and Public Opinion (5) W 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) W Bone Intensive study of American state legislatures, with special reference to the Washington State Legislature. Student's schedule must permit spending several Fridays in Olympia when the legislature is in session. Those desiring a more extensive involvement in the legislature should enroll in the political internship or general studies special projects courses. Prerequisites, upper-division standing and permission.

POL S
470 Public Bureaucracies in the Political Order (5) ASp Analysis of the growth, power, and roles of governmental bureaucracies in America; conflict and conformity with American political thought, other political institutions, and publics in policy making.

POL S
471 Administrative Processes (5) W Focus upon the theories of organization and social control processes (primarily personnel and budgeting) utilized in American governmental bureaucracies; special problems of responsiveness, executive and political direction, and regional administration.

POL S
472 Introduction to Administrative Law (5) Sp The legal context of American administration, the public function, public management, administrative powers, the nature of judicial control.

POL S
473 Administration in Modern Democracies (5) W The changing formal and informal structure of administration; organization and processes in noncommunist urban-industrial societies; the nature and role of bureaucracy; the effect of attitudes toward the state on administrative practices. Prerequisites, 470 and one or more of 345, 444, 445, or permission.

POL S
474 Administration in Developing Nations (5) Sp Administrative aspects of governmental change and modernization in developing nations; colonial influences on administration; problems of establishing new nationalities and adjusting to change in established states; bureaucratic development and administration. Prerequisites, 470 and at least one course in the politics of developing nations, or permission.

POL S
480 Introduction to Urban, Suburban, and Metropolitan Political Systems (5) W 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 metropolitanism. Offered jointly with the College of Architecture and Urban Planning as Urban Planning 460. Political Science 101 or 102 recommended.

POL S
481 Introduction to Large City Government and Politics (5) W 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 state levels.

380
local levels. Future of large cities and politics of change. 101 or 102 recommended.

POL S 482 State Government (5) Sp
Focus on the structures, processes, and policy outputs of state governments in the United States.

POL S 483 Technology, Environment, and Urban Policy (5) Sp
Examination of the interrelation 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 urban public organizations to predict change and to formulate policies that can take future states into account. Prerequisites, one course in state and local government or permission.

POL S 485 Problems in Urban Political Analysis (5, max. 10) Sp
Lamare, Merantio, Shepro
Advanced undergraduate course in urban politics. Opportunity for more independent and intensive analysis of particular problems or lines of inquiry. Prerequisites, 101 or 102 and 480 or 481.

POL S 487 Intergovernmental Relations (5) W Gore
Analysis of the content and dynamics of the relations between federal, state, and local governments, with emphasis upon patterns in these relationships that reflect program structures.

POL S 490 Analysis of Political Behavior (5) AW Gore
Examination of concepts, techniques, and results of research on political behavior.

POL S 491 Political Behavior Methodology (5) W Gore
Numeric and symbolic approaches to the study of political phenomena. Consideration is given to typologies, scales, measurement techniques, sampling of elites, and selected multivariate procedures and the results of their application to legislative, voting, judicial, and administrative behavior. Prerequisite, 490 or permission.

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 psychological studies of politics.

COMPARATIVE GOVERNMENT AND INTERNATIONAL RELATIONS

POL S 321 American Foreign Policy (5) W
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 102.

POL S 322 Diplomatic Practices and Procedures (5) Asp Riley
Department of State; diplomatic and consular services; American diplomatic practice and procedure.

other problems. Lectures, discussions, and readings in social psychology, political science, and economics. Offered jointly with the Department of Economics as Economics 408.

POL S 420 Foreign Relations of the Soviet Union (5) W Reshetar
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 S 425 International Law (5) A Rohn
History and present status of international law. Feedback between law and politics in international relations. Current trends in treaties and court cases.

POL S 426 World Politics (5) A Modelski
The nation-state system and its alternatives: world distributions of preferences and power; structure of international authority; historical world societies and their politics.

POL S 427 International Government and Administration (5) A
Comparative study of regional and general governmental international organizations.

POL S 429 International Relations in the Far East (5) Asp Hellmann
Analysis of the relations among the nations of East and Southeast Asia in the context of the global international system.

POL S 430 Government and Politics in the Middle East and North Africa (5) W Hitchner
Breakdown of traditional society and the problems of building modern political systems.

POL S 432 American Foreign Policy in the Far East (5) Taylor
Relationship to diplomacy, trade, and internal politics.

POL S 433 International Relations in Southeast Asia (5) W Lev
Analysis of the problems affecting the relations among the countries of Southeast Asia. Prerequisites, 101, 343, or permission.

POL S 434 International Relations of South Asia (5) W Brass
Interrelationships of domestic, interstate, and extraregional forces and their effects upon the resolution or expansion of interstate conflicts in South Asia.

POL S 435 Japanese Government and Politics (5) A Hellmann
Government and politics of Japan with emphasis on the period since 1945.
ARTS AND SCIENCES

POL S 439 Government and Politics of Sub-Saharan Africa (5, max. 10) W Survey of government and politics in the countries of tropical Africa, with major emphasis on political development and national integration in former British Africa. Prerequisite, 101 or permission.

POL S 440 Government and Politics of South Asia (5) Sp Brass Comparison of problems of national integration and political development in India, Pakistan, and Ceylon.

POL S 441 Government and Politics of the Soviet Union (5) A Reshetar Ideological and historical bases of Soviet politics; Leninism-Stalinism; Communist Party structure and function; administrative agencies; the police and military; law and the judiciary; Soviet federalism and nationality policy.

POL S 442 Government and Politics of China (5) A Townsend Introduction to post-1949 government and politics, with emphasis on problems of political change in modern China. Prerequisite, junior standing.

POL S 443 Constitutional Regimes (5) W Castinelli Analysis of modern and premodern types of political regimes concerned with social stability, with special attention to contemporary representative democracy.

POL S 444 Revolutionary Regimes (5) Sp 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) W Hitchner 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, or permission.

POL S 446 Peasants in Politics (5) Sp Hill Political interaction of peasants and governments, with emphasis on peasants' forms of autonomous 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) W 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. Prerequisite, permission.

POL S 448 Comparative Federal Systems (5) Sp Intensive analysis of the development and operation of typical federal systems in established states, and comparisons with those recently adopted in developing areas. Attention is devoted to legal, political, and socioeconomic problems in these federal regimes.

POL S 449 Politics of Developing Areas (5) ASp Brass, Hellmann, Townsend Comparative study of problems of national integration and political development in the new states of Asia and Africa. Prerequisite, junior standing.

Courses for Graduates Only

POL S 500, 501, 502 Language and Politics I, II, III (3,3,3) Examination of leading issues and positions in the philosophy of language and their implications for, and connections with, the philosophy and methodology of political and social science. The emphasis in the Autumn Quarter is on the work of Wittgenstein. The emphasis in the Winter Quarter is on discussions of issues in the philosophy of social science influenced positively or negatively by Wittgenstein (e.g., Winch, Peters, Taylor, Malcolm, Davidson, MacIntyre). Spring quarter emphasis is on research and writing. Prerequisites, 500 for 501; 501 for 502.

POL S 506 Contemporary Problems, Domestic and Foreign (3, max. 6) S

POL S 509 Reason, Value, and Politics I (3) A Selected topics in the relationships between ethics and politics.

POL S 510 Reason, Value, and Politics II (3) W Research and writing in the relationships between ethics and politics. Prerequisite, 509.

POL S 511 Studies in Ancient and Medieval Political Theory (3, max. 6) A Selected topics. Prerequisite, permission.

POL S 512 Studies in Modern Political Theory (3, max. 6) W Selected topics from the sixteenth to nineteenth centuries. Prerequisite, permission.

POL S 513 Studies in Recent and Contemporary Political Theory (3, max. 6) Sp Selected topics from the nineteenth and twentieth centuries. Prerequisite, permission.

POL S 514 Seminar in Problems of Political Theory (3, max. 9) Sp Selected topics, historical and conceptual, national, regional, and universal. Prerequisite, permission.

POL S 515 Scope and Methods in Political Science (3) AW Gore Inquiry into the philosophic foundations of various approaches in political science and their possible contributions to an understanding of politics. Substantial background in philosophy, as well as in political science, is highly desirable.

POL S 517, 518 Political Theory I, II (3,3) Political philosophy interprets the meanings people give to political phenomena as members of political communities. Because phenomenology has developed methods for interpreting meanings as constituted in the intentions of individuals, it can be of considerable value in promoting the aims of political philosophy. Primary object of this course is to familiarize students with phenomenology and to help them relate it to the traditional concerns of political philosophy. Prerequisite, 517 for 518.

POL S 519 Theories of Decision Making (3) Sp Survey of the several theories of collective decision making, including analysis of alternative strategies and the spectrum of decision functions associated with each strategy.

POL S 520 Seminar on the Foreign Policy of the Soviet Union (3) Sp Reshetar Selected topics in the development, methods, and objectives of the foreign policy of the Soviet Union. Prerequisite, permission.

POL S 521 Theories of International Relations (3) Sp Modelski Review of contemporary theory, research, and methodology in the study of world politics. Prerequisites, 426 and permission.

POL S 522 Seminar on World Politics and Organizations I (3) W Modelski Principles of world politics and problems of world order: war and systemic conflict. Prerequisites, 426 and permission.


POL S 524 Seminar on World Politics and Organizations III (3) Sp The United Nations: selected problems.

POL S 525 International Law I: Policy (3) A Rohn Inputs of international law into the decisional process in foreign policy. Effect of policy on law. Relevant roles of individuals and institutions in routine and crisis situations. Prerequisite, 425 or permission.

POL S 526 International Law II: Treaties (3) W Rohn Classical and modern views of treaties. Quantitative research in treaties as a reflection of trends in international law and politics. Global, regional, and national treaty patterns. Prerequisite, 425 or permission.

POL S 527 International Law III: Courts (3) Sp Rohn Past and present roles of courts and quasi-judicial agencies in the development of inter-
national law. International judicial behavior. Prerequisite, 425 or permission.

POL S 529 Problems of American Foreign Policy (3) W
Critical analysis of the historical foundations and contemporary problems of foreign-policy making, with attention given to selected foreign-policy decisions. Prerequisite, 321 or permission.

POL S 530 Seminar in Regional Foreign Policy (3) Sp
Regionalism in the world order and economy; the "region" as a basis of foreign policy; foreign interests and policies of the major regions of the world: the USSR, Central Europe, Western Europe, the British Empire, the Middle and Near East, the Far East, and Latin America. Prerequisite, permission.

POL S 531 Problems of Southeast Asian Politics (3) Lev
Inquiry into selected domestic and international problems. Prerequisite, permission.

POL S 532 The Chinese Political System (3) W Townsend
Examination of key approaches, interpretations and secondary literature in the study of contemporary Chinese politics. Prerequisite, permission.

POL S 533 Seminar on Contemporary Chinese Politics (3) Sp Townsend
Research on selected problems in contemporary Chinese politics. Prerequisite, 552 or permission.

POL S 534 American Foreign Policy Formation (3) A Denny
American foreign policy viewed whole, including defense policy, the relationships of foreign policy to domestic policies and priorities, and the full range of historical, constitutional, institutional, political, and theoretical questions related to the formation and execution of foreign policy in this broad sense. Offered jointly with the Graduate School of Public Affairs as Public Policy 534.

POL S 535 International Relations of Modern China (3-3) Sp Taylor
Case studies of the international relations of China from 1928 to the present. Lectures, discussion, critical review articles, and literature. Open to political science majors and regional studies candidates for the M.A.; others by permission.

POL S 538 Government and Politics in the Middle East and North Africa (3) Sp
Study of political change in the area within the context of comparative politics; breakdown of traditional political systems; new range of choice expressed in competing ideologies; governmental and nongovernmental instrumentalities of change; and problems of international relations and regional conflict and integration.

POL S 539 Polities in Sub-Saharan Africa (3) Sp
Selected problems of government and politics in the countries of sub-Saharan Africa. Prerequisite, 439 or permission.

POL S 540 Seminar on Modern Indian Politics (3) Sp Reshetar
Research problems in contemporary Indian politics.

POL S 541 The Soviet Political System (4) A
Critical appraisal of the principal research methods, theories, and types of literature dealing with the government and politics of the Soviet Union. Prerequisite, permission.

POL S 542 Seminar on Commonwealth Governments (3) Sp
Comparative analysis of the government and politics of selected Commonwealth states; the Commonwealth as an institution.

POL S 543 Seminar on British Government (3) Sp Hitchner
Advanced studies in British parliamentary government.

POL S 544 Problems in Comparative Government (3, max. 9) W Castells, Hitchner
Selected problems in the comparative analysis of political institutions, organizations, and systems.

POL S 545 Seminar on Japanese Government and Diplomacy (3, max. 6) W Hellman

POL S 546 Seminar on Problems of Soviet Politics (3) W Reshetar
Selected problems of Soviet domestic politics. Prerequisite, 541 or permission.

POL S 547 Problems in Latin American Political Systems (3) Sp
Prerequisite, permission.

POL S 548 Comparative Political Parties (3) Wsp Bone, Brass
Examination of the role of political parties in the modern state. Similarities and differences in the origins and development of political parties and the functions they perform, both in established democracies and in the developing countries, are discussed.

POL S 549 Problems of Political Development (3, max. 9) Sp Brass
Comparison of aspects of political change and development in both contemporary and historical developing societies.

POL S 550, 551, 552 Seminar on Politics (3,3,3) A,W,Sp
Bone, Gotfried
Topical and regional studies of political associations in the United States; leading principles and motivations of political action and leadership; legislative processes; methodology and bibliography.

POL S 553 Public Opinion (3) W
Selected problems in opinion formation, characteristics, and the role of public opinion in the policy-making process. Prerequisite, 452.

POL S 554 Legislative Politics (3, max. 6) AW Bone, Francis
Selected problems in legislative processes and leadership, state and national. Prerequisite, 451 or equivalent.

POL S 555, 555A, 556 Public Law (3,3,3) A,W,Sp
Constitutional and legal concepts governing governmental authority and institutions and the conduct of governmental activities.

POL S 570 The Administrator and the Policy Process (3) Kroll
Context of public administration from the perspective of the administrator. Through case and research materials and field inquiries and interviews, the manifold roles and functions of the administrator are examined, particularly as he relates himself and his work to the process of implementing, making, and changing public policy. Offered jointly with the Graduate School of Public Affairs as Public Administration 501.

POL S 571 Public Policy and Administration (3) W Kroll
Interaction between the bureaucracy and those institutions, organizations, and groups involved in the policy process. Analyses of current policy problems are made from this perspective. Offered jointly with the Graduate School of Public Affairs as Public Administration 502.

POL S 572 Administrative and Executive Leadership (3) Sp Kroll
The nature of executive life in the public sector. The function of leadership in implementing, making, and changing policy. Leadership styles, the relationship of leadership to its constituencies and communities. Offered jointly with the Graduate School of Public Affairs as Public Administration 503.

POL S 573 Public Management: Program Planning and Design (3) A Shipman
Topics include the policy context of planning and programming, the institutionalization of purpose, the planning process, activity design, work scheduling and measurement, and program evaluation. Offered jointly with the Graduate School of Public Affairs as Public Administration 521.

POL S 574 Public Management: Budgeting (3) W Lyden, Pealy
Budgeting as a management process. Study of formulation and administration of government budget, including the role of budgeting in the policy process. Approaches to budget formulation and analysis, the development of the FPB approach, and aspects of budget administration such as revenue estimating, allotment control, and accounting. Offered jointly with the Graduate School of Public Affairs as Public Administration 522.
POL S
575 Public Management: Personnel (3) ASp
Lyden
Study of line-staff decision making in the acqui- sition and use of human resources in public organizations, including evaluation of job responsibilities, establishment of compensation levels, collective bargaining, selection and placement, performance appraisal, incentive management, and training. Offered jointly with the Graduate School of Public Affairs as Public Administration 523.

POL S
576 Administrative Problems: Micro-Organization (3) A Shipman
Analysis and solution of problems involving the interaction of individuals and groups within organizations. Emphasis is placed upon the differences between the traditional and behavioral approaches to the understanding of the governmental organization, the motivation of the persons involved in the decision to produce, the nature of the decision to participate, the nature of conflict and innovation, and the limits of rationality. Offered jointly with the Graduate School of Public Affairs as Public Administration 511.

POL S
577 Administrative Problems: Macro-Organization (3) W Shipman
Analysis and solution of problems inherent in the characteristics and behavior of large-scale organizations and multilayer complexity. Systems approaches are interrelated with social systems theory; functional problems are interrelated 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. Offered jointly with the Graduate School of Public Affairs as Public Administration 512.

POL S
578 Administrative Problems: Program Analysis (3) Sp
Shipman
Applicability of systems approaches and systems modeling to various types of program problems. Emphasis is upon comprehensive program planning, approaches to factoring of alternatives, the evaluation of cost-efficiency relationships, and the assessment of alternative options or "trade-offs" in activity components of large-scale action programs. Offered jointly with the Graduate School of Public Affairs as Public Administration 513.

POL S
579 Comparative Administrative Systems (3) W Carroll
Methodological problems of research in comparative administration. Theoretical and substantive aspects of administrative systems in urban-industrial and developing nations. Offered jointly with the Graduate School of Public Affairs as Public Administration 551.

POL S
580, 581, 582 Seminar in Metropolitan and Urban Planning Problems (3,3,3) A,W,Sp
The metropolitan community; nature, characteristics, functions, governmental structure, and intergovernmental relations. Urban planning: theory, law and administration, policy determination, and public relations. Methods and devices for plan implementation. Drafting local ordinances for planning, zoning, subdivision control, and urban renewal.

POL S
584 Approaches to Subnational Government (3) A
Analysis of current approaches and concepts in the study of subnational government—urban, state, and regional public organization.

POL S
585, 586 Local, State, and Regional Politics and Administration (3,3) W,Sp
Exploration and analysis of political and organizational behavior at the local, state, and regional levels of government, with emphasis upon methodology and field research.

POL S
590 Seminar in Political Behavior (3, max. 6) WSp
Gore
Analysis of behavioral research in selected fields of political science.

POL S
594 Multivariate Policy Analysis (3) W
Substantive focus on measurable attributes of public policy, including comparative and longitudinal analysis. Selected topics may include spending patterns and performance measures relating to cities, states, nations, or international organizations. Statistical analysis includes examples taken from several areas: (1) data transformations, (2) partial and multiple correlation and regression, (3) causal inference, (4) factor analysis, (5) regression lag modeling. Prerequisite, 491 or permission.

POL S
600 Independent Study or Research (*)

POL S
700 Master's Thesis (*)

POL S
800 Doctoral Dissertation (*)

PSYCHOLOGY
Courses for Undergraduates

PSYCH 100 General Psychology (5) A WSp
Fields
Survey of scientific and professional psychology, illustrating basic principles derived from experimental studies of human and animal behavior, including applications in the measurement, prediction, and development of human capabilities. Not open for credit to students who have taken 101 or 102.

PSYCH 101, 101H Psychology as a Social Science (5)
AWSp
Beach, Keating, McKeever, R. Smith
Survey of the scientific study of human behavior, covering experiments, observations, and theories relating to individual differences, personality, development, motivations, social behavior, deviant behavior, genetics and physiology of behavior, learning and cognitive processes, and sensory and perceptual processes. Discussion of social problems and the research psychologists, efforts to help characterize and solve these problems. 101H includes more extensive reading in texts and source material: a term paper is required. Prerequisite for 101H, permission of College of Arts and Sciences Honors Program adviser. Not open for credit to students who have taken 100.

PSYCH 102, 102H Psychology as a Natural Science
(5) AWSp, Sp
McKeever, Sackett, Woods
Survey of the study of behavior from a natural science viewpoint. Discussion of the components 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. 102H includes more extensive reading in texts and source material; a term paper is required. Not open for credit to students who have taken 100. Prerequisite for 102H, permission of College of Arts and Sciences Honors adviser.

PSYCH 105 Mnemonic Devices for Memory Improvement (1) Sp
G. Loftus, Nelson
Application of memory theory to everyday problems of memory (learning and retention). Surveys a variety of mnemonic devices, with brief descriptions of underlying theoretical mechanisms. Extensive use of class demonstrations. One aim of the course is to provide students with techniques that can improve memory.

PSYCH 200 Comparative Animal Behavior (5) A Sp
Barash
Introduction to the methods and findings of comparative animal behavior. Emphasis on the reasons for studying the behavioral differences and similarities between animal species. Behavior is viewed as part of each species' adaptation to its natural habitat. Discussion of the importance of the findings of comparative animal behavior to understanding of human behavior. 102 or Biology 210 recommended.

PSYCH 205 Introduction to Personality and Individual Differences (4) AWSp
Marlatt, R. Smith
Basic concepts and methods for more intensive study in the field of personality. Prerequisite, 100 or 102, or equivalent.

PSYCH 210 Psychology of Human Sexual Behavior (3) AWSp
Wagner

PSYCH 213 Introduction to the Logic of Behavioral Science Experimentation (6) AWSp
R. Lockard, Pagano
Examination of how hypotheses are investigated by systematic observation or laboratory manipulation; selection of experimental designs; problems of experimental control; interpretation of analyses of experimental data; problems of generalizing the results of an experiment. Prerequisite, Mathematics 106. Replaces 211, 212 as statistics requirement for majors registered in the psychology bachelor of arts program.

PSYCH 217 Introduction to Probability and Statistics in Psychology (4) AWSp
E. Loftus, G. Loftus, M. Smith
Probability theory as a model for scientific inference. Probabilistic variables and experi-
mental outcomes, conditional probability, binomial and related distributions, experiments as sampling statistics and sampling distributions, the normal distribution, problems of estimation from experiments. Prerequisites, Mathematics 157 or 124, and psychology major status required for majors in the psychology Bachelor of Science program or in the psychology honors or distinction programs. Ad hoc honors credit available to students in either honors or distinction programs. Prerequisite, permission of departmental honors adviser. (Formerly 302.)

**PSYCH**

218 Statistical Inference in Psychological Research (4) AWSp
   E. Loftus, G. Loftus, M. 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. Prerequisites, 217 and psychology major standing. Required for majors in the psychology Bachelor of Science program or in the psychology honors or distinction programs. Ad hoc honors credit available to students in the honors or distinction programs. Prerequisite, permission of departmental honors adviser. (Formerly 314.)

**PSYCH**

222 Survey of Physiological Psychology (3) AWS
   Douglas, Woodburne
   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, junior or senior standing in a biological science or either 100 or 101 or 102.

231, 231H Laboratory in Human Performance (5) AWSp,Sp
   G. Loftus, Nelson
   Lectures and laboratory on selected aspects of human learning, perception, and performance. Prerequisites, 213 or 217; for 231H, permission of College of Arts and Sciences Honors Program advisor. (Formerly 201, 201H.)

233, 233H Laboratory in Animal Learning (5) AWSp,W
   Makou, Rose
   Lectures and laboratory on selected aspects of animal learning. Operant techniques with the rat are stressed. Prerequisites, 100 or 101 or 102; for 233H, permission of College of Arts and Sciences Honors Program advisor. (Formerly 202, 202H.)

233, 233H Laboratory in Animal Behavior (5) AWSp
   Barash
   Experience with a variety of animal species and a variety of experimental procedures and instruments required for 100 or 101 and 102 or 200 or Biology 212, or equivalents; for 233H, permission of College of Arts and Sciences Honors Program advisor. (Formerly 203, 203H.)

250 Racism and Minority Groups (4) ASpS
   Sue Wagner
   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, Indian, and Asian groups.

**PSYCH**

250 Psychological Aspects of Poverty (3) Sp
   Lumdaune
   Information about the psychological effects and causes of poverty and related social phenomena; the effect on psychological development, personality, mental health, and social behavior. Discussion of possible remedial steps.

305 Deviant Personality (5) AWSpS
   Kohlenberg, Brother, 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 100 or 101 or 102, or equivalent.

306 Developmental Psychology (5) AWSpS
   H. Robinson, Slady
   Analysis of psychological development of the child in relation to biological, physical, and sociological antecedent conditions from infancy to adolescence. Prerequisite, 100 or 101 or 102, or equivalent.

320 Field Analysis of the Behavior of Young Children (3)
   Objective analysis of the behavior of young children with interpretations of data for research and guidance purposes. One hour weekly arranged for supervised observation in the Day Care Center. Prerequisite, 306 or equivalent.

345 Social Psychology (5) AWSpS
   Lumdaune, H. Mitchell, Steele
   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, 100 or 101 or 102, or equivalent.

350H Research Seminar in Psychology (2, max. 6) AWS
   Rose
   Presentations by professors and advanced honors or distinction students concerning the rationale, methodology, and progress of their research projects. Required quarterly by all junior Honors and distinction candidates in conjunction with 498 and 499. Meets with 450H. Prerequisites, 231H and 232H or 233H, or equivalents, and permission of departmental honors adviser.

355 Survey of Cognitive Psychology (5) AWS
   Beach, E. Loftus
   Survey of current theory and research in such areas as perception, attention, memory and learning, attitudes, thinking and decision making, and language. For both the student who wishes to survey and the student who intends additional work in any of the above content areas. Prerequisite, 10 credits in psychology, including an introductory course.

361 Laboratory in Social Psychology (5) ASpS
   Keating, H. Mitchell
   Practice and discussion of methods of systematic observation, content analysis, laboratory and field; experimental manipulation in social psychology; individual research projects. Prerequisites, 213 or 218, 345 and major standing, or permission.

**PSYCH**

400 Learning (5) WS
   Bolles
   Experimental research and basic theories primarily in animal learning. Prerequisite, 100 or 101 or 102.

403 Motivation (5) AWSp
   M. Smith
   Theory and research on reinforcement, punishment, frustration, preference, instinctual mechanisms, and other factors controlling animal behavior. Prerequisite, 100 or 101 or 102.

405 Advanced Personality: Theory and Research (5) AWSp
   Becker, Sarason
   Intensive survey of theoretical concepts and detailed review of experimental methods and experiments in the field of personality. Prerequisite, 205 or equivalent.

406 Instrumentation for Behavioral Scientists (5) W
   Petrinova
   Training in electricity and electronics to enable understanding, selection, and use of basic general-purpose psychological research apparatus. Topics include direct- and alternating-current circuits, measuring instruments, direct-current power supplies, amplifiers, relays, transducers, and bioelectrical recording. Emphasis on first-hand experience with research-caliber equipment. Registration limited to fifteen students. Prerequisites, junior or senior major standing and permission. (Offered alternate years; offered 1975-76.)

407 History of Psychology (5) A
   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.

409 Ethology (3) W
   Barash
   Perception, nervous integration, movement, motivation, instinct, learning, and social behavior in animals, with emphasis upon their evolution and selective significance. Offered jointly with the Department of Zoology as Zoology 409. Prerequisites, 200 or Zoology 210 and 212, or equivalents.

410 Deviant Development (5) ASp
   Perry
   Introduction to developmental deviations, including sensory-motor handicaps, mental retardation, brain injury and emotional disturbances. Particularly for students interested in advanced work in clinical psychology or special education. Prerequisites, 305 and 306, or equivalents.

414 Cognitive Development (5) AWSp
   Dale
   Cognitive development from infancy through adolescence. Emphasis on object permanence,
language 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 416 Animal Behavior (5) ASp**  
R. Lockard  
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 Ethology and Human Behavior (3) W**  
J. Lockard  
Analysis of animal social systems in comparative perspective, with emphasis on communication systems and adaptive significance of the social structure. Against this background, examination of human social behavior from an ethological viewpoint. Prerequisite, 200 or 409 or 416, or Zoology 409.

**PSYCH 421 Neural Basis of Behavior (5) ASp**  
Woodburne  
Anatomical and physiological principles involved in the integrative action of the nervous system and the results in behavior of this neural activity. Prerequisites, 100 or 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, 100 or 101 or 102, or equivalent.

**PSYCH 423 Sensory Basis of Behavior (5) Sp**  
Makous  
Sensory and perceptual phenomena; sensory equipment; theories of sense-organ function. Prerequisites, 15 credits in psychology, including an introductory course.

**PSYCH 424 Vision and Its Physiological Basis (5) A**  
Makous, Teller  
Phenomena of human vision, including: spectral sensitivity, color vision, spatial interactions, color and dark adaptation, distance perception, and binocular interaction. Techniques for study of vision in human subjects; emphasis on correlation of human visual functioning with known optical, biochemical, anatomical, and physiological factors. Offered jointly with the Department of Physiology and Biophysics at Physiology and Biophysics 424. Prerequisite, permission; some background in physical or biological science is recommended.

**PSYCH 425 Surgical and Histological Techniques (5) W**  
Woods  
Practicum in basic and advanced surgical and histological techniques used in psychophysiological experimentation. Registration limited to six students. Prerequisites, 421 and permission. (Offered alternate years; offered 1974-75.)

**PSYCH 427 Behavioral Endocrinology (5) W Woods**  
Comprehensive survey of the endocrine system and how its secretions influence and are influenced by behavior. Emphasis on relationships between the nervous and endocrine systems. Prerequisites, 421 and two quarters of zoology, or permission.

**PSYCH 430 Problems of Assessment in Psychology (3) A**  
Auszapfel  
Appraisal of human differences and the use of such appraisals in evaluation, selection, and classification. Emphasis on utilization of psychological tests and related measures. Prerequisite, 213 or 217.

**PSYCH 434 Laboratory in Human Vision (5) Makous**  
Introduction to techniques of research in visual psychophysics. Instruction in alignment and calibration of basic optical systems; replication of some classical vision experiments or design, or both, and completion of original vision experiments. Limited to ten students. Prerequisites, 424 and permission. (Offered alternate years; offered 1975-76.)

**PSYCH 441 Perceptual Processes (5) ASp**  
Culbert, Peeples  
Consideration of the ways in which experience is organized. Emphasis on experimental and theoretical treatment of perceptual aspects of sensory modalities, relations between physical and psychological dimensions, nonstimulus determiners of the perceived world, and mediafication feedback. Prerequisite, 15 credits in psychology.

**PSYCH 442 Measurement and Design in Attitude Research (5)**  
Major theories and problems of research design and measurement in studies of attitude formation and change. Laboratory sessions using traditional and recent approaches to the measurement of attitudes. Emphasis on theoretical implications of various measurement techniques. Students are required to undertake a report on an attitude measurement project. Prerequisites, 213 or 218 and 345, or equivalents. (Not offered 1974-75.)

**PSYCH 443 Social Psychology of Prejudice (3)**  
Examination of social psychological theory and research regarding the development, maintenance, and dissolution of prejudicial attitudes, with particular emphasis on anti-Black sentiment. Prerequisite, 345. (Not offered 1974-75.)

**PSYCH 444 Social Influence and Attitude Change (3) A**  
Lumsdale  
Discussion of research on the nature and effects of social influence, with special emphasis on attitude formation and change, conformity, behavior, prejudice, and propaganda. Prerequisite, 345.

**PSYCH 445 Theories of Social Psychology (5) W Steele**  
Individual determinants of social behavior, processes, and outcomes of social interaction, their effects on the individual and groups. Prerequisites, 345 and senior or graduate major standing.

**PSYCH 446 Objective Assessment of Personality (3) W Edwards**  
Methods and techniques of observing and measuring personality 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.

**PSYCH 447 Psychology of Language (5) W Culbert**  
Psychological principles applied to linguistic development and organization; language in both its stimulus and response aspects. Prerequisite, 15 credits in psychology.

**PSYCH 448 Seminar in Psychology (1-15) ASpS**  
Selected research topics of contemporary interest. May be repeated for credit. Quarterly listings of specific offerings are available at departmental advisory office. Prerequisite, permission.

**PSYCH 449 Organizational Psychology (3) Fiedler**  
Survey of research and methods in industrial-social psychology and of the application of social psychology to the behavior of individuals in large organizations and their subunits. Prerequisites, 218 and 345, or equivalents. (Offered alternate years; offered 1975-76.)

**PSYCH 450H Research Seminar in Psychology (2, max. 6) ASpS**  
Presentations by professors and advanced Honors students concerning the rationale, methods, and progress of their research projects. Required quarterly by all senior Honors and distinguished candidate candidates in conjunction with 498 and 499. Meets jointly with 350H. Prerequisites, 231H and 232H or 233H, or equivalents, and permission of departmental Honors advisor.

**PSYCH 457 Language Development (3) A**  
Dale  
First-language acquisition and use by children. Emphasis on theoretical issues and research techniques. Offered jointly with the Department of Linguistics as Linguistics 447. Prerequisite, 306 or Linguistics 400.

**PSYCH 461 Human Learning (5) McKeever**  
Selected experimental problems and theoretical interpretations, with emphasis on verbal learning. (Not offered 1974-75.)

**PSYCH 462 Human Memory (5) A**  
McKeever  
Discussion of recent literature on forgetting and retention.
PSYCH 463 The Pathology of Human Memory (5) W
M. 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 function (aphasia, agnosia, apraxia) as they relate to memory. Prerequisite, 421; 461 or 462 recommended.

PSYCH 465 Intelligence in Psychology (3) Sp
Hunt
Historical and contemporary treatments of the concept of intelligence by psychology: evolution and validity of techniques for intellectual assessment; biological and environmental issues in intellectual assessment; intelligence and personality; experimental and psychometric indicators of the future role of intelligence in psychology. Prerequisite, 15 credits in psychology, including one statistics course.

PSYCH 468 Information Processing (4)
Human thought is treated as a phenomenon to be described by formal models. Current theories and experimental studies of rational information processing; emphasis on how man notices, recognizes, remembers, and recalls information that subsequently can be used in rational problem solving; detailed discussion of theoretical models of attention, memory, and recall; cognitive models of rational problem solving. Prerequisite, 231 or 355, or equivalent. (Not offered 1974-75.)

PSYCH 475 Computing in Behavioral Sciences (5) Sp
G. Lofthus
Application of computers to research problems in the behavioral and social sciences; functional 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 or graduate standing in behavioral or social sciences, some knowledge of statistics and computer programming, or permission. (Offered alternate years; offered 1974-75.)

PSYCH 489 Clinical Psychology (3) W
A. Wagner
Introduction to basic issues, methods, and research in the area of clinical psychology, with emphasis on professional issues, psychological assessment, and approaches to psychotherapy and behavioral change. Prerequisites, 205 and 305, and junior or senior major standing.

PSYCH 497 Undergraduate Field Work (1-3, max. 6)
AWSp
P. Luneborg
Individual consultation with faculty member and supervised practicum experience in a broad range of community settings and agencies dealing with psychological problems. Prerequisites, junior or senior major standing and permission of supervising instructor.

PSYCH 498 Readings in Psychology (1-3, max. 9)
AWSp
Readings in special interest areas under supervision of staff members. Discussion of reading in conference with the instructor. Prerequisite, permission.

PSYCH 499 Undergraduate Research (1-3, max. 9)
AWSp
Design and completion of individual research projects. Prerequisites, 213 or 217 and permission.

Courses for Graduates Only

SEMINARS AND SPECIAL TOPICS

The content of each graduate seminar (numbered 540 through 560) offered by the department changes from quarter to quarter. A list of offerings is published each quarter and can be obtained from the Department of Psychology. Students registering for independent study or research courses must receive permission of the instructor.

PSYCH 500 Learning and Motivation (3) Sp
Bolles
General survey of animal learning and motivation; emphasis on recent problems, findings, and theoretical developments; topics may include avoidance learning, cyclic behavior, defensive behavior, food preferences, incentive motivation, noncontingent reinforcement, and territoriality. Prerequisite, graduate major standing.

PSYCH 503 Advanced Social Psychology (3) A
Fiedler
Problems in person perception; attitude; socialization; and group processes. Prerequisite, graduate major standing.

PSYCH 504 Theories and Issues in Developmental Psychology (4) A
H. Robinson
Examination of major theoretical approaches to the study of human development, with presentation of representative empirical literatures for each theory. Discussion of selected research areas, including such topics as language, intelligence, and parent-child interaction. Prerequisite, graduate major standing.

PSYCH 505 Perceptual and Cognitive Development (4) W
C. Rose
Cognitive, as opposed to social and personal development; emphasis on theoretical notions used to conceptualize cognitive development and on Piaget's theory of intellectual development; infancy, perceptual development of problem-solving abilities. Prerequisite, graduate major standing.

PSYCH 506 Personality and Social Development (4) Sp
Sloby
Survey of theories and empirical literature in the areas of personality and social development of children. Prerequisite, graduate major standing.

PSYCH 507 Developmental Psychology: Historical and Philosophical Perspectives (4) Sp
Dale
Introduction to the origins and development of developmental psychology, together with a consideration of the philosophy of science as it relates to the field. Prerequisite, 504.

PSYCH 508 Research Methods in Social Psychology (3) Sp
Steele
Examination of research problems most typically encountered by social psychologists. Examination and evaluation of various types of research settings; discussion of factors relevant to the validity of experiments. Prerequisite, 515.

PSYCH 509 Leadership (3) Sp
Fiedler
Critical review of leadership literature and research with emphasis on empirical studies on leadership selection, training, and prediction of group and organizational effectiveness. Prerequisites, 345 and 514, or equivalent.

PSYCH 510 Consistency Theories in Social Psychology (3)
C. Rose
Theoretical and empirical work that focuses on the ramifications of a need or pressure for cognitive consistency; dissonance, balance, and congruity theories are critically evaluated on the basis of current research. Prerequisites, 503 and graduate major standing. (Not offered 1974-75.)

PSYCH 511 Experimental Approaches to Personality (3) Sp
Schorson
Survey of current methodology and experimental research in the area of personality. Topics include the relationships of anxiety, hostility, need achievement, and personal styles to behavior. Prerequisite, graduate major standing or permission.

PSYCH 514-515 Experimental Design (3-3) W,Sp
Edwards
Design of experiments and analysis of experimental data in the behavioral sciences. Requirements of all first-year graduate majors. Must be taken in sequence. Prerequisite, elementary statistics or permission.

PSYCH 516 Psychometric Techniques (3)
C. Luneborg
Topics in regression analysis, measurement reliability and validity, and development of models for prediction, selection, and classification. (Not offered 1974-75.)

PSYCH 517 Mathematical Psychology (3) Sp
Rose
Application of mathematics (drawn from set theory, finite mathematics, and probability theory) in the areas of measurement, psychophysics, and learning. Open to undergraduates with permission. Prerequisite, 515 or equivalent. (Offered alternate years; offered 1974-75.)

PSYCH 518 Mathematical Models of Learning (3) Sp
Rose
Application of mathematical models in basic learning situations, such as paired-associate learning, concept formation, partial reinforcement and probability learning. Open to undergraduates with permission of instructor. Prerequisites, 515 or 517 or Mathematics 391,
or permission. (Offered alternate years; offered 1975-76.)

PSYCH 519 Statistical Methods in Longitudinal Research (3) Sp
Sackett
Presentation of those aspects of statistics and experimental design unique to, or heavily used in, developmental research, including: behavioral observation methods, analysis of variance, and nonparametric techniques, and time series analysis methods. Prerequisites, 515, graduate major standing.

PSYCH 520 Teaching Practicum in Psychology (3)
Discussion of models of excellent teaching in psychology utilizing videotape to allow the students to view their own teaching efforts. The aim is to help the student become an effective teacher of psychology. Prerequisites, graduate major standing and permission. (Not offered 1974-75.)

PSYCH 524 Cognitive Approaches to Human Memory (3) Nelz
Survey of cognitive approaches to human memory. Examination of theories and behavioral data base of the following areas: perceptual memory; short-term memory; acquisition, organization, and retention of information in long-term memory; relation between reinforcement and memory. Prerequisite, 462 or equivalent. (Offered alternate years; offered 1975-76.)

PSYCH 525 Psychodiagnostic Testing (3) Sp
Perry
Training in administration, scoring, and interpretation of individual intelligence tests, projective tests, and other major clinical techniques. Required of all first-year graduate majors in clinical psychology. Prerequisite, graduate major standing.

PSYCH 526 Psychological Assessment of Children (3) W
Perry
Review of a variety of assessment techniques appropriate to children, including infant tests, tests for special problems of preschool and school-age children, projective tests, family interviews, and target observational assessment; training in administration of selected techniques. Either 526 or 527 is required of all second-year graduate majors in clinical psychology. Prerequisites, 525 or equivalent, and permission.

PSYCH 527 Psychological Assessment of Adults (3) W
Broedel
Training in the psychological assessment of adults, including development of skills in administering, scoring, and interpretation of the Rorschach, TAT, and Draw-a-Person tests. Either 526 or 527 is required of all second-year graduate majors in clinical psychology. Prerequisites, 525 or equivalent, and permission.

PSYCH 528 Decision Processes (5) A
Beech
Literature on predecisional diagnosis of environmental states relevant to subsequent decisions; various models for decisions and relevant evidence for decisions. Open to undergraduates with permission. Prerequisite, 218 or equivalent.

PSYCH 532 Factor Analysis and Multivariate Measurement (3) C. Lunneberg
Special quantitative techniques, including matrix algebra, used in multivariate psychological research; theoretical foundations of factor analysis; computational procedures and application of factor analytic models to psychology; emphasis on the development and use of appropriate computer techniques. Prerequisite, 218 or equivalent. (Offered alternate years; offered 1975-76.)

PSYCH 540 Seminar on Clinical Psychology (2) AWsp
Becker, Broedel, Marlatt, Sarason, Sue
May be repeated for credit. Prerequisite, permission.

PSYCH 541 Seminar on Cognitive Processes (2) WSp
E. Lofthus, G. Lofthus, Nelson
May be repeated for credit. Prerequisite, permission.

PSYCH 542 Seminar on Animal Behavior (2) AW
Barash, Bolles, J. Lockard, R. Lockard
May be repeated for credit. Prerequisite, permission.

PSYCH 543 Seminar on Developmental Psychology (2) AWSp
H. Robinson, Sably
May be repeated for credit. Prerequisite, permission.

PSYCH 544 Seminar on Experimental Psychology (2)
May be repeated for credit. Prerequisite, permission.

PSYCH 545 Seminar on Human Learning (2)
May be repeated for credit. Prerequisite, permission.

PSYCH 546 Seminar on Learning (2)
May be repeated for credit. Prerequisite, permission.

PSYCH 547 Seminar on Motivation (2) AWsp
Bolles
May be repeated for credit. Prerequisite, permission.

PSYCH 548 Seminar on Perceptual Processes (2) Culbert
May be repeated for credit. Prerequisites, 441 and permission.

PSYCH 549 Seminar on Physiological Psychology (2) Dobson, Woods
May be repeated for credit. Prerequisite, permission.

PSYCH 550 Seminar on Psycholinguistics (2) AWsp
Culbert, Dale, M. Smith
May be repeated for credit. Prerequisites, 447 and permission.

PSYCH 551 Seminar on Psychophysiology (3) May be repeated for credit. Prerequisite, permission.

PSYCH 552 Seminar on Quantitative Techniques (2) Sp
Edwards, C. Lunneberg, Rose
May be repeated for credit. Prerequisite, permission.

PSYCH 553 Seminar on Social Psychology (2) Keating, H. Mitchell, Steele
May be repeated for credit. Prerequisite, permission.

PSYCH 554 Seminar on Decision Processes (2) Sp
Beach
May be repeated for credit. Prerequisite, permission.

PSYCH 555 Seminar on Programmed Learning (2)
May be repeated for credit. Prerequisite, permission.

PSYCH 556 Psychological Approaches to Rehabilitation (3)
Survey of psychological approaches to rehabilitation of persons with a variety of types of disabilities. Emphasis is placed on reactions to physical disability, the concept of work, the assessment of disabled persons, and the interaction between physical and mental disabilities. Prerequisite, graduate major standing. (Not offered 1974-75.)

PSYCH 591 Introduction to Clinical Psychology (3) A Wagner
Introduction to clinical psychological problems, methods, and techniques. Required of all first-year graduate majors in the clinical psychology training program. Prerequisite, graduate major standing in clinical psychology training program.

PSYCH 592, 593 Clinical Methods (6,6) AWSp, AWSp
Zaro
Advanced training in the application of clinical psychological testing and interviewing. Required of all second-year graduate majors in the clinical psychology training program. Prerequisites, 591 and graduate major standing.

PSYCH 594 Advanced Personality Theory (5) A R. Smith, Zaro
Theoretical problems in the study of personality development relating to the psychodynamics of personality organization. Required of all graduate majors in the clinical psychology training program. Prerequisite, 405 or permission.
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<tr>
<th>Courses for Graduates Only</th>
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<tr>
<td><strong>ROM</strong> 505, 506 Advanced Romance Linguistics (3,3)</td>
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<tr>
<td>Advanced problems in the phonological, morphological, and syntactical analysis of the Romance languages. Descriptive, comparative, and historical considerations. Prerequisites, FREN 401, 402, or Spanish 400, or French or Spanish 541, 542.</td>
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| **ROM** 521, 522 Seminar on Romance Linguistics (3,3) |
| Specific problems in linguistic analysis of the Romance languages. Prerequisites, 401, 402. |

| **ROM** 531 Problems in Romance Linguistics (2-5, max. 10) |
| Contreras, Hanze, Klausenburger |
| Group seminars, or individual conferences, are scheduled under this number to meet special needs. Prerequisite, permission of the Graduate Program Adviser. |

| **ROM** 581, 582 Methodology and Bibliography of Research (3,3) A,W |
| W. Leiner, Nortraud |
| Bibliographical resources for Romance literatures; recurrent types of research problems and the accumulating methodology; standards of evidence; the evaluation and organization of evidence; the philosophies of literary history and its relation to bibliography and criticism. |

| **ROM** 584, 585, 586 Seminar in Romance Culture (3,3,3) Nostrand |
| Individual and collective research in the evolution of concepts common to Romance literatures and cultures. Open to graduates of this and other departments. |

| **ROM** 590 Special Seminar and Conference (1,9, max. 18) |
| Group seminars, or individual conferences, are scheduled under this number to meet special needs. Prerequisite, permission of the Graduate Program Adviser. |

- **PSYCH 595 Psychopathology (5) Sp** Sue Major historical and contemporary theories of psychopathology and research in the main categories of the behavior disorders. Required of all graduate majors in the clinical psychology training program. Prerequisites, 594 and permission.
- **PSYCH 596 Psychology of Behavior Change (5) W** Kohlenberg Review of some of the principal theories and systems of psychotherapy. Required of all graduate majors in the clinical psychology training program. Prerequisites, 593 and permission.
- **PSYCH 597 Field Work (1-5, max. 36) AWSp** Becker, Broedel, Kohlenberg, Marlatt, Perry, Sarason, R. Smith, Strother, Sue, Wagner, Zaro Prerequisites, second-year graduate major standing and permission.
- **PSYCH 599 Readings in Psychology (*) AWSp** Selected topics. Prerequisite, permission.
- **PSYCH 600 Independent Study or Research (*) AWSp**
- **PSYCH 700 Master's Thesis(*) AWSp**
- **PSYCH 800 Doctoral Dissertation (*) AWSp**

| **ROMANCE LANGUAGES AND LITERATURE** |
| Courses in English translation appear at the end of the departmental listing. |

| **ROMANCE LINGUISTICS AND LITERATURE, GENERAL AND COMPARATIVE** |

| **Courses for Undergraduates** |
| **ROM** 401 Introduction to Romance Linguistics (3) AWSp |
| Conteraras, Hanze, Klausenburger, Saporta |
| Descriptive analysis of the phonological, morphological, and syntactical structures of the modern Romance languages. Prerequisites, the equivalent of two college years of a Romance language, or permission. |

| **ROM** 402 Introduction to Romance Linguistics (3) Sp |
| Klausenburger |
| Comparative historical survey of the development of the principal Romance tongues. Prerequisite, 401 or permission. |

| **ROM** 475 The Teaching of Foreign Literature (3) Sp |
| Keller |
| The methodology of teaching a foreign literature, with demonstrations by the instructor and practice by students; preparation of lectures; study of discussion techniques. Offered jointly with the College of Education as EDC&L 435. Prerequisites, senior standing and permission. |

| **CATHAL** |

| **CATALAN** |
| **CATALAN** 535 Catalan Language and Literature (3, max. 9) Algeo, Field |

| **FREN** 101, 102, 103 Elementary (5,5,5) AWSp,AWSp,AWSp |
| Methods and objectives are primarily oral-aural. Oral practice in the language laboratory is required. Prerequisite for 102: 101 or college equivalent, or placement test; for 103: 102 or equivalent, or placement test. |

| **FREN** 107, 108, 109 First-Year Reading (5,5,5) AWSp |
| Field |
| Beginning courses devoted to reading. Introduction to the grammar and syntax of written French, with representative texts of literary and scientific interest. Prerequisites, 107 for 108; 108 for 109. |

| **FREN** 111, 112, 113 Elementary (5,5,5) |
| Basic study of French grammar and idiomatic usage of the language. The three courses correspond to 101, 102, 103, but students who wish to transfer to day school courses must satisfactorily complete placement examinations, including an oral proficiency test. All assignments are written, but oral practice is provided through purchase and use of tape recordings. Purchase of a tape recording, available only through the Division of Evening and Extension Credit Programs, Office of Independent Study, is highly recommended. |

| **FREN** 201, 202, 203 Intermediate (5,5,5) AWSp,AWSp,AWSp |
| Systematic review of French grammar. Intensive practice in writing and conversation. Readings in literature, culture, and the sciences. Prerequisite for 201: 101 or college equivalent, or placement test; for 202: 201 or college equivalent, or placement test; for 203: 202 or college equivalent, or placement test. |

| **FREN** 221 French Expository prose (9) AWSp |
| Readings in, and discussion of, classical and modern French texts, primarily in the sciences and social sciences. Prerequisite, 202 or college equivalent, or placement test. |

| **FREN** 222 Introduction to French Literature (5) AWSp |
| Transition between reading for content on the intermediate level and the critical reading ability required for more advanced courses in French literature. Introduction to problems of style, genre, and esthetics. Prerequisite, 202 or equivalent, or placement test. |

| **FREN** 227 Conversational French (2-6, max. 8) |
| For participants in the Foreign Study Program. Prerequisites, 103 or college equivalent, and permission. |

| **FREN** 297 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. Substantial paper (written in English), and higher degree of participation, required for 6 credits. Course conducted in English. Prerequisites, two years of college French, and permission. |

| **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 1500-1700 (3) A |
| Renaissance, Baroque, and classical periods. Prerequisite, 203 or 221 or 222. |

| **FREN** 305 Survey of French Literature 1700-1850 (3) W |
| Enlightenment and romanticism. Prerequisite, 203 or 221 or 222. |
FREN 306 Survey of French Literatures 1850 to the Present (3) Sp From the realists to contemporary writing. Prerequisites, 203 or 221 or 222.

FREN 307 Composition (3) S For participants in the Foreign Study Program. Compositions on topical subjects of immediate difficulty relating to the civilization of the French-speaking countries of Europe. Grammar review, as needed. Prerequisites, 222 or college equivalent, and permission.

FREN 327 Advanced Conversation (2, max. 8) AWSp Prerequisite, 203 or college equivalent, or placement test.

FREN 337 Conversational French (3) Sp or S Prerequisites, 203 or 204, or college equivalent. For participants in the Foreign Study Program. Prerequisite, 222 or college equivalent.

FREN 350 Drama (3) Generic study of French drama. Prerequisite, 203 or 222, or college equivalent, or placement test.

FREN 351 Poetry (3) Generic study of French poetry. Prerequisite, 203 or 222, or college equivalent.

FREN 352 Fiction (3) Generic study of French fiction. Prerequisite, 203 or 222, or college equivalent.

FREN 354 The Idea of Progress in French Literature (3) Keller Study of the growth of the idea of progress in the seventeenth and eighteenth centuries, as seen in several writers of the classical and postclassical periods and in the Enlightenment. Attention is given to the basic and permanent issues involved in discussions of progress, but readings are from Pascal, Fontenelle, Perrault, Voltaire, the Encyclopedie, and Condorcet. Prerequisite, 222 or 203, or equivalent.

FREN 390 Supervised Study (2-4, max. 20) AWSp Prerequisites, 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. Prerequisites, two years of college French, and permission.

FREN 400 The Phonological Structure of French (3) Hanzeli Linguistic study of the French sound system. Prerequisite, Romance 401 or Linguistics 400.

FREN 401 The Morphological Structure of French (3) Hanzeli Linguistic study of French morphology. Prerequisite, Romance 401 or Linguistics 400.

FREN 402 The Syntactic Structure of French (3) Hanzeli Linguistic study of French syntax. Prerequisite, Romance 401 or Linguistics 400.

FREN 403 Background of Modern French (3) Klausenburger Linguistic analysis of the important developments in the history of the French language from its Latin origin to contemporary speech. Prerequisite, the equivalent of two college years of French.

FREN 404 Old French (3) Field Designed for acquisition of reading facility in Old French through intensive study of selected texts. Prerequisite, Romance 401.

FREN 407 Advanced Composition (3) S Compositions on an advanced level. Emphasis on matters of style rather than on grammar. Prerequisite, 303 or equivalent.

FREN 408 Explication de Texte (3) Close study of short pieces of French prose and poetry. The method consists of a literary analysis of the text from different critical viewpoints: biographical, historical, etc. Lectures, discussions, and student explications.

FREN 409 Advanced Phonetics (3) AWSp Creore Training in diction and oral expression; interpretation of literary texts; phonetics as a teaching device. Prerequisite, 303 or equivalent.

FREN 410 French Literature of the Sixteenth Century: Prose (3) Keller Study of sixteenth century literature, with emphasis on cultural and intellectual background. Prerequisite, 304.

FREN 411 French Literature of the Sixteenth Century: Poetry (3) Creore Study of sixteenth-century literature with emphasis on poetry and the general artistic ambience. Prerequisite, 304 or 410 or permission.

FREN 412 French Literature of the Seventeenth Century: Baroque (3) Leiner, Wortley Study of seventeenth-century literature, with emphasis on cultural background and the Baroque movement. Prerequisite, 304.

FREN 413 French Literature of the Seventeenth Century: Classicism (3) Leiner, Wortley Study of seventeenth-century literature, with emphasis on the development of classicism. Prerequisite, 304 or 412 or permission.

FREN 414 French Literature of the Eighteenth Century: Enlightenment (3) 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 (3) Ellrich Study of eighteenth-century literature, with emphasis on the "dark side of the Enlightenment" and nascent romanticism. Prerequisite, 414 or permission.

FREN 416 French Literature of the Nineteenth Century: Romanticism (3) 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 (3) Dale Study of nineteenth-century literature, with emphasis on the realist, naturalist, and symbolist currents. Prerequisite, 416 or permission.

FREN 418 French Literature of the Early Twentieth Century (3) Jones, Leiner Study of twentieth-century literature, with emphasis on the period 1900-1939. Prerequisite, 306.

FREN 419 French Literature Since World War II (3) Jones, Leiner Study of twentieth-century literature, with emphasis on the period 1939 to the present. Prerequisite, 418 or permission.

FREN 420 Fiction: 1600-1680 (3) W. Leiner Prerequisite, 304.

FREN 421 Fiction: 1680-1800 (3) Ellrich Prerequisite, 305.

FREN 424 Fiction: 1800-1850 (3) Dale Prerequisite, 305 or 306.

FREN 425 Fiction: 1850-1900 (3) Dale Prerequisite, 306.

FREN 426 Fiction: 1900-1950 (3) Jones, J. Leiner Prerequisite, 306.

FREN 427 Fiction since 1950 (3) Jones, J. Leiner Prerequisite, 306.

FREN 437 Advanced Conversational French (2-8, max. 8) Prerequisite, 327 or equivalent.
FREN 441 Poetry: Renaissance (3) Creore, Keller
Prerequisite, 304.

FREN 442 Poetry: Baroque (3) W. Leiner
Prerequisite, 304.

FREN 444 Poetry: Romantic (3) Prerequisite, 305.

FREN 445 Poetry: Parnassian and Symbolist (3) J. Leiner, Varnier
Prerequisite, 306.

FREN 446 Poetry: Twentieth Century (3) C. Wilson
Prerequisite, 306.

FREN 451 History and Literature of the French Religious Wars (5) Sp
Griffiths, 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 452 The French Enlightenment Ellrich
French thought and literature of the eighteenth century.

FREN 453 Sixteenth-Century Literary Prose (3) Keller
Prerequisite, 304.

FREN 454 Nonfiction of the Classic Period (3) Christofides, Keller, Worthey
Prerequisite, 304.

FREN 457 Twentieth-Century Nonfiction (3) Jones, Kern
Prerequisite, 306.

FREN 458 French Art and Literature: Period Studies (5) Sp
Jones
Comparative studies of theme and technique in art and literature to illustrate major concerns of a particular period as expressed in these two media. Offered jointly with the School of Art as ART 485. 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 (3) W. Leiner, Worthey
Prerequisite, 304.

FREN 463 Romantic Drama (3) Dale
Prerequisite, 305.

FREN 464 Realist and Naturalist Drama (3) Prerequisite, 306.

FREN 465 Twentieth-Century Drama (3) W. Leiner
Prerequisite, 306.

FREN 470 Cinema (3) Dale
Major films and figures of French cinema from the beginnings to the present.

FREN 474 Linguistics and the Teaching of French (3) Hanzel
Examination of areas of linguistics that can be particularly helpful to the French teacher. Prerequisite, 401 or permission.

FREN 477 African Literature in French: 1939 to the Present (3) W. Leiner
Survey of African literature from 1939 to the present. Readings, discussions, and reports on representative works in poetry, prose, and drama by Cesaire (West Indies), Senghor (Senegal), Damas (Guiana), Camara Laye (French Guinea), B. Dadie (Ivory Coast), Ouoloum and Kourouna (Mali), Oyono and Beti (Cameroon). Readings are in French.

Survey of North African literature from 1945 to 1971. Readings, discussions, and reports on representative works in prose, poetry, and drama by Memmi (Tunisia), Mouloud Mammeri, Mohammed Dib and Kateb Yacine (Algeria), Ahmed Sefrioui and Driss Chraibi (Morocco). Readings are in French.

FREN 480 Social and Cultural Background (3) 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 490H Honors Seminar (6, max. 12) AWSp

FREN 497, 498 The French-speaking Countries and Their Culture I, II (3, 3) AW J. Leiner, Nostrand
Readings on aspects of French literary tradition; discussion of social and cultural values as reflected in French literature. Taught in French.

Courses for Graduates Only

FREN 507 Stylistics, (3, max. 6) 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 interference. Outside reading on the nature and place of language training and rhetoric in French education. Conducted in French. Prerequisite, 407 or equivalent.

FREN 515 French Literature of the High Middle Ages (3. max. 9) Friedman
Old French literature, from the beginning to 1000. Prerequisite, permission.

FREN 516 Middle French Literature (3, max. 9) W. Friedman
French literature from 1315 to 1500. Prerequisite, permission.

FREN 520 Renaissance Prose: Rabelais (3) Keller

FREN 522 Studies in Fiction: Seventeenth Century (3, max. 9) W. Leiner

FREN 523 Studies in Fiction: 1660-1800 (3, max. 9) Ellrich

FREN 524 Studies in Fiction: 1800-1850 (3, max. 9) Dale

FREN 525 Studies in Fiction: 1850-1900 (3, max. 9) Dale, J. Leiner

FREN 526 Studies in Fiction: 1900-1950 (3, max. 9) Jones, J. Leiner

FREN 530 Studies in Renaissance Poetry (3, max. 9) Creore, Keller

FREN 531 Renaissance Poetry: Ronsard (3) Creore

FREN 532 Studies in Nineteenth-Century Poetry (3, max. 9)

FREN 533 Studies in Parnassian and Symbolist Poetry (3, max. 9)

FREN 534 Studies in Twentieth-Century Poetry (3, max. 9)

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 105 may also receive credit for 106. Credits earned in 106 may not be applied toward an advanced degree. Prerequisite, 105 or permission of the department.
ARTS AND SCIENCES

FREN
541, 542 History of the French Language (3,3)
Field, Klausenburger
Survey of the phonological, morphological, and syntactical development of the French language from its origins to the present.

FREN
552 Renaissance Prose: Montaigne (3)
Keller

FREN
554 Studies in Seventeenth-Century Nonfiction (3, max. 9)
Christoffers, W. Leiner, Wortley

FREN
555 Studies in Eighteenth-Century Nonfiction (3, max. 9)
Eilrich

FREN
556 Studies in Nineteenth-Century Nonfiction (3, max. 9)
Jones, J. Leiner

FREN
557 Studies in Twentieth-Century Nonfiction (3, max. 9)
Jona, L. Loer

FREN
564 Studies in Eighteenth-Century Drama (3, max. 9)
W. Leiner, Wortley

FREN
565 Studies in French Drama (3, max. 9) Sp
W. Leiner
Studies in French drama, sixteenth to twentieth centuries.

FREN
566 Seminar in Cinema (3, max. 9)
Dale
Prerequisite, permission.

FREN
575, 576, 577 Literary Criticism (3,3,3)

FREN
590 Special Seminar and Conference (1-9, max. 30) AWSp
Group seminars, or individual conferences, are scheduled under this number to meet special needs. Prerequisite, permission of the Graduate Program Adviser.

FREN
591 Literary Problems: Middle Ages (3, max. 9)

FREN
592 Literary Problems: Renaissance (3, max. 9)

FREN
593 Literary Problems: Seventeenth Century (3, max. 9)

FREN
594 Literary Problems: Eighteenth Century (3, max. 9)

FREN
595 Literary Problems: Nineteenth Century (3, max. 9)

FREN
596 Literary Problems: Twentieth Century (3, max. 9)

FREN
600 Independent Study or Research (*) ANSp

ITALIAN
ITAL
101, 102, 103 Elementary (5,5,5) AWSp
Methods and objectives are primarily oral-aural. Oral practice in the language laboratory is required. Prerequisites, for 102: 101 or college equivalent, or placement test; for 103: 102 or college equivalent, or placement test.

ITALIAN
ITAL
107 Italian Language and Civilization (3)
Deals with varied aspects of Italian culture, past and present. Point of departure is the language, considered both in its essential structure and as a reflection of the society for which it serves as a means of communication. One of the major aims of the course is to develop a reading knowledge of Italian. The 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.

ITALIAN
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.

ITALIAN
ITAL
111, 112, 113 Elementary (5,5,5)
Administered by the Office of Independent Study. Basic study of Italian grammar and idiomatic usage of the language. The three courses correspond to 101, 102, 103, but students wishing to transfer to day school courses must satisfactorily complete examinations, including oral proficiency test. All assignments are written, but oral practice is provided through purchase and use of tape recordings. Purchase of a tape recording, available only through the Division of Evening and Extension Credit Programs, Office of Independent Study, is highly recommended. Prerequisites, 113 for 211; 211 for 212; 212 for 213; or college equivalent.

ITALIAN
ITAL
301, 302 Advanced Syntax and Composition (3,3) AWSp
Prerequisites, 203 or college equivalent or placement test for 301; 301 for 302.

ITALIAN
ITAL
303 Italian Stylistics (3) Sp
Functional grammar review; creative written and oral composition and reading, with special attention to problems of style. Prerequisite, 302.

ITALIAN
ITAL
327 Advanced Conversation (2, max. 8) AWSp
Prerequisite, 203 or college equivalent, or placement test.

ITALIAN
ITAL
390 Supervised Study (2-6, max. 20) AWSp
Prerequisites, permission of the instructor and the undergraduate Italian adviser.

ITALIAN
ITAL
401 The Development of the Italian Language (3)
Pace
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 Linguistics 400, or Romance 401, or permission.

ITALIAN
ITAL
404, 405, 406 Survey of Italian Literature (3,3,3) AWSp
Prerequisite, 203 or college equivalent, or placement test. (Formerly 304, 305, 306)

ITALIAN
ITAL
410, 411, 412 Literature of the Renaissance (3,3)
Study of the main currents and writers of the Italian Renaissance—the lyric, drama, epic, and prose as exemplified by such writers as Poliziano, Sannazzaro, Guarini, Boiardo, Ariosto, Castiglione, Machiavelli, Guicciardini, and Tasso. Prerequisites, 404, 405, 406.

ITALIAN
ITAL
420, 421, 422 Eighteenth-Century Italian Literature (3,3,3) Pace

ITALIAN
ITAL
450 Manzoni and the Romantic Movement (3) A Pace
Study of Manzoni’s works, especially the Promessi Spiri, as products of Italian romanticism. Prerequisites, 404, 405, 406.

ITALIAN
ITAL
451 Leopardi and the Lyric (3) Sp Pace
Reading of the Cantù with lectures, discussions, reports. Prerequisites, 304, 305, 306.
ITAL 460 Verismo (3) Friedrich
Study of Giovanni Verga's main works within the historical background and development of Italian "Verismo." Prerequisites, 404, 405, 406.

ITAL 465 Contemporary Italian Narrative (3) Friedrich
Critical reading of selected modern exponents of the short story and novel. Prerequisites, 404, 405, 406, or equivalent.

ITAL 490 Preseminar in Italian Literature (3-5)
Special studies intended to help the student achieve a mature critical mastery of Italian literature. Required of Italian majors; others by permission.

Courses for Graduates Only

ITAL 512, 513, 514 Dante (3,3,3)

ITAL 541, 542 History of the Italian Language (3,3) Pace
Phonological, morphological, and syntactical development of the Italian language from its origin to the present.

ITAL 551, 552, 553 Seminar in Humanist and Renaissance Prose and Poetry (3,3,3)

ITAL 561, 562, 563 Italian Literature of the Nineteenth and Twentieth Centuries (3,3,3)

ITAL 570 Seminar on Cinema (3) Dale
Studies in various areas of Italian cinema, concentrating on major directors, critics, and movements. Prerequisite, permission.

ITAL 590 Special Seminar and Conference (1-9, max. 30) AWSp Group seminars or individual conferences are scheduled under this number to meet special needs. Prerequisite, permission of the Graduate Program Adviser.

ITAL 591 Literary Problems: Middle Ages and Fourteenth Century (3, max. 9)
ITAL 592 Literary Problems: Renaissance (3, max. 9)
ITAL 593 Literary Problems: Baroque (3, max. 9)
ITAL 594 Literary Problems: Eighteenth Century (3, max. 9) Pace
ITAL 595 Literary Problems: Nineteenth Century (3, max. 9)
ITAL 596 Literary Problems: Twentieth Century (3, max. 9)

ITAL 600 Independent Study or Research (*) AWSp

PORTUGUESE

PORT 101, 102, 103 Elementary (5,5,5) A,W,Sp
Methods and objectives are primarily oral-aural. Oral practice in the language laboratory is required. Prerequisites, for 102: 101 or college equivalent, or placement test; for 103: 102 or college equivalent, or placement test.

PORT 111, 112, 113 Elementary (5,5,5) Administered by the Office of Independent Study. Basic study of Portuguese grammar and idiomatic usage of the language. The three courses correspond to 101, 102, 103, but students wishing to transfer to day school courses must satisfactorily complete placement examinations, including oral proficiency test. All assignments are written, but oral practice is provided through purchase and use of tape recordings. Purchase of a tape recording, available only through the Division of Evening and Extension Credit Programs, Office of Independent Study, is highly recommended.

PORT 150 Accelerated (5)
For graduate students in Spanish who wish to develop a rapid command of Portuguese primarily for reading purposes. Prerequisite, graduate standing in Spanish or permission.

PORT 201, 202, 203 Intermediate (5,5,5) A,W,Sp
Modern texts, composition, conversation, and functional grammar. Students with advanced standing in Spanish courses may apply to instructor for permission to enter 301, instead of 201, after 103. Prerequisites, for 201: 103 or equivalent, or permission; for 202: 201; for 203: 202.

PORT 301, 302 Advanced Syntax and Composition (3,3) A,W
Students with advanced standing in Spanish courses may apply to instructor for permission to enter 301 after 103. Prerequisites, for 301: 203 or equivalent, or permission; for 302: 301.

PORT 303 Portuguese Stylistics (3) Sp
Functional grammar review; creative written and oral composition and reading with special attention to problems of style. Prerequisite, 302.

PORT 304 Survey of Luso-Brazilian Literature: Middle Ages and Renaissance (3) A
Prerequisite, 203 or equivalent, or permission.

PORT 305 Survey of Luso-Brazilian Literature: Seventeenth, Eighteenth, and Early Nineteenth Centuries (3) W
Prerequisite, 203 or equivalent, or permission.

PORT 306 Survey of Luso-Brazilian Literature: Late Nineteenth and Twentieth Centuries (3) Sp
Prerequisite, 203 or equivalent, or permission.

PORT 310 Introduction to Brazilian Literature (3) Sp
Prerequisite, 302 or permission.

PORT 327 Advanced Conversation (2, max. 6)
Prerequisite, 203 or equivalent, or permission.

PORT 390 Supervised Study (2-5, max. 20) AWSp
Prerequisite, permission of the instructor and the undergraduate Portuguese adviser.

PORT 409 Portuguese Phonetics (3)
Algo Phonemic structure of the Portuguese language as spoken in Portugal and Brazil; practice in Portuguese and Brazilian pronunciation. Prerequisite, 4 credits in 327 or equivalent, or permission.

Romanticism, realism, symbolism, and modernism in Portugal and Brazil. Eca de Queiros, Machado de Assis, twentieth-century novelists. Prerequisites, 304, 305, and 306.

Courses for Graduates Only

PORT 541, 542 History of the Portuguese Language (3,3) Algeo
Phonological, morphological, and syntactical development of the Portuguese language from its origin to the present. Prerequisite, Romance 401 or equivalent.

PORT 590 Special Seminar and Conference (1-9, max. 30) AWSp
Group seminars or individual conferences are scheduled under this number to meet special needs. Prerequisite, permission of Graduate Program Adviser.

PROVENCAL

PROV 534 Provençal Language and Literature (3)

ROMANIAN

RMN 401, 402, 403 Elementary Romanian (5,5,5) A,W,Sp
Augerot
401, 402: comprehensive introduction to both spoken and literary Romanian, 403: designed to increase the student's vocabulary and enhance his knowledge of grammar through the reading of short fictional material in modern Romanian. Offered jointly with the Department of Slavic Languages and Literature as Romanian 401, 402, 403.

RMN 404, 405, 406 Advanced Romanian (5,5,5) Continuation of 401, 402, 403. Offered jointly with the Department of Slavic Languages and Literature as Romanian 404, 405, 406. Prerequisite, 403 or permission.

RMN 420, 421 Structure of Romanian (3)
Descriptive analysis of the phonological, morphological, syntactical, and lexical structures of modern Romanian. Prerequisite, Romance 401 or permission.
# SPANISH

## SPAN 101, 102, 103 Elementary (5,5,5) AW,AWSp,AWSp

Methods and objectives are primarily oral-aural. Oral practice in the language laboratory is required. Prerequisites, for 102: 101 or college equivalent, or placement test; for 103: 102 or college equivalent, or placement test.

## SPAN 111, 112, 113 Elementary (5,5,5)

Administered by the Office of Independent Study. Basic study of Spanish grammar and idiomatic usage of the language. The three courses correspond to 101, 102, 103, but students wishing to transfer to day school courses must satisfactorily complete placement examinations, including oral proficiency test. All assignments are written, but oral practice is provided through purchase and use of tape recordings. Purchase of a tape recording, available only through the Division of Evening and Extension Credit Programs, Office of Independent Study, is highly recommended.

## SPAN 121 Chicano History and Culture (5)

Introduction to Chicano history and culture, including origins, customs, traditions, economics, politics, contemporary goals.

## SPAN 122 Basic Grammar Review (5)

Administered by the Office of Independent Study. Designed to review the grammar generally covered in the first year of Spanish at the university level or in the first two years at the high school level.

## SPAN 128 Spanish for the Elementary School (5) S Friedrich

Practice in the basic language skills is combined with the demonstration and analysis of methods and techniques appropriate to FLES. Emphasis is given to the language structures and vocabulary that normally occur in elementary school Spanish. Offered jointly with the College of Education as EDC&I 132.

## SPAN 201, 202, 203 Intermediate (5,5,5) AWSp, AWSp,AWSp

Intensive practice in speaking, reading, and writing. Systematic review of Spanish grammar. Oral practice based on selected pieces of Spanish literature, Prerequisites, for 201: 103 or college equivalent, or placement test; for 202: 201 or college equivalent, or placement test; for 203: 202 or college equivalent, or placement test.

## SPAN 211, 212, 213 Intermediate (5,5,5)

Administered by the Office of Independent Study. Intensive practice in reading and writing. Functional review in grammar. The three courses correspond to 201, 202, 203, but students wishing to transfer to day school courses must satisfactorily complete placement examinations, including oral proficiency test. All assignments and examinations are written, but oral practice is provided through purchase and use of tape recordings. Purchase of a tape recording, available only through the Division of Evening and Extension Credit Programs, Office of Independent Study, is highly recommended. Prerequisites. 113 for 211; 211 for 212; 212 for 213; or college equivalent.

## SPAN 221 Prose Readings in Spanish (5) Sp

Readings and discussion of nonfiction prose texts in Spanish. Reading material concentrates on the social sciences, such as aspects of Hispanic cultures, recent history, and contemporary social issues of Spanish-speaking countries. Prerequisite, 202, or permission.

## SPAN 227 Conversational Spanish (2 or 4 or 6) Sp

For participants in the Foreign Study Program. Prerequisites, 103 or college equivalent, and permission.

## SPAN 301, 302 Advanced Syntax and Composition (4,4) AW,AWSp

Prerequisites, for 301: 203 or college equivalent, or placement test; for 302: 301.

## SPAN 303 Spanish Stylistics (4) AWSp

Functional grammar review; creative written and oral composition and reading with special attention to problems of style. Prerequisite, 302.

## SPAN 304 Survey of Spanish Literature: 1140-1498 (3) A

Masterpieces of Spanish literature from origins to 1498. Prerequisite, 203 or college equivalent, or placement test, and 350 or 351 or 352.

## SPAN 305 Survey of Spanish Literature: 1498-1681 (3) W

Prerequisites, 203 or college equivalent, or placement test, and 350 or 351 or 352.

## SPAN 306 Survey of Spanish Literature: 1681 to the Present (3) Sp

Prerequisites, 203 or college equivalent, or placement test, and 350 or 351 or 352.

## SPAN 311 Black Literature of the Caribbean (3) Bodden

Survey in English of the rise of Black literature from its beginnings in the Afro-Cuban current of the vanguardista movement of the 1930s to the present. Authors from the French-, English-, and Spanish-speaking territories are studied.

## SPAN 312 Black Poetry of the Caribbean (3) A Bodden

The poetry of the Caribbean centered around the problem of being Black in a colonial situation. The evolution from a superficial attitude to a viable politicoracial one is examined.

## SPAN 327 Advanced Conversation (2, max. 8) AWSp

Prerequisite, 203 or college equivalent, or placement test.

## SPAN 331 Themes in Mexican-American Studies (5) Shipley

Examination of significant historical and cultural themes of the Mexican-American experience. Creation of multimedia Chicano educational materials. Prerequisites, 121 and a colloquial speaking knowledge of Spanish.

## SPAN 335 Drama (3) A

Generic study of Spanish drama. Prerequisite, 203 or college equivalent, or placement test.

## SPAN 351 Poetry (3) A

Generic study of Spanish poetry. Prerequisite, 203 or college equivalent, or placement test.

## SPAN 352 Fiction (3) W

Generic study of Spanish fiction. Prerequisite, 203 or college equivalent, or placement test.

## SPAN 359 Introduction to Mexican Literature (3)

Main outlines of literary expression in Mexico, from pre-Hispanic poetry to the contemporary period. Reference is made to Chicano literature in the United States. Prerequisite, 303 or permission.

## SPAN 390 Supervised Study (2-6, max. 20) AWSp

Prerequisite, permission of the instructor and the undergraduate Spanish adviser.

## SPAN 400 The Structure of Modern Spanish (3) W Contreras

Analysis of the spoken language from a linguistic point of view: phonological, morphological, and syntactic analysis. Prerequisites, 203, and Romance 401 or Linguistics 400.

## SPAN 408 The Structure of the Spanish Language (3)

Advanced study of the structure of the Spanish language. Syntactical patterns are carefully examined. Guiding principles are derived from internal evidence. All important aspects of grammar and syntax are studied, and drill is concentrated on especially problematic points. The approach is that of a native studying his own language. The course is conducted in Spanish. Prerequisites, 301, 302, 303, or permission.

## SPAN 409 Advanced Phonetics (3) AWSp Algeo, Contreras, Salinter

Analysis of sounds: training in pronunciation, intonation, and close transcription of Spanish language in its modalities.

## SPAN 410 Spanish Poetry Origins Through the Fifteenth Century (3)

Prerequisites, any three of the following: 304, 305, 306, 350, 351, 352.

## SPAN 411 Spanish Poetry The Golden Age, Sixteenth Through Seventeenth Centuries (3) Shipley

Prerequisites, any three of the following: 304, 305, 306, 350, 351, 352.

## SPAN 412, 413, 414 Hispanic Poetry (3,3,3) Predmore

Modern lyric poetry of the Hispanic world. The period studied extends from 1870 to 1936 and deals with thirteen major poets, from Bequer to Hernandez. Prerequisites, any three of the following: 304, 305, 306, 350, 351, 352.
SPAN 417 The Epoch of Cervantes (3) W Salinero

Introductory study of Cervantes' environment, emphasizing the cultural and artistic background of this outstanding period. Prerequisite: 418. Prerequisites, any three of the following: 304, 305, 306, 350, 351, 352.

SPAN 418 Cervantes and Modern Fiction (3) Salinero

Study of Cervantes' Don Quixote as a milestone in modern fiction. Prerequisites, any three of the following: 304, 305, 306, 350, 351, 352.

SPAN 420 Spanish Literature of the Eighteenth Century (3) Penelas

Study of the main literary currents and authors of the eighteenth century in Spain with emphasis on the ideological crisis of that time. Prerequisites, any three of the following: 304, 305, 306, 350, 351, 352.

SPAN 437 Advanced Conversational Spanish (2 or 4) S

For participants in the Foreign Study Program. Prerequisites, 327 or equivalent, and permission.

SPAN 441 Spanish Drama: 1150-1600 (3)

From the beginning to Lope de Vega. Prerequisites, any three of the following: 304, 305, 306, 350, 351, 352.

SPAN 442 Spanish Drama: 1600-1652 (3)

Lope de Vega through Ruiz de Alarcón. Prerequisites, any three of the following: 304, 305, 306, 350, 351, 352.

SPAN 443 Spanish Drama: 1653-1812 (3)

Calderón de la Barca and dramatists of his school. Prerequisites, any three of the following: 304, 305, 306, 350, 351, 352.

SPAN 444 The Modern Theatre in Spain, 1700-Romanticism (3) Anderson

Study of the directions, documents, and literature of Spain's theatre during the eighteenth and early nineteenth centuries. Special attention to the concepts and manifestations of neoclassicism and romanticism. Prerequisites, any three of the following: 304, 305, 306, 350, 351, 352.

SPAN 445 The Modern Theatre in Spain, 1850-1900 (3) Anderson

The theories and literature of the Spanish theatre in the second half of the nineteenth century. Post-romantic drama, Genero Chico, naturalism. Prerequisites, any three of the following: 304, 305, 306, 350, 351, 352.

SPAN 446 The Modern Theatre in Spain, 1900-Present (3) Anderson

Major currents and literature of Spain's theatre in this century. Special attention to modern reactions against realism. Benavente, Valle-Inclán, Sastre, Lorca, and others. Prerequisites, any three of the following: 304, 305, 306, 350, 351, 352.

SPAN 450 Spanish Drama and Play Production (2-6) Anderson

Prerequisites, any three of the following: 304, 305, 306, 350, 351, 352.

SPAN 451, 452, 453 Spanish Literature Since 1700 (3,3,3) A.W,Sp Anderson, Penelas


SPAN 461, 463 Spanish Literature of the Golden Era (3,3)

Shipley


SPAN 471 Individual Authors (3, max. 9)

One or more representative Spanish or Spanish-American authors. Prerequisites, any three of the following: 304, 305, 306, 350, 351, 352.

SPAN 474 Application of Linguistics to the Teaching of Spanish (3) A

Current theory and practical application of methods and techniques of teaching Spanish, as based on the findings of linguistics.

SPAN 480 Contemporary Chicano Literature (3) Sp Ybarra

Examination of genres, authors, and movements in the developing body of contemporary Chicano literature. The historical and cultural context of this literature is explored. Prerequisite, 359 or permission.

SPAN 481, 482, 483 Spanish-American Literature (3,3,3) A,W,Sp Bodden


SPAN 484 Twentieth-Century Spanish-American Poetry (3) Bodden

Lectures on major trends in modern Spanish-American poetry; close reading and discussion of poems by representative contemporary poets. Prerequisites, any three of the following: 304, 305, 306, 350, 351, 352.

SPAN 485 Romanticism, Realism, and Naturalism in Spanish America (3) A


SPAN 486 The Modernist Movement in Spanish-American Literature (3) W

The leading poets, essayists, and novelists of Spanish America (1890-1920). Prerequisites, any three of the following: 304, 305, 306, 350, 351, 352.

SPAN 487 The Contemporary Spanish-American Novel (3) Sp

Prerequisites, any three of the following: 304, 305, 306, 350, 351, 352.

SPAN 488 Cultural Background of Latin-American Literature (3)

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.

SPAN 489 Problems in the Spanish-American Novel (3, max. 9)

Prerequisites, any three of the following: 304, 305, 306, 350, 351, 352, or permission.

SPAN 495 Study in Spain (12) Sp Anderson

One-semester 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, two University courses that deal wholly or partially with the modern Spanish theatre, and permission.

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 106. Credits in 105 may not be applied toward an advanced degree. Prerequisite, graduate standing or permission of the department.

SPAN 106 Elementary (5)

Continuation of 105. Students who have received credit in 102 and/or 103 may also receive credit in 106. Credits in 106 may not be applied toward an advanced degree. Prerequisite, 105 or permission of the department.

SPAN 500 Seminar in Spanish Linguistics (3) Sp Contreras

Problems in the phonological and grammatical analysis of modern Spanish. Prerequisite, 400.

SPAN 501-502 Graduate Study of Hispanic Literature (3-3)

Close studies of literary texts exemplifying a variety of practical critical methods.

SPAN 511, 512, 513 Early Spanish Literature (3,3,3)

Dramatic survey of early Spanish literature, from its beginning through the fifteenth century. Examination of primary texts of epic and
lyric poetry, brief prose fiction, drama, the ballad, didactic materials, the histories.

**SPAN**

515 The Contemporary Spanish-American Short Story (3)

521, 522 - The Renaissance in Spain (3,3) Shipley

541, 542 - History of the Spanish Language (3,3) Salmero

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.

553 The Generation of '98 (3) Penuelas

561 Spanish-American Novel From 1940 to the Present (3, max. 9)

562 Spanish Literature From 1940 to the Present (3) Penuelas

571 The Modern Essay in Spanish America (3)

572 Twentieth-Century Spanish Poetry (3) Predmore

573 Twentieth-Century Spanish-American Poetry (3)

575 Literary Criticism (3) Penuelas

590 Special Seminar and Conference (1-9, max. 30) A/WSp

Group seminars, or individual conferences, are scheduled under this number to meet special needs. Prerequisite, permission of the Graduate Program Adviser.

591 Literary Problems: Middle Ages (3, max. 9)

592 Literary Problems: Renaissance (3, max. 9)

593 Literary Problems: Golden Age (3, max. 9)

594 Literary Problems: Eighteenth Century (3, max. 9)

595 Literary Problems: Nineteenth Century (3, max. 9)

596 Literary Problems: Twentieth Century (3, max. 9)

597 Literary Problems: Spanish-American Colonial Literature (3, max. 9)

598 Literary Problems: Latin America (3, max. 9)

600 Independent Study or Research (*) A/WSp

**ROMANCE LANGUAGES AND LITERATURE**

700 Master's Thesis (*) A/WSp

800 Doctoral Dissertation (*)

**ENGLISH TRANSLATION**

These courses are recommended as appropriate minor or 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**

458 French Art and Literature: Period Studies (5) Sp

Jones

Comparative studies of theme and technique in art and literature to illustrate major concerns of a particular period as expressed in these two media. Offered jointly with the School of Art as ART H 485. 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).

481 Twentieth-Century French Novel in English (3-5) Wilson

482 French Poetry From Baudelaire to the Present (5)Analysis of 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.

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.

484 Rabelais and Montaigne in English (3) 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.

485 Racine and Molière in English (3) Worthy

486 Literature of the Enlightenment in English (3) Ellrich

487 Nineteenth-Century Fiction in English (3) Dale

488 Women in French Literature (3) J. Leiner

Masterpieces of French literature are read in an attempt to understand French attitudes toward women. Economic, social, sexual, and personal attitudes form the core of the course. The works read trace French attitudes from the sixteenth century, with a concentration on the twentieth century.

**ITALIAN**

318 Italian Literature in English (5)

319 - The Italian Short Story in English (5) Friedricb

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.

384 Renaissance Literature of Italy in English (3)

**ROMANCE LITERATURE**

481 - The Divine Comedy in English (5) Studies of Dante's Divine Comedy in English translation, with consideration of its back-ground and influence.

**SPANISH**

460 - The Literature of the Renaissance in English (5)

315 - Latin-American Authors in English (5)

345 - Spanish Literature of the Renaissance in English (3)

**SCANDINAVIAN LANGUAGES AND LITERATURE**

**DANISH**

101-102, 103 - Elementary Danish (5-5.5) A/WSp Rasel

Fundamentals of oral and written Danish.
DAN
220 The Danish Short Story and Fairy Tale (3) A
Røssel
Selected short stories and fairy tales in Danish literature. Prerequisite, 103 or equivalent.

DAN
221 Modern Danish Fiction (3) W
Røssel
The study of a novel by J. P. Jacobsen, Martin A. Hansen, or other modern Danish novelists. Prerequisite, 220 or equivalent.

DAN
222 Danish Drama and Film (3) Sp
Røssel
Study of a play by Kaj Munk or Soya and a film by Carl Dreyer. Prerequisite, 221 or equivalent.

DAN
223, 224, 225 Danish Conversation and Composition (2,2,2) A,W,Sp
Røssel
Prerequisites, 103 for 223; 223 for 224; 224 for 225.

DAN
300, 301, 302 Studies in Danish Language and Literature (3,3,3) A,W,Sp
Røssel
Representative selections from modern Danish fiction or poetry. Literary analysis and grammar.

DAN
450 History of Danish Literature (3)
Røssel
A one-volume history serves as text. Representative literary works from the earliest times to the present are read to supplement the historical account and to show the evolution of the thought and form of the various genres. Prerequisite, 222 or equivalent.

DAN
490 Supervised Reading (*, max. 10) A,W,Sp
Røssel
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.

ICELANDIC
ICEL
101, 102, 103 Elementary Modern Icelandic (3,3,3) A,W,Sp
Conroy
Fundamentals of oral and written modern Icelandic.

ICEL
104, 105, 106 Modern Icelandic (3,3,3) A,W,Sp
Conroy
Elementary readings in modern Icelandic literature.

NORWEGIAN
NORW
101-102, 103 Elementary Norwegian (5-5,5) A,W,Sp,SpA
Flatin
Fundamentals of oral and written Norwegian.

NORW
220 The Norwegian Short Story (3) A
Flatin
Selected short stories by twentieth-century Norwegian writers. Prerequisite, 103 or equivalent.

NORW
221 Ibsen (3) W
Flatin, Sehmsdorf
Study of two plays by Ibsen. Prerequisite, 220 or equivalent.

NORW
222 Hansson (3) Sp
Flatin
Study of two novels by Hansson. Prerequisite, 221 or equivalent.

NORW
223, 224, 225 Norwegian Conversation and Composition (2,2,2) A,W,Sp
Flatin, Sehmsdorf
Prerequisites, 103 for 223; 223 for 224; 224 for 225.

NORW
300 The Norwegian Contemporary Novel (3) A
Flatin, Sehmsdorf
Prerequisite, 222 or equivalent.

NORW
301 Norwegian Lyrical Poetry (3) W
Flatin, Sehmsdorf
Prerequisite, 222 or equivalent.

NORW
302 Drama After Ibsen (3) Sp
Flatin, Sehmsdorf
Prerequisite, 222 or equivalent.

NORW
303, 304, 305 Advanced Norwegian Conversation and Composition (2,2,2) A,W,Sp
Flatin, Sehmsdorf
Prerequisite, 222 or equivalent.

NORW
350 The Norwegian Short Story (3) A
Flatin, Sehmsdorf
Generic study of the Norwegian short story. Prerequisite, 220 or permission.

NORW
351 Norwegian Romanticism (3)
Flatin, Sehmsdorf
Historical study of Norway's cultural and, specifically, literary renewal from 1814 to approximately 1865. Prerequisite, 220 or permission.

NORW
352 New Norwegian Writers (3)
Flatin, Sehmsdorf
Study of fiction and poetry in Nynorsk by Dunn, Veesaa, Garborg, and others. Prerequisites, two Norwegian courses on the 300 level and permission.

NORW
450 History of Norwegian Literature (3) Sp
Flatin, Sehmsdorf
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.

NORW
490 Supervised Reading (*, max. 10) A,W,Sp
Flatin, Sehmsdorf
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.

SWEDISH
SWED
101-102, 103 Elementary Swedish (5,5,5) A,W,Sp,SpA
Jarvi
Fundamentals of oral and written Swedish.

SWED
220 Modern Swedish Poetry (3) AW
Jarvi
Selected poems by Fröding, Lagerkvist, Södergran, and others. Prerequisite, 103 or equivalent.

SWED
221 The Swedish Short Story (3) W
Sp
Hjalmar Söderberg and his short stories. Prerequisite, 220 or equivalent.

SWED
222 Modern Swedish Drama and Film (3) ASp
Jarvi
Shorter works of Par Lagerkvist and one film by Ingmar Bergman. Prerequisite, 221 or equivalent.

SWED
223, 224, 225 Swedish Conversation and Composition (2,2,2) A,W,Sp
Jarvi
Prerequisites, 103 for 223; 223 for 224; 224 for 225.

SWED
300 Bellman and The Troubadour Tradition (3) A
Jarvi
Study of Bellman's poetry and its impact on Swedish vis-à-vis-tradition. Prerequisite, 222 or equivalent.

SWED
301 Swedish Poetry After 1940 (3) A
Jarvi
Selection of poems by such poets as Karl Vennberg, Erik Lindegren, Werner Aspenström, Tomas Tranströmer, and Harry Martinson. Prerequisite, 300 or equivalent.

SWED
302 The Swedish Contemporary Novel (3) ASp
Jarvi
Selected works by Delblanc, Gyllensten, Sara Lidman, and others. Prerequisite, 301 or equivalent.

SWED
303, 304, 305 Advanced Swedish Conversation and Composition (2,2,2) A,W,Sp
Jarvi
Third-year conversation and composition, based on readings in Swedish newspapers and journals. Prerequisite, 225 or equivalent.

SWED
350 Contemporary Swedish Literature (3) A
Jarvi
Introduction to developments in Swedish lit-
ARTS AND SCIENCES

erature in the 1950s and 1960s through the study of representative poetry, prose, and drama. Prerequisite, 222 or equivalent.

SWED

352 Strindberg and His Works (3) Sp
Jarvi
Representative short stories, dramas, autobiographical works, poems, and one novel. Prerequisite, 222 or equivalent.

SWED

450 History of Swedish Literature (3) Sp
Beijbom, Jarvi
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) AWSp
Beijbom, Conroy, Jarvi
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.

SCANDINAVIAN COURSES

IN ENGLISH

SCAND

100 Introduction to Scandinavian Culture (2 or 2½) AWSp
Beijbom, Conroy, Jarvi
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
Rosel, Sehmsdor/Jarvi
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)
Rosel
Holberg and his major dramas, with attention to the comic tradition in the Scandinavian theatre.

SCAND

260, 261 Scandinavian Cinema (3,3)
Steene
Study of major Scandinavian films from the 1920s to the present. Courses may be taken consecutively or independently.

SCAND

309 The Icelandic Saga in Translation (2 or 2½) Sp
Conroy
Representative old Icelandic sagas in translation. 2½ credits available Summer Quarter only.

SCAND

310 The Scandinavian Emigrant Novel (2 or 2½)
Beijbom
The emigrant novel: Rövaag, Bojer, Moberg. 2½ credits available Summer Quarter only.

SCAND

311 Modern Scandinavian Fiction in English (2 or 2½) WS
Flinn, Jarvi, Rosel, Sehmsdor/Jarvi
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
Sehmsdor
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. (Formerly 230.)

SCAND

331 The Hero in Scandinavian Tradition (3) W
Sehmsdor/Jarvi
As a continuation of Scandinavian 330, this course explores the exemplary character and quest of the divine and the human hero. Emphasis on the two Eddas and the Volsunga 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.

SCAND

332 The Scandinavian Folktales (3) A
Beijbom, Conroy, Flatin
Study of the Scandinavian folktales as oral literature and as expression of popular beliefs. (Formerly 231.)

SCAND

370 The Vikings (3)
Beijbom, Conroy, Flatin
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 the Department of History as HSTEU 370.

SCAND

380 History of Scandinavia to 1521 (3) A
Beijbom
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 the Department of History as HSTEU 380.

SCAND

381 History of Scandinavia to 1809 (3) W
Beijbom
Survey of Scandinavian history from 1521 to 1809 with emphasis on the efforts at unification between Iceland, Denmark, Norway, and Sweden and their relationship to the European continent. Offered jointly with the Department of History as HSTEU 381.

SCAND

382 History of Scandinavia From 1809 to the Present (3) Sp
Beijbom
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 the Department of History as HSTEU 382.

SCAND

389 Swedenborg and Mysticism (3) Sp
Jarvi
Consideration of Swedenborg's major ideas and their influence on European and American culture.

SCAND

390 Kierkegaard (2)
Rosel
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) A
Conroy
Descriptive analysis of the phonological, morphological, and syntactical structures of the modern Scandinavian languages. Prerequisite, equivalent of two college years of a Scandinavian language.

SCAND

460, 461 History of the Scandinavian Languages (3,3) W,Sp
Conroy
Survey of the development of the languages from primitive Scandinavian to contemporary Danish, Faroese, Icelandic, Norwegian, and Swedish. Prerequisite, two years of a Scandinavian language or permission.

SCAND

480 Ibsen and His Major Plays in English (2 or 2½) AS
Jarvi, Steene
2½ credits available Summer Quarter only.

SCAND

481 Strindberg and His Major Plays in English (2 or 2½) WS
Jarvi, Steene
2½ credits available Summer Quarter only.

Courses for Graduates Only

SCAND

500, 501, 502 Old Icelandic (3,3,3) A,W,Sp
Conroy

SCAND

506 Ibsen's Early Plays (3) A
Jarvi, Steene
(Offered alternate years; offered 1975-76.)

SCAND

507 Ibsen's Later Plays (3) W
Jarvi, Steene
(Offered alternate years; offered 1975-76.)

SCAND

508 The Nineteenth-Century Scandinavian Novel (3) A
Rosel, Sehmsdor/Jarvi
(Offered alternate years; offered 1974-75.)

SCAND

509 The Twentieth-Century Scandinavian Novel (3) W
Rosel, Sehmsdor/Jarvi
(Offered alternate years; offered 1974-75.)

SCAND

510, 511, 512 Strindberg (3,3,3) A,W,Sp
Jarvi, Steene
(Offered alternate years; offered 1975-76.)
SCAND 519 Recent Scandinavian Drama (3) A
Jarvi, Steene
Seminar on Scandinavian drama since Ibsen and Strindberg. Considers such playwrights as Par Lagerkvist, Stig Dagerman, Nordahl Grieg, Soya, Munk, and Kjeld Abel.

SCAND 520 Modern Scandinavian Poetry (3) W
Rosel
Seminar on the poetry from 1880 to 1930. (Offered alternate years; offered 1974-75.)

SCAND 521 Recent Scandinavian Poetry (3) Sp
Rosel
Seminar on recent and contemporary poetry from SCAND 521 Recent Scandinavian Poetry (offered alternate years; offered 1974-75.)

SCAND 522 Scandinavian Literature and Film (3) Sp
Steene
Study of the film adaptations by Sjostrom and Stiller of the works of Selma Lagerlof; a consideration of the film adaptations by Carl Dreyer of such works as Kaj Munk's Ordet and H. Soderberg's Gertrud; an analysis of the relationship between Strindbergian dream-play technique (and vision) and Ingmar Bergman's films. 260, 261 recommended, but not prerequisites.

SCAND 524 Scandinavian Emigration: History and Literature (History and Literature (3) Sp
Belfry
Graduate seminar focusing on an area of Scandinavian history and literature that has received increasing scholarly attention in the past ten years. Studied are the forces behind Scandinavian emigration to the United States, the structure of Scandinavian communities in certain parts of America, and the literature by and about Scandinavian emigrants.

SCAND 530, 531 Medieval Scandinavian Literature (5,5) Sp
Rosel
The study of the main genres in the vernacular, with primary emphasis on the ballads. (Offered alternate years; offered 1974-75.)

SCAND 541 Scandinavian Mythology (3) Sp
Sehmzdorf
Seminar on the historical development and special problems in Scandinavian mythology.

SCAND 542 Scandinavian Folklore I: Folk Beliefs (3) A
Sehmzdorf
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
Sehmzdorf
Various forms of Scandinavian folk literature: legends, fictional folktales, proverbs, riddles, folk song, and ballad.

SCAND 600 Independent Study or Research (*) A,W,Sp

SCAND 700 Master's Thesis (*) A,W,Sp

SCAND 800 Doctoral Dissertation (*) A,W,Sp

ARTS AND SCIENCES

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 in modern authors to increase student's command of grammar and vocabulary. Prerequisite, Russian 203 or 210 or 250, or permission.

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.

CZECHOSLOVAKIAN

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. Prerequisite, Russian 203 or 210 or 250, or permission.

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.

HUNGARIAN

HUNGR 401, 402, 403 Elementary Hungarian (5,5,5) A,W,Sp
Introduction to spoken Hungarian pronunciation, basic grammar, and conversation. Limited reading and writing in 401, 402. More extensive reading and writing in 403.

POLISH

POLISH 401, 402, 403 Elementary Polish (5,5,5) A,W,Sp
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. Prerequisite, Russian 203 or 210 or 250, or permission.

POLISH 404, 405, 406 Advanced Polish (5,5,5) A,W,Sp
Carpenter Continuation of 401, 402, 403 to provide introduction to Polish literature through selected readings of the main works from the nineteenth and twentieth centuries. The course also reinforces the student's basic knowledge of vocabulary, grammatical patterns, and conversation.

ROMANIAN

ROMN 401, 402, 403 Elementary Romanian (5,5,5) A,W,Sp
401, 402: comprehensive introduction to both spoken and literary Romanian. 403: designed to increase the student's vocabulary and enhance his knowledge of grammar through the reading of short fictional material in modern Romanian. Offered jointly with the Department of Romance Languages and Literature as Romanian 401, 402, 403.

ROMN 404, 405, 406 Advanced Romanian (5,5,5) A,W,Sp
Continuation of 401, 402, 403. Prerequisite, 403 or permission. Offered jointly with the Department of Romance Languages and Literature as Romanian 404, 405, 406.

RUSSIAN

RUSS 101, 102 First-Year Russian (5,5) A,W
Introduction to Russian. Extensive oral practice to afford assimilation of basic structural features. Introduction to reading and composition. One hour weekly: lectures on pronunciation, grammar, and writing; opportunities for student questions (conducted in English). Four hours weekly: practice sessions conducted entirely in Russian. (See also 110.) For continuation, see 103.

RUSS 103 First-Year Russian (5) Sp
Continuation of 101, 102. Prerequisite, 102 or 110, or permission.

RUSS 110 Accelerated Russian (10) A
Covers material of 101, 102 in one quarter. Two hours weekly: lectures on pronunciation, grammar, and writing (conducted in English). Eight hours weekly: practice sessions conducted entirely in Russian. For continuation, see 115.

RUSS 115 Accelerated Russian (10) W
Continuation of 110. Covers material of 103, 201 in one quarter. For continuation, see 210. Prerequisite, 110 or 102, or permission.

RUSS 150 Intensive First-Year Russian (15) S
Covers material of 101, 102, 103 in one quarter. Recommended for students who want to acquire rapidly a considerable proficiency. For continuation, see 201 or 250, 202, 203.

RUSS 201 Second-Year Russian (5) A
Sequel to 103. For continuation, see 202, 203. Prerequisite, 150 or 103, or permission.

399
For students with a knowledge of the Russian language, credit.

RUSS 401, 402, 403 Advanced Russian (5,5,5) A,W,Sp
Gribanovsky
Class conversation and composition based on reading. Prerequisites, 303 for 401; 401 for 402; 402 for 403.

RUSS 404 Advanced Russian Prose Composition (3) W
Russian prose translation from English to Russian, with emphasis on stylistics. Prerequisite, 403, or equivalent, or permission.

RUSS 405 Advanced Russian Prose Composition (3) W
Russian prose translation from English to Russian, with emphasis on idiom. Continuation of Russian 404. Prerequisite, 403, or equivalent, or permission.

RUSS 406 Advanced Russian Prose Composition (3) Sp
Russian prose composition on topics of literary or cultural interest. Continuation of 405. Prerequisite, 403, or equivalent, or permission.

RUSS 407 Advanced Russian Conversation (3) A
Russian conversation on literary and cultural topics, with emphasis on style and syntax and on contemporary intonation patterns. Prerequisite, 403, or equivalent, or permission.

RUSS 408 Advanced Russian Conversation (2) W
Continuation of 407. Prerequisite, 403, or equivalent, or permission.

RUSS 409 Advanced Russian Conversation (2) Sp
Continuation of 408. Prerequisite, 403, or equivalent, or permission.

RUSS 450 Intensive Fourth-Year Russian (15) S
Gribanovsky
Intensive practice in conversation, composition, and reading at an advanced level. Equivalent to 401, 402, 403. Prerequisite, 303, 350, or permission.

RUSS 451, 452, 453 Structure of Russian (3,3,3) A,W,Sp
Augerol, Coats
Descriptive analysis of the phonology and morphology of contemporary standard Russian. Prerequisites, 303 or equivalent for 451; 451 for 452; 452 for 453, or permission.

RUSS 461, 463 Introduction to Russian Literature (5,5) Gribanovsky, Koniek
Discussion and analysis of Russian prose, poetry, and drama in Russian. Prerequisite, 303 or permission.

RUSS 470 Special Topics in Russian for Teachers (5) S
Augerol
Discussion of journalistic and literary texts. Practical review of morphology and syntax. Essay writing. All intended for the improvement of Russian teaching through presentation of current linguistic and literary developments in the Soviet Union and at home. Conducted in Russian.

RUSS 490 Studies in Russian Literature (5, max. 15) Sp
Studies on various aspects of Russian literature, either in Russian or English, varying from quarter to quarter. Prospective students should consult the department office for information.

RUSS 499 Undergraduate Research (3-5, max. 15) A,W,Sp
For Slavic majors only. Prerequisite, permission.

SERBO-CROATIAN
SER C
401, 402, 403 Elementary Serbo-Croatian (5,5,5) A,W,Sp
Kaperandi
401, 402: comprehensive introduction to both spoken and written literary Serbo-Croatian. 403: designed to increase the student's vocabulary and enhance his knowledge of grammar through the reading of short stories in the modern literary idiom. Prerequisite, Russian 203 or 210 or 250, or permission.
**SLAVIC**

**SLAV**

351 History of the Slavic Languages (5) Sp

Kapetaníć

External and internal history of Slavic literary languages from the beginnings to the present time, including the development of writing systems, external attempts at reform, and the development of vocabulary. Prerequisite, reading knowledge of one Slavic language.

499 Undergraduate Research (3-5, max. 15) AWSp

For Slavic majors only. Prerequisite, permission.

**UKRAINIAN**

401, 402, 403 Elementary Ukrainian (5,5,5) Introduction to spoken and written Ukrainian.

**LITERATURE COURSES IN ENGLISH**

**CZECH**

320 Czech Literature in English (5) W

Survey of Czech literature, with emphasis on major trends and achievements.

**POLISH**

320 Polish Literature in English (5) A

Survey of Polish literature, with emphasis on major trends and achievements.

**RUSS**

320 Russian Literature in English (5)

Introduction, from 1782 to the present. Representative prose and poetical works of the foremost Russian and Soviet writers are discussed and analyzed.

321 Russian Literature and Culture to 1800 (5)

Haney

Russian literature and culture from the beginnings through the eighteenth century. Discussions center on literature as an element in Russian culture; however, art, architecture, music, philosophy, and popular culture are treated as well. Periods covered include monumental simplicity, Renaissance, Reformation, Baroque, sentimentalism, and classicism.

322 Russian Literature and Culture of the Nineteenth Century (5) Hagglund

Russian literature and culture of the nineteenth century. Discussion centers on literature as an element in Russian culture; however, art, architecture, music, philosophy are treated as well. Periods covered include romanticism, realism, and the beginnings of socialist criticism.

323 Russian Literature and Culture of the Twentieth Century (5)

West

Discussion centers on literature as an element in modern Russian culture, but art, architecture, and music are considered as well. Periods covered include symbolism, revolution, postrevolution, Stalinist, the "thaw," and contemporary.

420 Early Twentieth-Century Russian Literature in English (5) A

Sważy

Survey of Russian literature from 1900 to 1935.

421 Contemporary Russian Literature in English (5) W

Sważy

Survey of Russian literature from 1917 to the present.

422 Russian Plays in English (5) Sp

From 1782 to 1948.

424 Pushkin and Gogol in English (5)

Introduction to the works of A. S. Pushkin and N. V. Gogol in English.

426 Goncharov and Turgeniev in English (5) A

427 - Tolstoy in English (5) W

428 Dostoevsky in English (5) Sp

429 Chekhov and His Contemporaries in English (5)

Introduction to the writings of A. P. Chekhov in English, including both short stories and plays. Garshin, Korolenko, Kuprin, and Bunin also are given attention.

430 Solzhenitsyn and Pasternak in English (5)

Introduction to the prose writing of Boris Pasternak and of A. I. Solzhenitsyn. Works to be studied include One Day in the Life of Ivan Denisovich, Masaryk's Home, First Circle, Cancer Ward, and August, 1914; and Doctor Zhivago, Aerial Ways, Letters From Tula, I Remember.

432 Serbo-Croatian Literature in English (5) Sp

Survey of Serbian and Croatian literatures, with emphasis on major trends and achievements.

**RUSSIAN**

512 Nineteenth-Century Russian Literary Criticism (4) A

Hagglund

Analysis of the critical approach, methods, and literary values of major Russian literary critics of the nineteenth century.

513 Contemporary Russian Literary Criticism (4) W

Recent trends in the Russian study of literature.

515 Russian Vernacular (4) Sp

West

Russian vernacular and poetic language, with a brief survey of bibliography pertaining to Russian literary studies. Prerequisite, 526 or permission.

516 Stylistics of Modern Russian Poetry (4) Sp

Examination of the linguistic aspects of poetic style in selected works of modern Russian poetry. Prerequisites, 451, 452, and 6 credits in Russian literature courses, or permission.

520 Seminar on Russian Poetry (4) Sp

Topics in Russian poetry to be selected by the instructor.

522 Pushkin (4) A

Analysis of the works of Alexander Pushkin.

524 Nineteenth-Century Russian Poetry Since Pushkin (4) W

Discussion of the masters of nineteenth-century Russian lyric poetry since Pushkin.

525 The Russian Symbolist Movement (4) Sp

Study of Russian poetry and prose of the symbolist period (1894-1910).

526 Modern Russian Poetry (Acmeism and Futurism) (4) A

Study of Russian poetry in its renaissance, from 1890 to 1925. Prerequisite, 403 or equivalent.

530 Seminar on Russian Prose (4) A

Examination and discussion of Russian masterpieces.

532 Gogol (4) A

Close analysis of Gogol's novels, plays, and stories in Russian.

533 Chekhov (4) A

Detailed analysis of the plays and short stories of Anton Chekhov in Russian.

534 Dostoevsky (4) W

Analysis of the works of Feodor Dostoevsky.

535 Tolstoy (4) W

Analysis of the works of Leo Tolstoy.

538 Pasternak (4) Sp

Detailed analysis of the poetry and prose of Boris Pasternak in Russian.

540 Seminar on Contemporary Russian Literature (4) W

Examination of selected works of poetry, prose, and criticism representative of Russian literature from 1917 to the present. Prerequisite, permission.

550 Advanced Russian Morphophonology (3) A

Mickleisen

Detailed discussion and evaluation of attempts...
to incorporate both Russian phonology and
Russian morphology in modern scientific gram-
mars. Prerequisite, 453.

RUSS
551 Advanced Russian Syntax (3) W
Micklesen
Detailed structural analysis of sentence types in
the Russian literary language, with emphasis on
grammatical categories and word classes.

RUSS
555 History of the Russian Language (4) W
Coats
Outline of grammatical and lexical develop-
ments of the Russian literary language from the
earliest documents to the present. Prerequisite.

RUSS
556 Readings in the History of the Russian
Language (4) Sp
Coats
Readings and grammatical interpretation of
selected texts from various periods of develop-
ment of the Russian language. Prerequisite,
555.

RUSS
565 Russian Eighteenth-Century Literature
(4) Sp
Haney
Discussion of representative works of poetry,
prose, fiction, and criticism in the eighteenth
century. Prerequisite, 320 or permission.

RUSS
575 Klevan Literature (4) W
Haney
Analysis of representative works of prose and
poetry of Kievian Rus' from the beginning to the
end of the thirteenth century. Prerequisite,
graduate standing. (Offered alternate years.)

RUSS
576 Muscovite Literature (4) Sp
Haney
Analysis of representative works of prose and
poetry of the Muscovite period from the end of
the thirteenth century to the reign of Peter I.
Prerequisite, graduate standing. (Offered alter-
ate years.)

RUSS
577 Russian Folk Literature (4) A
Haney
Analysis of representative works of the various
genders of folk literature including the bylina,
skaszk, historical and lyrical songs and the spiri-
tual zikhi. Prerequisite, graduate standing. (Of-
fered alternate years.)

RUSS
578 Studies in Klevan Literature (4) W
Haney
Field course for students with a specialization in
Kievian literature. Work with primary sources,
textual tradition, and bibliography.

RUSS
579 Studies in Muscovite Literature (4) Sp
Haney
Field course for students with a specialization in
Muscovite literature. Work with primary sources,
textual tradition, and bibliography.

RUSS
580-589,590 Russian Literature, 1750 to the
Present (5-5-5) A,W,Sp
Survey of Russian Literature for first-year grad-
uate students. Prerequisite, graduate standing.

RUSS
600 Independent Study or Research (*)
AWSp

SLAVIC
SLAV
550 Historical Survey of Common Slavic (5)
Micklesen
Slavic languages and their geographical and
dialectical distribution; Slavic civilization
throughout prehistoric and early historic peri-
ods; principal phonological and morpholog­
ical features of Slavic as a subgroup of the
Indo-European family of languages. Prerequi-
site, Russian 453 or permission.

SLAV
552 History of the East Slavic Languages
(3) A
Micklesen
Designed to acquaint majors in Slavic linguis-
tics with the details of the historical develop-
ment of the phonological and morphological
structure of the East Slavic languages. Prerequi-
site, 550.

SLAV
553 History of the West Slavic Languages
(3) W
Micklesen
Designed to acquaint majors in Slavic linguis-
tics with the details of the historical develop-
ment of the phonological and morphological
structure of the West Slavic languages. Prerequi-
site, 550, 552.

SLAV
554 History of the South Slavic Languages
(3) Sp
Micklesen
Designed to acquaint majors in Slavic linguis-
tics with the details of the historical develop-
ment of the phonological and morphological
structure of the South Slavic languages.
Prerequisites, 550, 552, 553.

SLAV
555 Old Church Slavonic (4) W
Augerot
Rise and development of earliest Slavic literary
language and a descriptive study of its orthog-
raphy, phonology, morphology, and syntax.

SLAV
556 Readings in Old Church Slavonic (4) Sp
Augerot
Reading and grammatical interpretation of a
selected group of texts.

SLAV
557 Seminar on Slavic Linguistics (3) Sp
Micklesen
Seminar designed to permit the investigation
and discussion of special topics in Slavic lin-
guistics. May be repeated for credit. Prerequi-
sites, 554 and Russian 551.

SLAVIC LANGUAGES
AND LITERATURE
SLAVC
600 Independent Study or Research (*)
AWSp

SOCIAL SCIENCE
SOC S
150 Afro-American History (5)
Examination of the Negro and his role in
history, both in Africa and the Americas.

SOCIETY AND JUSTICE
SO SO
310 Non-Field Research in Society and
Justice (1-5, max. 15) AWSpS
Individual nonquantitative research, under su-
pervision, on some aspects of society and jus-
tice. Prerequisite, majors only.

SO SO
311 Field Research in Society and Justice
(1-5, max. 5) AWSpS
Individual field research, under supervision, on
some aspect of society and justice. Prerequisite,
majors only.

SO SO
320 Field Experience in Society and Justice
(1-5, max. 5) AWSpS
Scotland
Participant observation in some public or pri-
ivate agency relevant to the system of justice.
Prerequisite, majors only.

SO SO
321 Case Study in the System of Justice (1-4,
max. 4) AWSpS
Scotland
Personally follow a felony case through the
agencies of the system of justice. Prerequisite,
majors only.

SO SO
400 Seminar in Society and Justice (3, max. 6)
AWSpS
Seminar in various aspects of the administra-
tion of justice. Prerequisite, majors only.

SO SO
450 Special Topics in Society and Justice
(1-5, max. 15) AWSp
Scotland
Examination of various current topics or is-
sues concerning the criminal justice system in
our society.

SOCIOLGY
SOC
105 Sociology of Black Americans (5)
Black
Evaluates the sociocultural context of the Black
man's environment and consequences of interac-
tion 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.

SOC
223 Social Statistics (5) AWSp
Haggerty, M, Miyamoto, Roberts
Methods and sources for quantitative investiga-
tion. Prerequisite, 110.
media of communications as a force in social life; methods of research. Prerequisite, 240 or equivalent.

SOC 445 Social Movements (3) Miyamoto
Social movements as collective enterprises to establish new social orders; types, formation, and organization of movements. Prerequisite, 240 or equivalent.

SOC 448 Sociometric Analysis and Group Structure (5) Roberts
Analysis of the theory and techniques used in the description and experimental investigation of group structure and process. Study of formation, organization, cohesion, and disorganization of social groups through sociometric techniques. Prerequisites, 223, 240, and senior standing.

SOC 450 Contemporary American Institutions (5) Guest, Hechter, 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 Social Change and Trends (5) Hechter, Wager
Basic trends in American life; frames of reference for analysis of social change; forces causing social change. Prerequisite, 15 credits in social science.

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) Gordon
Review and analysis of empirical research in courtship and marriage, marital adjustment, and specific areas of marriage and family life. Prerequisites, 223 and 352.

SOC 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 (3)
Process of institutionalization and the general nature of institutions; relationship of institutions to persons; institutions and social control; social change and institutional disorganization. Prerequisites, 110 and upper-division standing.

SOC 459 Comparative Social Systems: Africa (3) van den Bergh
Comparative approach to the social structure of literate and nonliterate societies with special emphasis on problems of social evolution, integration, and conflict. Africa south of the Sahara is stressed. Prerequisite, senior standing in the social sciences.

SOC 460 Social Differentiation (5) Barth, Bales, Hargens
Analysis of societal organization based on sex, age, residence, occupation, community, class, caste, and race. Prerequisite, 110.

SOC 463 American Negro Community (3) Barth
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 instituted 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)
Changing focus of field; contrasting types of industrial organizations; industrial organizations as social systems; problems of social systems; the individual in the organization; union-management relations and organizational dynamics. Prerequisite, 110.

SOC 467 Industry and the Community (3)
Nature of the economy. Theories of industry-community relations. Varieties and types of relations between industry and community. Process of power. Impact of technological change. Levels of worker participation in the community. Integration of industry and other communal institutions. Prerequisite, 110.

SOC 468 Sociology of Occupations and Professions (5) Borse
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 472 Juvenile Delinquency (5) Costner
Factors of delinquency, juvenile courts. Programs of treatment and prevention. Prerequisite, 371 or equivalent.

SOC 473 Corrections (5) Schrag

SOC 481, 482, 483 Issues in Analytic Sociology (3, max. 9; 3, max. 9; 3, max. 9)
Examination of current issues in sociological analysis. The specific content of the course varies according to recent developments in sociology and according to the interests of the instructor. Any of the sequence may be repeated with permission. Prerequisite, permission.

SOC 495H, 497H, 498H Senior Seminar (3,3,3) 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.

SOC 499 Undergraduate Research (2-5, max. 15) A,W,Sp
Open only to qualified undergraduate students by permission.

SOC 501, 502, 503 Research Frontiers in Sociology (3,3,3)
Review and analysis of research strategies, requirements, and opportunities in and between major fields of sociological inquiry. Requirements of all entering graduate students and restricted to this group. Must be taken in sequence.

SOC 510 Seminar on Sociological Theory (3) Roth
Macrosociological theories; functionalism and neoevolutionism; conflict and consensus approaches; comparative strategies; models and long-range theories; ideology and sociology. From Marx and Tocqueville to contemporary literature.

SOC 513 Demography and Ecology (3) A Review of selected research problems related to demography and ecology. Provides substantive knowledge of determinants and sequences of population patterns, to delineate areas where current knowledge is deficient; to begin instilling the analytic skills required to advance knowledge in the area.

SOC 514 Theories in Social Psychology (3) A Broad graduate-level introduction to the theories in the field of social psychology.

SOC 515 Current Research in Social Psychology (3) W Broad graduate-level introduction to the research in the field of social psychology.

SOC 516 Organizations (3) Sp Cook, Gross
Broad graduate-level introduction to the theory and research on complex organizations.
SOC 517 Deviance and Social Control (3) Sp
     Schrag
     Survey of current research on deviant behavior
     and mechanisms of social control; definitions
     and forms of deviant behavior, causal analysis,
     and legal or other methods of social control.
     Prerequisite, graduate standing.

SOC 518 Social Stratifications (3) W
     Hargens, Stark
     Intensive preparation in theoretical, methodo-
     logical, and substantive topics in social strat-
     ification.

SOC 519 Political Sociology and Social Change (3) Sp
     Hechter, Roth
     Designed for first-year graduate students as
     part of the requirements for the M.A. degree.
     The course is intended to thoroughly familiariz-
     e graduate students with basic perspective
     in the area of political sociology and social
     change, which is an examination field for the
     Ph.D., with some classical works and some
     exemplary empirical studies of recent date.

SOC 521, 522 Seminar on Methods of
     Sociological Research (3,3)
     Prerequisites, 223 and 420, or equivalents.

SOC 526 Causal Approach to Theory Building
     and Data Analysis (3)
     Bialock
     Theory construction and testing from a causal
     models perspective. One-way causation (re-
     cursive models); implications for data analysis,
     path analysis, standardized versus unstandard-
     ized measures. Feedback models and simulta-
     neous-equation systems: identification proble-
     ms, estimation in over-identified models,
     difference equations, differential equations,
     stability conditions. Multiplicative models as
     alternatives to additive ones. Causal approach
     to measurement error: random measurement
     error, alternative nonrandom error models.

SOC 528 Seminar on Selected Statistical
     Problems in Sociological Research (3)
     Costner
     Prerequisite, 426.

SOC 530 Advanced Human Ecology (3)
     Prerequisites, 330 or 430, and 15 credits in
     social sciences.

SOC 531 Demography (3)
     Research problems in population and vital
     statistics. Prerequisites, 331 or 431 and 15
     credits in social sciences, or permission.

SOC 532 Research Methods in Human Ecology (3)
     Analysis of community structure, segregation,
     and other spatial phenomena. Measures of mi-
     gration, intensity relations, and diversity. Gen-
     eral problems of measuring ecological associa-
     tions. Prerequisite, 330 or 430.

SOC 533 Research Methods in Demography (3)
     Measures of population composition, fertility,
     and mortality. Life table analysis, standardiza-
     tion procedures, population projects and esti-
     mates. Prerequisite, 331 or 431.

SOC 539 Selected Topics in Demography and
     Ecology (3, max. 9)
     Specialized problems in demography or ecology
     are covered; for example, migration, fertility,
     mortality, language, race and ethnic relations,
     metropolitan community. See quarterly an-
     nouncement for specific problem to be covered.
     Prerequisite, permission.

SOC 540, 541 Seminar on Social Interaction (3,3)
     Burgess, Schmitt
     Evaluation of studies in social interaction. Ana-
     lyzes types of interaction, interaction models,
     and such major variables as roles, self-concep-
     tion, and the influence of norms. Prerequisite,
     440.

SOC 542 Seminar on Small Group Research (3)
     Cook
     Theories, methodology, and studies in the area
     of small-group research. Covers such topics as
     interaction channels, group cohesion, group
     locomotion, and consensus in groups. Prerequi-
     site, permission for nonmajors.

SOC 543 Communications Seminar (3)
     Larsen
     Sociological research in mass communication.
     Emphasis on the role of groups in providing
     norms and networks in the flow of information
     and influence from the mass media. Prerequi-
     site, 443 or equivalent.

SOC 544 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.

SOC 545 Methods of Experimental Analysis in
     Social Research (3)
     Burgess, Schmitt
     Application of the method of experimental
     analysis to problems in sociology and social
     psychology.

SOC 550, 551, 552 Marriage and the Family (3,3,3)
     Schwartz
     Analysis of marriage and family patterns and
     problems, with initial emphasis on research
     findings and methods. Individual research on
     selected projects. Prerequisites, 352 and 453, or
     equivalents.

SOC 562 Seminar on Comparative Race Relations
     (3)
     van den Berghe
     Cross-cultural approach to race and ethnic
     relations, including case studies from Africa
     and Latin America. Prerequisite, graduate
     standing in social sciences.

SOC 566, 567 Seminar on Complex Organizations
     (3,3) W,Sp
     Grosz, Wager
     Research training in industrial sociology. Read-
     ings and field projects. Prerequisite, 465 or
     equivalent.

SOC 569 Social and Cultural Change: Africa (3, max.
     9)
     Ottenberg, van den Berghe, Winana
     Urbanization, stratification, technology, educa-
     tion, social and religious movements, and cul-
     tural pluralism in contemporary Africa. Offered
     jointly with the Department of Anthropology as
     ANTH 569. Prerequisite, graduate standing in
     a social science department.

SOC 571 Correctional Communities (3)
     Schrag
     Prisons and juvenile reformatories as communi-
     ties. Prerequisites, 371 and 473.

SOC 572 Analysis of Criminal Careers (3)
     Personal and social factors in criminal matura-
     tion and reformation. Prerequisites, 371 and
     473, or equivalents.

SOC 573 Crime Prevention (3)
     Critical consideration of programs for delin-
     quency prevention. Prerequisites, 371 and 472.

SOC 574 Seminar on Methods of Criminological
     Research (3)
     Schrag
     Provides training in the technical analyses of
     published research in criminology; design
     and processes studies in parole prediction, pre-
     diction of prison adjustment, and prediction of
     treatment effect.

SOC 581, 582, 583 Special Topics in Sociology
     (3,3,3) A, W, Sp
     Examination of current substantive topics in
     sociology. The specific content of the seminar
     varies according to recent developments in
     sociology and according to the interests of the
     instructor. May be repeated for credit with
     permission.

SOC 600 Independent Study or Research (*)
     A, W, Sp

SOC 700 Master's Thesis (*) A, W, Sp

SOC 800 Doctoral Dissertation (*)

SPEECH

GENERAL

Courses for Undergraduates

SPCH 100 Voice and Articulation Improvement (3)
     A, W, Sp
     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 are con-
     sidered. Special laboratory work available to
     students with significant voice or pronunci-
     ation problems.

SPCH 101 Applied Phonetics (2) A, W, Sp
     Continuation of 100 for students with special
     concerns in the area of pronunciation and
     articulation. Not open to those who have had
     300 or 302. Prerequisite, 100 or permission.
SPCH 102 Speech, the Individual, and Society
AWSp
Introduction to the study of speech communication, the semantic and physical bases of speech, speech in the life of the individual and society, the impeding and facilitating of communication.

SPCH 103 Basic Principles of Oral Communication
AWSp
Training in interpersonal communication. Emphasizes analyzing and experiencing communication variables affecting human relationships, such as person perception, feedback, idea development, nonverbal cues, etc. Emphasis is on informal communication settings.

SPCH 111 Standard and Nonstandard American Speech: Theory and Applications (2)
AWSp
A wide variety of American speech patterns or dialects is studied in terms of their phonetic, phonological, sociolinguistic, and psycholinguistic characteristics. Study of standard and nonstandard American speech patterns is supplemented by readings in phonetics, phonology, sociolinguistics. Students analyze their own patterns and develop appropriate phonetic skills as desired. Especially useful for foreign students and minority students from nonstandard speech communities. Prerequisite: permission.

SPCH 203 Principles of Oral Communication (3)
AWSp
Fundamentals of interpersonal communication designed to develop the elementary and secondary teacher's ability to communicate sensitively and effectively in an educational setting. Required for the Provisional Teaching Certificate. 103 may be substituted, but credit may not be received for both 103 and 203.

SPCH 308 Humanistic Approaches to Interpersonal Communication (5)
W
Stewart
Intermediate-level course that explores several humanistic approaches to interpersonal speech communication, emphasizing the theorists' philosophical orientations.

SPCH 368 Small Group Facilitation (3)
AWSp
Nyquist
Study of methods for facilitating discussion in small groups formed for the purposes of instruction. Examines theoretical principles of group communication and group thought-line development. Considers both the cognitive goals and processes of 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: 102 and permission.

SPCH 369 Small-Group Facilitation Practicum (2)
AWSp
Nyquist
Practicum experience in the implementation of the theoretical principles taught in 368 of facilitating discussion in small groups formed for instructional purposes. Emphasis is on the direct application of those principles to an assigned group of students from 102. Prerequisite: to be taken concurrently with 368.

SPCH 400 Theoretical Backgrounds in Speech (3) W
AWSp
Speech as a form of individual and social behavior, with an emphasis on the function of symbols in human interaction.

SPCH 499 Undergraduate Research (1-5, max. 15)
AWSp
Prerequisite, permission.

Courses for Graduates Only

SPCH 501 Introduction to Graduate Research In Speech (3)
A

SPCH 590 Seminar on Theory of Speech (2, max. 6)
A

SPCH 600 Independent Study or Research (*)
AWSp

SPCH 700 Master's Thesis (*)
AWSp

SPCH 800 Doctoral Dissertation (*)

RHETORIC AND PUBLIC ADDRESS

Courses for Undergraduates

SPCH 220 Introduction to Public Speaking (5)
AWSp
Campbell
Beginning course in persuasive speaking emphasizing choice and organization of material, sound reasoning, audience analysis, oral style, and delivery. Frequent speeches before the class, followed by conferences with instructor. Not open to students who earned credit for 120 prior to Autumn Quarter 1961. Special section for honors students offered Autumn Quarter only.

SPCH 222 Speech in a Free Society (3)
W
Bosmajian
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 235 Parliamentary Procedure (3)
A
Bosmajian
Principles and practice: a study of the historical bases and contemporary uses of parliamentary procedure; methods and practice in organizing and conducting public meetings.

SPCH 305 Perspectives on Language in Speech Communication (5)
W
Stewart
Introduction to the study of language and meaning, and survey of three influential modern approaches: semantic, behavioral, and analytic philosophical. Relates theories of language and meaning to the study of speech communication.

SPCH 320 Public Speaking (5) A
AWSp
Practice in preparation and presentation of a variety of types of public speeches based on study of their structure and form; emphasis on organization and delivery. Prerequisite, 103 or 220, or permission.

SPCH 327 Extemporaneous Speaking (3) Sp
Not open to speech majors or students who have taken 220 or 320.

SPCH 329 Rhetoric of Social and Political Movements (5)
Sp
Inquiry into the rhetoric of social and political movements; emphasis on investigation of persuasive discourse; also an examination of the nonverbal symbols of persuasion.

SPCH 334 Essentials of Argument (5)
Douglas, Stephenson
Practicum as a technique in the investigation of social problems; evidence, proof, refutation, persuasion; training in argumentative speaking.

SPCH 335 Methods of Debate (3)
Douglas
Introduction to debate as a method of advocacy with study and practice of its more important forms. Concurrent registration in 339 not permitted. Prerequisite, 220 or 334, or permission.

SPCH 339 Forensic Studies (1-3, max. 9)
Douglas
Discussion of selected public questions before audiences on and off campus. No more than 3 credits may be earned in one year, and these should normally be distributed through at least two consecutive quarters. The student should confer with the Director before completing registration. Prerequisite, permission.

SPCH 373 Principles of Group Discussion (9)
Douglas
Discussion as an everyday community activity, with emphasis on the informal cooperative decision-making methods of committee, conference, and round-table groups. Prerequisite, 103 or 334, or permission.

SPCH 421 Advanced Speech Composition (5)
W
Baskerville
Preparation and delivery of longer public speeches. Emphasis on style, thought organization, and proof. Analysis of model speeches. Prerequisite, 220 or permission.

SPCH 424 Rhetoorical 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 controversies. Examines Rights of Man, Communist Manifesto, The Origin of Species, etc.

SPCH 425, 426 American Public Address (5,5) A
Bosmajian
Historical and critical study of principal speakers and speeches and of their relationship
to American political, social, and intellectual life. A lecture, discussion, and reading course. 425: revolutionary period to late nineteenth century; 426: late nineteenth century to the present.

SPCH

428 British Public Address (3) W
Campbell
Historical and critical study of principal speakers and speeches and of their relationship to British political and social life. Rhetorical analysis of speeches.

SPCH

473 Problems of Discussion Leadership (3) Sp
Critical analysis of leadership in committee and conference, with emphasis on the development of speech effectiveness in the cooperative achievement of goals. Prerequisite, 373.

Courses for Graduates Only

SPCH

521 Studies in Greek and Roman Rhetoric (5) A
Critical analysis of writings on rhetoric by Plato, Aristotle, Cicero, Quintilian, and others.

SPCH

522 Studies in Medieval and Renaissance Rhetoric (5) W
Critical analysis of works and topics related to the development of rhetorical theory during the Middle Ages and the Renaissance. Prerequisite, 521. (Offered alternate years; offered 1975-76.)

SPCH

523 Studies in Modern Rhetoric (5) W
Campbell
Critical analysis of writings on rhetoric by Cox, Wilson, Bacon, Campbell, Blair, Whately, and others.

SPCH

524 Studies in Contemporary Rhetoric (5) Sp
Nilsen
Critical analysis of recent developments in, and contributions to, rhetorical thought.

SPCH

525 Rhetorical Criticism (5) W
Baskerville
History and method of rhetorical criticism. Application of critical standards to notable British and American speeches. Prerequisite, 425 or 426 or 428.

SPCH

592 Seminar in Rhetoric and Public Address (2, max. 6) W

SPCH

593 Seminar in Argument and Discussion (2, max. 6) Sp

ORAL INTERPRETATION OF LITERATURE

Courses for Undergraduates

SPCH

140 Oral Interpretation of Literature (5) ASwp
Weybright
Introduction to the study of imaginative literature through the medium of oral performance. Analysis and interpretation of verse, prose, and drama.

SPCH

240 Critical Approaches to Oral Interpretation (3) W
Relating oral interpretation performance and literary criticism. Critical study and performance of contemporary verse, prose, and drama. Prerequisite, 140.

SPCH

345 Ensemble Oral Interpretation (3) Sp
Potential for ensemble oral interpretation in the three major genres of imaginative works of literature. It includes study in the theory and techniques of Chamber Theatre and Readers Theatre. Prerequisite, 140. (Offered alternate years; offered 1975-76.)

SPCH

347 Oral Interpretation of Nonfiction Prose (3) Sp
Study of stylistic, literary, and rhetorical strategies in nonfiction prose texts from the point of view of the oral interpreter. Materials are selected from histories, biographies, autobiographies, speeches, essays, travel literature, letters, journals, and diaries. Prerequisite, 140. (Offered alternate years; offered 1974-75.)

SPCH

349 Readers Theatre (2, max. 10) ASwp
Post
Preparation and public presentation of programs of literary works. Prerequisites, 140 and permission.

SPCH

440 Oral Interpretation of Poetry (3) W
Study of forms of verse through analysis and oral presentation. Prerequisite, 140.

SPCH

442 Oral Interpretation of Fiction (3) A
Analysis of oral interpretation of narrative perspectives in the novel and the short story. Prerequisite, 140.

SPCH

444 Oral Interpretation of Modern Dramatic Literature (3) Sp
Study of dramatic literature from Ibsen to the present for purposes of developing understanding, appreciation, and ability to communicate its meaning. Prerequisite, 140.

SPCH

446 Oral Interpretation of Elizabethan Drama (5) A
Development of understanding of the content and form of selected Elizabethan plays by relating literary analysis and performance. Plays by Shakespeare, Marlowe, Kyd, Jonson, and Webster are included. Prerequisite, 140.

Courses for Graduates Only

SPCH

540 History of Oral Interpretation (3) A
Critical analysis of writings by Sheridan, Walker, Rush, Delaete, Bell, Curry, Emerson, and others. (Offered alternate years; offered 1975-76.)

SPCH

543 Studies in Theories of Performance and Criticism (3) W
Analysis of performance theories as expressed in the writings of oral interpreters and literary critics.

SPCH

554 Seminar in Oral Interpretation (2, max. 6) Sp

SPEECH-COMMUNICATION SCIENCE

Courses for Undergraduates

SPCH

270 Introduction to Speech-Communication Science (5) A
D'Angelo, Stephenson
Basic research principles in speech-communication science; survey of substantive research findings. Prerequisite, 103.

SPCH

471 Persuasion (3) Sp
Arundale, D'Angelo
Analysis of the ways in which beliefs, values, attitudes, and behavior are deliberately influenced through communication.

SPCH

472 Speech Communication and Interpersonal Influence (5) W
Arundale, D'Angelo
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.

SPCH

476 Speech Communications: Behavioral Models and Theories (4) Sp
Arundale, Stephenson
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.

Courses for Graduates Only

SPCH

576 Experimental Methods in Speech Communication (3) Sp
D'Angelo, Stephenson
Application of behavioral research principles to problems in quantification, design, and analysis of data in speech-communication research. Prerequisite, introductory statistics or equivalent, or permission.

SPCH

577-578 Research Problems in Speech Communication (3, max. 6)-(3, max. 6) W,Sp
Examination of experimental literature on selected topics. Subject to change from year to year, including conflict resolution, information processing, communication networks, feedback systems, audience composition research, communication effects. Prerequisite, permission.
SPCH 301 Anatomy of the Speech Mechanism (5) AWSp
Palmer
Structure and function of the organs concerned with phonation and articulation. Class size limited.

SPCH 302 General Phonetics (4) AWSp
Tiffany
Phonetic and phonemic analysis of the sound system of the English language with special application to the problems of speech improvement.

SPCH 303 Speech and Language Development (3) ASp
Study of the normal acquisition of speech and language in children. Prerequisite, 302 or permission.

SPCH 304 Physical Dimensions of Speech (2) ASp
Tiffany
Basic introduction to physical characteristics of the speech signal. Emphasis is given to properties of vibratory systems, analysis and measurement of speech waveforms, and physical correlates of the perceptual attributes of speech sounds. Not open to those who have had 300, except by permission. Lectures complemented by laboratory demonstrations and projects.

SPCH 402 Advanced Phonetic Analysis (2) WSp
Tiffany
Advanced transcriptional and feature analysis of abnormal and nonstandard speech patterns. Prerequisite, 302 or equivalent introductory phonetics course by permission.

SPCH 414 Speech Physiology (3) A
Abba, Bennett
Study of the physiological parameters of speech production. Prerequisite, 300, 302 or permission.

SPCH 415 Speech Acoustics (3) W
Minifie, Tiffany
Study of the acoustical correlates of the distinctive parameters of speech. Special emphasis on speech analysis methods, including sound spectrography. Prerequisite, a course in speech science or phonetics, or permission.

SPCH 416 Speech Perception (3) Sp
Bennett
Study of the perceptual and linguistic parameters of speech perception. Prerequisites, 300, 302, or permission.

SPCH 420 Instrumentation for Speech and Hearing Science (3) A
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.

SPCH 300 Speech Science (5) AWSp
Study of the basic physiological and acoustical attributes of speech production and reception.

SPCH 301 Anatomy of the Speech Mechanism (5) AWSp
Palmer
Structure and function of the organs concerned with phonation and articulation. Class size limited.

SPCH 502 Advanced Anatomy of Speech and Hearing Structures (4) AWSp
Palmer
Directed individual dissection and study of selected anatomic structures of the speech or hearing mechanisms.

SPCH 503 Experimental Phonetics (3, max. 9) Sp
Tiffany
Application of experimental methods to research in voice and phonetics; critical review of research literature.

SPCH 504, 505 Research Methods in Speech and Hearing Science (3, 3) WSp
Prather, Thompson
504: introduction to empirical methods in the speech and hearing sciences. 505: applications of basic statistical procedures to investigation of specific problems in the communication sciences. Prerequisite for 505, Psychology 302 or equivalent.

SPCH 519 Seminar in Speech Science (2, max. 6) AWSp

SPCH 520 Advanced Instrumentation for Speech and Hearing Science (3) Sp
Design and use of electronic and electroacoustic devices in the speech and hearing sciences. Laboratory construction and calibration of equipment. Two hours of laboratory required each week. Prerequisite, 420. (Offered alternate years; offered 1974-75.)

SPEECH AND LANGUAGE DISORDERS

Courses for Undergraduates

SPCH 250 Introduction to Communication Disorders (3) ASp
Orients the student to the field of communication disorders and to a basic classification system. Required of all students majoring in speech pathology.

SPCH 330 Disorders of Articulation (3) ASp

SPCH 331 Language Disorders of Children (3) W
Consideration of descriptions and theories, both historical and contemporary, of disordered language in children and related problems. Prerequisites, 250 and 303.

SPCH 332 Diagnosis of Speech Disorders (3) ASp
Prerequisites, 330 and 331.

SPCH 348 Survey of Communication Disorders (3) Sp
For students not intending to major in speech pathology or audiology.

SPCH 350 Methods of Clinical Management (3) AWSp
Miner
Techniques and procedures for planning effective management of speech disorders. Prerequisites, 380 or 331 and 332; 332 may be taken concurrently.

SPCH 351 Practicum in Speech Pathology (1-2, max. 15) AWSp
Miner
Total undergraduate credits in 351 and 391 together cannot exceed 20 credits. Minimum of 3 credits recommended. Prerequisites, 332, 350, and permission.

SPCH 352 Research in Communication Disorders (3) ASp
Prerequisites, 330 and 331.
S

SPCH 430 Nature of Stuttering (3) ASp
Major theories of stuttering are studied in light of research concerning the characteristics of stutterers and their symptoms. Prerequisite, 250 or permission.

SPCH 432 Interview Techniques for Communication Disorders (2) ASp
Interview techniques for the management of communication disorders. Prerequisites, 250 and junior standing.

SPCH 449 Special Studies in Speech Pathology and Audiology (1-5, max. 15)
Intensive study of selected special problems in speech pathology and audiology. Prerequisite, permission.

SPCH 450 Treatment of Stuttering (3) W
Prie Description and evaluation of therapy systems for children and adults who stutter. Two hours per week of therapy observation are integrated with class material. Prerequisites, 350 and 430, or permission.

SPCH 451 Speech Pathology-Audiology Practicum in the Schools (1-5) ASp
Miner, Wilson
Special projects in clinical practicum, 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.

SPCH 452 Rehabilitation Medicine Information in Speech Pathology (3) A
Orientation information for speech pathology and audiology students on rehabilitation principles and techniques. Offered jointly with the Department of Rehabilitation Medicine as Rehabilitation Medicine 479. Lecture and clinical observation in all areas of rehabilitation, emphasizing cooperation and coordination of various professions in rehabilitation.

SPCH 454 Voice Disorders (3) W
Etiology, evaluation, and treatment. Prerequisites, 250 and 301.

Courses for Graduates Only

SPCH 550, 531, 532 Organic Disorders of Speech (3,3,3) A, W, Sp
Etiology, evaluation, and treatment. 530: morphologic disorders, especially cleft palate and dental malocclusions. 531: dysarthria, especially cerebral palsy. 532: dysphasia. Prerequisite for each course, 330 or permission.

SPCH 555 Psychological Factors in Communication Disorders (2) W
Prerequisite, Psychology 305 or permission.

SPCH 556 Advanced Diagnostic Procedures in Speech Pathology (4) ASp
Study of approaches to differential diagnosis in speech and language disorders, as well as experience in the integration of information gained from various diagnostic procedures. Two hours of laboratory required per week. Class size limited. Prerequisites, 332 and permission.

SPCH 551 Advanced Practicum in Speech Pathology (1-5, max. 10) ASp
Miner
Prerequisites, 351 or equivalent and permission.

SPCH 552 Clinical Management of Stuttering (3) W
Prie Study and application of clinical procedures for the diagnosis and the 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.

SPCH 556 Research Methods in Clinical Management of Childhood Language Disorders (3) ASp
Rationale and methods for systematic sampling, data collection, and data analysis are applied to the evaluation and the modification of language behaviors. Each student designs, conducts, and reports on a laboratory project applying research methods to the evaluation of some aspect of a child's language behavior. Class size limited. Prerequisites, 303 and permission.

SPCH 561 Language of Normal Children (3) ASp
Carpenter
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, 303 and 560 or equivalent, and permission.

SPCH 562 Evaluation of Language Disorders of Children (4) ASp
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, 331 and 561, and permission.

SPCH 563 Management of Language Disorders of Children (3) ASp
Methodology appropriate to individual and small-group management with children having language disorders, with emphasis on a behavioral approach. Two hours of practicum required each week. Class size limited. Prerequisites, 331 and 561, and permission.

SPCH 564 Classroom Management of Language Behaviors (2-5) ASp
Rieke
Methodology and supervised experience in management of language behaviors in a preschoool class setting. Class size limited. Prerequisites, 563 and permission.

SPCH 565 Practicum in Language Disorders of Children (1-3, max. 15) ASp
Prerequisites, 563 or equivalent, and permission.

SPCH 566 Seminar on Language Development and Disorders (2, max. 6) Sp
Prerequisites, 331 and 477.

SPCH 569 Seminar on Speech Pathology (2, max. 6) Sp
Disorders of speech and language associated with psychopathologies in children and adults.

AUDIOLGY

Courses for Undergraduates

SPCH 306 Introduction to Audiology (5) ASp
Description of normal audition; elementary structure and function of the hearing mechanism; types of deficient hearing and their effects on speech. Prerequisites, 301 and 304.

SPCH 371 Basic Audiology (5) ASp
Introduction to the theory and practice of the assessment of hearing function. Two hours of laboratory required each week. Class size limited. Prerequisites, 306 and permission.

SPCH 390 Introduction to Aural Rehabilitation (5) W
Wilson
Psychological and educational implications of hearing loss; principles and methods of speech reading, auditory training, and speech conservation. Prerequisite, 306.

SPCH 391 Practicum in Audiology (1-2, max. 15) ASp
Wilson
Total undergraduate credits in 351 and 391 together cannot exceed 20 credits. Minimum of 2 credits recommended; may be repeated for credit. Prerequisites, 371 or 390, and permission.

SPCH 477 Pediatric Audiology (3) W
Assessment of auditory disorders in infants and young children. Emphasis on behavioral and electrophysiologic techniques and on the role of the audiologist in the clinical management of the young hearing-impaired child. Prerequisites, 306 and 371, or permission.

SPCH 493 Acoustic Amplification (3) W
Study of acoustic amplification and pertinent audiology techniques. Prerequisites, 371 and 390, or permission.

SPCH 494 Hearing Conservation for Children (2) Sp
Wilson
Planning and execution of identification and educational programs relative to hearing-impaired infants and children of preschool and school ages. Prerequisites, 371 and 390, which may be taken concurrently.

ARTS AND SCIENCES
ZOOLOGY

Courses for Undergraduates

**ZOOL 114** Evolution (2) S
General survey of evolution of animals, including man. For nonmajors.

**ZOOL 118** Survey of Physiology (5) AWSp
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
Martin
Specifically for physical education majors. May be taken by others only with permission. Prerequisite, 118 concurrently.

**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. Prerequisites, two quarters of college chemistry, two quarters of college biological sciences completed or in progress.

**ZOOL 301** Introductory Physiology (3)
Olsen, Riddiford, Truman
Fundamentals of physiology: biochemistry of cell constituents, environment of the cell, bioenergetics, intermediary metabolism, membranes, control mechanisms. Prerequisites, chemistry through organic, one year of college physics, 10 credits in biological sciences.

**ZOOL 330** Natural History of Marine Invertebrates (5) SpS
Kohn, Palen
Field and laboratory course emphasizing the habits, habitats, adaptations, and interrelationships of marine animals. Students may be required to share a portion of the transportation costs of field trips.

**ZOOL 331** Natural History of Freshwater Invertebrates (5) SpS
Osterud
Field and laboratory course dealing with the occurrence, distribution, and ecological relationships of common freshwater invertebrates. Students may be required to share a portion of the transportation costs of field trips. Prerequisite, 15 credits in biological sciences or permission.

**ZOOL 362** Natural History of Vertebrates (5) SpS
Field and laboratory course on the classification, ecology, and behavior of fishes, amphibians, reptiles, birds, and mammals. Students may be required to share a portion of the transportation costs of field trips. Prerequisite, permission.

**ZOOL 402** History of Zoology (3)
Prerequisite, 20 credits in zoology or permission.

**ZOOL 403** Comparative Vertebrate Histology (5) A
Cloney
Microscopic and submicroscopic anatomy of the tissues and organs of vertebrates. Prerequisite, Biology 212.

**ZOOL 409** Ethology (3) W
Orians, Palka
Perception, nervous integration, movement, motivation, instinct, learning, and social behavior in animals, with emphasis on their evolution and selective significance. Offered jointly with the Department of Psychology as Psychology 409. Prerequisite, 212 or Psychology 200, or equivalent.

**ZOOL 410** Ethology and Ecology Laboratory (1-4) Sp
Orians, Palen
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.

**ZOOL 428** General Physiology of Excitable Tissues (3)
Willows
Simple and complex ionic equilibria, electrical properties of membranes; active and passive membrane responses. Impulse generation and conduction; electrical and chemical synapses; structure of muscle, and mechanical, thermal, chemical, and electrical aspects of contraction. Prerequisite, 301.

**ZOOL 429** General Physiology of Excitable Tissues Laboratory (2)
Willows
Laboratory work to demonstrate the basic properties of nerve and the electrical and mechanical characteristics of muscle. This is followed by experiments with diverse species that emphasize less-well-known nerve, muscle, and synaptic phenomena. Training is given in the use of intracellular and extracellular stimulating and recording methods and other basic electrophysiological techniques. Prerequisites, 428 concurrently and permission.

**ZOOL 430** Marine Zoology (8) SpS
Kozlowski
Survey of groups of invertebrate animals represented in marine environments; natural history, ecology, distribution, habitat, adaptation, trophic interrelationships, including symbiotic associations, of local marine invertebrates. Prerequisites, 20 credits in biological sciences and upper-division standing.

**ZOOL 432** Marine Invertebrate Zoology (8) SpS
Kozlowski
Survey of groups of invertebrate animals represented in marine environments; natural history, ecology, distribution, habitat, adaptation, trophic interrelationships, including symbiotic associations, of local marine invertebrates. Prerequisites, 20 credits in biological sciences and upper-division standing.
ZOO 433, 434 Invertebrate Zoology (5,5) A,W
H. Kohn, Kozloff
Morphology and phylogeny of invertebrates exclusive of terrestrial arthropods. Not open to students who have had 432. Prerequisites, Biology 212; 433 for 434.

ZOO 435 Parasitology (5)
Osterud
General course covering the principles of parasitism and the major groups of animal parasites. Prerequisite, 20 credits in biological sciences or permission.

ZOO 438 Comparative Endocrinology 3 W
Gorbman
Hormonal integration of living processes at all levels in animals: cells, organs, organisms, populations. Prerequisites, one year of zoology and permission; histology and organic chemistry recommended.

ZOO 439 Comparative Endocrinology Laboratory (2) Sp
Gorbman
Appropriate experiments to accompany and enlarge on material presented in 438. Prerequisites, 438 and permission.

ZOO 444 Entomology (3) Sp
Edwards
Biological arthropods, with emphasis on insects. Structure, classification, physiology, and ecology of insects. Interrelationships of insects and man. Prerequisite, 15 credits in biological sciences or permission.

ZOO 445 Entomology Laboratory (2) Sp
Edwards
Structure and function of arthropods, with emphasis on insects. Field studies and taxonomy of important insect groups. Students may be required to share a portion of the transportation costs of field trips. Prerequisites, concurrent registration in 444 and permission.

ZOO 449 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.

ZOO 451 Concepts of Nervous System Function Laboratory (2)
Palka
Experiments to accompany material presented in 448. Prerequisites, 448 and permission.

ZOO 453-454 Comparative Anatomy of Chordates (5-5) A,W
Snyder
Phylogeny of the chordates; structure, function, and evolution of vertebrate organ systems. Prerequisite, Biology 212.

ZOO 456 Developmental Biology of Animals (5)
Adams, Bakken, Fernald, Schubiger
Introduction to properties and experimental analysis of developing systems, and a descriptive and comparative study of development with emphasis on chordates. The Autumn Quarter course emphasizes descriptive and comparative analysis. The Spring Quarter course emphasizes experimental aspects and the use of live material in the laboratory. Prerequisite, Biology 212. Prior completion of Zoology 301 recommended for the Spring Quarter course.

ZOO 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.

ZOO 458 Vertebrate Physiology (5)
Olsen, Martin
Emphasis on the physiology of nonmammalian vertebrates’ major functions and organ systems viewed extensively from ecologic and evolutionary aspects. Special attention is given to respiration, circulation, excretion, locomotion, energy metabolism, seasonal adaptation. Prerequisite, 301.

ZOO 459 Laboratory in Development (2) Sp
Analysis of developmental problems using several experimental approaches. Exercises include tissue culture and transplantation experiments, and use of biochemical approaches to characterize embryonic development. Prerequisites, concurrent registration in 457 and permission.

ZOO 460 Natural History of Birds (5) Sp
Rohwer
Lecture, laboratory, and field course. Students may be required to share a portion of the transportation costs of field trips. Prerequisites, Biology 212 and permission.

ZOO 461 Natural History of Mammals (5) Sp
Snyder
Lecture, laboratory, and field course. Students may be required to share a portion of the costs of transportation. Prerequisites, Biology 212 and permission. (Offered alternate years.)

ZOO 462 Comparative Physiology (5)
Edwards, Martin, Olsen
Osmotic and ionic regulation, respiration, circulation, and excretion, with special emphasis on the variety of means with which animals solve common problems. Prerequisite, 301.

ZOO 469 Reproductive Endocrinology (3) Sp
Gorbman
Regulation of the process of reproduction. Integration of reproduction with environmental features through behavioral and metabolic adjustments; its structural and functional evolutionary adaptive aspects. Endocrine modulation of the developmental process and its cellular mechanisms. Prerequisite, one year of college-level biology.

ZOO 470 Concepts and Issues (5)
Zoological concepts, their current and potential applications to cultural dilemmas and frontiers. Prerequisite, advanced standing.

ZOO 475 Zoogeography (3) W
Studies of the present distribution of terrestrial vertebrates and how it has come about, especially in relation to environment, evolution, and dispersal. Prerequisites, Biology 212 or equivalent, and one additional course involving some study of vertebrate classification, or permission.

ZOO 490 Undergraduate Seminar (3, max. 6)
Supervised reading and group discussion on selected concepts of zoology. Prerequisites, 20 credits in zoology and permission.

ZOO 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.

ZOO 498 Special Problems in Zoology (1-5, max. 15) A,W,Sp
Prerequisites, 30 credits in zoology and permission.

Courses for Graduates Only
ZOO 506 Topics in Experimental Embryology (3, max. 6)
Seminars and discussions of aspects of growth of special current interest. Prerequisite, permission.

ZOO 517 Comparative Developmental Physiology (6)
Whitney
The topics of oogenesis, fertilization, and differentiation of invertebrates are considered from the point of view of biosyntheses, permeability, and metabolic changes, acquisition of special biochemical properties and physical mechanisms of developmental processes. The laboratory deals comparatively with a variety of marine invertebrates. Offered at Friday Harbor Laboratories. Prerequisite, permission.

ZOO 520, 521, 522 Seminar (1,1,1) A,W,Sp
Farnar

ZOO 528 Advanced Topics in Physiology (1-3, max. 15)
Bakken, Edwards, Laird, Ridiford, Schubiger
Advanced considerations in physiology with emphasis on recent developments. Prerequisite, at least one 400-level course in physiology.

ZOO 531 Advanced Invertebrate Zoology (6) Sp
The rich and varied invertebrate fauna of the San Juan Archipelago is studied, emphasizing systematics and ecology, with opportunity for developing individual research problems. Offered at Friday Harbor Laboratories. Prerequisite, 10 credits in invertebrate zoology or equivalent.
BUSINESS ADMINISTRATION

ZOOL
534 Topics in Advanced Invertebrate Zoology (3 or 6, max. 15)
Ilg, Kohn, Kofoid
Advanced considerations in morphology, ecology, phylogeny of invertebrates, emphasizing current developments. Six credits available at Friday Harbor Laboratories only. Prerequisite, permission.

ZOOL
536 Comparative Invertebrate Embryology (6) SpS
Morphological and experimental studies of development of selected types of marine invertebrates. Offered at Friday Harbor Laboratories. Prerequisites, 433, 434, and 456.

ZOOL
538 Advanced Invertebrate Physiology (6) SpS
Physiological bases of ecology, evolution, and tolerance to stress, as illustrated by many diverse forms. Offered at Friday Harbor Laboratories. Prerequisites, chemistry through organic and 10 credits in invertebrate zoology, or equivalent.

ZOOL
554 Advanced Vertebrate Morphology (3)
Snyder
Current problems and trends in vertebrate anatomy emphasizing functional relationships. Prerequisites, 454, 456, and permission.

ZOOL
556 Insect Development (3)
Edwards, Baldieoff, Schubiger
Characterizes developmental processes and their adaptations in diverse insect groups. Emphasizes hormonal control mechanisms in metamorphosis, polymorphism and diapause, regeneration and genetic analysis of development. Prerequisites, 456 or equivalent, Biology 212 or equivalent, or permission.

ZOOL
566 Chemical Integration (2, max. 6) AW
Gorbman
Graduate seminar dealing with current problems in endocrinology and neuroendocrinology. Prerequisite, permission.

ZOOL
572 Topics in Ecology (2 or 3) W
Edmonston, Kohn, Orians, Paine
Graduate seminar on modern problems in ecology. Prerequisites, Biology 472 or equivalent, and permission.

ZOOL
574 Ecology of Marine Communities (3)
Paine
Lecture course emphasizing the ecological structure and functioning of marine communities. Topics include population interactions and dynamics, distributional patterns, bioenergetics, stability, and species diversity. Prerequisites, Biology 472 or equivalent, and permission.

ZOOL
576 Environmental Marine Physiology (6)
The relationship of vertebrate and invertebrate physiology to physical factors in the marine environment. Instruction 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; physiology recommended.

ZOOL
578 Advanced Ecology (5)
Ornans
Strategies of reproduction, habitat selection, foraging and spacing; theory of competition and predator-prey interactions; niche theory and community structure. Prerequisites, Biology 472 or equivalent, and permission.

ZOOL
581 Systematic Zoology (5)
Ilg
History, principles, and procedures of zoological taxonomy; review of biological bases of phylogeny; history and principles of zoological nomenclature. Prerequisite, permission.

ZOOL
583 Advanced Techniques in Microscopy (5) W
Cloney
Theory and use of light and electron microscopes, modern techniques of specimen preparation for morphological studies, photography. Methodologies are applied to analyses of special problems selected by students. Prerequisite, permission.

ZOOL
600 Independent Study or Research (*) A WP S

ZOOL
700 Master's Thesis (*) A WP S

ZOOL
800 Doctoral Dissertation (*) A WP S

SCHOOL AND GRADUATE SCHOOL OF BUSINESS ADMINISTRATION

ACCOUNTING
Courses for Undergraduates

ACCTG
210 Fundamentals of Accounting (3)
Nature and social setting of accounting; uses of accounting information; introduction to basic accounting concepts, and some accounting techniques. Prerequisite, sophomore standing.

ACCTG
220 Fundamentals of Accounting (3)
Basic concepts used in financial reporting, interpretation of financial statements. Prerequisite, 210.

ACCTG
230 Basic Accounting Analysis (3)
Analysis and evaluation of accounting information as part of the managerial processes of control, planning, and decision making. Concentrates on the use of information by those managing the enterprise and making decisions. Prerequisite, 220.

ACCTG
301 Intermediate Accounting I (3)

ACCTG
302 Intermediate Accounting II (3) Continuation of 301. Prerequisite, 301.

ACCTG
303 Advanced Accounting (3)

ACCTG
311 Cost Accounting (3)
Introduction to the theory of cost accounting: job order processes; and standard cost systems; overhead accounting; problems in accumulation and allocation of costs; decision making with cost data. Prerequisite, 301.

ACCTG
371 Auditing or Industrial Internship (2)
One quarter's internship with a certified public accounting firm, industrial organization, or government agency. Prerequisite, prior departmental approval.

ACCTG
375 Topics in Financial Reporting (4)
Critical examination of the uses and limitations of general purpose financial statements that have been prepared in accordance with generally accepted accounting principles. Prerequisite, 230; not open to accounting majors.

ACCTG
411 Auditing Standards and Principles (3)
Establishes a framework in which the student operates as a professional to examine the problems and the opportunities, the approaches and the methodology in performing the attest function and in expanding the attest function in the future. Prerequisites, 302, 311.

ACCTG
421 Federal Income Tax (5)
Comprehensive development of individual and corporation income tax. 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 Quantitative Methods 200.

ACCTG
440 Accounting Systems (3)
Focuses on the integration of accounting and other information systems. The concepts and methodology of computerized information systems analysis and design, and a study of the management of the information function. As a part of systems design, the student is introduced to COBOL as a programming language used in business information systems. Advanced study of computer equipment and its impact on systems. Prerequisite, 430.

ACCTG
450 Special Tax Problems (3)
Special problems in income tax, including partnerships and estates and trusts, corporate reorganization, gift and estate taxes, basic tax research. 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 standards and principles to case studies of auditing problems, including practice case. Prerequisite, 411.

ACCTG 475 Administrative Controls (3)
The use of the budgetary, statistical, and accounting information in planning operations and achieving planned objectives through control. Prerequisites, 230 and Quantitative Methods 201.

ACCTG 480 Fund Accounting (3)
Fund and budgetary accounting as applied to governments and to institutions, such as hospitals and colleges. Prerequisite, 302.

ACCTG 485 Consolidated Financial Statements (3)
Accounting for parent-subsidary and branch relationships; mergers; foreign exchange. Prerequisite, 303.

ACCTG 490 Advanced Problems (3)
Intensive study of accounting principles, procedures, and presentations, principally through consideration of C.P.A. problems. Prerequisites, 311, 411, 421, 480.

ACCTG 495 Advanced Accounting Theory (3)
Theory of accounting related to income measurement, assets, and equities. Prerequisites, 303 and senior standing.

ACCTG 499 Undergraduate Research (3, max. 9)
Arranged and supervised by individual members of the faculty. Prerequisite, permission.

ACCTG 4998 Special Study (3)
Advanced undergraduate study of special problem areas in accounting, such as various behavioral implications of accounting and financial reporting processes or accounting controls for social programs. Prerequisite, permission.

Courses for Graduates Only

ACCTG 500 Managerial Accounting (3)
Covers concepts and procedures for determination and presentation of information for managerial and financial decisions. Income determination, cost analysis, and analytic reports. Interpretation, use, and limitations of accounting statements. Prerequisite, permission.

ACCTG 501 Managerial Accounting (3)
Study of the generation and use of accounting information within the firm for purposes of planning and controlling operations. Topics covered include cost concepts, responsibility accounting systems, cost control, and the use of accounting information in short- and long-term management decision problems. Prerequisites, 500 and permission.

ACCTG 510 Concepts In Accounting Measurements (3)
Intensive study of accounting principles underlying financial statements, the measurement of income, the valuation of assets, and accounting for corporate stock options. Emphasis is placed on the uses and limitations of accounting data, including analysis and interpretation of financial statements, and the manager's responsibilities and opportunities in financial reporting. Prerequisites, 500 and permission.

ACCTG 511 Concepts In Accounting Measurements (3)
Identifying and measuring attributes of resources of the firm relevant to management decisions. Flows as they relate to time, volume of activity, units of product, segments of the firm, and functional responsibility. Problems of cost and revenue forecasting for planning and control. Prerequisites, 500, 501, and permission.

ACCTG 520 Seminar in Financial Accounting (3)
Critical examination of alternative approaches to the study and development of accounting theory. Evaluation of selected classic contributions to accounting theory. Extensive readings and discussion of recent attempts in English-speaking countries to formulate meaningful and useful conceptual bases for accounting. Prerequisite, permission.

ACCTG 521 Seminar in Financial Accounting (3)
Application of accounting theories to unresolved problems in financial accounting. Topics covered vary with the changing importance of current accounting concepts and problems. Stress is placed on developing research and writing skills along with analytic abilities. Prerequisites, 520 and permission.

ACCTG 522 Seminar in Cost Accounting (3)

ACCTG 540 Seminar on International Accounting (3)
Emergence of the international accounting problem and organizations associated with the study of the issues involved; national differences in accounting thought and practice; international standards of accounting and auditing and financial reporting. Prerequisite, permission.

ACCTG 570 Seminar on Auditing (3)
Examination of the changing business environment of the auditor and the impact of these changes on auditing philosophy, objectives, and methodology. The seminar focuses on the auditing of integrated information systems, the use of computers as an audit tool, and the expansion of the reporting function. Management aspects of public accounting practice are examined. Prerequisite, permission.

ACCTG 571-572 Research Reports (3-3)
Independent study in business administration; critical evaluation of business analysis and research methods. Effective communication of ideas is emphasized. Methods and content of independent research studies being completed by the students are subjected to critical evaluation. Open only to M.B.A. nonthesis students. Prerequisites, instructor's approval of preliminary research topic outline for 571-; 571-- for 572.

ACCTG 585 Seminar on Management Control Systems (3)
Design of information systems for planning and control processes in large organizations; formulation of divisional goals and control criteria; motivation and measurement of divisional performance; administration of new investment programs; and general organization of the planning and control function. Prerequisites, 501, Administrative Theory and Organizational Behavior 550, and permission.

ACCTG 599 Doctoral Seminar on Accounting (3)
Study and research in advanced topics of accounting. The seminar is generally concerned with unpublished areas of research as well as research methodology and philosophy. It is conducted by visiting professors and departmental faculty. For doctoral students only. May be repeated for credit. Prerequisite, permission.

ADMIN

ADMIN 510 Integrative Administration (15 credits)
Summer Quarter, 5 credits; Autumn, Winter, or Spring Quarter
Johnson
Includes materials basic to the study and analysis of administration in organizations: organizational theory and administrative behavior; resource allocation, accounting and financial control; systems operation and analysis; marketing; and governmental-societal framework. Faculty team-teach approach. Not open to business administration majors. Prerequisite, permission of Graduate School of Business Administration.

ADMINISTRATIVE THEORY AND ORGANIZATIONAL BEHAVIOR

Courses for Undergraduates

A ORG

A ORG 301 Behavioral Science and Administration (4)
Introduction to some of the fundamental research and theories of behavioral science that are particularly relevant to the study of management. Materials are presented to aid the student of management and administration in understanding the behavior of individuals and work groups. Prerequisite, junior standing.

A ORG

A ORG 440 Organization Theory (3)
Study of concepts of authority, power, and influence; communications, delegation and decentralization, decision and planning theory; formal organization structures, group decision making, philosophy and values in business organizations, and considerations of organization as a social issue. Prerequisite, 90 credits.

413
BUSINESS ADMINISTRATION

A ORG 441 Advanced Organization Theory (3)
Deals with current research, measuring organizational effectiveness, planning, leadership, terms, current problems, developments in related disciplines. Prerequisite, 440.

A ORG 460 Human Relations in Organizations (4)
Develops understanding of organizational behavior, with a clinical focus on basic processes and methods involved in diagnosing human situations, current problems, and structuring effective interpersonal relationships in organizational contexts. Prerequisites, 460 or permission, and senior or graduate standing.

A ORG 461 Two-Person Behavior in Organizational Contexts (4)
Clinically examines those behavioral skills and processes that are most basic in the development of effective individual behavior in business and other organizational contexts. Emphasis on clinical practice in developing: (1) self-awareness; (2) skills and processes in face-to-face communication and interaction; and (3) structuring of effective interpersonal relationships in organizational contexts. Prerequisites, 460 or permission, and senior or graduate standing.

A ORG 463 Administrative Behavior (4)
Studies practice and theory in formal organizations through selected readings and actual cases. Emphasizes the superior-subordinate relationship at all levels. Considers the administrator's frame of reference, communication in organizations, motivation, informal organization, situational and environmental aspects, and administrative controls. Prerequisite. either Administrative Theory and Organizational Behavior 460 or Human Resource Systems 301.

A ORG 464 Racial, Ethnic, and Cultural Factors in Administration (4)
Focuses on understanding racial, ethnic, and cultural factors and their impact on the administration of organizations. Emphasis on the comprehension of behavioral dynamics of discrimination through case analysis, role playing, and other exercises. Prerequisite, permission.

A ORG 499 Undergraduate Research (3, max. 9)
Prerequisite, permission.

Courses for Graduates Only

A ORG 500 Human Relations in Organizations (3)
Analytically examines basic clinical processes related to diagnosing organizational behavior and taking action, and such aspects as individual and group behavior, basic human relations skills, behavioral processes, and the effects of organizational systems and processes on human organization. Prerequisite, permission.

A ORG 550 Organization and Management (3)
Studies concepts of power, authority and influence, objectives and goals, decision making and planning, communication, delegation and decentralization, leadership and motivation, and considerations of values, social issues, and future trends in organization. Research and theoretical studies in other fields, such as behavioral science and economics, are related to business organization and management theory. Prerequisite, permission.

A ORG 565 Seminar on Comparative Administrative Theory (3)
Identifies and evaluates the variations that occur among significant factors within organizations, across organizations, institutional groups (business, education, health services, government), national cultures (U.S., Russia, France, Brazil) and supranational cultures (SEATO, EEC), and their effect upon unit effectiveness. Prerequisite, permission.

A ORG 571-572 Research Reports (3-3)
See Accounting 571-572 for description.

A ORG 575 Human Aspects of Administration (3)
Examines administration process with a primary focus on organizational behavior. Develops the basic contributions of social science and other sources in the formulation of administrative-organizational conceptual schemes. Critically evaluates administrative theory in relation to administrative practice. Prerequisite, permission.

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, drawing on findings from psychology, sociology, social and cultural anthropology, business administration, government, and other sources. Prerequisite, permission.

A ORG 577 Practicum in Human Relations (3)
Utilizes the concepts, structures, methods, and techniques, commonly called the laboratory training method, for learning about personal and interpersonal phenomena. The course presents the opportunity for an in-depth examination of one's and other's behavior and of the consequences of that behavior, using the vehicle of the T- group—an unstructured small group that focuses on the "here and now" actions, reactions, and interactions of the group members. The T-group provides the environment for inquiry, examination, and experimentation; the data are created and analyzed by the group members working together. Prerequisite, permission.

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 of planning into a single theory. Prerequisite, permission.

A ORG 584 Theory and Practice in Organization Development (3)
Provides a conceptual understanding of organization design and change, 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, inter-group conflict resolution, and implications for the total organization. Prerequisite, permission.

A ORG 587 Seminar on Advanced Organization Theory (3)
Investigates the development of a theory of organization with subtheories on structures, processes, goal determination, problem solving, innovation, and change. Appraises various approaches to the study of organizations such as the sociological, normative, descriptive, analytical, and systems approach. Studies in detail the most important conceptual and analytical models of organization such as bureaucratic, information-communication, coalition, economic, and behavioral. Appraises the research methodologies in field studies, laboratory investigations, model building, and simulation. Discusses the future trends in organization theory. Prerequisite, permission.

A ORG 599 Doctoral Seminar on 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.

A ORG 699 Independent Study or Research (*)
Prerequisite, permission.

BUSINESS ADMINISTRATION

B A 513 Introduction to Information Processing Systems (2)
Introduction to the use and the programming of computers for business applications. Programming problems in BASIC. Impact of computers on management. No credit if Quantitative Methods 200 has been taken. Prerequisite, permission.

B A 515 Introduction to Computer Information Systems (4)
Provides further study of computer technology and its impact on administrative organizations, the design and implementation of computerized information systems, and some exposure to computer languages. The purpose of the course is to provide the knowledge required by an operating or staff manager to work effectively with specialists developing computerized information systems. Prerequisites, 513 and permission.

B A 700 Master's Thesis (*) AWRp

B A 800 Doctoral Dissertation (*)

BUSINESS ADMINISTRATION

RESEARCH METHODS

BA RM 500 Statistical Methods I (4)
The treatment of statistical methods useful in doing research in the various areas of business administration. Emphasis is placed on using the
statistical tools for testing hypotheses. Includes probability theory, sampling, estimation, hypothesis testing. Prerequisites, Quantitative Methods 201 or equivalent, doctoral standing, and permission.

**BA RM**
501 Statistical Methods II (4)
Continuation of 500. A treatment of statistical methods useful in doing research in the various areas of business administration. Includes multiple regression analysis, analysis of covariance, nonparametric statistics. Prerequisites, 500 and permission.

**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, and permission.

**BA RM**
511 Applied Econometrics II (3)
Continuation of 510. Hypothesis testing, distributed lag 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, and permission.

**BA RM**
521 Behavioral Research Methods—Approaches and Applications (3)
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 statistical tools and techniques for an understanding of theory development and research design. Prerequisites, 500 and 501, and permission.

**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**

**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. Prerequisite, Economics 201.

**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, Economics 200 and 201.

**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 of forecasting techniques. Prerequisites, 301 and Quantitative Methods 201.

**B ECN**
499 Undergraduate Research (3, max. 6)
Research in selected areas of business economics. Prerequisites, 300 and 301, and permission.

**Courses for Graduates Only**

**B ECN**
500 Business Economics I (3)
Factors underlying the determination of cost and prices for the industry and the firm; demand analysis. Prerequisite, permission.

**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. Prerequisites, 500 and permission.

**B ECN**
512 Advanced Managerial Economics (3)
Focus is on application of basic firm theory as developed in 500. Principles of optimum resource allocation, empirical estimation of cost and demand schedules. Prerequisites, 500 and Quantitative Methods 500, and permission.

**B ECN**
513 Macroeconomics (3)
National income and output analysis; examination of dynamic income-expenditure models; economic growth and industry change. Prerequisites, 501 and permission.

**B ECN**
520 Seminar on Monetary and Fiscal Policy (4)
Exploration of the recent and current literature in the area of monetary and income theory and an examination of monetary and fiscal policy problems in the area of domestic finance. Prerequisites, 500, 501, and Finance 420, and permission.

**B ECN**
524 Seminar on Forecasting (3)
Problems of forecasting business conditions; analysis of forecasting methods and techniques of preparing forecasts used by corporations, advisory services, and government. Empirical as well as theoretical problems. Prerequisites, 513.

**B ECN**
526 Industry Structure and Performance (3)
Market structure, conduct, and performance; mergers and diversification; price and non-price patterns of firm behavior. Prerequisite, permission.

**B ECN**
571-572 Research Reports (3-3)
See Accounting 571-572 for description.

**B ECN**
588 Seminar on Applied Microeconomic Analysis (3)
Seminar on applied microeconomic analysis: emphasis on individual selected topics and presentation of papers with application to economic problems of industries and firms, such as the estimation of aggregate production functions for industries, consumer preference patterns, firm forecasting and intrafirm pricing policies. Prerequisite, permission.

**B ECN**
599 Doctoral Seminar on Business Economics (3)
Study and research in advanced topics of business economics. 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.

**B ECN**
600 Independent Study or Research (*)

**BUSINESS, GOVERNMENT, AND SOCIETY**
Courses for Undergraduates

**BGS**
101 Business: An Introductory Analysis (5)

**BGS**
200 Introduction to Law (5)
Legal institutions and processes; law as a system of social thought and behavior and a frame of order within which rival claims are resolved and compromised; legal reasoning; law as a process of protecting and facilitating voluntary arrangements in a business society.

**BGS**
310 Legal Aspects of Business and Public Policy (5)
Legal questions involved in government and economic institutions, including government regulation of competition; business-labor relations, government ownership; government assistance to business as well as business influences on government; regulation and the alternative of public control in selected case studies.
in such areas as pollution control and public utilities. Prerequisite, 200 or permission.

BG&S 333 Business and Society (4)
Major concepts in the behavioral sciences with respect to the influence of cultural norms and goals upon business activity, and the interdependence of business and other elements of the social order. Lectures and discussion.

BG&S 361 Business History (3)
Exploration and analysis of the development of the American business system within the context of environmental forces shaping the growth of the nation.

BG&S 403 Commercial Law (5)

BG&S 440 Pre-Modern Social and Economic Systems (3)
Examination of the social and economic institutions of representative premodern societies around the world.

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.

BG&S 490 Special Topics and Issues in Business, Government, and Society (3, max. 9)
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, permission.

BG&S 499 Undergraduate Research (3, max. 9)
Selected problems in social, legal, and economic institutions. Prerequisite, permission.

Courses for Graduates Only

BG&S 510 Business and Public Policy (3)
Legal institutions and processes in the development of public policies affecting business with special emphasis on the newly emerging issues of business and public policy. Analysis of the relation of recent legal developments to corporate social responsibility. Possible topics include: major legal developments regarding consumer and environmental protection, employer-employee relationships, and the existence and use of corporate power. Prerequisite, permission.

BG&S 511 The Context of the Business System (3)
Specific problems that arise between the business system and the environmental context within which it operates. The role and contribution of the business system to American society and the symbiotic relationship that exists between the two. Prerequisite, permission.

BG&S 549 Cultural Change and Modernization (3)
Intensive analyses of specific cases of culture change around the world. The emphasis is on economic development and modernization with special attention to problems of introducing change and the practical consequences of change.

BG&S 552 Legal Aspects of Business Regulation (3)
Examination, from the point of view of the business manager and the society, of advanced problems bearing upon top management's operating policy, with particular reference to selected legal and economic issues in public policies relating to competition. Prerequisite, permission.

BG&S 553 Advanced Problems in Business and Public Policy (3)
Advanced contemporary problems in business and public policy; wage and price controls; collective bargaining and strikes in essential industries; racial integration; "undesirable" and "excessive" advertising; industrial impact on the physical environment. Prerequisite, permission.

BG&S 562 Responsibilities of Business Leadership (3)
Relationships among business and consumers, government, labor, and agriculture as affected by changing social forces. Problems of business ethics. Prerequisite, permission.

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.

BG&S 571-572 Research Reports (3-3)
See Accounting 571-572 for description.

BG&S 575 Theories of Capitalism (3)
Focuses upon the various theories of capitalism developed over the past several centuries and their relevance for our contemporary society. Prerequisite, permission.

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 microbusiness and microbusiness. Prerequisite, permission.

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.

BG&S 598 Analysis of Business Behavior (3)
Analysis of the behavior of the modern firm and its environment in the light of traditional and contemporary theory. Emphasis is placed upon empirical investigation of firm behavior. Prerequisite, permission.

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 upon problem analysis, the decision-making process, administration and control, and continuous reappraisal of policies and objectives. This course integrates and builds upon the work of the core curriculum. Prerequisites, senior standing or above and Finance 350, Marketing 301, Operations and Systems Analysis 301, and Human Resource Systems 301 or Administrative Theory and Organizational Behavior 460, or permission.

B POL 471 Problems of the Independent Businessman (4)
The role of small business in the economy. Case studies of problems faced by owner-managers of small business enterprises. The managerial role in establishing and operating new businesses. Case studies of problems involved in translating new product or service ideas into economic enterprises. Emphasis on the decision-making process in choosing a strategy and implementing it. Prerequisites, senior standing or above and Finance 350, Marketing 301, Operations and Systems Analysis 301 and Human Resource Systems 301 or Administrative Theory and Organizational Behavior 460, or permission.

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 Finance 350, Marketing 301, Operations and Systems Analysis 301 and Human Resource Systems 301 or Administrative Theory and Organizational Behavior 460, or permission.

B POL 499 Undergraduate Research (3, max. 9)
Prerequisite, permission.

Courses for Graduates Only

B POL 571-572 Research Reports (3-3)
See Accounting 571-572 for description.

B POL 593 Policy Determination and Administration (3)
Analysis of policy problems faced by chief administrators of business firms. Determining of objectives; development of policies to achieve objectives; organization of...
executive personnel to implement policies; coordination of the organization; appraisal and adjustments to changes in the environment. The course is intended to give a clearer insight not only into how business decisions are reached but also into the motivation of businesswomen in deciding upon courses of action in varying circumstances. It is recommended that this course be scheduled toward the end of the student's course work. Prerequisite, second-year standing in M.B.A. program and permission.

B POL
594 Policy Determination and Administration
(3)
Advanced analysis of policy problems faced by chief administrators of organizations. Course includes case studies and business gaming. It is recommended that this course be scheduled toward the end of the student's course work. Prerequisite, 593.

B POL
595 Entrepreneurship
(2)
Course focuses on entrepreneurship, both in the form of (1) establishment of new independent businesses owned largely by those who manage them or (2) initiation of new enterprises having exceptional autonomy within larger organizations that finance and own them. Basic knowledge in accounting, marketing, and finance is assumed. Prerequisite, permission.

B POL
596 Technological and Social Responsibilities in Management Decisions
(3)
The job of any manager, whether in a corporation, hospital, or government agency, includes: awareness of the technical responsibility of the organization to provide efficient goods or services to society; awareness of human responsibility of the organization to provide a good life for human beings inside and outside the organization; and an ability to reconcile and balance these often conflicting values in managerial (policy) type decisions. The primary goal of the course is to develop a method for making this kind of decisions by use of case analyses and selected reading. Prerequisite, second-year standing.

FINANCE
Courses for Undergraduates

FIN
350 Business Finance
(4)
Sources, uses, cost, and control of funds in business enterprises. Internal management of working capital and income sources and cost of long-term funds; capital budgeting; financing of the growth and expansion of business enterprises; government regulation of the financial process. Prerequisite, Business Economics 300.

FIN
420 Financial Markets
(4)
Analysis of the structure and functions of the money and capital markets; the saving-investment process and financial intermediaries; supply and demand for lendable funds and the level and structure of interest rates, role of Federal Reserve and Treasury in money market developments. Prerequisite, Business Economics 301.

FIN
422 Banking and the Financial System
(4)
Role of banks and nonbank financial institutions in the financial system; asset choices of banks and nonbank financial institutions; problems in the management of financial institutions with emphasis on commercial banks. Prerequisites, 350, 420.

FIN
424 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, Business Economics 301.

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 Accounting 375.

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 Quantitative Methods 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, securities portfolios, and total wealth. Prerequisite, 350.

FIN
461 Investment Analysis
(4)
A sequence course to 460 in which traditional investment analysis of securities is explored in more detail, and special emphasis is directed to more recent developments, especially portfolio analysis. Prerequisite, 460.

FIN
499 Undergraduate Research
(3, max. 6)
Research in selected areas of business finance, money and banking, or investments. Prerequisites, 350 and permission.

Courses for Graduates Only

FIN
502 Business Finance
(3)
Financial management of the firm including capital budgets, working capital analysis, and dividend policy. Prerequisite, permission.

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 Urban Development as Urban Development 515. Prerequisite, permission.

FIN
520 Money Markets
(3)
Analysis of the functions and the structure of money markets; the saving-investment process and financial intermediaries; supply and demand for lendable funds and the level and structure of interest rates, role of the Federal Reserve and Treasury in the money markets. Prerequisites, Business Economics 501 and permission.

FIN
521 Seminar on Financial Markets
(3)
Analysis of managerial and environmental financial problems of banks and nonbank financial institutions; theory of flow of funds and financial intermediation. Prerequisites, 420, and Business Economics 500, 501, and permission.

FIN
527 Seminar on International Finance and Investments
(3)
Study of selected problems in financing, international trade, investment, and foreign business operations; international aspects of money markets; problems of evaluation of foreign investments. Prerequisites, 502 and permission.

FIN
550 Advanced Business Finance
(3)
Systematic coverage of the theory of financial management. Application of quantitative analysis to the financial problems of the firm. Examination of empirical studies on the financing of the modern corporation. Prerequisites, 502 and permission.

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. Prerequisites, 502 and permission.

FIN
552 Seminar on 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, doctoral standing and permission.

FIN
560 Investments
(3)
Introduction to the nature, the problems, and the process of evaluating particular securities and portfolio construction and administration. Special attention is directed to the risk and rate-of-return aspects of particular securities, securities portfolios, and total wealth. Prerequisites, 502 and permission.

FIN
561 Seminar on Investments
(3)
Discussion and analysis of concepts, processes, and problems of investment media valuation, portfolio valuation, and portfolio construction, and administration for individuals and institutions. Prerequisites, 460, 502, and permission.

FIN
571-572 Research Reports
(3-3)
See Accounting 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 only. Prerequisite, permission.

FIN 600 Independent Study or Research (*)

**HUMAN RESOURCE SYSTEMS**

**Courses for Undergraduates**

HRSYS 301 Personnel Systems and Industrial Relations (3)
The recruitment, selection, utilization, and development of human resources, with special emphasis on union-management relations and relevant behavioral science research.

HRSYS 443 Staffing (4)
Includes manpower planning, recruitment, testing, selection, placement orientation, training, and promotion.

HRSYS 445 Compensation and Performance Evaluation (4)
Includes job evaluation, wage and salary administration, performance standards and appraisal, employee benefits.

HRSYS 450 Collective Bargaining and Arbitration (5)
Focus on helping the student acquire knowledge and skills that will enable him to be effective in resolving intergroup conflict. This is accomplished almost exclusively 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.

HRSYS 499 Undergraduate Research (3, max. 9)
Prerequisite, permission.

**Courses for Graduates Only**

HRSYS 520 Seminar in Personnel and Industrial Relations (3)
Problems and policies in personnel and industrial relations are analyzed in the following areas: personnel philosophy, ethics, role of personnel department, breadth of personnel department's responsibilities, implementation of personnel programs, collective bargaining, and contribution of personnel department to the organization. Prerequisite, permission.

HRSYS 530 Personnel Systems and the Behavioral Sciences (3)
Depth analysis of the utility, reliability, and validity of current and proposed personnel devices and systems in staffing, directing, appraisal, compensation, training and development, and collective bargaining. Prerequisite, permission.

HRSYS 541 Management-Employee Relations Systems in the White Collar and Professional Sectors (3)
Focuses on current and emerging forms of management and employee relations systems. Primary emphasis is given to new forms of white-collar unionization, bargaining and quasi-bargaining situations between professionals and management, and emerging forms of third-party participation in these relationships. Prerequisite, permission.

HRSYS 571-572 Research Reports (3-3)
See Accounting 571-572 for description.

HRSYS 599 Doctoral Seminar in Personnel and Industrial Relations (3)
Study and research in advanced topics of personnel and industrial relations. The seminar is generally concerned with unpublished areas of research and is conducted by visiting professors and departmental faculty. For doctoral students only. May be repeated for credit. Prerequisite, permission.

HRSYS 600 Independent Study or Research (*)

**INTERNATIONAL BUSINESS**

**Courses for Undergraduates**

I BUS 310 Principles of International Business (5)
Broad study of the major forms of international business: export and import trade, overseas investment, production and marketing operations, licensing, financing, and other services. Theoretical principles, government policies, business practices. Prerequisite, junior standing or permission.

I BUS 330 Business Environment in Developing Nations (4)
The international environment for transnational trade, investment, and operations in the less developed countries; survey of the economics of underdevelopment; analysis of foreign economic, cultural and political environments and their impact on international business; foreign investment in the development process; case studies. Prerequisite, 310 or equivalent.

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 business activities; analysis of sources and causes of international change. Prerequisite, 310 or equivalent.

I BUS 440 National Policy in International Business (4)
Concepts and characteristics of contemporary international economic relations; analysis of tariffs and non-tariff trade controls; international economic policies of the United States and other major countries; bilateral and multilateral trade; GATT, UN Trade and Development Conference; Kennedy Round and aftermath; pending issues; analysis and evaluation of current trade legislation. Prerequisite, 310 or equivalent.

I BUS 450 East-West Economic Relations (4)
Impact of foreign economic policies of communist countries on world business; communist trading organization and representation abroad; trade patterns; integration of international trade and industrial activity; export and import policies and practices; pricing and costing practices; joint ventures between communist and capitalist enterprises; United States policies toward communist countries; changing patterns of East-West economic relations. Prerequisite, 310 or equivalent.

I BUS 460 Multinational Operations Management (4)
Case studies in foreign operations management: planning international objectives and strategies; developing multinational company structures and executives; adapting administrative practices and operating policies to international diversities. Prerequisite, 310 or permission.

I BUS 499 Undergraduate Research (3, max. 9)
Prerequisite, permission.

**Courses for Graduates Only**

I BUS 515 Concepts and Policies (3)
Theoretical and managerial concepts, institutions, and environment of international business; organization and administration of foreign operations; conflicts between domestic and international policies and practices. Prerequisite, permission.

I BUS 520 Business Enterprise in Developing Areas (3)
The conditions, requirements, and problems that create business enterprise in the developing countries of Africa, Asia, Latin America, and Oceania form the theme and the structure for this seminar. Prerequisite, permission.

I BUS 521 Business Enterprise in Integrated Markets (3)
Study in depth of the European Economic Community and other internationally integrated areas; their impact upon business operations and world trade is emphasized. Prerequisite, permission.

I BUS 544 Multinational Corporate Systems (3)
Theoretical concepts; structural and sociological systems; intracompany international trade; transfer of corporate skills; transfer pricing; managerial communication; integration of the different national subsystems; normative deductions. Prerequisites, 515 and permission.

I BUS 571-572 Research Reports (3-3)
See Accounting 571-572 for description.

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 a program adviser and a faculty member who can be assigned to direct their work in accordance with a definite program of studies. Prerequisite, permission.
MARKETING
Courses for Undergraduates

MKTG 300 Marketing Concepts (4)
Analysis of tools, factors, and concepts used by management in planning, establishing policies and solving marketing problems. Topics cover marketing concepts, consumer demand and behavior, location analysis, marketing functions, institutions, channels, prices, and public policy. Not open to business administration students for credit, nor to those who have taken 301.

MKTG 301 Marketing Concepts (4)
Analysis of tools, factors, and concepts used by management in planning, establishing policies and solving marketing problems. Topics cover marketing concepts, consumer demand and behavior, location analysis, marketing functions, institutions, channels, prices, and public policy. Prerequisite, Economics 201.

MKTG 341 Product and Price Policies (4)
Examines important aspects of product planning and development, product line decisions, packaging, brand policies, guarantees, and services. Price theory is considered but emphasis is placed on special pricing policies and problems and legal constraints on pricing activity. Prerequisites, 301 and Business Economics 300.

MKTG 350 Marketing Management (4)
Analysis of marketing management areas. Major areas covered are: market evaluation, product planning, promotion, channels and dealer relations, pricing and government controls, physical distribution, organization and planning and control of marketing activities. Prerequisite, 301.

MKTG 361 Marketing Channels and Institutions (4)
Analysis of marketing institutions and their functions, marketing channel structure, and channel alternatives available to management. Special attention is given to the role and perspective of the channel manager in directing marketing channel systems. Not open to students who have taken 361. Prerequisite, 301.

MKTG 381 Retailing (4)
Profit planning and business control; buying, stock control, pricing, promotion; store location, layout, organization, policies, systems; coordination of store activities. Not open to students who have taken 361. Prerequisite, 301.

MKTG 401 Sales Management (4)
Sales and distribution planning; sales organization and training; management of the sales force; methods of sales, cost, and performance analysis. Prerequisite, 301.

MKTG 411 Advertising (4)
The management of the advertising function and its integration with other forms of promotion. Topics covered are planning the program; determining the most effective approach; evaluation of media and budget; advertising research; advertising institutions; economic and social aspects. Prerequisite, 301.

MKTG 415 Consumer Behavior (4)
Theory and practice pertinent to marketing decisions of individuals and business firms; utilization of theories from behavioral sciences in marketing research; theories of fashion, characteristics of goods, shopping behavior, product differentiation, market segmentation, and opinion leadership; application of concepts to management of advertising, personal selling, pricing, and channels of distribution. Prerequisite, 301. Quantitative Methods 201 recommended.

MKTG 421 Marketing Research (4)
The marketing research 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. Prerequisite, 301.

MKTG 430 Quantitative Methods in Marketing (4)
Application of quantitative methods to marketing decision problems, such as product testing, advertising effectiveness, routing of salesmen, distribution systems, pricing, and marketing models. Methods include analysis of variance, multiple regression, Bayesian statistics, linear programming, and others as appropriate. Prerequisites, 301 and Quantitative Methods 201 or equivalent.

MKTG 481 Retail Field Work (2, max. 8)
Open to scholarship students only. Prerequisite, permission.

MKTG 491 Marketing Problems (4)
Analysis of managerial marketing problems of the manufacturer, wholesaler, and retailer. Prerequisites, 301 and senior standing.

MKTG 499 Undergraduate Research (3, max. 9)
Prerequisite, permission.

Courses for Graduates Only

MKTG 500 Marketing Management (3)
Analysis of markets and institutions, and the role of marketing in the economy. Considerations necessary for sound management decisions in pricing, demand creation, physical distribution, channel selection, and product development; marketing structures and policies under various competitive relationships; public policy and legislative constraints. Prerequisite, permission.

MKTG 510 Market Structure and Channel Strategy (3)
Principles, structure, and channel implications of both wholesale and retail distribution; factors affecting channels; selected product channels; physical distribution factors; marketing cost analysis and control. Prerequisites, 500 and permission.

MKTG 515 Price Practices and Policies (3)
The nature of pricing decisions; price theory and practice; primary and secondary factors affecting price policy; pricing methods and strategies; pricing practices in selected industries. Prerequisites, 500 and permission.

MKTG 520 Seminar on Promotion in Marketing (3)
Examination of topics of importance in the promotion of the firm's goods and services in its markets. Prerequisites, 500 and permission.

MKTG 521 Seminar on Measurement in Marketing (3)
The theory and application of experimental designs in marketing. Emphasis is placed on the underlying logic of experimentation and the analysis and interpretation of experimental data dealing with a variety of marketing problems. Prerequisites, 500 and Quantitative Methods 500, and permission.

MKTG 540 Advanced Marketing Concepts (3)
The interdisciplinary exchange of ideas related to marketing is studied. The marketing theories and evolving concepts of marketing and management are critically appraised. Prerequisites, 520 or 521, and permission.

MKTG 552 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.

MKTG 571-572 Research Reports (3-3)
See Accounting 571-572 for description.

MKTG 599 Doctoral Seminar in Marketing (3)
Study and research in advanced topics of marketing. The seminar is generally concerned with unpublished areas of research and is conducted by visiting professors and departmental faculty. May be repeated for credit. For doctoral students only. Prerequisite, permission.

MKTG 600 Independent Study or Research (*)

OPERATIONS AND SYSTEMS ANALYSIS
Courses for Undergraduates

OPSYS 301 Principles of Operations Analysis (3)
Fundamentals of systems management and the techniques used in the analysis and control of operational systems. Background of management decision making and systems analysis, concepts of alternate systems of operations, selection of resources, scheduling and control of the flow of
transactions in systems, maintenance of efficiency, statistical analysis of systems behavior, use of computers and quantitative models in analysis and control of operations. Prerequisites, Quantitative Methods 200, 201, or permission.

**OPSYS 401 Administration of Operations (4)**
Case problems of decision situations confronting managers of operations. Cases focus upon a systems approach to decisions, 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. Prerequisite, 301 or permission.

**OPSYS 441 Systems Theory and Design (4)**
Planning and design of systems, including analytical techniques particularly suited to system analysis, systems dynamics, continuous-flow computer simulation models, systems analysis, and network analysis. Analysis of organizations as complex systems, emphasizing the interactions between management decisions and information feedback. Prerequisite, 301 or permission.

**OPSYS 442 Operations Planning and Control (4)**
Analysis of design, planning, and control of operating systems. Topics vary among facilities location, layout, capital equipment selection and replacement, design of statistical control systems, and applications of improvement curve theory to systems planning and control. Prerequisite, 301 or permission.

**OPSYS 443 Scheduling and Inventory Systems (4)**
Analysis of alternative scheduling and inventory systems with emphasis on applications of mathematical models and computer simulation. Includes effective utilization of inventory resources, inventory systems, distribution systems, aggregate forecasting and scheduling, network planning methods, job shop scheduling, and sequencing operations. Prerequisite, 301 or permission.

**OPSYS 499 Undergraduate Research (3, max. 9)**
Prerequisite, permission.

**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 techniques of analysis for management decision making; analysis of structure and dynamic behavior of management systems; use of computers and quantitative models in planning and control of operations; selection of resources; choosing among alternative systems of operations. Prerequisites, Quantitative Methods 500 and permission.

**OPSYS 520 Systems Analysis and Current Issues (3)**
Evaluation and redesign of organizations using the systems approach. Both macrosystems and microsystems are studied; however, the emphasis is on the larger units, for example, corporate conglomerates or metropolitan centers. Each member of the class selects some segment of an issue to research, but all use the same model for analysis. Prerequisites, 500 and permission.

**OPSYS 521 Studies in Operations Analysis (3)**
Policy formulation and administration of operating sectors of organizations, emphasizing applications of quantitative models to operating problems, systems analysis, and integration of functions of operations management with the major goals of the organization. Case studies and models are used. Prerequisites, 500 and permission.

**OPSYS 571-572 Research Reports (3-3)**
See Accounting 571-572 for description.

**OPSYS 577 System Dynamics (3)**
Analysis of the feedback structure and dynamic behavior of management decision and information systems. The dynamics of management decision making from an overall systems point of view. Emphasis on the interaction of the separate components of the enterprise. Organizational control and growth of firms and other social, economic, and environmental systems viewed as feedback processes. Nonmathematical treatment of the properties of complex feedback systems. Construction of continuous-flow computer simulation models using specialized languages, such as MIMIC and DYNAMO. Prerequisite, 500 or permission.

**OPSYS 582 Analytical Models (3, max. 6)**
Application of quantitative methods to operations problems. Content varies. Topics include inventory, theory, location, scheduling, maintenance scheduling, quality control, with one or two areas covered in depth each quarter. Prerequisites, 500 and Quantitative Methods 510, and permission.

**OPSYS 585 Systems Analysis Models (3, max. 6)**
Study of elements and structure of system analysis models. Examination of systems analysis in public sector, of complex organizations, and in environmental affairs. Emphasis on quantitative, computer-oriented forms of analysis. Prerequisite, permission.

**OPSYS 599 Doctoral Seminar in Operations and Systems Analysis (3)**
Study and research in advanced topics of operations management. The seminar is generally concerned with unpublished areas of research and is conducted by visiting professors and departmental faculty. May be repeated for credit. Prerequisite, permission.

**OPSYS 600 Independent Study or Research (*)**

**QUANTITATIVE METHODS**

**Courses for Undergraduates**

**QMETH 200 Statistical Analysis (4)**
Survey of statistical techniques useful in guiding business decisions: introduction to probability, decision making, correlation, and regression. Prerequisites, 200 and Mathematics 157.

**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, 200 and Mathematics 157.

**QMETH 401 Statistical Methods for Business Research (4)**
Survey of distributions, estimation, tests of hypotheses, simple nonparametric methods, elements of statistical decision theory. Prerequisite, 201.

**QMETH 404 Computer Programming for Business (4)**
Programming techniques and languages for solution of business problems. Assembly language, FORTRAN, COBOL. Basic data-processing techniques. Programming assignments. Prerequisite, 200; 350 recommended.

**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; 350 recommended.

**QMETH 430 Probability and Statistical Inference for Business (4)**
Introduction to calculation concepts of probability, random variables, moments, and probability models. Includes applications of probability in management decision making. Prerequisite, 350 or equivalent.

**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 algorithms. Prerequisite, 350 or equivalent.

**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 applications. Prerequisites, 401, 404, 450, depending on topic.

**QMETH 499 Undergraduate Research (3, max. 9)**
Research in selected problems in business statistics, operations research, decision theory, and computer applications. Prerequisite, permission.

**Courses for Graduates Only**

**QMETH 500 Business Statistics (3)**
Treatment of statistical methods useful in the decision-making process. Includes descriptive statistics, probability and inference, correlation,
and regression. Emphasis on basic concepts and application. Prerequisites, Mathematics 157 or equivalent, and permission.

QMETH
510 Quantitative Methods (3)
Survey of operations research techniques for business problem solving. Emphasis on linear programming and general mathematical programming techniques. Prerequisites, 500 and permission.

QMETH
516 Stochastic Decision Processes for Business (4)
Application of utility theory, probability theory, and game theory to decision making under conditions of risk and uncertainty. Bayesian approach to decision making. Prerequisites, 500 or equivalent, and permission.

QMETH
521 Applied Multivariate Analysis (4)
Exploration and inference for the association of two variables. Formulation of prediction equation using simple and multiple regression. Selection of variables in regression equation, use of dummy variables and analysis of covariance. Matrix approach to linear statistical models. Prerequisite, 500.

QMETH
529 Topics in Applied Business Statistics (4, max. 8)
Seminar in the application of statistical techniques: topics are selected from nonparametric statistics, advanced application of statistical techniques in administrative control, advanced multivariate analysis, theories and techniques of time series analysis, and index.

QMETH
530 Stochastic Series Analysis and Forecasting (4)
Introduction to modern time series analysis and forecasting. Autoregressive, moving average, and mixed models. Practical methods for model identification, estimation, diagnostic checking, and adaptive forecasting. Oriented toward real data and application. Prerequisite, 500; 521 or equivalent strongly recommended.

QMETH
550 Seminar in Operations Research Techniques (3, max. 6)
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, 450 and permission.

QMETH
551 Mathematical Programming (4)
Advanced topics in linear programming and an introduction to nonlinear programming; the managerial significance of nonlinear 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 Mathematics 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 Mathematics 407.

QMETH
560 Research Seminar in Operations Research (4, max. 6)
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, 450 and permission.

QMETH
570 Business Computer Systems (4)
Introduction to hardware and software systems for the development of a management information system. Hardware characteristics and economics. Computer languages for management information systems and their use. Introduction to data base organization and management. Not open for credit to students who have taken 444. Prerequisite, 513.

QMETH
571-572 Research Reports (3-3)
See Accounting 571-572 for description.

QMETH
589 Seminar in Business Computer Systems (4)
Investigation into the applications of digital computers in the business environment. Possible topics include economic feasibility of using computers in business, computational algorithms for business data analysis problems, computational approaches to problems of operations research, and application of artificial intelligence techniques to business problems. Prerequisites, 404, 500, and 510 (or equivalent) and permission.

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.

QMETH
600 Independent Study or Research (*)
Prerequisite, permission.

RISK AND INSURANCE
Courses for Undergraduates

RINS
310 Fundamentals of Risk and Insurance (5)

RINS
420 Analysis of Insurer Operations (4)
Study of basic operations common to all types of insurance companies. Emphasis on analysis and decision making as applied to different insurance company operating problems. Prerequisite, 310.

RINS
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. Prerequisite, 310.

RINS
499 Undergraduate Research (3, max. 6)
Individual investigation of risk and insurance problems. Prerequisite, permission.

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.

TRANS
461 Logistics Theory (4)
Management's responsibility for the movement of raw materials and finished products, including traffic management, plant location, material handling, distribution warehousing, inventory control, and production scheduling.

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.

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. Prerequisite, 310.

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.

Courses for Graduates Only

TRANS
505 Transportation Systems and Institutions (3)
Economic, social, and political aspects of the transportation industry from the standpoint of the transportation firm, the user, and the regulatory agencies. Modern physical distribution systems. The economic impact of location on transportation industries. Theoretical and pragmatic considerations in pricing transportation services. Environmental aspects of domestic and international transportation and physical
distribution systems. The socioeconomic impact of advancing technology in transportation. Prerequisite, permission.

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.

TRANS
571-572 Research Reports (3-3)
See Accounting 571-572 for description.

TRANS
600 Independent Study or Research (*)
Prerequisite, permission.

URBAN DEVELOPMENT
Courses for Undergraduates

UD
310 Urban Development Economics (4)
Introduction to real estate markets, investment, appraisal, accessibility concepts, urban history, urban research, and related topics.

UD
320 Law 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.

UD
395 Urban Development and Private Investment (4)
Emphasizes the role of the private sector in urban development; valuation and investment theory; techniques of investment analysis and capital allocation.

UD
405 Urban Development and Location of Firms (4)
Practical workshop on empirical methods to conduct and evaluate locational studies.

UD
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.

Courses for Graduates Only

UD
510 Urban Development (3)
Topical survey of urban development. Objective to provide substantive information, methodology, and 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. Prerequisite, permission.

UD
515 Capital Investment in Urban Development (3)
Develops principles for evaluating opportunities to invest in urban real estate, determinants of cost of capital. Investigates problems in application of appropriate investment criteria and aspects of urban renewal problems. Offered jointly with the Department of Finance, Business Economics, and Quantitative Methods as Finance 515. Prerequisite, permission.

UD
525 Urban Development and the Location of Firms (3)
Advanced workshop on empirical methods to conduct and evaluate locational studies. Prerequisites, 510, 515, or permission.

UD
600 Independent Study or Research (*)
Prerequisite, permission.

DENTAL HYGIENE

DHYG
345 Oral Prophylaxis (2) W
Hoople
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.

DHYG
347, 348, 349 Dental Hygiene Procedures (4,6,8) A, W, Sp
Laine, Langelet, Wells
Clinical dental hygiene courses coordinating dental and oral anatomy, dental materials, occlusion, radiography, and other related dental subjects. Clinical experience under close supervision.

DHYG
350 Clinical Oral Prophylaxis (6) S
Continuation of 349. Prerequisites, 349 and permission.

DHYG
401 Office Procedure and Ethics (2) Sp
Koch
Dental office and clinic procedure; dental and dental hygiene ethics, professional interrelationships.

DHYG
402 Community Dental Health (3) W
Wells
Field experience in community health, with emphasis on dental hygiene care in specific community health programs. Seminars include 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.

DHYG
403 Principles of Dental Health Education (2) W
Wells
Presentation and analysis of current principles of dental health and disease, with emphasis in the areas of plaque control, nutrition, teaching materials, and techniques.
DHYG 445 Advanced Clinical Techniques
(2 or 4, max. 8) AWSpS
Advanced instrumentation and clinical procedures for certified dental hygienists. Seminars and clinical experience. Prerequisites, certification in dental hygiene from an accredited program and permission.

DHYG 446 Field Practice (2) AWSp Farrell
Application of dental health principles and practices to field experience in the health departments, the educational system, in hospitals, and/or special clinic assignments. Includes experience in the dynamics of the interrelationships between health professionals and other agency personnel.

DHYG 447 Dental Hygiene Practice (4) A Anderson, Hoople, Murphy
Fourth in a sequence of six clinical dental hygiene courses designed to provide the student with information and techniques used in performing all phases of dental hygiene services. Students are expected to recall, apply, and utilize information and technical procedures in all previous courses in performing dental hygiene services.

DHYG 448 Dental Hygiene Practice (4) W Anderson, Murphy
Fifth in a sequence of six clinical dental hygiene courses, including supervised opportunity for experience, knowledge, and skill in all areas of student interest and dental hygiene specialties.

DHYG 449 Dental Hygiene Practice (4) Sp Anderson, Hoople, Murphy
Final undergraduate clinical dental hygiene course, including supervised opportunity for experience, knowledge, and skill in all areas of student interest and dental hygiene specialties.

DHYG 450 Dental Hygiene Practice (6) S Continuation of 449. Prerequisite, 449.

DHYG 491 Seminar in Dental Hygiene (2) AWSp Fales
Study of professional education, accreditation, legislation, organization, and literature. Responsibilities of the dental hygienist to the community.

DHYG 492 Readings in Current Literature in Dental Hygiene and Preventive Dentistry (2) AWSp S Fales
Discussion of reported readings and survey of background material, with emphasis on dental research and its application to dental health education.

DHYG 493 Problems in Dental Hygiene (2-4) AWSp S Problems for study directed toward increased understanding in the selected field of practice. Presentation of research suitable for publication. Prerequisite, permission.

DHYG 494 Principles of Teaching in Dental Hygiene (2) AWSp S Fales
Application of principles of learning to teaching methods and techniques effective in dental hygiene, with opportunity for course planning, demonstration, and practice teaching.

DHYG 497 Directed Studies in Dental Hygiene (* ) AWSp S 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. May be repeated for credit. Prerequisites, permission of class adviser and instructor.

DENTISTRY
COURSES FOR UNDERGRADUATES


DENT 401 Human Growth and Development (2) W Growth and development of the human being from birth through maturity. Special emphasis upon growth of the head and dentition.

DENT 410 Abnormal Growth and Development (1) Continuation of 401.

DENT 420, 421 Dental Auxiliary Utilization (1,1) W, Sp Combined seminar, lecture, and clinical course designed to provide instruction in the training and utilization of auxiliary personnel in the practice of dentistry. (Formerly 471.)

DENT 430 General Practice Seminar (2-2-2) AWSp Combined lecture-seminar courses devoted to treatment planning and management of the problem periodontal patient in the general practice setting. Emphasis upon different techniques employed in the control of periodontal disease and management of treated areas. Discussion of the role of the auxiliary personnel in the practice of dentistry.

DENT 432, 433, 434 Team (1,1,1) A, W, Sp Strand DENT 432 Dental students skilled in four-handed, sideline dentistry are given didactic training and practical experiences in the management and optimum utilization of multiple, expanded-function auxiliaries, and in the management of personnel and resources necessary to operate an expanded-function dental practice.

DENT 470 Clinical Orientation (0) A Course for third-year students prior to the beginning of Autumn Quarter. It is designed to familiarize the student with clinical equipment and procedures and initiates the transition of thought from technical and laboratory methods to clinical application of them. It includes student exercises on each other in prophylaxis, rubber dam applications, and local anesthetic injections in preparation for treatment of patients.

DENT 490 Special Studies in Dentistry (2, max. 4) AWSp
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.

COURSES FOR GRADUATE AND CERTIFICATE

DENT 500 Principles of Personality Development (2) A Yuodelis Discussion of the principles of personality development and the problems most commonly met. Consideration given to the physiological, psychological, and cultural factors from infancy through old age. For nonmedical students. Prerequisite, senior or graduate student standing.

DENT 510 Applied Osteology and Myology of the Head and Neck (3) Joondeph, Keller, McNeill Detailed study as a background for the study of the growth and development of the head and for roentgenometric interpretation. (Department of Orthodontics)

DENT 511 Roentgenographic Cephalometry (2) A Moore Basic principles, history, and techniques of roentgenographic cephalometry. (Department of Orthodontics)

DENT 512, 513 Growth and Development (2,2) W, W Joondeph, Keller, McNeill Review of the various methods of studying human growth and the problems most commonly met, with growth of the head, and study of the development of the dentition from birth through maturity; analysis of the factors that produce normal occlusion and malocclusion. Prerequisites, 512 and 513. (Department of Orthodontics)

DENT 514 Genetics and Its Applications to Dental Problems (2) W Cohen, Moffett Review of methodology in twin studies, population genetics, and karyotypic analysis, using examples in dental research. Survey of literature on inherited dental traits.

DENT 515 Morphogenesis of Skeletal Tissue (3) Sp S Review of development of connective tissue, cartilage, bone and joints, including the differentiation, growth, remodeling, aging, and degenerative changes.

DENT 518 Scientific Methodology in Dental Research (3) Sp (1) Review of the scientific method. (2) Evaluation of dental literature. (3) Discussion of proposed master's degree research projects. (4) Procedure in scientific writing. (5) Formulation...
and discussion of hypothetical research projects related to orthodontics.

**DENT**

**520 Data Interpretation and Epidemiology In Dentistry (3) AWSp**

Principles of research design and epidemiology as they pertain to interpretation of the scientific literature in dentistry. The principles of biostatistics are studied independently with the aid of programmed material.

**DENT**

**532, 533, 534 Basic Science (3,4,4)**

Seminar-lecture discussion course dealing with the structure, physiology, chemistry, and microbiology of the dental and periodontal tissues. Correlations with the needs of the clinical specialties are made wherever possible.

**DENT**

**560 Dental Photography (2)**

Freese

Designed to provide the student with sufficient knowledge and experience for him to select and use correct photographic equipment for photographing patients (facial and intraoral). Carts, instruments, X-rays, charts, and objects.

**DENT**

**581 Comprehensive Treatment Planning (4)**

Yuodelis

Seminar devoted to the 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.

**DENT**

**587 Masticatory Functional Analysis and Occlusal Adjustment (2)**

Yuodelis

Designed to enable the orthodontic graduate student to mount dental casts on an adjustable articulator, allowing for the reproduction of various mandibular border movements related to the functional occlusion of the teeth. For orthodontic graduate students only.

**DENT**

**588 Seminar in Occlusion (2)**

Yuodelis

Nine week, three-hour lecture/seminar and clinical sessions in the study of the physiology of occlusion. Pertinent literature is reviewed and discussed from the multidisciplinary viewpoint. The clinical sessions include training in masticatory functional analysis and the treatment of occlusally related diseases. Open to graduate dental students only.

**DENT**

**589 Masticatory Functional Analysis and Occlusal Adjustment (2)**

Yuodelis

Continuation of 588. Prerequisite, 587 or 588.

**DENT**

**700 Master's Thesis (4)**

**ENDODONTICS**

**ENDO**

**410 Introduction to Endodontics (2)**

Nakatin

Lecture course dealing with the differential diagnosis and the treatment of pulp pathosis and associated periapical pathosis.

**ENDO**

**420 Endodontics (1)**

Nakatin

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)**

Harrington

Management of a variety of technical problems frequently encountered in the treatment of endodontic cases. Required for third-year dental students.

**ENDO**

**448 Directed Studies in Endodontics (4)**

Students and faculty with common academic interests pursue them together within the curriculum by means of independent study and a tutorial student-faculty relationship. Prerequisites, permission of class adviser and instructor.

**ENDO**

**470 Clinical Endodontics (6-1-1) AWSp**

The student is required to complete endodontic treatment of an anterior, bicuspid, and molar tooth.

**ENDO**

**471 Endodontic Technique (4)**

Nakatin

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. Prerequisite, 410.

**ENDO**

**475 Clinical Endodontics (6)**

Continuation of 470. Prerequisite, 470.

**ENDO**

**480 Advanced Clinical Endodontics (1-1)**

AWSp

In addition to conservative treatment of several endodontic cases, the student performs periapical surgery and at least one minor operation such as bleaching.

**ENDO**

**481 Directed Studies in Endodontics (4)**

AWSp

Course permits students and faculty who have common academic interests to pursue them together within the curriculum by means of independent study and a tutorial student-faculty relationship. Prerequisites, permission of class adviser and instructor.

**Courses for Graduates Only**

**ENDO**

**501 Advanced Endodontic Diagnosis and Treatment (2)**

Harrington, Nakatin

Current concepts are presented and discussed relating to the diagnosis and treatment of pulpal and periapical pathosis. Criteria for evaluation of success or failure of root canal therapy.

**ENDO**

**504 Advanced Endodontic Planning**

Harrington, Nakatin

Diagnosis and treatment of acute symptoms of dental origin, surgical endodontic therapy, traumatic dental injuries, and the relationship between periodontal and pulpal pathology, the differential diagnosis, and appropriate treatment planning.

**ENDO**

**525 Physiologic Bases of Dental Science (3)**

Van Hassel

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 Physiology and Biophysics as Physiology and Biophysics 506. Prerequisite, permission.

**ENDO**

**526, 527, 528, 529 Advanced Topics in Endodontics (2,2,2,2)**

Van Hassel

Use of the bacteriologic culture, resorptive phenomena, differential diagnosis of oral pain, evaluation of case success, and replantation are representative topics. Course method includes critical evaluation of presently accepted concepts and the better known literature upon which they are based, followed by study of the applicability and validity of the biologic concepts involved and of the historical development of present dicta.

**ENDO**

**530 Calcification of Oral Tissues (2)**

Van Hassel

Present concepts of the formation of dentin, enamel, cementum, and bone; role of vitamins, PTH, Calcitonin, serum Ca++ and PO4-- levels, inhibitors, and phosphatases in matrix and crystal deposition; calcification, dissolution, and repair. Prerequisite, permission.

**ENDO**

**535 Microbiological Aspects of Endodontic Therapy (2)**

Zeldow

Seminar discussion of areas of microbiology of particular significance to the field of endodontics. Required for endodontics graduate students. Prerequisite, permission for nonendodontics dental graduate students.

**ENDO**

**546, 547, 548 Clinical Endodontics (3,4,4)**

Harrington

The clinical diagnosis and treatment of the pulpsless tooth.

**ENDO**

**549, 550, 551 Clinical Endodontics (3,4,4)**

Nakatin

The clinical diagnosis and treatment of the pulpsless tooth. Prerequisites, 546, 547, 548.

**ENDO**

**576, 577, 578 Endodontic Seminar (2,2,2)**

Nakatin

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) Harrington
Continuous weekly seminar devoted to review of endodontic and related literature and to discussion of research methods. Prerequisites, 576, 577, 578.

ENDO
583, 584 Treatment Planning Seminar (2,2) Harrington
Weekly seminar to discuss controversial treatment problems and difficult diagnostic cases.

ENDO
585, 586, 587 Treatment Planning Seminar (2,2,2) Harrington
Continuation of the weekly seminar to discuss controversial treatment problems and difficult diagnostic cases. Prerequisites, 582, 583, 584.

ENDO
591, 592, 593 Clinical Practice Teaching (1,1,1) Naitkin
Closely supervised experience in teaching clinical endodontics to the undergraduate dental student. Prerequisites, 546, 547, 548, 576, 577, 578.

ENDO
597, 598 Endodontics Teaching Seminar (2,2) W,W Harrington
Weekly seminars devoted to an examination of general problems of teaching and learning and specific problems of endodontics teaching. Prerequisite, 597 for 598.

ENDO
600 Independent Study or Research (*) Van Hassel
Investigative program in one of the basic sciences under the direction of the departmental faculty. Prerequisite, permission.

For other graduate course offerings see individual department listings.

ORAL BIOLOGY
ORALB
301 Dental Caries (1) Sp Robinovitch
Etiology, pathogenesis, histopathology, epidemiology, and principles of prevention of dental caries. Considerable time is devoted to the formation, composition, and pathogenetic potential of the dental plaque and its relation to dental caries. Required for students in dental hygiene; others by permission.

ORALB
334 Oral Histology (4) AW Development and microscopic anatomy of structures of the oral cavity. (Required for dental hygiene students.) Prerequisite for other students, permission.

ORALB
400 Oral Histology and Embryology (4) W Development and microscopic anatomy of enamel, dentin, enamel, pulp, cementum, periodontal membrane, alveolar bone, oral mucous membrane, maxillary sinus and temporomandibular articulation. Required for dental students. Prerequisites, course in general mammalian histology or equivalent and permission.

ORALB
401 Dental Caries (1) W Series of lectures outlining the morphological, biochemical, and microbiological aspects of dental plaque and caries. Required for dental students. Prerequisites, course in general biology and permission.

ORALB
405 Oral Pathology for Dental Hygienists (2) W Study of diseases and abnormalities of the hard and soft tissues of the oral cavity. Prerequisite, Pathology 310.

ORALB
410 Oral Pathology (5) Sp Survey of the diseases of the oral-facial regions in lecture and laboratory sessions. Among the conditions discussed are diseases of teeth and their supporting structures and diseases of the oral and pararot oral 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. The course is required of all dental students and is open to other qualified students by permission.

ORALB
448 Directed Studies in Oral Biology (*) See Community Dentistry 449 for course description.

ORALB
449 Undergraduate Research Topics in Oral Biology (*) Individual research on topics selected in collaboration with a faculty member. Prerequisite, permission.

ORALB
497 Directed Studies in Oral Biology (*) A/WSpS
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. Prerequisites, permission of class adviser and instructor.

ORALB
498 Directed Studies in Oral Biology (*) A/WSpS
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. Prerequisites, permission of class adviser and instructor.

Courses for Graduates Only

ORALB
500 Dental Caries (2-3) Sp 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, course in general mammalian histology or its equivalent and permission.

ORALB
502 Supervised Teaching in Oral Biology (1-5, max 15) A/WSpS
Directed and guided experience in selected topics in teaching techniques, teaching philosophy, and course design of courses given by the Department of Oral Biology. Students are required to participate in lecture and laboratory teaching under the supervision of the course director. Prerequisite, permission.

ORALB
510 Clinical Oral Pathology (1-3, max. 10) Sp Presentation of interesting oral lesions from the dental school and the University Hospital and the correlation of the clinical findings with the underlying morphologic and biochemical changes in the tissues. The relation of these oral lesions to systemic disease is stressed. Primarily designed for students with D.D.S., M.D., or D.V.M. degrees. Prerequisite, permission.

ORALB
515 Surgical Oral Pathology (2-4, max. 16) A Students are trained to interpret microscopic slides of lesions from the head and neck and related areas, and to correlate these with the clinical findings. Each student is responsible for the grossing of specimens and the preparation of histology reports. Primarily designed for students with D.D.S., M.D., or D.V.M. degrees. Prerequisite, permission.

ORALB
520 Seminar in Oral Pathology (1-3, max. 9) Sp 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.

ORALB
531 Oral Pathology (5) W Presents to the student the major disease processes of oral tissues and adjacent structures. It demonstrates a rationale for interpretation and diagnosis of clinical findings, based upon an understanding of the mechanisms of disease. Students are required to participate in seminars of present literature reviews of specific disease states. Primarily designed for students with D.D.S., M.D., or D.V.M. degrees. Prerequisite, permission.

ORALB
532 Clinical Stomatolology (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.

ORALB
540 Oral Biology Seminar (1-3, max. 10) A/WSp 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.

ORALB
545 General Oral Biology (3) A Basic interdisciplinary course designed for graduate students in oral biology and other sciences. The course is intended to acquaint students with the breadth and interdisciplinary
nature of the field and to present the current state of scientific knowledge in the area. Includes discussion of evolutionary trends in the development of the vertebrate head and jaw, the biology of soft tissues of the mouth, the process of secretion, and the biology of dental hard tissues. Prerequisite, permission.

ORALB 546 General Oral Biology (2) W
Continuation of ORALB 447 Chemical processes of tooth formation, maturation, deglutition, sensation, and the perception of oral stimuli. Consideration of oral manifestation of systemic conditions, oral microbiology and anatomy, and adhesion in biological systems. Prerequisite, permission.

ORALB 550 Research Techniques in Oral Biology (2-4, max. 15) Sp
Introduction to biochemical, analytical, or morphological techniques employed in biochemical cytology or molecular pathology as well as in vitro techniques of tissue and organ culture. Biochemical techniques include cell fractionation, page and column chromatography, zone electrophoresis, and appropriate chemical and enzymatic determinations. Morphological techniques include light microscopy, electron microscopy, radioautography, histochemistry, and cytochemistry. 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.

ORALB 565 Histological Comparative Odontology (2) A
Presents a broad view of the evolution of dental tissues as demonstrated by the microscopic organization of teeth and their supporting structures in various vertebrate species. (Offered alternate years.)

ORALB 570 Oral Facial Development (2-3) Sp
The course traces the embryological development of the tissues and organs of the human face and oral regions. Contributions of embryonic primordia to adult structures are studied. Mechanisms resulting in abnormal development receive special emphasis. Prerequisite, permission; course in basic embryology recommended. (Offered alternate years; offered 1974-75.)

ORALB 581 Biological Structure and Function of Exocrine Glands (1-3) A
Initiation, differentiation, and development of exocrine glands in a number of mammalian species. Exocrine tissues, such as pancreas and salivary glands, are emphasized, but examples of other exocrine systems are presented. Stress placed on the relation of the structural and ultrastructural characteristics of exocrine glands to their varied functions. Prerequisite, permission; basic course in introductory biology (e.g., Biology 212) or human biology (e.g., Biological Structure 330 or Human Biology 411) recommended. (Offered alternate years; offered 1974-75.)

ORALB 582 Physiology of Exocrine Glands (3) W
The autonomic innervation of salivary glands, and action of drugs, changes in blood flow and metabolism during activity as well as the processes involved in the transport of water and electrolytes through the glands are explored in depth. Prerequisite, permission; basic knowledge in general physiology recommended. (Offered alternate years; offered 1974-75.)

ORALB 583 Biochemical Aspects of Secretion (2-3) Sp
Biochemical aspects of the secretory process, including biosynthesis, intracellular transport and expulsion of proteins and glycoproteins from the cell. Exocrine tissues such as pancreatic and salivary glands are emphasized, but course material includes examples of non-exocrine secretion (e.g., of collagen, plasma proteins, thyroglobulins, inulin, etc.). Prerequisites, Biochemistry 406 or its equivalent and permission; Biology 331 recommended. (Offered alternate years; offered 1974-75.)

ORALB 600 Independent Study or Research (-) AW/Sp
Laboratory projects and/or conferences with individuals faculty members designed to acquaint the student with research projects currently in progress within the department. Prerequisite, permission.

ORALB 700 Master's Thesis (-)

ORAL 800 Doctoral Dissertation (-)

ORAL DIAGNOSIS AND TREATMENT PLANNING

ODTP 460 Introduction to Clinical Procedures (2) A
Orientation to dental examination procedures with appropriate clinical participation by the student.

ODTP 461 Principles of Nutrition (1) Sp
Principles of nutrition applied to dental practice.

ODTP 462 Introduction to Oral Diagnosis (1) Sp
Principles involved in integrating and evaluating diagnostic criteria for arriving at a treatment plan are covered and applied to actual clinical examples.

ODTP 463 Advanced Radiographic Interpretation (1) A
Patten, Solter, Somers, Truelove
Radiographic interpretation of the structures of the head and jaws as observed by panoramic, lateral head film, and other extraoral techniques. The radiographic appearance of pathology as seen on extraoral films. Prerequisites, 400, 550.

ODTP 470 Oral Medicine (2) W
Fundamental procedures in oral diagnosis; preparation for advanced instruction.

ODTP 475 CBNIcal Oral Diagnosis and Treatment Planning (1-2) WSp
Opportunity for examining, performing X-ray survey, and planning treatment for less involved patients. Students also participate in rendering diagnosis and emergency treatment.

ODTP 486 Advanced Clinical Oral Diagnosis and Treatment Planning (1-2) AW
Advanced instruction in diagnosis and in the examination and handling of patients. Students are in block assignment and perform radiographic surveys, oral diagnosis, and treatment plans for prospective patients.

ORAL MEDICINE

Courses for Graduates Only

ORALM 500 Advanced Diagnostic Techniques (3) Truelove
Advanced diagnostic procedures used to identify oral and perioral diseases. Included are in-depth discussions of history analysis, methods for psychologic evaluation, soft and hard tissue diagnostic procedures, neurologic, salivary gland, and other tissue analyses requiring special procedures.

ORALM 530, 531, 532, 533, 534, 535 Hospital Oral Medicine (3,3,3,3,3,3) Truelove
Clinic, oriented to the hospital practice of oral medicine, deals with examination and nonsurgical therapy of hospital patients. The conditions treated include primary oral diseases, oral manifestations of systemic diseases, and oral defects resulting from medical treatment of serious systemic disease.
ORALM 546 Clinical Oral Medicine (3, max. 21)
Truelove
Clinic involving the diagnostic evaluation of patients with difficult and unusual oral diseases. The student diagnoses and treats the patient. Types of therapy include medications and chemical agents, functional physical therapy, and counseling.

ORALM 548 Oral Medicine Clinical Conference (1, max. 7)
Truelove
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, 561, 562 Oral Medicine and Therapeutics (5,5,5)
Truelove
Lecture course directed toward the presentation and discussion of oral diseases and oral manifestations of systemic disease. Primarily the clinical manifestations' relationship to generalized disease processes and patient management with in-depth discussions of therapy.

ORALM 576 Oral Medicine Literature Review Seminar (2, max. 6)
Truelove
Seminar analyzes the recent literature concerning the area of oral medicine, diagnosis, and therapy for oral disease.

ORALM 580 Advanced Radiographic Techniques (2)
Truelove
Seminar and clinic concerning radiographic procedures necessary for visualization of soft and hard tissue structures of the maxilla, sinuses, temporomandibular joint, and malleable and soft tissue structures approximating the oral cavity. Emphasis placed on extraoral and special techniques.

ORALM 585 Advanced Radiographic Interpretation (3)
Truelove
Lecture, seminar, and clinic dealing with interpretation of routine and special radiographs of the oral and perioral region. Emphasis placed on the radiographic characteristics of degenerative, neoplastic, metabolic, developmental, and infectious processes. In the clinical component, the student interprets films taken of patients suspected of having radiographically apparent oral diseases.

ORALM 590, 591, 592 Clinical Oral Diagnosis Teaching (1,1,1)
Truelove
Clinic designed to give the student experience and instruction in the teaching of clinical oral diagnosis. Treatment of emergency dental problems as well as routine and special diagnostic procedures is emphasized.

ORALM 600 Independent Study or Research (*)
Truelove
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

OS 400 Introduction to Dental Emergencies and Techniques of Local Anesthesia (2) Sp
Development of the symptomatic treatment of dental emergencies, especially those emergencies that could be considered life threatening. Some instruction is given in the classical manner on the diagnosis of dental emergencies, such as syncope, hysteria, anaphylactic shock, and cardiopulmonary resuscitation. A portion of the material presented on cardiopulmonary resuscitation is made by the Medic II staff, which includes demonstration and practice on manikins. The other major portion of the course is on local anesthesia techniques and includes lectures on the pharmacology and physiology of the drugs utilized and extensive audiovisual materials demonstrating the techniques. Students are required to demonstrate local anesthetic block techniques at the completion of the instruction.

OS 410 Dental Sedation and Pain Control (2) W
An approach to the patient with respect to minimizing the discomfort of the dental procedures. Every form of sedation, from vocal reassurance through intravenous sedation, is included. Emphasis is placed on local anesthetics that have a high level of safety; practical experience with intravenous and nitrous oxide techniques; and sophisticated methods of the treatment of emergencies, especially intravenous sedation.

OS 430 Oral Surgery (3-3-3) AWSp
Theory and practice of major and minor oral surgery, using a mediated autotutorial approach supported by thirty clinical sessions. Self-instructional modules include: extraction of teeth, impaction surgery, preprosthetic surgery, medications, surgical complications, and postoperative care, biopsy, infections and principles of incision and drainage, bone cysts, maxillary sinus, salivary glands, treatment of facial trauma and deformities.

OS 431 Hospital Dentistry (1) Sp
Anderson
Introductory course presenting hospital procedures and protocols and specific patient types. Prerequisite for 480.

OS 475 Clinical Exodontia (6) S
Continuation of 470. Prerequisite, 470.

OS 480 Hospital Dentistry (1-1-1) AWSp
Clinical experience that puts into practice the material presented in 431. The student is involved in hospital procedures and protocol and in dental care of the hospital patient. Prerequisite, 431.

OS 485 Clinical Oral Surgery (6) S
Continuation of 480. Prerequisite, 480.

OS 487 Directed Studies in Oral Surgery (*)
Selected reading and tutoring in dental pain control. Prerequisites, permission of class advisor and instructor.

Courses for Graduates Only

OS 500, 501, 502 Oral Surgery Seminar (2,2,2)
AWSp
Truelove
Weekly seminar devoted to the discussion of oral surgery and related problems from basic science, medical, diagnostic, therapeutic, operative, and postoperative aspects. Subjects such as hemorrhagic diathesis, antibiotic therapy, facial trauma, neurologic disorders, developmental deformities, soft tissue surgery, maxillary sinus pathology, pharmacology of general anesthetics, bone physiology, and tracheotomy are discussed. Prepared presentations are given by the graduate students. Guest lecturers are invited to discuss their specialties in the fields such as ophthalmology, otolaryngology, neurosurgery, and general surgery, as they are related to oral surgery. Several seminars are held jointly with other departments (Prosthodontics and Orthodontics). Each graduate student attends ninety seminars over the three-year period.

OS 520, 521, 522 Literature Review (2,2,2)
AWSp
Hooley, Staff
Survey of the pertinent literature in the field of oral surgery. Current literature is reviewed at the beginning of each session, and following this a seminar presents a seminar on topics in oral surgery based on a review of the literature.

OS 540, 541, 542 Advanced Oral Surgery Clinic (3,3,3) AWSp
West
The patient evaluation, clinical diagnosis, treatment plan, operation and management of oral surgery cases that can be operated under premedication and local anesthesia on an outpatient basis are accomplished. Problems such as biopsy, benign tumor, cyst, verrucaous, peripheral neuritis, vestibular extension, removal of hyperplastic tissue, exostosis, torus, foreign body, supernumerary impacted teeth, and other procedures are included.

OS 550 Anatomical Approaches to Head and Neck Surgery (2) W
Gehrig
Study and laboratory dissection of the anatomical structures as they are found in major oral surgery procedures. Prerequisite, permission.

OS 600 Independent Study or Research (*)
AWSp
Investigative program in one of the basic or clinical sciences under the direction of the departmental faculty. Prerequisite, permission.

ORTHODONTICS

ORTH 410 Minor Tooth Movement (1) Sp
Van Ness
Prerequisite, Pedodontics 460.

ORTH 420 Orthodontics (2) A
Brief historical review of the etiology of malocclusion; classification and analysis of cases; growth anomalies, as well as deformities and their evaluation; the temporomandibular joint; the mandibular position, as related to ortho-
DENTISTRY

Orthodontic case analysis; treatment planning; types of appliances and their uses; retention; the ultimate outcome of orthodontic treatment.

**ORTHODONTICS**

**449 Directed Studies in Orthodontics (O) A**

See Community Dentistry 449 for course description.

**497 Directed Studies in Orthodontics (O) A**

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. Prerequisites, permission of class adviser and instructor.

**Courses for Graduates Only**

**ORTHODONTICS**

**500, 501, 502, 503, 504, 505, 506 Orthodontics Seminar (2,3,4,5,6)**

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.

**546, 547, 548, 549, 550, 551, 552 Clinical Orthodontics(4,4,4,4,4,4)**

Techniques of contraction and manipulation of the edgewise arch mechanism; application of the principles in the treatment of malocclusion. Treatment of patients begins in the second quarter. Each course is prerequisite to the following course.

**560 Surgical Orthodontic Diagnosis and Treatment Planning (3) A**

Seminar and clinic for orthodontic graduate students and oral surgery residents in comprehensive, integrated diagnosis, and treatment planning for patients with major facial deformities. Prerequisites, 503, 512, 513, 546, or permission.

**583 Orthodontic Diagnosis and Treatment Planning for the Adult Dental Patient (3) A**

Sayess

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. Prerequisites, 503, 512, 513, 546, or permission.

**600 Independent Study or Research (O) A**

Prerequisite, permission.

**PEDODONTICS**

**420, 421 Pedodontics (1,1) A,W**

Peterson

Emotional development of the child and its implications in pedodontic procedures. Space maintenance, the interception of incipient malocclusion, and clinical management of oral habits.

**546 Pediatric Dentistry (2-2)**

Principles of pediatric dentistry with orthodontic minor tooth movement.

**PEDO 461 Introduction to Clinical Pediatric Dentistry (1)**

Series of lectures on the child in the dental environment combined with initial treatment of the child patient.

**PEDO 470 Clinical Pedodontics (1-1-1) A**

Diagnosis and examination of the child patient. Restorative procedures in primary and mixed dentitions, with special emphasis on application of the rubber dam.

**PEDO 475 Clinical Pedodontics (6) S**

Continuation of 470. Prerequisite, 470.

**PEDO 480 Advanced Clinical Pedodontics (1-1-1) A**

Diagnosis and treatment planning, with emphasis on preventive dentistry. Complete operative procedures, including vital pulp therapy, construction of space maintainers, bite planes, and restoration of fractured anterior teeth.

**PEDO 485 Advanced Clinical Pedodontics (6) S**

Continuation of 480. Prerequisite, 480.

**Courses for Graduates Only**

**607 Directed Studies In Orthodontics (O)**

**500, 501, 502, 503, 504, 505, 506 Orthodontics Seminar (2,3,4,5,6)**

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.

**546, 547, 548, 549, 550, 551, 552 Clinical Orthodontics(4,4,4,4,4,4,4)**

Techniques of contraction and manipulation of the edgewise arch mechanism; application of the principles in the treatment of malocclusion. Treatment of patients begins in the second quarter. Each course is prerequisite to the following course.

**560 Surgical Orthodontic Diagnosis and Treatment Planning (3) A**

Seminar and clinic for orthodontic graduate students and oral surgery residents in comprehensive, integrated diagnosis, and treatment planning for patients with major facial deformities. Prerequisites, 503, 512, 513, 546, or permission.

**583 Orthodontic Diagnosis and Treatment Planning for the Adult Dental Patient (3) A**

Sayess

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. Prerequisites, 503, 512, 513, 546, or permission.

**589 Independent Study or Research (O) A**

Prerequisite, permission.

**PERIODONTICS**

**410 Basic Periodontal Therapy (1) A**

Introduction to periodontal therapy: examination, treatment planning, initial therapy. (Formerly 401.)

**411, 412 Introduction to Periodontal Therapy (1,1) W,A**

Lecture. See also 461, 462. (Formerly 460.)

**420 Periodontal Therapy (1) A**

**430-431 Periodontal Therapy and Treatment Planning in General Practice (1-2) A**

Lecture-seminar course with focus on the treatment planning and management of the problem periodontal patient in the general practice environment. Discussions on the effective integration of periodontal therapy with restorative dentistry, and of the establishment of effective recall and maintenance programs in the private practice office. Prerequisites, 420, 472.

**449 Directed Studies in Periodontics (O)**

See Community Dentistry 449 for course description.

**450 Basic Periodontal Instrumentation (1)**

Combined lecture and clinical experience in diagnosis, treatment planning, and performance of nonsurgical and elementary surgical procedures. The indication for, application of, and technical performance of, various procedures and their integration into dental practice are discussed. (Formerly 450.)

**470, 471, 472 Clinical Periodontics (1,1,1) A,W,S**

Treatment of periodontal disease. Emphasis on diagnosis, treatment planning, and nonsurgical treatment procedures. (Formerly 470.)

**475 Clinical Periodontics (6) S**

Continuation of 470. Prerequisite, 470.

**480 General Practice Periodontics (2-1-1) A**

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.

**481 Honors Course in Periodontics (0-0-3) A**

Heins

Intensive clinic-seminar experience in periodontics for selected fourth-year students. May be taken instead of 480.

**485 Advanced Clinical Periodontics (6) S**

Continuation of 480. Prerequisite, 480.
Courses for Graduates Only

PERIO
530, 531, 532, 533 Hospital Periodontics (2-2-2-2)
Prepares graduate students in periodontics to practice in hospital situations. Experience in operating with nitrous oxide and other general anesthetics, and in intravenous premedication is offered. Hospital procedures for treating out-patients and inpatients are offered. Prerequisites, training in graduate-level periodontics for one year, course work in anesthesiology, clinical orientation to hospital procedures, and permission.

PERIO
536 Clinical Periodontics for Dental Hygienists (2-6) W
Hall
Examination and therapy techniques on untreated and treated periodontal patients for graduate dental hygienists. Clinical training in cooperation with, and under the direction of, periodontics graduate students and faculty. Student must have a bachelor's degree and pass a preclinical examination.

PERIO
546, 547, 548, 549, 550, 551 Clinical Periodontics (2-2-2-2) W
Schluger
Clinical experience in diagnosis and treatment of periodontal disease.

PERIO
550 Morphology of the Periodontium (1)
Study of the structure of the periodontium. This course is designed to correlate closely with 599. Prerequisite, permission.

PERIO
561, 562, 563 Periodontal Case Management (1, 1, 1)
Didactic presentation of clinical periodontics to provide a comprehensive view of the field and a grasp of modern therapeutic techniques.

PERIO
570 Review of Current Literature (2)
Weekly seminar-discussion devoted to literature published within the past three years and confined to material not covered in previous subject matter. Prepares the graduate student for oral and written examination for certification by the American Academy of Periodontology.

PERIO
576 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 Periodontal Treatment Planning Seminars (1, max. 7) W
Ammons
Weekly seminar involved with the presentation, discussion, and tentative solution of moderate to complex problems in diagnosis and treatment.

PERIO
585 Periodontal Therapy Seminars (1, max. 7) W
Ammons
Weekly seminar utilizing the case review method and dealing with the treatment of moderate to advanced periodontal disease.

PERIO
591, 592, 593 Clinical Practice Teaching (1,1,1) W
Ammons
Supervised experience in teaching clinical periodontics to undergraduate dental students. Prerequisites, 546, 547, 548, 576, 577, 578.

PERIO
599 Pathology of the Periodontium and Contiguous Structures (3) W
Page
Seminar covers in depth the tissue alterations noted in periodontal disease and the concepts of the nature of the underlying lesion. Prerequisites, Pathology 445 and 500, or permission.

PERIO
600 Independent Study or Research (*) Ammons, Schluger
An investigative program in one of the basic sciences under the direction of the departmental faculty. Prerequisite, permission.

PROSTHODONTICS
PROS
410 Removable Partial Denture Design (2) A Frank
Schluger
Lectures in the basic principles of removable partial denture design; more advanced designs are discussed in seminars; certain technical aspects of design procedures are done in the classroom.

PROS
420 Management of Immediate Denture Patients (1) A Bolender
Lecture course describing and illustrating the clinical management of immediate denture patients (typical and overdenture). 

PROS
421 Special Topics in Prosthodontics (1) A Bolender
Lecture describing and illustrating the following topics: relapse procedure, management of troublesome patients, maxillofacial prosthesis, and quality-control problems in private practice.

PROS
449 Directed Studies in Prosthodontics (*) See Community Dentistry 449 for course description.

PROS
460 Introductory Complete Denture Prosthodonties (6) W
Lectures in the basic principles of complete denture fabrication as well as the diagnosis and treatment of a completely edentulous patient.

PROS
461 Complete Denture Prosthodonties (1-1)
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. He also provides follow-up care to the 460 and 461 patients during Winter Quarter and Spring Quarter.

PROS
470 Removable Partial Denture Clinical Preparatory Course (4) A Frank
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 Prosthodonties (1-2-1) A Frank
Clinical course involving the diagnosis and management of completely edentulous and partially edentulous patients. Removable partial dentures and immediate dentures are fabricated. In addition, follow-up care is provided for patients previously treated.

PROS
475 Clinical Prosthodonties (6) S Continuation of 470. Prerequisite, 470.

PROS
480 Clinical Prosthodontic Maintenance (1) A Frank
Clinical involving the relining or rebasing of dentures previously made at the University of Washington.

PROS
485 Advanced Clinical Prosthodonties (6) S Continuation of 480. Prerequisite, 480.

PROS
497 Directed Studies in Prosthodonties (*) AWSp
Permits students and faculty who have common academic interests to pursue them together within the curriculum by means of independent study and a tutorial student-faculty relationship. Prerequisites, permission of class adviser and instructor.

Courses for Graduates Only

PROS
560 Complete Dentures (4) A Bolender, Swoope
Comprehensive seminar-clinical course devoted to the diagnosis and treatment of the completely edentulous patient. Emphasis is placed on management of patients who present difficulties in treatment.

PROS
561 Immediate Dentures (4) W Bolender, Swoope
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 (4) Sp Bolender, Swoope
Seminar-clinical course devoted to the diagnosis and treatment of the partially edentulous patient requiring the fabrication of a removable partial denture. The study of supporting tissues and their physiologic responses is included.
DENTISTRY

PROS
563 Obturators and Speech Appliances (2) A,W,S
Smith, Swoope
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
564 Definitive and Adjunctive Maxillofacial Appliances (2) A,W,S
Beder
Seminar-laboratory course devoted to the theories and principles in the fabrication of prostheses; appliances for resected 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
565, 566, 567 Clinical Practice Teaching (1,1,1) A,W,S
Bolender, Swoope
Supervised experience in teaching clinical prosthodontics to the undergraduate dental student.

PROS
568 Obturators and Speech Appliances (2) A,W,S
Beder
Clinical application of 563. Patients requiring the fabrication of obturators and speech appliances are treated.

PROS
569 Definitive and Adjunctive Maxillofacial Appliances (2) A,W,S
Beder
Clinical application of 564. Patients requiring the fabrication of a variety of special appliances are treated.

PROS
571 Prosthodontics Seminar (2, max. 12) A,W,S
Bolender, Smith, Swoope
Continuous weekly seminar devoted to the review of prosthodontic and related literature.

PROS
574 Prosthodontic Visual Aids (2) S
Review of literature. Prerequisite, permission.

PROS
578 Prosthodontic Technique Practice Teaching (1) A,W,S
Lord, Swoope
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) S
Swoope
A study of common materials utilized in the fabrication of dental appliances. Emphasis is placed on resin systems and various precious and base-metal alloys.

PROS
585 Advanced Clinical Prosthodontics (4, max. 10) A,W,S
Swoope
Continuation of 560, 561, 562. Seminar-clinical course covering recent and advanced phases of prosthodontics.

PROS
600 Independent Study or Research (*) A,W,S
Smith, Swoope
Prerequisite, permission.

RESTORATIVE DENTISTRY

RES D
400, 401, 403 Oral Anatomy (2,2,2) A,W,S
Canfield
Detailed study of the human oral and paranasal structures from the standpoint of form and function, with attention given to systematized nomenclature. Study of the determinants of occlusion and instruction in the examination and the modification of the occlusal patterns of an individual patient.

RES D
411 Restorative Dentistry Technique (3) Sp
Brooks
Lecture-laboratory course offering experience in instrumentation and manipulation of restorative materials. Special emphasis on dental amalgam and composite resin restorations. Prerequisite, 410.

RES D
420, 421, 422 Restorative Dentistry (1,1,1) A,W,S
Warnick
Lectures closely related to 470, providing a means of communication with the class regarding clinical instruction and policy. Presentation of new material relating to the operations and procedures with which they are involved clinically.

RES D
430, 431 Advanced Restorative Dentistry (1,1) A,W,S
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
449 Directed Studies in Restorative Dentistry (*) Morrison, Staff
See Community Dentistry 449 for course description.

RES D
450 Dental Materials (2) A
Nichols
Physical and chemical properties of dental materials.

RES D
451, 452, 453 Oral Anatomy Laboratory (2,2,2) A,W,S
Canfield
Detailed study of the human oral and paranasal structures from the standpoints of form and function, with attention to systematized nomenclature. Study of the determinants of occlusion and instruction in the examination and the modification of the occlusal patterns of an individual patient.

RES D
454, 455 Restorative Dentistry (4,4) W,S
Instruction in the use of various restorative materials for the restoration of diseased or missing parts of the natural dentition. Emphasis placed upon occlusal function, tooth preparation, manipulation of each of the materials and upon the requirements for each type of restora-

DES D
460 Restorative Dentistry (4) A,W,S
Continuation of 455 with emphasis on extra-coronal restorations.

RES D
461 Restorative Dentistry (6) A,W,S
Continuation of 460 with the addition of some clinical application of basic restorative procedures. Prerequisite, permission.

RES D
462 Restorative Dentistry (6) Sp
Continuation of 461 with emphasis on the clinical application of fundamental restorative procedures.

RES D
463 Preclinical Analysis and Adjustment of Occlusion (3) A
Background information and techniques required to enable students to manage the adjustment of occlusion for their patients. The technique of adjustment is related to both orthodontic and restorative means by which occlusion may be altered. Selected cases representing a variety of problems involving occlusal adjustment, and this necessary adjustment is carried out on mounted casts, following the same principles that would be applied clinically. The laboratory involves the adjustment of casts for selected patients.

RES D
470 Restorative Dentistry (4-4-4) A,W,S
Morrison
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
475 Clinical Crowns and Fixed Partial Dentures (6) S
Prerequisite, 470.

RES D
480 Clinical Practice (3-3-3) A,W,S
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. Prerequisite, 470.

RES D
485 Advanced Clinical Crowns and Fixed Partial Dentures (6) S
Prerequisite, 480.

RES D
497 Directed Studies in Restorative Dentistry (*) 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. Prerequisites, permission of class adviser and instructor.
Courses for Graduates Only

RES D
520 Basic Principles of Operative Dentistry (4)
Principles of cavity design for operative dentistry. Laboratory practice in the fundamentals of cavity preparation. Indications and contraindications of outline form for the various types of clinical restorations.

RES D
540 Oral Rehabilitation (4, max. 32) AWSp
Yuodelis, Staff
Clinical course to provide experience in diagnostic 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. 6)
AWSp
Yuodelis, Staff
Continuous weekly seminar devoted to a review of restorative and related literature, and discussion of teaching methods, philosophy of teaching and treatment. (Offered in odd-numbered years.)

RES D
571 Resin and Other Interim Restorations (2)
Indications and contraindications, physical properties, rationale and techniques of manipulation, cavity preparation and tissue response.

RES D
575 Gold Foil Restorations (4)
Sibila
Indications and contraindications for the various types of restorations. Rationale and techniques of manipulation. Modification of cavity preparation forms, with emphasis on W. I. Ferrier designs. Reactions of hard and soft tissues to restorative procedures and environmental changes. Alternates with 576.

RES D
576 Pure Gold Restorations (4)
Sibila
Physical properties, indications, and contraindications for the various forms of pure gold for dental restorations. History and significance of pure gold as a restorative material. Alternates with 575.

RES D
580 Restorative Treatment Planning Seminar (2, max. 12) AWSp
Yuodelis, Staff
Continuous weekly seminar to discuss controversial treatment problems and difficult diagnostic cases selected for either graduate or under­graduate students.

RES D
590 Gatnostics (2) AWSp
Yuodelis, Staff
Ten seven-hour lecture/laboratory/clinical sessions in the study of gatnostic principles and procedures as they pertain to the treatment of comprehensive cases assigned to the students. Use and application of several fully adjustable articulators. Prerequisites, 588, 589.

RES D
591 Restorative Technique Practice Teaching (1, max. 3) AWSp
Supervised practical experience in teaching technical procedures to undergraduates in dental laboratory courses.

RES D
592 Clinical Practice Teaching (1, max. 3) AWSp
Supervised experience in teaching clinical fixed prosthodontics to undergraduate dental students.

RES D
600 Independent Study or Research (*)
AWSp
Yuodelis
Investigative program in one of the clinical sciences, under the direction of one of the departmental faculty.

COLLEGE OF EDUCATION

EDUCATIONAL ADMINISTRATION

EDADM 430 Public School Administration (3)
Introduction to theories and practices of administering public schools; designed for persons who are not majoring in educational administration. Structure of school organizations, supervision of personnel, planning problems encountered at various levels, interpretation of the school program to the public, formation of policies, decision making, administration of the instructional program, finance and business management, school housing, appraisal of the school system, and leadership in democratizing school administration.

EDADM 440 Social Power in the Educational Environment (3)
Factors contributing to the development and use of social power: conflict between organizational expectations and individual needs; self-esteem; realistic and unrealistic conflict; the dynamics of collective action. Consideration is also given to the identification of concepts and practices that can reduce organizational conflict.

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 advisor most appropriate for the project proposed and the instructor, and the form must be filed in the Office of Educational Administration in 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. Prerequisite, permission.

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 526 Seminar in School Supervision (3)
Anderson
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. Prerequisites, 527, master's degree in educational administration, or equivalent.

EDADM 527 Educational Administration and Supervision (3)
Bolton
Emphasizes the human elements of educational administration, including such topics as leadership, selection and orientation of personnel, small-group processes, staff utilization, administration of the curriculum, supervision and control processes, differences and conflict. Prerequisite, graduate standing.

EDADM 528 Educational Administration and Supervision (3)
Andres
Theoretical bases and practical integration of schools within the school/environmental context. Topics include schools as complex organizations, schools as open systems interacting with other open systems, power, and consensus mechanisms. Prerequisite, graduate standing.

EDADM 529 Educational Administration and Supervision (3)
Strayer
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 are some of the topics. Prerequisite, graduate standing.

EDADM 530 Seminar in Educational Decision Making (3)
Bolton
Analysis of nature of decisions in educational setting. Consideration of theory of decisions, social and psychological constraints, and application in simulated situations. Prerequisite, master's degree in educational administration or equivalent.

EDADM 531 Seminar in Administration: Finance (3)
Strayer
Current problems in school finance, including the 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 in educational administration or equivalent.

EDADM 552 Seminar in Human Relations in Educational Administration (3)
Anderson, Bolton
Analysis of factors involved in human relations problems related to operation of public schools. Motivation, perception, communication, role analysis, and dynamics of groups emphasized through use of case studies and simulated situations. Prerequisite, master's degree in educational administration or equivalent.

431
EDADM 533 Seminar in Administration: School Buildings (3) Schneider
Survey of problems and issues faced by educational administrators that are impacting on educational facilities. Projected readings and informal discussion of the people, processes, programming, planning, and evaluation of ways and means of accommodating changes due to identifiable problems and issues. Prerequisite, master's degree in educational administration or equivalent or permission.

EDADM 534 Seminar in Educational Planning and Organization (3) Strayer
Application of principles utilized in planning and organizing public schools. Formation of policy and procedures: formal and informal organization; power, authority, and responsibility; utilization of people, time, and space. Prerequisite, master's degree in educational administration or equivalent.

EDADM 535 Research Seminar: Educational Administration and Supervision (3, max. 6) Anderson, Andrews, Bolton, Ostrander, Strayer
Analysis of complex administrative problems; acquisition and use of information for making administrative decisions; requires application of administrative concepts and research procedures. Prerequisites, 527, 528, 529 and EDPSY 490, 591 or equivalents, or permission.

EDADM 536 Internship in Educational Administration (1-6, max. 6) Anderson, Andrews, Bolton, Johnson, Ostrander, Strayer
Recommended for all candidates preparing for administrative positions except those having sufficient experience as administrators. 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 or school principal in the selected school district. Prerequisites, completion of all other requirements for administrator's credential and permission.

EDADM 537 Special Problems in Educational Administration and Supervision (3, max. 9) Anderson, Andrews, Ostrander, Strayer
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. Prerequisites, master's degree in educational administration and permission.

EDADM 538 School-Community Relations (3) Andrews, Ostrander, Strayer
Examines the dynamics of the interface between the public schools and the community. Special attention is given to the findings of research in relation to school-community power, types, and organizational influences. Prerequisite, 228, master's degree in educational administration or equivalent, or consent of instructor.

EDADM 539 The Law and Education (3) Andrews, Ostrander
Examination of court cases associated with the rights of individuals and groups in educational organizations. Attention is given to the interpretation of administrative due process requirements and the growing body of administrative law affecting student and personnel management. Prerequisite, master's degree in educational administration or equivalent, or permission.

EDADM 540 Seminar in Conflict Management (3) Ostrander
Examination of procedures and techniques pertinent to the management of organizational conflict. Among the areas covered are collective bargaining, grievance procedures, mediation, fact finding, and arbitration.

EDADM 541 Seminar in Educational Planning (3) Strayer
Design, construction, and finishing of projects of industry. (Formerly 202.)

EDADM 542 Seminar in School Personnel Administration (3) Bolton
Major emphasis is 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 school personnel topics. Prerequisite, master's degree in educational administration or equivalent.

EDADM 543 Independent Studies in Education (*)
Independent studies or readings of specialized aspects of education. Registration must be accompanied by a study prospectus endorsed by the appropriate faculty adviser for the work proposed, and which, with permission of the instructor, must be filed with the Office of Educational Administration in the College of Education. Prerequisite, permission.

EDADM 544 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 Administration in the College of Education. A report or paper setting forth the results of the investigation is required. Prerequisite, permission.

EDUCATIONAL CURRICULUM AND INSTRUCTION

EDC81 132 Spanish for the Elementary School (3) Andrews
Practice in the basic language skills is combined with the 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 settings. Offered jointly with the Department of Romance Languages and Literature as Spanish 128.

EDC81 269 Education of Black Americans (3) Banker
Examines the unique characteristics and learning problems of inner-city Black children and considers curriculum patterns and teaching strategies designed to enhance their academic achievement and emotional growth.

EDC81 300 Industrial Education: Sketching and Technical Drawing (3) Bally
Freehand sketching; orthographic projection; pictorial representation; dimensioning; lettering; working drawing and blueprint reading. (Formerly 200.)

EDC81 301 Industrial Education: Sketching and Technical Drawing (3) Bally
Developmental drawing; sheet metal layout drawing; revolutions, mechanical perspective—angular; mechanical perspective—parallel. Prerequisite, 300 or permission. (Formerly 201.)

EDC81 302 Industrial Education: Home Planning (4) Bally
Consumer knowledge and information in the problems involved in purchasing, planning, financing, and building a home are emphasized. Students draw plans and write specifications for a complete set of house plans. Prerequisite, 300 or equivalent. (Formerly 300.)

EDC81 303 Industrial Education: Fundamentals of Woodwork (3) Bally
Hand-tool processes; elementary machine operations; methods of assembling and fastening; simple wood finishing. (Formerly 204.)

EDC81 304-305 Industrial Education: Woodworking Technology (3-2) Bally
Design, construction, and finishing of projects in wood, involving machine operations. Prerequisites, 303 for 304; 304- for 305.

EDC81 306 Industrial Education: General Shop (5) Bally
Introduction to industrial education; the common tools, materials, processes, and products of industry. (Formerly 202.)

EDC81 307 Industrial Education: Tools and Materials (2) Bally
Sources, specifications, and costs of shop materials and equipment. Care, repair, and sharpening of hand and machine tools.

EDC81 308 Special Problems in Industrial Education (1-5, max. 5)
The student works on an individual basis, conferring with the staff as needs arise, on one or more problems of special interest to him in industrial education. An outline and an organized plan of procedure are to be presented to the staff.
EDC&I 309 Industrial Education: General Metalwork (3) Baily Tools, materials, and processes used in sheet metal, forging, casting, bench metal, ornamental iron work, welding, machining, and finishing of metal. (Formerly 206.)

EDC&I 311 Industrial Education for Elementary Teachers (5) Baily Planning and preparing a representative unit in some area of the elementary school program, with particular emphasis on those parts that involve construction activity. Development of basic skills in the use of common hand tools. Related information about industrial technology and its place in our society is included. (Formerly 302.)

EDC&I 312 General Shop for Occupational Therapists (5) Baily Introduction to the common tools, materials, and processes used in occupational therapy. Freehand sketching, both pictorial and architectural, working drawings and print reading. (Formerly 203.)

EDC&I 313 Industrial Education: Basic Woodworking for Occupational Therapists (5) Baily Hand-tool processes, elementary machine operations, safety practices, problem solving and planning, methods of assembling and fastening, simple wood finishing. (Formerly 303.)

EDC&I 314 Business Education Clinic (1-15, max. 15) Briggs, Brown, Frerichs Business education clinic designed to develop and refine those skills that are considered to constitute basic essential capabilities for beginning business education teachers. Instruction is largely on an individualized basis, with measurement largely by performance standards. Focus is on secretarial skills, accounting, office machines operation, and data processing. Prerequisites, basic skills in typewriting, shorthand, office machines operation, office procedures, and accounting; Business, Government, and Society 101 and 200; Accounting 210 and 220; Economics 200 and 201.

EDC&I 315 The Teaching of Business Education: Typewriting, shorthand, Office Practice, and Transcription (4) Briggs, Brown, Frerichs Prerequisites, EDPSY 304 and Secretarial Studies 112.

EDC&I 316 The Teaching of Business Education: Accounting, Office Machines, Business Arithmetic, and General Business (4) Briggs Prerequisites, EDPSY 304 and 9 credits in accounting.

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, Speech 350 and 351 or 391.

EDC&I 321 Health in the Elementary School (2) Mills Health procedures and techniques for meeting health needs and problems of elementary school children, including screening, observation, emergency care, etc.

EDC&I 324 Physical Education in the Elementary School (3) Special methods and procedures for planning and conducting the physical education program in the elementary schools (grades 1-6). Consideration of the physical activities that are appropriate for children and contribute to their motor efficiency and physical fitness. Prerequisite, EDPSY 304.

EDC&I 327 The Teaching of Home Economics (5) Granberg (Credits count: 2 as education and 3 as home economics.) Prerequisites, 2.50 grade-point average, EDPSY 304 and 308, which may be taken concurrently. 40 home economics credits, and permission.

EDC&I 328 Methods of Teaching for Institution Administration Students (3) Granberg Prerequisites, junior standing and 25 credits in home economics, including Home Economics 307.

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 (3, 3, 3) Lewis Elementary, junior high, and senior high emphases. Prerequisites, EDPSY 304 and demonstration of language proficiency.


EDC&I 336 The Teaching of German in Secondary Schools (3) Galt Prerequisites, 329, EDPSY 304, Germanic Languages and Literature 303, or permission.

EDC&I 337 The Teaching of German in Elementary Schools (3) Galt Objectives and methods of the FLES (Foreign Languages in Elementary Schools) program. Prerequisites, 329, EDPSY 304, Germanic Languages and Literature 303, or permission.

EDC&I 338 The Teaching of Russian (2) Auger Special methods in the teaching of Russian to acquaint prospective teachers with materials, methods, and problems. Prerequisites, 329, EDPSY 304, and permission.

EDC&I 339 The Teaching of Scandinavian (Norwegian, Swedish) (2) Special methods in the teaching of Norwegian and Swedish to acquaint prospective teachers with materials, methods, and problems. Prerequisites, 329, EDPSY 304, and permission.

EDC&I 340 Elementary Art Education (3) Johnson 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 students majoring in elementary education. A study of art in the development of children. Experiences in working with various materials used in school art programs. Prerequisites, EDPSY 304 and ART 100.

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 growth of related concepts and skills. Prerequisites, EDPSY 304 and Music 119.

EDC&I 344 Materials and Methods of Teaching Chinese (3) Yen 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 345 Fundamentals of Kindergarten-Primary Teaching (3) Methods, materials, and professional practices relevant to teaching young children. Recommended for students planning to teach in the kindergarten and primary grades. Prerequisite, 360.

EDC&I 346 Music in Pre-School and Primary Grade Classrooms (3) Cooper For students majoring in preschool and primary education (not open to music specialists). A study of music in the development of children, ages 4 to 8, with attention to musical activity and growth of related concepts and skill. Prerequisites, EDPSY 304 and Music 119.
EDC&I
347 Modern Theories and Practices in Early Childhood Education (3)
Stevens
Introduction to modern theories and practices in early childhood education presented via classroom lectures and observations in selected schools and agencies. Prerequisite, EDPSY 304 or permission.

EDC&I
348 Language Arts and Social Studies in Early Childhood Education (3)
Hirabayashi
Basic course stressing language arts and social studies as related to the development of the young child. The course familiarizes students with effective teaching procedures and learning resources designed to help children learn language competencies and social awareness within the framework of social studies content.

EDC&I
349 Mathematics and Science in Early Childhood Education (3)
Hurd
Basic course in science and mathematics instruction emphasizing knowledge and skills in teaching scientific and mathematical processes and concepts to young learners.

EDC&I
350 Program Planning in Early Childhood Education (3)
Allen
The theoretical and practical aspects of planning, selecting, preparing, presenting, and supervising curricular materials and activities in the prekindergarten are presented. (Course taken concurrently with teaching practicum, 7 credits.)

EDC&I
355 Language Arts in the Elementary School (3)
Hirabayashi, Kittell
Basic course in planning and teaching elementary language arts: listening and speaking, handwriting, spelling, creative and practical writing. Prerequisite, EDPSY 304.

EDC&I
356 The Teaching of English (3)
Smith
Designed to draw together the student's previous background in English literature, language, and composition, the course focuses on the techniques and materials for teaching English in junior and senior high schools. Prerequisite, EDPSY 304.

EDC&I
357 The Teaching of Speech (3)
A special methods course in the teaching of speech at the secondary level. Prerequisites for majors in speech, EDPSY 304, at least 20 credits in speech; for nonmajors, permission.

EDC&I
358 The Teaching of Journalism (3)
For teachers in high schools and junior colleges, or for education students taking first or second areas in journalism. Prerequisites, EDPSY 304, Communications 321 and 325, or permission.

EDC&I
360 Reading in the Elementary School (3)
Baxley, Monson, Sebesta
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. Prerequisite, EDPSY 304.

EDC&I
365 Social Studies in the Elementary School (3)
Banks, Hunkins, Jarolimek, Koltsounis
Basic course in the planning and teaching of social studies in the elementary school. Prerequisites, EDPSY 304 and Geography 100.

EDC&I
366 The Teaching of Social Studies in Secondary Schools (3)
Gate
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)
Oistad, 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. Prerequisites, EDPSY 304 and 5 credits in an approved course in science.

EDC&I
371 Teaching Science in the Secondary School (3)
Oistad
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 (3)
Olson
Prerequisites, 371, EDPSY 304, and 25 credits in biology.

EDC&I
373 The Teaching of Chemistry (3)
Ritter
Prerequisites, 371, EDPSY 304, and at least 20 credits in college chemistry.

EDC&I
375 Mathematics in the Elementary School (3)
Beal, Hurd, Kersh
Examination of the learning and teaching of elementary mathematics (grades K-6), in light of recent theoretical and pedagogical developments. Prerequisites, EDPSY 304 and Mathematics 170.

EDC&I
376 The Teaching of Junior High School Mathematics (3)
Kingston
Emphasis is on understanding of junior high school subject matter; supplementary topics include teaching aids and classroom procedures. Not open to students having credit for 377. Prerequisites, 378, EDPSY 304, Mathematics 101, or equivalent.

EDC&I
377 The Teaching of Secondary School Mathematics (3)
Emphasis is on understanding of subject matter; supplementary topics include teaching aids and classroom problems. (Credits count: 2 as education and 1 as mathematics.) Prerequisites, 378, EDPSY 304, Mathematics 412, or equivalent.

EDC&I
378 Teaching Mathematics in the Secondary School (3)
Beal, Kerch
Basic course in the teaching of mathematics in the secondary school for preservice teachers.

EDC&I
400 Selection and Organization of Occupational and Industrial Education Subject Matter (3)
Baily
Problems, techniques, and procedures in the selection and organization of teaching 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)
Baily
To acquaint prospective industrial education teachers with teaching aids, classroom procedures, and problems in the teaching of industrial education courses. Prerequisite, 400 or permission.

EDC&I
402 Instructional Analysis for Industrial Education Teachers (3)
Baily
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 course.

EDC&I
403 Planning the Industrial Education Facilities (3)
Baily
Study of the fundamental concepts and principles in planning industrial education areas to produce safe, efficient, and effective teaching-learning situations. An analysis of the problems encountered in the selecting, purchasing, locating, and installing of equipment, tools, materials, and services.

EDC&I
404 Principles and Objectives of Vocational Education (3)
Baily
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)
Baily
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.

EDC&I
406 Organization and Administration of Vocational Education Programs (3)
Baily
Administrative problems involved in organizing and operating vocational schools and classes. This class is designed for superintendents, principals, vocational directors, supervisors, or other persons with direct responsibility for the administration or supervision of vocational programs.
in beginning and advanced typewriting. Demonstration and participation in drill techniques; testing and grading; evaluation of recent research findings in the development of speed and accuracy; classroom organization.

EDC&I 416 Materials and Methods of Teaching Office and Clerical Practice (3) 
Briggs 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 Gregg Shorthand and Transcription (3) 
Briggs Recent research and experimentation in teaching shorthand and transcription are emphasized. Psychology of skill development; comparison of the various methods of teaching shorthand; evaluation of teaching materials; consideration 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) 
Briggs Objectives, history, trends, and issues of business education; federal participation in vocational education; economic, occupational, and population trends and their implications in business education; leaders in business education; research and problems.

EDC&I 419 Materials and Methods of Teaching Bookkeeping and General Business Subjects (3) 
Briggs 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) 
Bally Designed primarily for teachers and administrators interested in developing a school safety program in elementary, junior, and senior high schools. Special emphasis is placed on the need for a safe school environment and the role of the teacher in promoting safety.

EDC&I 421 Workshop in Instructional Improvement Industrial Education (2-6) 
Individual or group study projects on the improvement of instruction in industrial education.

EDC&I 422 Programs in Elementary Physical Education (3) 
Boyungs Progress and problems in modern programs. Offered jointly with the Department of Physical and Health Education as Physical Education 478.
EDC & I
445 Theory and Practice of Kindergarten and Primary Teaching (3)
Systematic treatment of the content, teaching processes, and learning resources appropriate to kindergarten and primary education with particular emphasis on current research and developments. Prerequisite, teaching experience.

EDC & I
455 The Language Arts: Instructional Problems and Practices in the Elementary School (3)
Kittell, Settles
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
458 Journalism Teaching in the Secondary School (3)
Advances course in teaching high school journalism. For experienced publications advisers. No credit if 358 or Journalism 375J has been taken.

EDC & I
460 The Teaching of Reading (3)
Baxley, Monson, Sebesta
Improvement of teaching reading in the elementary school, including comprehension and decoding, reading in the content fields, motivation of voluntary reading. Prerequisite, teaching experience or prior course work in the teaching of reading.

EDC & I
461 Supplementary Materials for the Teaching of Reading (3)
Monson
Designed to provide acquaintance with, and basis for, evaluation of materials used in the teaching of reading. Basal readers, material from the content areas, recreational reading materials, and supplementary practice materials are examined. Prerequisite, teaching experience.

EDC & I
462 Reading in the Secondary School (3)
Baxley
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.

EDC & I
464 The Indian Child and His Education (5)
Bull
Assists students in understanding the North American Indian child from cultural, socioeconomic, and psychological points of view. Provides opportunities for the student to apply knowledge and skills gained in other courses to prepare programs and learning aids relevant to the educational situation of the Indian child.

EDC & I
465 Social Studies Education: Elementary School Programs and Practices (3)
Banks, Jaroilimek, Kalsounz
Stresses curriculum patterns, instructional procedures, resource materials, and the selection of content in social studies. For elementary and junior high school teachers. Prerequisite, teaching experience.

EDC & I
466 Social Studies Education: Secondary School Programs and Practices (3)
Guth
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 the Department of Geography as Geography 467.

EDC & I
468 Workshop in Instructional Improvement: Social Studies (3-6)
Individual or group study projects on the improvement of instruction in social studies.

EDC & I
469 Educating the Black Inner-City Child (3)
Banks, Bas
Undertakes an intensive analysis and review of the research and the literature, both theoretical and empirical, relevant to curriculum patterns and programs designed especially 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)
Olstad, Smith
Designed for classroom teachers with reference to the teaching and learning of science from kindergarten through grade 6. Emphasis is placed on objectives, methods, and materials as related to the concepts and processes of science. Prerequisite, teaching experience.

EDC & I
471 Science Education: Secondary School Programs and Practices (3)
Olstad
Survey of the status and potential role of science in 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 (3-6)
Individual or group study projects on the improvement of instruction in science.

EDC & I
474 Multi-Ethnic Studies: Methods, Content, and Materials (3)
Banks
Designed to help preservice and inservice teachers identify content and materials and devise methods for implementing ethnic studies programs and for incorporating ethnic content into the 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 Rican Americans, and white ethnic groups. Prerequisite, an approved teacher education program or teaching experience.

EDC & I
475 Improvement of Teaching: Elementary School Mathematics (3)
Beal, Kerzh
Designed for elementary teachers (grades K-6). Emphasis is placed on the contributions of research to the improvement of teaching of mathematics in the elementary school. Prerequisite, teaching experience.

EDC & I
476 Improvement of Teaching: Junior High School Mathematics (3)
Exploration of some modern mathematical concepts for the purpose of improving the teaching of junior high school mathematics. Prerequisite, Mathematics 101 or equivalent.

EDC & I
477 Improvement of Teaching: Secondary School Mathematics (5)
Exploration of some modern mathematical concepts for the purpose of improving the teaching of secondary school mathematics. Prerequisite, teaching experience.

EDC & I
478 Special Topics in Mathematics for Teachers (2.5, max. 15)
Algebra and geometry for junior high school teachers of mathematics. Offered jointly with the Department of Mathematics as Mathematics 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)
Hawk, Torkelson
Factors influencing the selection and use of audiovisual resources in instruction.

EDC & I
481 Practicum in Learning Resources (3)
Driscoll, Hawk
Design and production of visual and auditory materials for teaching. Prerequisite, 480 or equivalent.

EDC & I
482 Still Photography in Education (3)
Theory and practice in producing still photographs and slides for teaching purposes; camera and darkroom techniques. Producing photographic materials to meet specific learning problems. Prerequisite, 480 or permission.

EDC & I
483 Educational Film Production (3)
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 rerecording. Prerequisite, 483.
EDC&I 485 Workshop in Instructional Improvement: Learning Resources (2-6)
Individual or group study projects on the improvement of instruction in learning resources.

EDC&I 486 Screen Education (3)
Torkelson
Workshop course in screen education for secondary 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)
Torkelson
For teachers and others interested in understanding animation techniques in educational television and films. Relationships of rhythm, graphic design, and sound. In addition to lecture-demonstrations, opportunity is given for experimentation in simple animation and special effects cinematography.

EDC&I 488 Television in the Schools (3)
Dilworth
Television programs to supplement classroom work; the development of the American system of broadcasting; the development and significance of educational television, and the contribution schools can make to broadcasting. Open to nonmajors; not open to graduate students in communications. Offered jointly with the School of Communications as Communications 459.

EDC&I 489 Television Production Workshop for Teachers (5)
Torkelson
Working in University studios under laboratory conditions involving production on-camera methods, teachers learn to present instructional subject matter through television. For those especially who expect to work with television as instructors or as supervisors of school-oriented television activities. Open to nonmajors; not open to graduate students in communications or to students with credit for Communications 361. Offered jointly with the School of Communications as Communications 463.

EDC&I 494 Workshop in Curriculum Development (1-15, max. 15)
Hunkins
Individual or group work on curriculum development projects in elementary and secondary schools. Prerequisite, 559.

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) in the appraisal of themselves and their work. Offered only by special arrangement with school districts.

EDC&I 496 Workshop in Instructional Improvement (3-6, max. 6)
Individual or group study projects on the improvement of instruction.

EDC&I 499 Undergraduate Research (3-5, 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 510 Seminar in Industrial Arts and Vocational Technical Education (3)
Baily
Intensive study of current events, problems and research studies in industrial arts education, vocational and technical education. Prerequisite, permission.

EDC&I 511 History of Industrial Education (3)
Baily
Study of the leaders, agencies, movements, experiments, and publications that have contributed to the development of industrial education, with special attention to the economic, social, and philosophical factors that have motivated and influenced this development in America.

EDC&I 515 Seminar in Business Education (3)
Briggs
Analysis of selected problems in business education; current research in business education; evaluation of work experience programs; development in vocational business education. Prerequisites, 415, 418, 419.

EDC&I 520 Current Models in Early Childhood Education (3)
Stevens
In-depth analysis of current program models for the education of young children, with an emphasis on specification of objectives, practices, and evaluation of model effectiveness. Models emphasized are those developed in this country, but the course also includes a study of models developed in other countries as they have influenced practice here.

EDC&I 521 Problems and Issues in Early Childhood Education (3)
Stevens
Study of issues currently facing the field of early childhood education, emphasizing the rational, impact, and management of child-care programs. Relationship of local child-care programs to state and federal agencies is included. Prerequisite, 520 or permission.

EDC&I 522 Practicum in the Training of Early Childhood Instructional Personnel (3)
Stevens
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.

EDC&I 524 Seminar in Teacher Education (3) W Foster
Focus on recent trends, issues, and proposals for future development in teacher education and certification. Prerequisite, permission.

EDC&I 556 Elementary School Curriculum (3)
Hunkins, Kaltsounis
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 practicum.

EDC&I 557 Junior High School Curriculum (3)
Historical, philosophical, and functional analysis of junior high school education, with particular emphasis on curriculum and teaching procedures.

EDC&I 558 Secondary School Curriculum (3) 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)
Guise, Hunkins
Intensive study of the basic principles and procedures utilized in the development of curriculum. Prerequisite, teaching practicum.

EDC&I 560 Seminar in Reading (3) Baxley, Monton, Sebesta
Designed to focus primarily on those aspects of the reading process that are of concern in a developmental reading program. 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. Prerequisite, permission.

EDC&I 561 Seminar in Language Arts (3) Kittell
Study of recent research in language structure with special attention to research pertaining to the teaching of language skills:auding, speech, and written composition. Course work includes group and individual analysis of language arts studies with attention to research design and measurement. Prerequisite, permission.

EDC&I 562 Seminar in Reading and Language Arts: Secondary Emphasis (3) Fea, Sebesta
Study of recent research in listening, oral language, reading, and written language, emphasizing psychological and interrelated aspects. Prerequisite, permission.
<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>EDC41053</td>
<td>Current Issues in Language Arts Education</td>
<td>(1, max. 6)</td>
<td>Kittell Discussion of problems and issues of current interest and importance in language arts education.</td>
</tr>
<tr>
<td>EDC41054</td>
<td>Seminar in the Reading of Literature (3)</td>
<td></td>
<td>Reading of literature and its effect on reading skills, language development, social values, and literary judgment of children and adolescents. Emphasis on analysis of research in these areas and on the development of action research designed to study response to literature. Prerequisite, one 400- or 500-level educational curriculum and instruction course in reading or language arts or one graduate course in literature for children or young adults.</td>
</tr>
<tr>
<td>EDC41056</td>
<td>Seminar in Social Studies Education: Elementary Emphasis (3)</td>
<td></td>
<td>Jarolimek, Kaltsounis Intensive study of the social studies curriculum, with particular emphasis on current literature and research. Prerequisite, 465 or equivalent.</td>
</tr>
<tr>
<td>EDC41056</td>
<td>Seminar in Social Studies Education: Secondary Emphasis (3)</td>
<td></td>
<td>Guise, Jarolimek Intensive study of the social studies curriculum, with particular emphasis on current literature and research. Prerequisite, 465 or equivalent.</td>
</tr>
<tr>
<td>EDC41057</td>
<td>Current Issues in Social Studies Education (1, max. 6)</td>
<td></td>
<td>Kaltsounis Discussion of problems and issues of current interest and importance in social studies education.</td>
</tr>
<tr>
<td>EDC41057</td>
<td>Seminar in Science Education: Elementary Emphasis (3)</td>
<td></td>
<td>Obstad Investigation of curriculum and instruction in science at elementary school levels, with particular emphasis on current literature and research. Prerequisite, 470 or equivalent.</td>
</tr>
<tr>
<td>EDC41057</td>
<td>Seminar in Science Education: Secondary Emphasis (3)</td>
<td></td>
<td>Obstad, Souch Investigation of curriculum and instruction in science at secondary school levels, with particular emphasis on current literature and research. Prerequisite, 471 or equivalent.</td>
</tr>
<tr>
<td>EDC41057</td>
<td>Current Issues in Science Education (1, max. 6)</td>
<td></td>
<td>Obstad, Souch Discussion of topics and problems of current interest and importance in science education. Prerequisite, graduate standing.</td>
</tr>
<tr>
<td>EDC41057</td>
<td>Seminar in Mathematics Education: Elementary Emphasis (3)</td>
<td></td>
<td>Kersh Investigation of curriculum and instruction in mathematics at the elementary school level; review of research and preparation of proposals. Prerequisite, 475 or equivalent.</td>
</tr>
<tr>
<td>EDC41058</td>
<td>Seminar in Mathematics Education: Secondary Emphasis (3)</td>
<td></td>
<td>Kersh Investigation of curriculum and instruction in mathematics at the secondary school level; review of research and preparation of proposals. Prerequisite, 476 or 477, or equivalent.</td>
</tr>
<tr>
<td>EDC41057</td>
<td>Current Issues in Mathematics Education (1, max. 6)</td>
<td></td>
<td>Kersh Discussion of problems and issues of current interest and importance in mathematics education.</td>
</tr>
<tr>
<td>EDC41058</td>
<td>Seminar in Learning Resources (3)</td>
<td></td>
<td>Driscoll, Torkelson Advanced analysis of learning resources, instructional communications, and technology. Prerequisite, 480 or permission.</td>
</tr>
<tr>
<td>EDC41058</td>
<td>Management of Learning Resources Programs (3)</td>
<td></td>
<td>Hash Study of factors affecting management of educational programs involving production, storage, distribution, and use of visual and auditory materials and equipment. Prerequisite, 480 or permission.</td>
</tr>
<tr>
<td>EDC41058</td>
<td>Learning Resources Systems of Instruction (3)</td>
<td></td>
<td>Torkelson Study of the &quot;systems&quot; approach to instruction and the orchestration of relevant components, techniques, and arrangements (e.g., logistics, instructional space and facilities, computer-assisted instruction).</td>
</tr>
<tr>
<td>EDC41061</td>
<td>Learning Resources and Learning Domains (5)</td>
<td></td>
<td>Driscoll Research and relevant literature concerning visual and auditory stimuli as these relate to learning domains (affective, perceptual-motor, cognitive).</td>
</tr>
<tr>
<td>EDC41058</td>
<td>Seminars International and Cross-Cultural Education (3)</td>
<td></td>
<td>Orisecoll Treats selected instructional problems, innovation strategies, and the management of learning resources in various emerging countries.</td>
</tr>
<tr>
<td>EDC41059</td>
<td>Seminar in Learning Resources (3)</td>
<td></td>
<td>Torkelson For doctoral majors in learning resources, concentrating on contemporary research in the field, and on candidate's individual project and postdoctoral research plans.</td>
</tr>
<tr>
<td>EDC41060</td>
<td>Seminar in Elementary Education (3)</td>
<td></td>
<td>Foster, Kittell 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 401.</td>
</tr>
<tr>
<td>EDC41061</td>
<td>Seminar in Secondary Education (3)</td>
<td></td>
<td>Johnson Research and study of secondary education. Primary focus on factors involving change in secondary school curriculum and organization. Prerequisite, 557 or 558.</td>
</tr>
<tr>
<td>EDC41061</td>
<td>Seminar in Curriculum Theory and Practice (3)</td>
<td></td>
<td>Guise, Hankins Investigation of the area of curriculum theory and practice. Consideration is given to the development of models to explain the relationships between various curricular variables. These theoretical models are related to curricular practices and innovations. Prerequisites, 559 and teaching experience.</td>
</tr>
<tr>
<td>EDC41061</td>
<td>Seminar in Curriculum Theory and Practice (3)</td>
<td></td>
<td>Bankims Further investigation of the area of curriculum theory and practice. Theoretical models considered and developed in EDC 593 are further refined and new models are discussed. Curricular practice and innovation is considered from additional theoretical frameworks. Prerequisites, 559, 593, and teaching experience.</td>
</tr>
<tr>
<td>EDC41061</td>
<td>Seminar in Analysis of Teaching (3)</td>
<td></td>
<td>探索多种媒体和类型，包括心理学、社会学以及哲学因素。特别强调的是，研究和开发的相关因素被考虑在内，与教学相关变量相关。</td>
</tr>
<tr>
<td>EDC41061</td>
<td>Seminar in Strategies of Instruction (3)</td>
<td></td>
<td>Kaltsounis Exploration of the various media and types of organization relevant to the implementation of strategies based on theoretical models. Prerequisite, 595.</td>
</tr>
<tr>
<td>EDC41061</td>
<td>Internship in Curriculum (3-9, max. 9)</td>
<td></td>
<td>Johnson Recommended for all doctoral candidates preparing for positions as curriculum directors 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. Prerequisite, 559.</td>
</tr>
<tr>
<td>EDC41061</td>
<td>Independent Studies in Education (*)</td>
<td></td>
<td>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, must be filed with the Office of Educational Curriculum and Instruction in the College of Education. Prerequisite, permission.</td>
</tr>
<tr>
<td>EDC41061</td>
<td>Independent Study and Research (*)</td>
<td></td>
<td>Independent Study and Research (*) Registration must be accompanied by a study prospectus endorsed by the appropriate faculty adviser for the work proposed and must be filed with the Office of Educational Curriculum and Instruction in the College of Education. A report or paper setting forth the results of the study.</td>
</tr>
</tbody>
</table>
EDUCATIONAL POLICY STUDIES

EDEPS 444 Constitutional Freedom and American Education (3-6, max. 6) S
Morris
Emphasis on the principles, processes, and content of constitutional law in an effort to provide new insights and 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 the School of Law as Law 444. Satisfactory/not satisfactory option available to nonlaw students only. (Formerly 412.)

EDEPS 458 History of American Education to 1865 (5)
Burgess
Development of American education in cultural context: colonial period, influence of Enlightenment, and common school movement. Offered jointly with the Department of History as HSTAA 458.

EDEPS 459 History of American Education Since 1865 (5)
Burgess
Development of American education in cultural context: progressive education, recent criticism, continuing issues and trends. Offered jointly with the Department of History as HSTAA 459.

EDEPS 479 Crucial Issues in Education (3)
Kerr
Designed to consider in some detail certain of the most significant and critical problems of educational policy.

EDEPS 488 Philosophy of Education (3)
Kerr, Tostberg
Consideration of philosophic questions of import to education. Emphasis on gaining acquaintance with the literature of philosophy of education. Attention to the forms of analysis and justification as conceptual tools for clarifying decisions of educational policy and practice. Prerequisite, EDUC 402 or 403 or 404 or equivalent, or permission of Chairman of the area of educational policy studies.

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)
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)
Burgess
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 adviser 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 investigations should be regarded as a basic part of the program.

EDEPS 500 Field Study (3 or 6, max. 6)
Individual study of an educational problem in the field under the direction of a faculty member. Prerequisites, approved plan of study and permission of the instructor must be filed in the Office of Educational Policy Studies in the College of Education.

EDEPS 501 The Study of Educational Policies (3)
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)
Jarolimek
Examination of roles played by small and large groups as they affect the school as a social system. Current sociological theory is modified or extended to explain school events and interrelationships. Special assignments. (Formerly 410.)

EDEPS 503 History of Educational Thought (3)
Burgess, Madsen
Study of educational theory and practice in Western culture. (Formerly 480.)

EDEPS 504 Philosophy of Education (3)
Kerr, Tostberg
Philosophy of education considered as a study of the conceptual basis for educational policy and practice. Emphasis on relationships between enduring educational problems and fundamental philosophic issues; concepts that feature centrally in educational discourse; and conceptual analysis as a means for clarifying decisions regarding educational policy and practice. (Formerly 488.)

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)
Trends, projections, policy issues, problems, and goals in the relation between education and utilization of professional and specialized personnel. Offered jointly with the School of Public Affairs as Public Policy 571, 572, 573. Prerequisite, permission. (Formerly EDUC 571, 572, 573.)

EDEPS 580 Seminar in History of Education (3, max. 6)
Burgess, Madsen
Study of the literature, bibliography, sources, and critiques of history of education. Research methods analyzed and demonstrated in seminar papers. Prerequisites, graduate standing and permission.

EDEPS 582 Seminar in Philosophy of Education: Modes of Inquiry (3, max. 6)
Tostberg
Study of the various ways in which philosophers of education have conducted their inquiries and presented their findings. Prerequisites, 488 and permission.

EDEPS 583 Seminar in Educational Research (3)
Theory, concept, and method of sociological inquiry as applied to problems in education. Prerequisite, permission.

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.

EDEPS 587 Contemporary Philosophies of Education (3)
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.

EDEPS 589 Special Topics in History, Philosophy, and Sociology of Education (3, max. 18)
For advanced degree candidates majoring in history, philosophy, and sociology of education. Prerequisite, permission.

EDEPS 594 History of the University Since the Reformation (3)
Madsen
Growth of the modern university with attention to intellectual trends as well as organiza-
EDBED: Policy Studies. Prerequisite, Education.

EDBED 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.

EDBED 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 in the College of Education. A report or paper setting forth the results of the investigation is required.

HIGHER EDUCATION

EDHED 401 Student Protest Movements (3) Williams
An intensive effort to understand the role college and university students have played during recent decades in educational and social reform. Lunch counter sit-ins and other civil rights activities in the South; the protests at Berkeley, Columbia, and San Francisco State; student protest abroad—these and later activities provide the background for class discussion.

EDHED 430 Higher Education and the Ethnic Minority (3) A Mortihona
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 commonality of experience among the four groups. Additional emphasis placed on major differences.

EDHED 496 Community College Programs and Problems (1-6, max. 6) Merson
Individual and group study of significant topics relating to the planning, development, organization, operation, or evaluation of current or emerging programs or problems in the community college. Prerequisite, permission.

EDHED 499 Undergraduate Research (2-5, max. 15)
For undergraduates. Registration must be accompanied by a study prospectus on a special form provided by the Office of Higher Education, endorsed by the faculty advisor most appropriate for the project proposed and the instructor, and the form must be filed in the Office of Higher Education in the College of Education. Students developing studies under this rubric should be advised that a report or a paper setting forth the results of their investigations should be regarded as a basic part of the program.

EDHED 500 Field Study (3 or 6, max. 6)
Individual study of an education 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 Higher Education in the College of Education.

EDHED 501 Occupational Programs in Higher Education (3) Schill
Analysis of occupational preparation programs in institutions of higher education, industry, business, and governmental agencies, with emphasis on the composition of the student body and the purposes and methods of the programs, and on processes for evaluation and on research.

EDHED 502 College Instruction (3)
Analysis of various instructional modes, media, and instruments, with emphasis on current research findings and methodology.

EDHED 503 The Community College (3) Larsen
Study of the history and development, the roles, the objective, and the organization of the community college and of the problems and the issues confronting the two-year college.

EDHED 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 various kinds of institutions, the composition and character of the student bodies and faculty, and the state coordination of colleges and universities.

EDHED 506 History of American Higher Education (3) Madsen, Williams
Examination of the historical development of the American higher education enterprise.

EDHED 510 Goals and the Societal Environments of Higher Education (3) A Cope, Williams
Study of the goals of higher education, conceptualized in terms of aims reaching toward student development, the growth of knowledge, and societal growth. Comparisons of goal priorities as they differ among universities, senior colleges, community colleges, and other institutions of higher education with the goals held for higher education by those in the exploring society. 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 similar 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 surrounding society attributable to higher education.

EDHED 520 Seminar in the Administration of Community Colleges (3) Larsen
For students preparing for administrative positions in community colleges. Principles and practices in organization and administration of community colleges. Prerequisite, 503 or equivalent.

EDHED 521 Seminar in Occupational Programs in Higher Education (3) Schill
Analysis of current critical social and educational issues that affect occupational preparation programs in post-high-school institutions. Prerequisite, 501 or permission.

EDHED 522 Seminar in Teaching and Learning in Higher Education (3-9) Reitan
Advanced seminar devoted to a consideration of theory and practice in the area of instruction and learning. May be repeated with permission. Open to advanced doctoral students in higher education and to others at the discretion of the instructor.

EDHED 523 Seminar in Institutional Analysis and Planning (3) Cope
Study of the nature, the functions, and the techniques of analysis as they pertain to institutions of higher education. The application of computer-based information systems, program budgeting, behavioral research techniques, and long-range planning procedures are examined as aids to assessment, planning, and change. Intended for doctoral candidates.

EDHED 524 Seminar in the History and Organization of Higher Education (3) Williams
Advanced seminar on special problems in the history and the organization of higher education. May be repeated for credit at the discretion of the student and the instructor. Open to advanced doctoral students in higher education and to others at the discretion of the instructor.

EDHED 525 Administering the Urban Community College (3) Kelly
Examination of the community college in the context of the urban setting. Attention is given to the impact of ecology, critical events, and social action groups upon structure, operations, and development of the community college.
EDHED
540 Internship in Higher Education (3-10, max. 10)
Reitan
Field study and experience in college teaching and administration, planned by the College of Education in consultation with selected colleges. Prerequisite, permission received one month prior to beginning of quarter.

EDHED
550 Review of Research in Higher Education
(1-2)
Open seminar for all students in higher education, designed to promote mutual consideration of research in this field. May be repeated with permission of the advisor.

EDHED
551 College Problems (3)
Williams
Identification of a number of contemporary problems of American higher education, and an analysis of the methods by which solutions may be sought. Prerequisite, 550.

EDHED
554 Seminar in the Administration of Colleges and Universities (3)
Cope
Study of the internal administration and organization of four-year colleges and universities with emphasis on practice and theory. Instruction largely by the case or problem method.

EDHED
559 Seminar in Higher Education (3)
Intensive study of selected problems and proposals for research in higher education. May be repeated for credit. Prerequisite, permission.

EDHED
592 Institutional Research Methods (3)
A. Mortishina
For students planning to engage in institutional research in higher education. Primary emphasis on survey research and data-gathering forms. Background provided on theory, format, caveats, and the like. Students expected to develop forms for class critique. Prerequisite, EDPSY 591.

EDHED
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, with permission of the instructor, the form must be filed with the Office of Higher Education in the College of Education. Prerequisite, permission.

EDHED
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 Higher Education in the College of Education. A report or paper setting forth the results of the investigation is required. Prerequisite, permission.

EDUCATIONAL PSYCHOLOGY
EDPSY
304 Educational Psychology (5)
Brown, Nolan
Basic undergraduate course in psychology concerned with the study of human learning in the educational setting. Learning, motiva-

tion, technology, the cognitive process, human development and socialization, the affective processes and attitudes change, and classroom management are examined. Emphasis is placed 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 teacher education program and permission.

EDPSY
308 Evaluation in Education (3)
Brown, 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 teacher education program and permission.

EDPSY
400 Developmental Foundations of Early Learning (3)
Evans, Gray, McCartney
Study of perceptual-motor, language, and overall cognitive development in children from birth through primary school age. Basic learning processes and guidelines for the development of an effective program and an assessment of developmental status are also examined. Field-based course projects are arranged when appropriate, and implications of early development for parenting and teacher behavior are stressed. Prerequisite, 304 or equivalent. (Formerly 365.)

EDPSY
402 Childhood Socialization and School Practice (3)
Evans, Gray, McCartney
Study of the development of personal-social behavior from the preschool through the pre-adolescent years. Basic concepts of socialization in United States culture are reviewed as is current research about American child-rearing practices. The role of the school in socialization is examined with particular emphasis on socialization problems and the teacher as socialization agent. Prerequisite, 304 or equivalent.

EDPSY
403 Adolescence and Youth (3)
Evans, Gray, McCartney
Overview of the adolescent period for individuals who plan to work with students in the junior and senior high schools and in the early college years. Focus is on crucial developmental processes and patterns and considers the impact of culture upon the adolescent group. Prerequisite, 304 or equivalent. (Formerly 513.)

EDPSY
407 Teaching the Gifted Child (3)
Freemun
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)
Barkey, Lawrence, Salyer
Principles of mental health; normal personality development and functioning; relation of school environment to mental health of students, teachers, and administrators. Background in educational psychology is recommended, but is not a prerequisite.

EDPSY
421 Remedial Education (3)
Experience in and study of analysis of difficulties in school subjects with special reference to language arts and mathematics. Experience in language arts and mathematics. Experience in and study of, appropriate remedial instruction. Analysis and instruction is that considered both feasible and practical for the teacher working with individuals or with a group.

EDPSY
425 Reading Disability; Remedial Techniques (3)
Merritt
Evaluation of methods for diagnosing and minimizing reading retardation. Descriptions of in-class and clinical procedures supplemented by classroom observations. Prerequisite, EDUC 360 or equivalent.

EDPSY
447 Principles of Guidance (3)
Island, McBeath
Study of guidance programs in elementary and secondary schools. Attention is given the roles of specialists with emphasis on the role of the classroom teacher in school guidance programs. This course is designed for teachers, administrators, and prospective counselors. Prerequisite, psychology 360, 533.

EDPSY
449 Laboratory in Educational Psychology (2-6, max. 6)
Klockars, Peckham, Sax
Frequency distributions, measures of central tendency and variability, linear correlation, probability, random sampling, tests, normal distributions, significance of means and correlations, zero order regression and prediction.

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 the instructor, and the form must be filed in the Office of Educational Psychology 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.

EDPSY
500 Field Study (*)
Individual study of an educational problem in the field under the direction of a faculty member. Prerequisites, approval of study and permission of the instructor must be filed in the Office of Educational Psychology in the College of Education.

EDPSY
501 Seminar in Concepts and Problem Solving (3)
Fea, Gray
The psychology of children's thinking. Course
emphasizes study of research results in concept development and problem solving with application to classroom learning situations. Prerequisite, permission.

EDPSY 502 Seminar in Critical and Creative Thinking (3) Fee
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.

EDPSY 503 Psychology of Reading (3) Fee
Reading and perception, word recognition, concept development and meaning in reading: psychology of reading interests and skills. Prerequisite, permission.

EDPSY 504 Verbal Instruction (3) Fee
Study of the psychological implications of verbal behavior as applied to classroom instruction and learning. Prerequisite, permission.

EDPSY 506 Instructional Theory (3)
Examination of the contribution of psychology to teaching and an evaluation of selected elements in instructional strategies. Prerequisite, 505. Offered alternate years; check current Time Schedule.

EDPSY 507 Reading Disabilities: Etiology and Diagnosis—Practice (5) Thalberg
Theory and basic concepts underlying appraisal techniques and causality. Lectures and clinical practicum in administering, scoring, and evaluating each technique, and in interpreting and communicating results. Prerequisites, 425 and permission.

EDPSY 508 Clinical Supervision—Practice (2-6, max. 12)
Practicum in supervising, counseling, group counseling, diagnostic activities and remedial reading therapy. Prerequisite, advanced graduate standing.

EDPSY 510 Seminar in Educational Psychology (1-3, max. 15)
Seminar on advanced topics in educational psychology. A critical appraisal of current research. Prerequisites, advanced degree candidacy in educational psychology and permission.

EDPSY 511 Seminar in Applied Educational Psychology (1, max. 6) Bashey, Forster, Island
Designed for graduate students in educational psychology during, but not restricted to, their last year of residency. Selected contemporary topics relating to the application of theoretical constructs to school psychology and counseling. Prerequisite, permission.

EDPSY 514 Seminar in Quantitative Methods (3, max. 15) Klockars
Seminar on such topics as measurement techniques, research design, psychometrics, and statistics. Prerequisite, permission.

EDPSY 515 Seminar in Development and Socialization (3, max. 15) Evans, Gray, Klockars
Seminar on such topics as cognitive development, language formation, and socialization. Prerequisite, permission.

EDPSY 516 Seminar in Learning and Thinking (3, max. 15) Klockars
Seminar on such topics as learning theory, cognition, and problem solving. Prerequisite, permission.

EDPSY 520 Advanced Educational Psychology—Learning (3) Evans, Fee, Gray, McCarty
Consideration of the major topics in the psychology of learning as applied to the teacher—learner environment. Prerequisite, 304 or equivalent. (Formerly 401.)

EDPSY 521 Educational Issues in Human Learning (3) Freehill, 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. (Formerly 505.)

EDPSY 522 Reading Disability Clinic (3-5)
Supervised practicum in diagnosing and teaching children with reading disabilities. Prerequisites, 425, 507, and permission.

EDPSY 540 Individual Testing (5) Bashey, Brown, Gray, Meacham, Olch
Study of intelligence testing with supervised experience. The emphasis is on the Stanford Binet and the Wechsler Intelligence Scale for Children. Prerequisites, 308, 541, and permission.

EDPSY 541 Group Tests in Counseling (5) Bashey, Forster, Lawrence
Emphasis on the utilization of objective measures in counseling. Prerequisite, 490 or equivalent.

EDPSY 542 Career Development (3)
Salyer
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.

EDPSY 543 Seminar in Vocational Psychology (3) Island
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.

EDPSY 544 Counseling (5) Brummer, Island, Lee
Emphasis on the theory and practice of student counseling.

EDPSY 545 Practicum in Counseling (3-6, max. 6) Bashey, Brummer, Brown, Forster, Island, Thalberg
Supervised practice in counseling. Prerequisites, 541, 544, and permission.

EDPSY 546 Internship in Student Personnel Services (2-12, max. 12)
Supervised practice in student personnel activities for advanced students. Prerequisite, permission.

EDPSY 547 Organization and Administration of Student Personnel Programs (3)
Basic considerations in planning, organizing, and operating school student personnel programs; analysis of issues and problems encountered in formulating policy; supervising and evaluating services. Prerequisites, 551, 552, or equivalent.

EDPSY 548 Educational Implications of Personality Theory (3) Freehill, Olch
Study of personality development and personality theories with continuous attention to the meaning of these in educational practice, testing, and counseling. Prerequisites, 15 credits of psychology and educational psychology.

EDPSY 549 Seminar in Student Personnel Work (3, max. 9) Brummer
Individual problems and issues of student personnel programs at school and college levels. Prerequisite, permission.

EDPSY 550 Family Counseling (3) Brown
Introduction to family counseling theory and practice, emphasizing family dynamics and communication analysis. Prerequisite, 544 or permission.

EDPSY 553 Student Personnel Services in Higher Education (3) Brummer
Survey and critical study of the philosophy and practice of student personnel work in American colleges and universities.

EDPSY 555 Seminar in Rehabilitation Counseling (1-2, max. 6) Bashey, Forster
Oriented toward the role of a rehabilitation counselor as a professional worker. The history, background, scope, and trends of vocational rehabilitation services are studied. Field trips are utilized extensively to acquaint the student with resources serving the disabled in the immediate community. Prerequisite, permission.

EDPSY 556 Group Process Laboratory (3) Brummer, Brown, Fenker, Forster, Island
Experience in small group process. Collateral discussions of process and independent study. Prerequisite, permission.
EDPSY 556 Practicum in School Psychology (1-6, max. 6) Brown Practice in appraisal and counsel, emphasizing diagnosis and counseling with behavior and learning disabilities and bringing to bear techniques acquired in prior courses (540, 545, 565). Prerequisite, permission.

EDPSY 565 Personality Appraisal (5) Freehill, Meacham, Olch Study of personality evaluation with a supervised laboratory emphasizing work with children and their families. Prerequisites, 540, 548, and permission.

EDPSY 566 Case Study Seminar (1, max. 2) Brown, Freehill, Island 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.

EDPSY 570 Seminar in School and Community Psychology (1, max. 3) Freehill, Meacham Seminar in current issues in professional psychology. Limited to master's degree students in school psychological services. Prerequisite, permission.

EDPSY 590 Computer Utilization in Education (3) W Peckham Introduction to programming languages, computer utilization in the solution of research problems, data reduction to forms amenable to computer processing, appropriate framing of problems for solution by computers, utilization of program packages. Prerequisite, 490. (Formerly 491.)

EDPSY 591 Methods of Educational Research (3) Clark, Sax, Peckham Introduction to educational research. Primary focus on hypothesis development, experimental design, use of controls, data analysis and interpretation. Prerequisites, 308, 490, and permission.

EDPSY 592 Advanced Educational Measurements (3) Klockars, Sax Theory of tests and measurement; an examination of assumptions involved in classical test theory, errors of measurement, factors affecting reliability and validity, and problems of weighting. Prerequisites, 308, 490.

EDPSY 593 Experimental Design and Analysis (5) Klockars, Peckham Experimental design with specific emphasis on the analysis of variance and covariance. Prerequisites, 490 or equivalent, and 591.

EDPSY 594 Advanced Correlational Techniques (5) Klockars Multivariate analysis, including regression and multiple correlation; partial, phi, tetrachoric, bivariate, and point-biserial correlation; the discriminant function; factor analysis; intraclass correlation; trend analysis. Prerequisites, 490 or equivalent, and 591.

EDPSY 595 Measurement and Evaluation Practices in Early Childhood Development and Education (3) Sp8 Review and critical examination of measurement strategies and evaluation procedures in contemporary settings for early childhood development and education. Emphasizes a study of early childhood education evaluation research, established and experimental measurement techniques, related to 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; 490 recommended.

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. Prerequisite, permission.

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.

SPECIAL EDUCATION

EDSPE 402 Instructional Modifications for the Education of the Mildly Handicapped (3) Neel In-depth analysis and application of several modifications of instructional techniques necessary for the education of the mildly handicapped. 

EDSPE 403 Education of the Emotionally Disturbed (3) Neel Classroom instruction and measurement of emotionally disturbed children; modification of classroom behavior.

EDSPE 404 Exceptional Children (3) Edgar, Lowenbraun, Smith Atypical children studied from the point of view of the classroom teacher.

EDSPE 405 Educating the Mentally Retarded (3) Affleck Basic course for students preparing to teach the educable mentally retarded; organization of programs, curriculum planning, and instructional procedures and materials.

EDSPE 406 Fundamentals of Reading for Handicapped Children (3) Preservice course. Emphasis on basic prereading and reading skills, such as phonics and structural analysis, specifically for the handicapped child. Acquisition of comprehension skills by the boy or severely retarded or spattered. Diagnosis of reading problems; published materials appropriate for handicapped; material modification.

EDSPE 407 Education of Severely Retarded Individuals With Multiple Handicaps (3) Basic course for students preparing to teach the severely retarded individual and the multiple-handicapped individual. Includes curriculum planning, instructional techniques, and modification of materials for these students.

EDSPE 409 Mental Retardation (3) Smith Introductory course on mental retardation and the problems it presents to parents, the mentally retarded, the community, the schools, and society.

EDSPE 411 Learning Disabilities (3) Ryckman Analysis of major theoretical approaches to the study of children with learning disabilities.

EDSPE 412 Behavioral Measurement and Management in the Classroom (3) Haring, Lovitt Response measurement in the classroom; use of data analysis for instructional decisions and behavior management; instructional programming for handicapped children.

EDSPE 414 Integrating Handicapped With Non-Handicapped Preschool Children In the Inner City (3) Edgar, Hayden Upper-division course designed for teachers and aides planning to work in inner-city preschool classrooms where handicapped children are integrated with nonhandicapped children.

EDSPE 416 Evaluation of Instructional Materials for Exceptional Children (3) Ryckman Introduction to techniques of determining the quality of instructional materials in terms of (1) the systems of specific subject matter organization and (2) specified instructional outcomes.

EDSPE 418 Vocational Development of Handicapped Children and Youth (3) Auld Curricular aspects of vocational training relevant to each age level in the education of handicapped children. Application of programmed instructional techniques to breaking down of 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.

EDSPE 419 Interventions for Families of Handicapped Children (3) WS Edgar, Hayden Upper-division course for professionals and paraprofessionals working with families of handicapped children enrolled in special education or integrated programs.
EDSPE 435 Principles and Practice of Manual English (3)  
Nature of manual communication is introduced with an identification of its specific modes: sign language, signed English, simultaneous method, finger spelling, and manual English. Discussions center on the nature of manual communication is introduced manual English. Discussions center on the theory and models of communication. Neuropsychological bases of communication are then explored with reference to different types of exceptional children. Offered to advanced undergraduates and graduate students with permission of instructor; an introductory course in psychology and special education is desirable.

EDSPE 511 Individual Assessment and Modification Strategies in Special Education (3)  
Loyit  
Exploration of variables affecting the academic and behavioral performance of exceptional children. Assessment and establishment of instructional programs and procedures.

EDSPE 512 Clinical Appraisal of Exceptional Children (3)  
Ryckman  
Diagnostic instruments used in the clinical appraisal of exceptional children. Theoretical considerations are used to buttress practical experiences in appraisal related to intervention.

EDSPE 515 Problems and Issues in Special Education (3, max. 9)  
Affleck, Hayden, 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.

EDSPE 516 Developing Instructional Materials for Exceptional Children (3)  
Ryckman  
Theory and basic concepts underlying the writing of instructional materials for exceptional children. The course involves a basic review of the literature in programming research and methodology. Students write, field test, and rewrite a unit of instructional materials for a specific population of exceptional children. Prerequisite, 416.

EDSPE 517 Practicum in Research Design and Analysis in Special Education (3)  
Ryckman  
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, EDP5Y 490 and 591 or equivalent, or permission.

EDSPE 518 Seminar in Special Education Research (1, max. 3)  
Loyit, Lowenbraun, Ryckman, Smith  
Designed for doctoral students in special education during their year of residency. Each candidate selects a dissertation problem and submits a proposal. Topics such as the procurement of subjects, the reporting and communication of research findings, and the evaluation of research are stressed. The seminar leads to the evolution of a viable dissertation proposal.

EDSPE 520 Seminar in Special Education (1-3, max. 6) A  
Designed for graduate students in special education. Focus on contemporary topics relating to the application of the theoretical constructs to special education. Prerequisite, permission.

EDSPE 521 The Communicative Disorders of the Exceptional Child (3)  
Scroggs  
Discussion centers on the theory and models of communication. Neuropsychological bases of communication are then explored with reference to different types of exceptional children. Offered to advanced undergraduates and graduates with permission of instructor; an introductory course in psychology and special education is desirable.

EDSPE 530 The Teaching of Speech to the Deaf (6)  
Lowenbraun  
Study of principles and techniques used in developing English sound by the analytical method, introduction of speech by the whole-word method; major emphasis on development of speech in the preschool and school-age deaf child; an introduction to manual communication.

EDSPE 531 The Teaching of Language to the Deaf (6)  
Lowenbraun  
Study of principles and techniques of teaching language to the preschool and school-age deaf child. Leading systems of teaching language to the deaf are reviewed, and a step-by-step development of at least one language system is covered.

EDSPE 532 Elementary School Methods for the Deaf (6)  
Lowenbraun  
Principles and methods of teaching the following subjects to deaf children at the primary and intermediate levels: (1) reading, (2) arithmetic, (3) social studies, (5) science. Covers use of visual aids in classes for the deaf.

EDSPE 534 The Psycho-Educational Principles of Lipreading (3)  
Scroggs  
Theoretical, practical, human, and intellectual elements of the lipreading process. Historical perspectives, current methods of instruction, and research are presented and evaluated.

EDSPE 565 Seminar: Early Childhood Education for the Handicapped (3) W  
Advanced seminar on early childhood education for the handicapped. Historical and current research from appropriate specialties in special education reviewed; research from related fields is reviewed in terms of its application to the education of young handicapped children.

EDSPE 599 Independent Studies in Education (*)  
Independent studies or readings of specialized aspects of education. Registration must be accompanied by a study prospectus endorsed by the appropriate faculty advisor for the work proposed, and, with permission of the instructor, the form must be filed with the Office of Special Education in the College of Education.

EDSPE 600 Independent Study or Research (*)  
Registration must be accompanied by a study
is made by the director of field experiences. Prerequisites, application during Spring Quarter prior to expected participation; completion of the required professional education sequence and of required portion of the elementary education minor; 2.00 grade-point average in professional education; 120 minimum credits; and permission. (20 credits required for certification.)

EDUC 404 Practicum in Classroom Teaching and Management: Secondary School (3-36) 
Dimmitt
Teaching practicum is completed in an assigned public school. A full day, from 8 a.m. to 4 p.m., must be left free for this assignment. Placement is made by the director of field experiences. Prerequisites, application during quarter prior to participation; completion of the required professional education sequence; 2.00 grade-point average in professional education; 120 minimum credits; and permission. (20 credits required for certification.)

EDUC 501 Advanced Practicum in Community Service Activity (3-18) 
Dimmitt
Opportunity is provided for tutoring and teaching experiences in a specific community service organization. Approximately twenty hours of participation plus scheduled seminars are required for each credit earned. Prerequisites, application during quarter prior to participation and permission.

EDUC 502 Advanced Practicum in Classroom Teaching and Management (3-18) 
Dimmitt
Designed to provide experienced teachers with selective, in-depth classroom experiences and teaching in a specific community service organization. Approximately twenty hours of participation plus scheduled seminars are required for each credit earned. Participants wishing to use advanced community service experience to satisfy, in part, graduate program requirements should make such arrangements prior to enrollment with their adviser and the director of field experiences. Prerequisites, application during quarter prior to participation and permission.

EDUC 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 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 chairman or Graduate Program Adviser.

EDUC 800 Doctoral Dissertation (*)
Research for the doctoral dissertation and research preparatory or related thereto. Limited to intermediate-level (i.e., those 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. Name of faculty member responsible for supervising the student should be indicated on the Program of Studies. Prerequisite, permission of Supervisory Committee, Chairman or Graduate Program Adviser.

COLLEGE OF ENGINEERING

COLLEGE COURSES

Courses for Undergraduates

FUNCTIONAL TECHNIQUES

ENGR 123 Graphical Analysis (1-8, max. 8) AWSp
Designed for a range of students from those with little or no drawing experience to those with considerable graphical background. Taught by self-paced instructional units. Approximately thirty units cover the following techniques: freehand and instrument drawing; development of orthographic view relationships; reading and interpreting drawings; design drawing; selected topics in descriptive geometry and graphical statics; practical applications in graphical calculus, empirical equations, and nomography. Starting unit determined by test. Subject matter covered determined by student's interests and major. (Formerly 120, 121, 123.)

ENGR 130 Techniques of Communication (3) AWSp
Organization, development, and expression of ideas.

ENGR 131 Scientific and Technical Reporting (3) AWSp
White
Fundamental principles of making a logical, concise, and effective presentation of technical materials to various types of audiences. Prerequisite, qualifying score on Washington Pre-College Test.

ENGR 140 Measurement and Experimentation (4) AWSp
Seabloom
Solution of problems in engineering measurements, statistics, probability, and unit systems. Design of experiments. Collection of data in several laboratories in the college. Corequisite, Mathematics 124.

ENGR 141 Computer Applications to Engineering Problems 1 (4) AWSp
Dunn
Language of FORTRAN applied to engineering problems. Flow charts, program organization, and basic computer statements. Introductory problems solved on CDC 6400. Prerequisite, Mathematics 124, which may be taken concurrently, or permission.

ENGR 150 Design and Synthesis (3) WSp
Chalk
Introduction to the engineering design process.
Individual and team effort is directed from conceptual and formative stages through preliminary design. The design may involve a concept, a technique, a device, a facility, or a process to meet the needs of a particular problem.

ENGINEERING SCIENCES

ENGR 170 Fundamentals of Materials Science (4) AWSp8 Polonsky 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, multiphase systems, and natural and synthetic polymeric materials are included. Mechanical stress, electromagnetic fields, irradiation, and thermal and chemical changes are considered with respect to their influences on mechanical, Machanical, and chemical properties. For advanced freshmen and sophomores. Prerequisite, Chemistry 150.

ENGR 180 Materials Science Laboratory (1) AWSp8 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 or concurrent registration.

ENGR 189 Engineering Statics (4) AWSp8 Morrison Principles of statics, basic concepts, parallelogram law, Newton's law, resultants, force-couple relationships, equilibrium diagrams, equilibrium analysis, three-dimensional structures, two-dimensional frames, trusses, friction, and virtual work. Vector algebra used throughout the course. Prerequisite, Mathematics 125, which may be taken concurrently.

ENGR 190 Introduction to Logical System Design (3) AWSp8 Johnson Introduction to concepts of logical algebras and techniques in the design of certain classes of systems. Formal and informal number systems used in logical models and associated arithmetics. Boolean algebra and its use in the specification and modeling systems is introduced. Examples of system reduction by logical operations and topological methods along with formal algorithms for combinational logical simplification. Examination of time dimension in logical models for development of mechanical, operational, and decision. Examples of simple systems ranging from digital computers to fault trees. Emphasis on selection of system categories eligible for logical modeling.

ENGR 230 Kinematics and Dynamics (4) AWSp8 Polonsky Dynamics, rectilinear motion, vector calculus, kinematics and kinetics of a particle, statics, friction, vibration, impulse, momentum, work and energy, conservation laws, moving references, central force motion, systems of particles, rigid-body mechanics. Prerequisite, Mathematics 126.

ENGR 240 Introduction to Continuum Mechanics (4) AWSp8 Dill 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 determined primarily from the areas of fluid mechanics and solid mechanics. Prerequisites, Mathematics 126 and Physics 121.

ENGR 250 Introduction to Engineering System Dynamics (4) AWSp8 Jorgensen Lectures and laboratory demonstrations introducing the concept of system analysis and mathematical modeling by ideal-lumped linear elements and their interconnections. Identification of system variables and application of basic physical laws. Discussion of approximations required to describe the response of engineering system elements by linear differential equations with constant coefficients. Computational methods for finding the system response, on both analog and digital computers. Comparison between the system response and that of the computational model. Prerequisite, Mathematics 126.

ENGR 260 Thermodynamics (4) AWSp8 Oates Introduction to the basic principles of thermodynamics, from a predominantly macroscopic point of view. Development of the basic laws of thermodynamics, together with this illustration by application to energy transformations and state changes in engineering problems. Prerequisites, Mathematics 126, 100-level physics and chemistry courses.

ELECTIVES

ENGR 110 Career Planning I (1) AW Whittemore 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 information of general interest. The small sections provide an opportunity for students to become acquainted with an engineering faculty member and a time to ask questions and to obtain assistance in preparing a statement of career and educational goals. Offered on credit/no credit basis only.

ENGR 161 Plane Surveying (3) ASp Macarthur Plane surveying methods; use of the engineer's level, transit, and tape; computations of bearings, plane coordinate systems, areas, stadia surveying, public land system. Prerequisite, trigonometry.

ENGR 270 Air-Water Interface Transportation Vehicles (3) WS Bollard The force system acting on air-water interface and land vehicles and their resulting mechanisms of motion. The effect on the environment is an important factor in the choice of vehicles for a specific purpose.

ENGR 280 Materials Application in Engineering (3) W Polonsky Principles of materials selection as related to engineering requirements; evaluation and testing, including definitions and analyses of material failure; current developments in engineering materials; tutorial sessions involving team approach to solution of materials application problems. Prerequisite, 170.

ENGR 305 Environmental Radioactivity (3) Sp Woodruff Study of the nature of the various sources of radioactivity encountered today and to be expected in the future. Topics covered include: natural radioactivity; radiation from nuclear weapons, from nuclear power plants and fuel reprocessing plants, and from medical diagnosis; radiation effects on plants and animals; radiation therapy and other useful applications and methods of detection.

ENGR 307 The Energy Question (3) ASp Albrecht, Garlid Description and analysis of crucial questions, methods, and means of determining energy supplies and consumption. Consideration is given to energy sources and requirements on global, national, and regional scales; fundamentals of energy generation, conversion, and distribution; resulting pollution and environmental effects; controversies between environmentalists and growth proponents. All forms of energy are considered, but electrical energy production and use are emphasized. The course is designed to illuminate the conflicts involved in choosing optimal energy policies. Prerequisite, junior standing.

ENGR 308 The Energy Question Laboratory (1) ASp Laboratory devoted to computer modeling and analysis of energy problems to accompany 307.

ENGR 341 Computer Applications to Engineering Problems II (3) AWSp8 Marshall Development and application of numerical methods and algorithms to solve problems in engineering. Simultaneous equations, curve fitting, root-finding algorithms, Taylor series analysis, numerical integration, ordinary differential equations, partial differential equations, and statistical methods are emphasized. Several programs in addition to the interpreter are written and executed. Prerequisite, 141 or equivalent and Mathematics 238, which may be taken concurrently. (Formerly 390)

ENGR 345 Advanced Topics in Digital Computing (3) AWSp8 Redeker The concept of the higher level language. Advanced FORTRAN techniques used to construct an interpreter, including the full set of FORTRAN IV statements, the machine dependent features of the CDC 6400, real and integer binumber conversion stuffing and unstuffing, object-time formatting, logic and Boolean algebra as applied to circuit design, and Polish notation. Several programs in addition to the interpreter are written and executed. Prerequisite, 141 or equivalent. (Formerly 215)

ENGR 346 Assembly Language Programming (3) AWSp8 Redeker The central processor assembler language,
COMPASS, of the CDC 6400 computer, including program structure and organization, COMPASS language instructions, pseudoinstruction, and macroprogramming techniques. Integer and floating-point conversion, character manipulation, simple and nested loops, array accessing. COMPASS-FORTRAN subroutine linkage, and instruction timing. Programs are coded and executed on the computer. Prerequisite, 141 or equivalent. (Formerly 315.)

ENGR

351 Inventions and Patents (1) Sp
Seed
Law and procedures for patenting inventions, employer-employee relationship and trademarks. Primarily for engineering students. Prerequisite, junior standing.

ENGR

360 Introductory Acoustics (3) Sp
Chalupnik, Fyfe, Rogers, Sigelmann
Historical development of acoustics; the terminology and units employed. Sound sources in engineering systems. The wave equation, traveling and standing waves. The analysis of vibrating systems. Helmholtz resonators, wave transmission, and reflection. Ultrasonics and instrumentation. For advanced sophomores and juniors. Prerequisite, 12 credits of engineering sciences or permission.

ENGR

498 Special Topics in Engineering (1-3, max. 6) A,W,Sp

499 Special Projects in Engineering (1-3, max. 6) A,W,Sp

AERONAUTICS AND ASTRONAUTICS

Courses for Undergraduates

A A

300, 301, 302 Aerodynamics I, II, III (3,3,3) A,W,Sp
Decher, Ganzer, Joppa, Rae
The atmosphere and the fluid medium. Dimensional analysis and force coefficients. Kinematics and dynamics of flow fields; incompressible flow about bodies. Thin airfoil theory; finite wing theory. Compressible fluids; one-dimensional compressible flow; two-dimensional supersonic flow. Viscous flows; boundary layers. Prerequisite, 301 for 302; Engineering 260 recommended.

A A

310 Orbital Mechanics (3) A
Kevorkian, Ness, Vagners

A A

311 Flight Mechanics (3) W
Ganzer, Joppa, Ness
Dynamics of systems of particles-rigid body motion; application to constrained rigid bodies and flight mechanics. Prerequisite, 300 or 310 or Engineering 230.

A A

312 Aerelasticity (3) Sp
Bollard, Ness

A A

320, 321, 322 Junior Laboratory I, II, III (2,2,2) A,W,Sp
Ahstrom
The design and conduct of experimental inquiry with consequent introduction to experimental equipment and techniques relative to the general field of mechanics with emphasis in the applied fields of aeronautics and astronautics. Student registers for the entire three-quarter sequence.

A A

330, 331, 332 Structural Analysis I, II, III (3,3,3) A,W,Sp
Bollard, Dill, Holapple, Parmerter
Development of the equations of elasticity, viscoelasticity, and plasticity. Plane stress, plane strain; torsion, bending, and stability of rods and beams; vibrations; energy; potential energy, Castiglione's theorem; statically indeterminate structures; bending of plates and shells. Prerequisite, 331 for 332; Engineering 240 recommended.

A A

370 Introduction to Applied Analysis (3) Sp
Pearson, Street

A A

400, 401, 402 Gas Dynamics I, II, III (3,3,3) A,W,Sp
Ahstrom, Christiansen, Rae, Russell

A A

Ganzer, Ness, Rae
Preliminary design of a modern airplane to satisfy a given set of requirements. Estimation of size, selection of configuration, weight and balance, and performance. Satisfaction of stability, control, and handling qualities requirements. FAA load requirements, load analysis, structural design of components. Prerequisites, 302 for 410; 332 and 411 for 412.

A A

424 Environmental Aspects of Energy Conversion and Heat Engines (3) W
Decher, Hertzberg
Considerations of ecological constraints on the design of heat engines. Thermal pollution of air and water, and pollution by electrical power plants. Advanced methods of power production and of waste heat elimination. Chemistry and kinetics of high-temperature gases. Chemical emission by automotive engines, gas turbines, and hybrid engines. Prerequisites, Chemistry 140, Engineering 260, or permission.

A A

430 Matrix Structural Analysis (3) A
Dill, Holapple
Introduction to matrix methods of structural analysis. Prerequisite, 331.

A A

431 Plates and Shells (3) W
Dill, Holapple, Parmerter
Introduction to the theory of plates and shells. Prerequisite, 332.

A A

452 Special Topics in Structural Analysis (3) Sp
Bollard, Dill, Holapple, Parmerter
Problems and introduction to theory associated with plastic behavior, viscoelastic materials, filament wound and laminated structures, fatigue, creep, and impact. Prerequisite, 331.

A A

Ganzer, Joppa
Calculation of aerodynamic coefficients and stability derivatives. Prediction of performance, stability, and control characteristics of a specified aircraft. Vehicle equations of motion near a flat earth; the performance problem within the atmosphere; an introduction into the dynamic stability of vehicles subject to aerodynamic forces. Wind tunnel tests of an aircraft model to determine performance and stability parameters; comparison of wind tunnel and derived aerodynamic characteristics. Determination in flight of performance, stability, and control characteristics; and comparison with predicted and wind tunnel results. Prerequisites, 302 for 440; 441 for 442.

A A

Kevorkian, Vagners

A A

Pearson, Street, Oates

A A

470 Analytical Problems in Aeronautics (3) A
Dill, Pearson, Street
Courses for Graduates Only

A A

501, 502, 503 Physical Gas Dynamics I, II, III (3,3,3) W,Sp,A
Christiansen, Hertzberg, Street

504, 505, 506 Fluid Mechanics I, II, III (3,3,3) W,Sp,A
Ahlstrom, Christiansen, Decher, Russell, Street
Review of thermodynamics; vectors and dyads. Derivation of the Navier-Stokes equations, stream functions and potential functions, integrals of the equations of motion. Boundary conditions and discontinuities; fluids in solids. Dimensional analysis, sound waves, surface waves, ideal incompressible flows, compressible flows. Laminar and turbulent viscous flows, transonic flow, hypersonic flow, combustion, super fluids. Prerequisite, 567, which may be taken concurrently with 504.

Russell, Christiansen, Decher
Introduction to viscous flow; exact solutions of the equations of motion; approximate equations; exact solutions of steady two-dimensional laminar boundary layers; approximate methods for two-dimensional steady laminar boundary layers, the phenomena of turbulence; free turbulent flows; turbulent boundary layers. Special topics.

510 Wave Propagation in Fluids and Solids (3) Sp
Fye
Examination of the fundamental concepts of wave propagation; group, phase, and shock velocities; interaction of different wave forms; theory and application of the method of characteristics to wave propagation problems.

511 Unsteady Aerodynamics (3) W
Oates
Aircraft gas turbine cycle analysis, component matching, overall engine performance. Aerodynamics of turbines and compressors, through-flow theories, actuator disk theory, three-dimensional effects. Advanced aerodynamic analysis of flows, boundary layers and separation, turbulence in supersonic inlets, engine compatibility, engine noise. (Offered even-numbered years.)

512 Magneto-Fluid Dynamics (3) Sp
Ahlstrom
Review of electrodynamics and Maxwell’s equations; orbit theory of charged particles, statistical mechanics of ionized gases; continuum magneto-fluid dynamics, the two-fluid model and the one-fluid model; wave propagation in a plasma. Offered only when warranted by sufficient enrollment. Prerequisite, 504.

513 Gas Laser Theory and Practice (3) Sp
Christiansen, Hertzberg, 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 population inversions, power extraction, basic therodynamic models, and the interaction of optical radiation with matter are part of the study topics. Due to the rapid development of the subject matter to the energy problems, applications of high-power lasers also are emphasized.

516, 517 Stability and Control I, II (3,3) W,Sp,A
Ganzer, Joppa
Aerodynamics of control; the general problem of dynamic stability; the influence of aerodynamic parameters on flying characteristics. Response of airplane to actuation of control; automatic stability and control.

519 Special Topics in Stability and Control
(3, max. 12) W,Sp,A
Ganzer, Joppa
Study of recent work in stability and control of aircraft, with special attention to handling qualities. Prerequisite, 516 or permission.

523 Seminar in Aerodynamics (1-3, max. 12) W
Ahlstrom
Study of recent advances in aerodynamics. Topics vary from year to year. Open only to students having the M.S. degree or its equivalent.

526 Aerodynamics of Aircraft Gas Turbine Engines I, II, III (3,3,3) W,Sp,A
Decher, Dill
Aircraft gas turbine cycle analysis, component matching, overall engine performance. Aerodynamics of turbines and compressors, through-flow theories, actuator disk theory, three-dimensional effects. Advanced aerodynamics-secondary flows, boundary layers and separation, turbulence in supersonic inlets, engine compatibility, engine noise. (Offered even-numbered years.)

A A

527, 528 Energy Conversion I, II (3,3) W,Sp
Decher, Oates
Analysis of cycles for space and low-pollution commercial power generation. Brayton cycle, very high temperature cycles, direct conversion of heat to electricity, solar collection. Energy storage systems. (Offered odd-numbered years.)

539 Space Propulsion (3) A
Decher, Oates
Physics, nucleons, and heat transfer of nuclear heat sources. Electromagnetic, electrostatic, and electrostatic thrusters. Prerequisite, permission. (Offered odd-numbered years.)

Bollard, Dill, Fye, Hoopes, Parmenter

535, 536, 537 - Analysis of Shells I, II, III (3,3) Sp,A,W
Dill, Parmenter
Nonlinear equations of thin shells. Solution of the linearized equations for shells of revolution and other shapes. Buckling of thin-walled and large shells. Postbuckling deformation of shells.

540, 541, 542 Finite Element Analysis I, II, III (3,3,3) W,Sp,A
Dill, Hoopes
The finite element concept; historical background; relation to classical theory; finite element models; general finite element theory. Finite elements in structural mechanics; structural idealization; constraints; linear and nonlinear problems. Finite element theory for inelastic bodies; problems in structural dynamics and wave propagation; finite element applications to other fields.

545, 546 Bioastronautics I, II (3,3) W,Sp,A
Bollard
Systematic study in how the principles of engineering science apply to specific biosystems; to acquaint the student with the principles of structure and function of the human organism. Prerequisite, 545 for 546.

547 Engineering Aspects of the Fluid Mechanics of the Human Body (3) Sp
Oates
Engineering background to the many flow regimes existing in the human body. Specific examples of flow problems such as cardiovascular, bronchial, microcirculatory, urethral, etc. Prerequisite, permission.

550, 551 Aerospace Systems I, II (3,3) W,Sp,A
Bollard, Fye, Ganzer
Study of aerospace system analysis employing transform methods. The effect of subsystem behavior such as the flexibility of flight vehicle structure, aerodynamic forces.

553 Vibrations of Aerospace Systems (3) W
Bollard, Dill, Fye
Natural frequencies and modes of vibrations of linear systems; forced vibrations and motion dependent forces; Lagrange's equations and
Department of Electrical Engineering as Electrical Engineering 461. Prerequisite, senior standing in engineering or permission.

CH E 465 Reactor Design (3) W
Application of principles of chemical kinetics to the design of commercial-scale chemical reactors; characterization of batch and flow reactors, in homogeneous and heterogeneous systems. Prerequisite, 435.

CH E 470 Chemistry of Wood (3) W
Chemical and physical properties of cellulose, lignin, hemicellulose, and extractives; wood as a raw material for the chemical industry. Prerequisite, Chemistry 102 or 232, or permission.

CH E 471 Pulp and Paper Technology (3) W
Morphology of wood fibers, manufacture of mechanical and chemical pulps, stock preparation, paper machine operation, coated papers, paper-plastic combinations, converting operations. Prerequisite, Chemistry 102 or 232, or permission.

CH E 472 Pulp and Paper Laboratory (2) Sp
Laboratory experiments in the pulping of wood, fiber technology, and the physical and chemical characterization of paper and pulp. Prerequisite, 471.

CH E 480 Process Dynamics and Control (3) A
Analysis of the dynamics of simple chemical process units and systems; applications to stability, control, and instrumentation of such processes. Prerequisite, senior standing.

CH E 481 Process Optimization (3) Sp
Concepts and techniques of optimizing chemical engineering processes and systems including classical and direct methods of experimental search, linear and nonlinear programming, and dynamic programming. Prerequisite, 435.

CH E 485 Process Design I (3) W
Applied economics in chemical engineering design and operations; market survey and plant location; introduction to plant and process design. Prerequisite, 435.

CH E 486 Process Design II (3) Sp
Comprehensive design of a specific process, including economic feasibility studies, utilization of market survey and plant location studies, process equipment design and optimization, and overall plant integration and layout. Prerequisite, 485.

CH E 490 Engineering Materials for Biomedical Applications (3) A
Combined application of the principles of physical chemistry, biochemistry, materials engineering, mass transfer, and fluid mechanics to biomedical problems. Case studies include considerations of the selection of materials, the design and the operation of instruments, components of, or entire, artificial organs (heart, kidney, lung) and artificial structural elements (bone, teeth, skin), all for use in contact with body fluids. Offered jointly with the Center for Bioengineering as Bioengineering 490. Prerequisite, permission.

CH E 499 Undergraduate Research (1-6, max. 12) AWSp
Independent research projects in chemical engineering. Prerequisite, permission.

Courses for Graduates Only

CH E 523 Seminar in Chemical Engineering (1, max. 20) AWSp
Topics of current interest in chemical engineering.

CH E 525 Chemical Engineering Thermodynamics (4) A
Review of principles of thermodynamics. Applications to problems in multiphase and multicomponent systems; theories of solutions. Prerequisite, undergraduate thermodynamics.

CH E 526 Topics in Thermodynamics (3) W
Classical and molecular thermodynamics of phase equilibria, solution theory, thermodynamic stability, and critical phenomena. Prerequisite, 525 or permission.

CH E 530 Momentum, Heat, and Mass Transfer I (4) A
Derivation of the differential equations for mass, energy, and momentum transport; transport properties of liquids and gases. Principles of fluid mechanics; creeping flow, turbulence, boundary layer theory.

CH E 531 Momentum, Heat, and Mass Transfer II (4) W
Continuation of 530. Flows of fluid-particle systems; convective heat transfer, natural convection.

CH E 532 Momentum, Heat, and Mass Transfer III (3) Sp
Molecular diffusion of mass; transfer across interfaces; radial and axial dispersion in flow systems; applications to engineering equipment design; random and stagewise operations; characteristics of contact equipment.

CH E 543, 544 Fluid Turbulence (3,3) A,W
Gusenner
Statistical and phenomenological theories of turbulence. Introductory concepts, velocity correlations, the energy spectrum, the decay of turbulence, scalar fields, turbulent transport, shear turbulence, wall turbulence, phenomenological theories of energy transport, instrumentation, recent literature. Offered jointly with the Department of Mechanical Engineering as Mechanical Engineering 543, 544. Prerequisite, 6 credits in graduate fluid mechanics. (Offered Autumn Quarter in odd-numbered years, Winter Quarter in even-numbered years.)

CH E 555 Interfacial Phenomena (4) Sp
Berg
Surface tension, capillary statics, wetting and spreading phenomena; thermodynamics of capillary systems, adsorption, surfactant monolayers and micellar solutions; capillary hydrodynamics, interfacial turbulence and applications in distillation, absorption, and extraction. Prerequisites, 525, 530, or permission.
CH E 556 Principles and Applications of Colloidal Materials (4) Sp
Hoffman
Preparation, stabilization, properties and destruction of important colloidal materials. The theory and structure of the electrical double layer, electrophoresis. Includes selected case studies pertinent to air and water pollution, biological fluids, industrial processes, home cooking.

CH E 564 Fundamentals of Chemical Kinetics (3) Sp
Larson

CH E 599 Topics in Chemical Engineering Design (3) W
Larson
Lectures and seminars on current design methods in chemical engineering, including technical and economic feasibility of processes, design and optimization of process equipment, and environmental and social constraints. Prerequisite, undergraduate chemical engineering design or permission.

CH E 600 Independent Study or Research (*) AWSp

CIV 198 Career Planning II (1) WSp
Hennes
Review of the areas of specialization that compose the whole field of civil engineering and of the functions performed by the civil engineering practitioner.

CIV 316 Geometronics (4) ASp
Colcord, Veres
Introduction to geodetic and photogrammetric concepts and their 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, Engineering 141 or permission and 18 credits in mathematics.

CIV 320 Transportation Engineering I (4) WS
Hooq, McNeese
The design of alignment and grade of the traveled way, as well as its physical components; roadbed, drainage, pavement, and other design elements. Relationship of design elements to vehicle and human characteristics. Prerequisite, 316.

CIV 342 Fluid Mechanics I (4) AWSp
Nece

CIV 345 Hydraulic Engineering (4) AWSp
Richy
Extension and application of fluid mechanics principles to hydraulic engineering problems. Diffusion and mixing processes, surface-water and groundwater hydrology, open channel flow, pipeline systems, turbomachinery. Prerequisite, 342.

CIV 350 Environmental Engineering (4) WSp
Bogan, Seaibloom
Introduction to the basic concepts of environmental engineering and evaluation of man's interaction with his ecology. Introduction to several major environmental engineering problem areas, including the characteristics and control of air and water pollution, the collection and disposal of solid wastes, and the planning of urban water supply and sewage and drainage systems. Prerequisite, 342, which may be taken concurrently, or permission.

CIV 363 Constructional Materials (4) AWSp
Miller
General treatment of physical and mechanical properties and engineering behavior of metallic and nonmetallic materials. Steel, aluminum, concrete, wood, asphalt, soils, and bituminous mixtures. Laboratory testing, instrumentation, and investigation into microbehavior. Correlation with microstructure and various aspects of materials science. Prerequisites, 393, which is to be taken concurrently, Engineering 170, 240, or permission.

CIV 366 Soils Engineering (4) ASp
Meese, Sheriff
Mechanical properties of soils. Theoretical mechanics and engineering practice in the evaluation of lateral earth pressures, bearing capacity, and settlement of foundations. Underground exploration techniques and foundation construction methods. Prerequisite, 363.

CIV 380 Analysis of Elastic Structures (4) AWSp
Elastic theorems; superposition and virtual work. Solution of statically determinate and indeterminate problems by virtual work. Moment distribution. Limit analysis. Prerequisite, 393.

CIV 381 Concepts of Structural Design (4) AWSp
Planning, design, and construction aspects of structural projects. Criteria for structural adequacy and efficiency. Examination of the design process. Introduction to design in wood, steel, and concrete components for both fixed and moving load systems. Prerequisites, 363, 380.

CIV 390 Environmental Systems Planning (4) ASp
The systems approach. Topics selected from the acquisition and the use of data in the planning process, design theory, regional demographic forecasting. Examples stressing environmental aspects in various fields of civil engineering practice. Prerequisite, junior standing.

CIV 393 Mechanics of Materials II (4) AWSp
Statics with application to structures. Stress, strain, linear stress: strain law. Torsion. Simple
beam analysis. Stability of equilibrium, buckling. Prerequisite, junior standing.

Courses for Graduates Only

CIVE 504 Public Works—Finance, Policy, and Programming (3) W
Research seminar in the study of public works planning and evaluation systems, particularly emphasizing programming and review processes and social, political, and environmental concerns. Students select topics in their areas of public works interest.

CIVE 506 Probabilistic Design Theory (3) Sp
Probabilistic approach to decision processes in design. Resolution of dichotomy between owner and society. Study of input data, analytical procedures and subsequent response. Safety, reliability, and durability measures. Paradigms in design. Prerequisite, graduate standing.

CIVE 540, 541, 542 Social Management of Technology I, II, III (3,3,3) A,W,Sp
Analysis of the interaction of technology and society through general principles and case studies of contemporary issues and public policy; the nature of the technological enterprise, its scientific base, ingredients of capital, specialized manpower, organizational structure and management; employment of public and private institutions; policy planning to generate, utilize, and manage technology so as to maximize opportunities and minimize unwanted consequences; institutional conflicts; development of goals, strategies, program priorities, and policies; legal and economic considerations; processes of public decision making. The first quarter is devoted to general principles, sociopolitical processes and cognitive mapping, using the concept of technological delivery systems; the second, to post facto case studies such as in environmental policy, urban transportation, health care delivery, weather modification, civilian nuclear power, and federal energy allocation for science; the third, to a class-generated group research on a contemporary technology issue in Washington State leading to specific policy proposals. Prerequisite, permission.

CIVE 543 Marine Technology Affairs I (3) W
Case studies in marine legislation, fishery conventions, coastal pollution, oil and gas extraction, environmental observations, planning for international exploration of the sea, federal organizations, etc., to identify components in the marine technology enterprise, dynamics of interrelationships, externalities, policy planning and institutional conflicts in setting goals, priorities, and program strategies. Prerequisite, 540.

CIVE 544 Marine Technology Affairs II (3) Sp
Class-generated group research on a contemporary marine issue in Washington State leading to specific policy proposals. Prerequisite, 543.

CIVE 700 Master’s Thesis (*) AWSp

STRUCTURAL ENGINEERING AND ENGINEERING MECHANICS

Courses for Undergraduates

CESM 424 Pavement Design (3) W
Current rational pavement design procedures. Viscoelastic behavior of flexible pavements. Layered systems. Elastic slab theory, considering such factors as temperature and warping stresses. Other elements of pavement design. Prerequisite, senior standing in civil engineering.

CESM 463 Structure of Materials (3) W
Miller
Exploration and development of those aspects of material science applicable to civil engineering. The nature of metals, ceramics, polymers, and composites in terms of thermal, chemical, physical, and mechanical properties. Metallurgy of fracture. Laboratory optical techniques. Prerequisite, CIVE 363.

CESM 477 Soil Mechanics II (3) A
Meeste
Fundamental principles of soil mechanics, with emphasis on problems involving plastic equilibrium and seepage forces. Prerequisite, CIVE 366.

CESM 479 Advanced Mechanics of Materials I (3) Sp
General theory of torsion and bending of straight and curved beams; beams on elastic foundations and beam-columns. Prerequisite, CIVE 393 or permission.

CESM 470 Advanced Mechanics of Materials I (3) Sp
Elements of structural stability and plastic analysis. Stability of columns and beam-columns in the elastic and inelastic ranges. Stiffness and flexibility matrices and their applications to buckling. The basic hypotheses of simple plastic analysis, upper- and lower-bound solutions, interaction diagrams, and the effects of inelastic loading and geometry changes. Prerequisite, CIVE 380.

CESM 472 Stability and Plastic Analysis (3) Sp
Albrecht, Mattack
Theories of models, dimensional analysis, direct model analysis; studies employing specific materials, techniques of testing and measurement. Offered jointly with the Department of Architecture as Architecture 521. Prerequisite, permission.

CESM 477 Structural Design Through Model Studies (3) W
Theories of models, dimensional analysis, direct model analysis; studies employing specific materials, techniques of testing and measurement. Offered jointly with the Department of Architecture as Architecture 521. Prerequisite, permission.

CESM 481 Bridge Design (3) Sp
Hawkins
Design of highway bridges. Design considerations; planning; characteristics of different types, economy, esthetics, loading, vibration, deflection, distribution of loads to slabs and girders. Design of typical slab and beam bridge in accordance with AASHO specifications. Prerequisites, senior standing and CIVE 381.

CESM 482 Advanced Reinforced and Prestressed Concrete (3) W
Birkeland, Hawkins
Analysis, design, and construction of reinforced and prestressed concrete structures. Prerequisite, CIVE 381.

CESM 483 Design of Steel Structures (3) AWSp
Vasarhelyi
Design of steel structures, structural steels, manufactured products, and fabrication methods. The design of members and structural systems for various load conditions accepted in practice. Prerequisite, CIVE 381.

CESM 484 Design of Reinforced Concrete Structures (3) AWSp
Hawkins, Mattock, Mitte
Fundamentals of design of buildings in reinforced concrete in accordance with current codes and practices. Prerequisite, CIVE 381.

CESM 485 Applied Structural Analysis (3) W
Vasarhelyi
Classical and matrix methods of structural analysis for static loading. Introduction to the dynamic analysis of structures. Prerequisite, CIVE 380.

CESM 486 Design of Timber Structures (3) AWClanton
The design and construction of timber structures, using elements made of sawn wood, glued-laminated wood, and plywood. Prerequisite, CIVE 381.

CESM 487 Structural Unit Masonry (3) Sp
Lebert, Mattock
Structural behavior and design of reinforced brick, tile, and unit concrete masonry structures. Offered jointly with the Department of Architecture as Architecture 426. Prerequisite, CIVE 381 or permission.

CESM 494 Introduction to the Mechanics of Continuous Media (3) A
Evans, Hartz
Rigorous development of the basic equations of motion of elastic solids and Newtonian fluids through the use of vectors and Cartesian tensors, mechanical behavior of materials, problems in linear elasticity and fluid statics and dynamics. Prerequisites, Engineering 230, 240, CIVE 342 or Aeronautics and Astronautics 300, or permission.

CESM 498 Special Topics: Structures and Mechanics (1-5, max. 12) AWSp
Special topics in civil engineering offered as course with lecture and/or laboratory. May be repeated for credit. Prerequisite, permission of department chairman. A maximum of 6 credits may be applied toward an undergraduate degree.
CESM 499 Special Projects: Structures and Mechanics (1-5, max. 12) AWSp
Individual undergraduate research projects. May be repeated for credit. Prerequisite, permission of department chair. A maximum of 6 credits may be applied toward an undergraduate degree.

Courses for Graduates Only

CESM 520 Seminar (1, max. 6) AWSp
Prerequisite, permission of thesis supervisor.

CESM 556 Engineering Properties of Clay (3) A Sherif
Shearing strength, consolidation characteristics, structural concepts, rheological behavior, and related properties of clay. Prerequisite, CIVE 366. (Formerly CETC 567.)

CESM 567 Stresses in Earth Masses (3) W Sherif
Stress function. Stress-strain analysis within elastic range with emphasis on soil-water systems. Stress distribution under various loadings. Prerequisites, 467 and Mathematics 324, or permission. (Formerly CETC 565.)

CESM 568 Seepage and Slope Stability (2) W Meese
Analysis of groundwater flow, using relaxation, matrix, and finite-element methods. Slope stability analysis, considering seepage forces and pore-water pressures. Prerequisites, 467, 566. (Formerly CETC 568.)

CESM 569 Applied Soil Mechanics (3) Sp Meese
Passive pressure and bearing capacity theories. Foundation soils engineering project to develop design recommendations and performance estimates for deep and shallow foundation schemes. Prerequisite, CIVE 366. (Formerly CETC 569.)

CESM 571 Advanced Mechanics of Materials II (3) A Sp
Theory of stretching and bending of plates. Introduction to membrane theory of shells. Prerequisite, 470 or permission.

CESM 572 Advanced Mechanics of Materials III (3) Sp

CESM 573 Structural Mechanics I (3) A Sp
Elias, Evans, Hartz
Matrix methods in structural mechanics. Review of basic structural theory. Principle of virtual work. Development of basic matrix force (flexibility) and displacement (stiffness) methods of structural analysis. Prerequisite, graduate standing or permission.

CESM 574 Structural Mechanics II (3) W Sp
Elias, Evans, Hartz
Dynamic response of structures using mode superposition and matrix methods. Lumped and distributed parameter systems. Application to earthquake, moving and blast loads. Approximation and numerical methods. Prerequisite, 573 or permission.

CESM 575 Structural Mechanics III (3) A Sp
Elias, Hartz
Variational and energy methods in structural and solid mechanics. Application of calculus of variations and minimal principles of mechanics to nonlinear structural analysis, elastic stability, theory of elasticity, plates and shells, and vibrations. Prerequisite, 574 or permission.

CESM 576 Theory of Plates and Shells (3) W Sp
Elias
General theory of thin shells. Membrane and bending behaviors. Application to axisymmetric shells, shallow translational shells, and circular cylindrical shells. Prerequisite, 571 or permission.

CESM 577 Finite Element Methods in Structural Mechanics (3) Sp
Elias, Hartz
Extension of the matrix methods of structural analysis to the solution of elasticity, plate and shell problems by use of finite element approximations. Discussion of convergence and bounding and extension to investigation of stability and finite deformations. Prerequisite, 573 or permission.

CESM 580 Strain Measurements (3) W Sp
Vazarhelyi
Experimental determination of strain under static and dynamic loads; mechanical, optical, and electrical strain gauges; transducers for displacement, velocity and acceleration; photoelasticity, strain rosette, brittle coating and other methods; problems of instrumentation, and analysis of data. Prerequisite, graduate standing or permission.

CESM 582 Advanced Structures II (3) W Sp
Vazarhelyi
Analysis of trussed structures. Deflections and secondary stresses. Influence lines. Strain energy theorems, flexibility matrix, specialized computer programs. Prerequisite, 573 or permission.

CESM 583 Advanced Structures III (3) Sp
Vazarhelyi
Curved members and arches. Approximate and rigorous methods. Strain energy theorems, flexibility matrix, specialized computer programs. Prerequisite, 573 or permission.

CESM 584 Plastic Design of Steel Structures (3) W Sp
Vazarhelyi
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 economy of the procedure. Prerequisite, graduate standing or permission.

CESM 585 Advanced Design of Concrete Structures (3) Sp
Mattock
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. Unusual design problems in reinforced concrete. Prerequisites, 482, 484, or similar basic courses in design of prestressed and reinforced concrete.

CESM 586 Structural Materials and Design (3) W Hawkins
Critical review and discussion of the mechanical properties of structural steel, structural aluminum alloy, and reinforced concrete that affect structural design. Fatigue and impact in metallic structures. Failure of structures and structural members. Prerequisite, graduate standing in civil engineering.

CESM 587 Advanced Design of Steel Structures (3) Sp
Vazarhelyi
Broad review of the factors influencing the function of a structure, such as material properties and fabrication methods. Welded, riveted and bolted connections. Particular problems of welded structures. Design projects. Prerequisite, 586 or permission.

CESM 588 Behavior of Concrete Members (3) A Mattock
Behavior of structural concrete members subject to long- or short-term loading by axial force, bending, shear, and torsion. Prerequisite, 484.

CESM 589 Behavior of Concrete Structures (3) W Mattock
Behavior under load of concrete structures, continuous beams, frames, and slabs. Effect of creep and shrinkage on the behavior of structures. Prerequisite, 588.

CESM 590 Structures Under Wind (3) W Harrt
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 action. Prerequisite, graduate standing in engineering.

CESM 591 Theory of Elasticity I (3) Sp
Elias, Evans, Hartz

CESM 592 Theory of Elasticity II (3) A Sp
Elias, Evans, Hartz
Rigorous formulations of classical theory making use of Cartesian tensor analysis. Stress functions. Use of potential theory to obtain solutions in terms of Papkovitch functions. Prerequisite, Aeronautics and Astronautics 530 or Mechanical Engineering 551, or permission.

CESM 593 Theory of Elasticity III (3) W Sp
Elias, Evans, Hartz
Further topics in elasticity theory, including the Muskhelishvili method for plane elastostatics,

453
integral transforms, contact problems, and finite elastic deformations. Prerequisites, 592 and Aeronautics and Astronautics 580. (Offered even-numbered years.)

CESM

594 Wave Propagation in Solids (3) W
Evans, Hertz
Dynamic formulation of the theory of elasticity; elastic waves in two- and three-dimensional solids; elastic waves in rods, beams, and plates; plastic and viscoelastic wave propagation in solids. Prerequisites, 574 or equivalent and 592, or permission. (Offered odd-numbered years.)

CESM

599 Special Topics: Structures and Mechanics (2-5, max. 15) AWSpS
Prerequisites, permission of instructor and department chairman.

CESM

600 Independent Study or Research: Structures and Mechanics (*) AWSpS

TRANSPORTATION, CONSTRUCTION, AND GEOMETRONICS ENGINEERING

Courses for Undergraduates

CETC

310 Forest Highway Location and Design (5) SP
Hoag, McNeece
Reconnaissance, preliminary, and location surveys for forest highways. Earthwork computations, with and without use of electronic computers. Testing of road constructional materials and subgrade soils. Design of roadway elements. Not to be taken for credit by civil engineering majors. Prerequisites, Engineering 161 and Mathematics 125.

CETC

401 Highway and Traffic Engineering Functions (3) AS
Sawhill
Historical development of highway transportation in the United States and significant legislation in its development, including federal, state, and local programs. An overall view of traffic engineering in relation to planning, design, operations, administration, safety, and research. For students in traffic safety education. Not approved for students with credit for 410. Prerequisite, graduate or senior standing.

CETC

405 Critical Path Methods of Project Scheduling (2 or 3) AWSp
Dunn, Hoag
2 credits—precedence analysis of project activities; critical path methods (CPM); computer applications. 3 credits—CPM project; PERT and PREDENCE techniques. Prerequisite, Mathematics 105.

CETC

406 Construction Engineering (3) W
Hoag, Meese
Introduction to construction engineering, including such topics as selection of equipment, work analysis, and the role of the engineer in heavy construction operations. Prerequisite, senior standing in engineering or permission.

CETC

407 Contracts and Specifications (3) AWSp
Secret
Specification writing and the elements of contract law relating to heavy construction and engineering services. Prerequisite, junior standing.

CETC

410 Traffic Engineering—Fundamentals (3) A
General review of scope and functions of traffic engineering including its relation to urban planning, municipal engineering, motor vehicle registration, safety, and administration. Prerequisite, senior or graduate standing in engineering, or permission.

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 queuing theory to traffic events. Prerequisite, senior or graduate standing in engineering.

CETC

415 Photogrammetry (3) AS
Colcord, Veress
Geometrical characteristics of photographs. Planning and control considerations for mapping in terrestrial, aerial, and underwater environments. Theory of stereoscopy and parallax measurement. Photogrammetric instrumentation. Evaluation of accuracies and error sources. Prerequisite, CIVE 316 or permission.

CETC

417 Cadstral Surveys (3) WS
Colcord
Boundaries; the system of public lands; adverse and riparian rights; subdivision design and site planning. Professional ethics.

CETC

418 Engineering Control Surveys (3) Sp
Colcord

CETC

421 Transportation Engineering II (4) S
Sawhill, Staff
Physical elements of transportation facilities; roadway, drainage, pavement, railways, runways, waterways, and other design components of transportation systems. Prerequisite, junior or senior standing in civil engineering.

CETC

425 Introduction to Urban Transportation (3) W
Hoover
Identification of the framework, central concepts, constraints, and issues of the urban transportation planning problem. Offered jointly with the Department of Urban Planning as Urban Planning 430.

CETC

498 Special Topics: Transportation, Construction, and Geometronics (1-6, max. 12) AWSpS
Special topics in civil engineering offered as course with lecture and/or laboratory. May be repeated for credit. Prerequisite, permission of department chairman. A maximum of 6 credits may be applied toward an undergraduate degree.

CETC
516 Analytical Photogrammetry (3) W
Veres

CETC
518 Aerial Triangulation (3) Sp
Veres
Radial aero triangulation; instrumental aero triangulation by independent pairs; aeropolygon, aeroleveling and independent geodetic control methods. Semianalytical aero triangulation. Mathematical strip and block adjustment. Analytical aero triangulation methods. Prerequisites, 515, 516.

CETC
520 Seminar (1, max. 6) AWSp
Prerequisite, permission of thesis supervisor.

CETC
522 Transportation Systems (3) A
Interregional highways, state trunk lines and local roads; their functions and appropriate standards of design. The characteristics of road, rail, water, and air transport in relation to selection and design of the facility. Pipeline and conveyor transportation. Prerequisite, graduate standing in engineering or permission.

CETC
523 Transportation Terminals (3) W
Coordinatino of transportation facilities. Port and harbor installations. Airports. Rail belt lines and terminals. Prerequisite, graduate standing in engineering or permission.

CETC
524 Rapid Transit (3) Sp
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.

CETC
525 Transportation and Land Use Planning Models (3) A
Shinn
Theory underlyin land use and transportation planning models. Reviews of past efforts to model urban development. Modeling of alternatives. Forecasting technological innovation, assessing environmental impacts. Offered jointly with the Department of Urban Planning as Urban Planning 530. Prerequisite, permission.

CETC
526 Transportation Studies, Model Calibration, and Network Flow (3) Sp
Nihan
Review of the organization of regional transportation studies, including the functions of engineers, planners, and others. Examination of transportation and land use models as applied to transportation studies and analysis of current models. Application of technology of traffic assignment to transportation networks, with problems of tree building, network flow, restrictions and system optimization by computer. Prerequisite, graduate standing or permission.

CETC
527 Information Systems for Planning and Research (3) A
Colcord
Computer programming technology and data systems designed for large-scale data inputs. Machine editing, data manipulation, and retrieval. Laboratory problems adapted to specialized interests of students. No previous computer programming experience required. Offered jointly with the Department of Geography as Geography 527 and the Department of Urban Planning as Urban Planning 527.

CETC
528 Automated Mapping and Graphing (3) W
Dunn, Youngmann
Computer applications to statistical and areal analysis. Laboratory projects adapted to specialized interests of students. Offered jointly with the Department of Geography as Geography 528 and the Department of Urban Planning as Urban Planning 528. Prerequisites, 527, basic statistics, or permission.

CETC
529 Computer Applications to Urban and Regional Analysis (3) Sp
Calkins, Harwood
Simulation models and automated systems for the study of land use and related economic and demographic data. Machine methods of planning analysis and feedback review. Laboratory projects. Offered jointly with the Department of Geography as Geography 529 and the Department of Urban Planning as Urban Planning 529. Prerequisite, 528 or permission.

CETC
530 Adjustment Computations (4) A
Veres
Two- and multi-dimensional distributions and concept of errors, variances, 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.

CETC
531 Geodesy (4) A
Colcord
Introduction to gravimetric, geometric, and astrogeodesy; gravity observations and reduction; properties of the ellipsoid and geoid; determination of time azimuth; latitude and longitude for Lapse stations; computations of geodetic position; introduction to satellite methods. Prerequisite, permission.

CETC
535 Airport Systems Planning (3) W
Shinn
Investigation of environmental, sociopolitical, and economic features of air transportation system planning. Emerging technologies. Intermodal relationships. The decision-making process for resource allocation, land-use planning, programming, and organization. Scenarios of anticipated conflict and resolution problems. Offered jointly with the Department of Urban Planning as Urban Planning 535. Prerequisites, 425, Urban Planning 400, or permission.

CETC
537 Electronic Surveying (4) W
Veres
Modern EDM instrumentation theory and applications; hydrographic and navigation systems; chart and map designs, application of lasers in surveying; long line reduction and trilateration adjustment. Prerequisite, 530.

CETC
556 Remote Sensing of Environment (3) W
Bell, Dunn
Use of aerial photographs, multispectral imagery, and other sensors for object evaluation and environment studies. Factors in system and target signature evaluation. Prerequisite, permission.

CETC
599 Special Topics Transportation, Construction, and Geometronics (2-5, max. 19) AWSp
Prerequisites, permission of instructor and department Chairman.

CETC
690 Independent Study or Research (*) AWSp

WATER AND AIR RESOURCES
Courses for Undergraduates

CEWA
434 Ecological Effects of Waste Water (4) 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 the College of Fisheries as Fisheries 434.

CEWA
435 Physiological Effects of Water Pollutants (3) Sp
Brown, Welch
Physiological effects of water pollutants on economically important or endangered fishes, especially with respect to waste water. Types of industrial, urban, and agricultural entities that contribute wastes to natural waters. Monitoring procedures and assessment of changes in fisheries as a consequence of waste effluents. Offered jointly with the College of Fisheries as Fisheries 435. Prerequisites, upper-division or graduate standing, organic chemistry, and some background in any of the following: general physiology, cell biology, biochemistry, chemical biology, sanitary engineering.

CEWA
441 Intermediate Fluid Mechanics (3) A
Richay
Potential flow, boundary layer mechanics, generalized similarity problems, introduction to mixing processes. Application of equations of motion and control volume concepts. Prerequisite, CIVE 345 or permission.

CEWA
442 Introduction to Hydraulics in Water Resources (3) Sp
Nece
Introduction to the physics of water movements in natural freshwater bodies and inshore marine waters. Brief review of some essential fluid mechanics. Flow in rivers and streams; surface water hydrology. Motions in lakes, reservoirs, and estuaries as related to water and
heat budgets. Some aspects of diffusion. Instrumentation and procedures for obtaining field data. Not open to students with undergraduate civil engineering background. Prerequisites, senior or graduate standing and permission.

CEWA 444 Coastal Engineering I (3) W Richey
Linear theory of water waves, wave transformations due to boundary conditions, sediment mechanics, and sediment transport. Applications illustrated by laboratory experiments and selected case histories. Prerequisite, CIVE 342.

CEWA 445 Hydraulics Machinery (3) W Chenoweth
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 computers in analyzing such conditions. Prerequisite, CIVE 345.

CEWA 446 Analysis Techniques for Groundwater Flow (3) W Bogan
Emphasis on developing appropriate equations to quantitatively describe saturated groundwater flow and examining in detail, numerical and analog methods for solving groundwater flow problems. Participants required to obtain solutions to specific problems using numerical and electrical analog techniques developed during the course. Prerequisite, CIVE 342 or equivalent.

CEWA 447 Physical Hydrology (3) A Bogan
Global water picture, data sources and data homogeneity, precipitation, evapotranspiration, flow to wells, hydrographs, storm and snowmelt runoff, storage and flow in river basins, unit hydrographs, frequency studies. Hydrologic design: storage reservoirs; flood mitigation; drainage; introduction to deterministic and stochastic models. Prerequisite, senior standing or permission.

CEWA 448 Open-Channel Engineering (3) Sp Strasser
The transportation of water by gravity flow. Analysis and design of canals, transitions, energy dissipators, and similar structures. Analysis of surface profiles and effects of non-linear alignment on flow. Design-oriented problems in open-channel hydraulics. Prerequisite, CIVE 345.

CEWA 450 Man and the Pollution of His Environment (3 or 5) Asp Burgess, Mar, Nece, Pilat, Seabloom, Welch
Description of growing problems of air, water, and land pollution that the engineer must define and solve if the quality of man’s environment is to be maintained. The quantity and quality of present production of wastes; their known environmental effects; practical methods of control; prospects for the future. The essential team approach to these engineering problems is stressed, noting the interrelationship of physical, chemical, and biological causes and effects. Students must register for a minimum of 3 credits. 5-credit registration optional with additional term project. Primarily for nonengineering students. Prerequisite, junior standing.

CEWA 451 Environmental Engineering Design (3) AW Boren
Introduction to the theory and practice of planning and design of urban water supply, sewage, solid wastes, and drainage collection systems. Evaluation of service areas and service requirements and their relationships to urban and regional planning activities. Engineering methods and computer programs for designing basic system elements. Prerequisite, CIVE 350.

CEWA 452 System Engineering Fundamentals (3) Asp Mar
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.

CEWA 453 Water and Waste-Water Treatment (3) W Bogan
Objectives of water and waste-water treatment; associated physical, chemical, and biological phenomena; design of common treatment systems. Prerequisite, 451 or permission.

CEWA 454 Sanitary Engineering Design Studies (3) Sp Bogan
Individual and group design studies involving local communities. Application of the principles and methods presented in 451. Preparation of comprehensive plans and of 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 455 The Chemistry of Natural Water Systems (3) Asp Spyridakis
Principles of chemical equilibrium relevant to natural water systems; the nature and effect of chemical reactions in domestic and industrial waste effluents on natural water systems; chemical principles involved in the treatment of water and waste waters. Prerequisite, one year of general chemistry or equivalent.

CEWA 456 Water Quality Analysis (3) W Spyridakis
Laboratory evaluation of chemical quality of natural and waste waters. Theory and application of instrumentation used in water-quality measurement.

CEWA 457 Water-Quality Analysis (3) W Spyridakis
Laboratory evaluation of chemical quality of natural and waste waters. Theory and application of instrumentation used in water-quality measurement.

CEWA 458 The Chemistry of Air Pollution (3) A Chairson
The analytical and physical chemistry of trace atmospheric constituents, both natural and man made. Lecture and laboratory. Prerequisite, Chemistry 160 or equivalent.

CEWA 461 Air Resources Engineering I (3) Asp Rosson
Fundamental aspects of air pollution. Analysis of interrelationship between the essential factors of emission sources, meteorology, and topography and adverse effects on sensitive receptors. Review of the principles of air-pollution control, with emphasis on engineering approaches. Prerequisite, CIVE 350 or equivalent, or permission.

CEWA 462 Air Pollution Control (4) W Pilat
Overall approach for controlling air pollution. Definition of the problem, including identification of air pollutants, atmospheric dispersion, capacity, emission sources, and detrimental effects. Factors involved in air resources engineering: legal aspects, air pollution control legislation and regulation, processes and equipment for controlling emissions of gaseous and particulate air pollutants. Case studies of specific air pollution problems. Primarily for non-engineering students. Prerequisite, sophomore standing.

CEWA 467 Air Pollution Source Testing and Equipment Evaluation (3) Sp Pilat
Engineering evaluation of air pollutant sources and air pollution control equipment. Air pollutant source testing and stack sampling. Analysis of equipment performance and source emissions in the field and in the laboratory. Prerequisites, junior standing and permission.

CEWA 470 Solid Waste Disposal (3) A Hammer, Seabloom
For students majoring in the solid wastes program and an elective for undergraduate and graduate engineers and urban planners covering the sources and the handling of industrial, municipal, and agricultural wastes, with examination of processing, by-product recovery, and waste treatment methods, particularly those of biological systems. The role of urban and industrial planning and of collection and transportation aspects in solid-waste production and disposal are discussed, especially related to community location and planning and to methods of hauling and controlling wastes concentration and utilization. Laboratory-composting studies.

CEWA 485 Sampling Techniques for Water Quality (3) Sp Welch
Collection and analysis of water for selected abiotic and biotic characteristics in lakes, rivers, and estuaries. Emphasis is placed on the natural variability of water quality characteristics as determined by application of appropriate field sampling techniques and data analysis with the objective of designing adequate sampling programs. Prerequisite, 457 or permission.

CEWA 498 Special Topics—Water and Air Resources (1-5(4,12)) AWSp
Special topics in civil engineering offered as courses with lecture and/or laboratory. May be repeated for credit. Prerequisite, permission of department Chairman. A maximum of 6 credits may be applied toward an undergraduate degree.
of 6 credits may be applied toward an undergraduate degree.

Courses for Graduates Only

CEWA 550 Biological Waste Treatment (3) W

Biological treatment processes and systems used in water-quality control. Biological and engineering considerations of waste-water treatment, including theory, purpose, evaluation, and design of secondary and tertiary processes. Prerequisite, 456 or permission.

CEWA 551 Sanitary Engineering Unit Operations (3) Sp

Bogan

Major unit operations employed in water and waste treatment, including solids separations, filtration, chemical coagulation, ion exchange, and gas transfer and adsorption. Theory and basic principles. Development of mathematical models and evaluation of current design criteria and methods. Prerequisite, 456 or permission.

CEWA 552 Design of Water and Waste Treatment Processes (3) Sp

Bogan, Carlson

Selection and functional design of water and waste treatment 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 interpretation of biobehavioral problems and data from inland and coastal waters. Students participate in presentation and discussion of current research on selected topics. Prerequisites, 434, 456, or permission.

CEWA 554 Advanced Process Chemistry for Sanitary Engineers (3) Sp

Properties of colloidal systems, natural, and synthetic organic materials encountered in water and waste-water treatment, and laboratory methods for their analysis. Prerequisite, 456 or permission.

CEWA 555 Topics in Computer Simulation of Environmental Engineering Systems (3) A

Bogan

Discussion of mathematical models and computer programs for simulating processes and systems of interest to engineers in the field of environmental pollution control and the related areas of air and water resources, solid-waste management, and water and waste treatment. Intended for the graduate student who has acquired a fundamental understanding of the principal processes and systems of concern to his major field. No previous computer programming experience necessary. Class problems and term assignments adapted to the student’s special interests. Prerequisite, one year graduate study or permission.

CEWA 556 Industrial Waste Treatment (3) Sp

Carson

Sanitary engineering problems relating to biological and biochemical systems influencing man’s environment. Biological treatment of industrial wastes and advanced waste treatment processes. Prerequisite, 550 or permission.

CEWA 557 Water Resources Management (3) A

Mar

Engineering, social, and economic factors involved in water resource development and management; water policies, programs, and administration; use relationships and conflicts; considerations for regional water resources.

CEWA 558 Water Quality Management (3) W

Water quality control objectives, methods and philosophies; effect of various uses on water quality; receiving water characteristics; dispersion and behavior of pollutants; treatment required for various water uses. Prerequisites, 434, 456, or permission.

CEWA 559 Water Resources System Management (3) Sp

Application of advanced quantitative methods to the analysis and management of water resources. Includes quantitative policy analysis of water quantity and quality issues in specific regions, emphasizing interactions. Prerequisite, 557, 558, or permission.

CEWA 560 Topics in Environmental Health (3) W

Rossano

Introduction to human biology, including physiology, epidemiology, ecology, and toxicology. Study of modern environmental health problems and practices regarding radiological health, solid-waste disposal, food- and vector-borne diseases, occupational health, fluoridation, biometeorology, and bioengineering.

CEWA 562 Air Resources Engineering II (3) W

Rostano

Study in depth of the major sources of air pollution, including analysis of flow diagrams, raw materials, off-streets, pollution control facilities, and environmental impact. Field trips to representative plants; trip reports and term paper. Prerequisite, 461 or permission.

CEWA 563 Air Resources Management (3) Sp

Rostano

The atmosphere as a vital natural resource. Administrative and legal aspects of air conservation; air quality criteria and standards; design of area-wide surveys; long-range planning. Prerequisite, 461 or permission.

CEWA 564 Aerosol Science and Technology I (3) W

Charlson

Topics related to suspended particulate matter in a gaseous medium. Statistics, mechanics, and physical chemistry of aerosols. Particular reference to particulate matter in air and to experimental and engineering methods. Prerequisite, permission.

CEWA 565 Aerosol Science and Technology II (3) Sp

Charlson

Continuation of 564; light scattering, Brownian motion, diffusion and coagulation of aerosols. Prerequisite, permission.

CEWA 566 Design of Gaseous Air Pollutant Control Equipment (3 or 5) A

Pilat

Principles and design of the physical and chem-
toward engineering systems. Design of adsorption (packed and spray), absorption beds, and incinerators for controlling the emissions of gaseous pollutants. Design of settling chambers, cyclones, filters, etc., for particulate air pollutants. Case studies of design, construction, performance, and cost of actual gaseous air pollution control systems. Students not majoring in air resources engineering may register for 3 credits by permission.

CEWA
567 Design of Particulate Air Pollutant Control Equipment (3 or 5) W
Pilot Principles and designs of processes used to control the emission of particulate air pollutants. Design of settling chambers, cyclones, filters, wet scrubbers, and electrostatic precipitators. Design, construction, performance, and cost of actual particulate air pollution control installation. Students not majoring in air resources engineering may register for 3 credits by permission. Prerequisites, 564 and 566, or permission.

CEWA
571 Solid Waste Management (3) W
Hammar, Mar
Graduate workshop for engineers, applied scientists, planners, administrators, economists, and public health students to examine current solid-waste planning, management, and operating practices. Teams of interdisciplinary students are introduced to the systems approach for diagnosis of solid-waste problems. Each student is required to be proficient only in his own major. The workshop attempts to apply the results of each student's education prior to the solid-waste problem. During the course the use of simulation models, information systems, and optimization methods is introduced.

CEWA
572 Current Topics in Solid Wastes Management (3) Sp
Cone, Jahan
Solid-waste management, including resource recovery, recycling, incineration, and pyrolysis. The role of new technology, social incentives, and community action in alleviating solid-waste problems is developed. For students majoring in solid-waste management and for urban planners and business administration majors. Prerequisite, 470.

CEWA
599 Special Topics: Water and Air Resources (2-5, max. 19) AWSp
Prerequisites, permission of instructor and department Chairman.

CEWA
600 Independent Study or Research—Water and Air Resources (*) AWSp

ELECTRICAL ENGINEERING

Courses for Undergraduates

EE
201 Introduction to Electrical Engineering (3) AWSp
Introduction to the fundamentals of electrical engineering. Topics covered include fundamentals of communication, power, electronics, and the techniques of engineering analysis and design in these areas. This course is intended as an introductory course only and cannot be used as an electrical engineering elective. Prerequisite, Mathematics 125, which may be taken concurrently.

EE
299 Special Topics in Electrical Engineering (3-5) AWSp
New and experimental approaches to basic electrical engineering. May include design and construction projects. Prerequisite, permission of department Chairman.

EE
306 Elements of Electrical Engineering (5)
Principles of operation and application of the more frequently used electrical and electronic instruments. Theory and practical circuit application of semiconductors, diodes, transistors, and operational amplifiers. A short introduction to electrical machinery, including theory and operating experience. Includes a three-hour laboratory per week. Prerequisites, Physics 122 and Mathematics 126.

EE
310 Electronics Laboratory I (3) AWSp
Fundamentals of laboratory practices; fundamentals of instrumentation; switches, elementary gates, and flip-flops; elementary amplifiers, input and output impedances; use of integrated circuits and devices to typical applications, such as regulated power supplies, multipliers, operational amplifiers, and oscillators. Prerequisite, 351, which may be taken concurrently, or permission.

EE
312 Electrophysics Laboratory (3) AWSp
Two three-hour laboratory periods each week, covering topics in solid-state devices, properties of materials, energy and force, optics, acoustics, transmission of waves, guided waves, and computer applications. Prerequisites, 310 and 383, which may be taken concurrently.

EE
331 Circuits and Systems I (4) AWSp
Introduction to linear systems theory. Electrical circuits, their elements and equilibrium equations. Solution of linear differential equations by classical and Laplace transform methods. Illustrations from electrical circuits and other linear systems. Prerequisites, Physics 122, Mathematics 238.

EE
333 Circuits and Systems II (4) AWSp

EE
338 Energy Transmission (4) AWSp
Lumped and distributed circuits. Steady-state and transient processes on low-loss lines. Traveling waves on dissipative lines. Natural oscillations, standing waves, and resonance. Laboratory techniques. Prerequisite, 333.

EE
343 Introduction to Electromechanical Energy Conversion (5) AWSp
Fields and forces associated with the interaction of circuits in a relative motion. Analysis of lumped parameter electromagnetic devices and systems. Energy conversion and power flow. Includes a weekly three-hour laboratory. Prerequisite, 381.

EE
351 Electrodes (4) AWSp
Semiconductor device characteristics and circuit models; integrated circuits used for basic digital and analog applications, such as counters, amplifiers, and comparators. Prerequisites, Physics 122, Mathematics 238.

EE
353 Analog Electronic Circuits (4) AWSp
Application of semiconductor devices and semiconductor integrated circuits to analog electronic systems. Emphasis on frequency response, amplification, feedback, and power amplification. Prerequisites, 310, 333, and 351.

EE
354 Analog Electronic Circuits Laboratory (3) AWSp
Three-hour laboratory each week. To be taken concurrently with 353.

EE
371 Fundamentals of Computer Operation (4) AWSp
Organization and operating principles of digital computers. Representation of information, processor components, machine operation, and data transfer. Relation of computer design to programming and computer applications. Prerequisite, 351.

EE
381 Electrophysics I (4) AWSp
Electromagnetic fields and polarization; Maxwell's equations and electromagnetic waves in linear medium. Energy conversion; flux linkages, and electromechanical systems. Particle-probability-density waves, and atoms. Prerequisites, Physics 123, Mathematics 238.

EE
383 Electrophysics II (4) AWSp

EE
399 Special Topics in Electrical Engineering (3-5) AWSp
New and experimental approaches to current electrical engineering problems. May include design and construction projects. Prerequisite, permission of department Chairman.

EE
411 Introductory Network Synthesis (3) A
Network representations in the complex frequency domain. Stabilizability criteria for driving-point and transfer functions, canonical forms, and application of the digital computer in synthesis procedures. Prerequisites, 333 and senior standing.

EE
415 Computer-Aided System Analysis (3) Sp
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, Engineering 141 and senior standing.

EE
417 Introductory Stochastic Systems Analysis (4) W
Elementary concepts of probability, random variables, and random processes, with a view toward engineering systems analysis. Correlation functions and spectral analysis of random processes. Introduction to one or more of such topics as reliability theory, estimation tech-
Techniques of digital and analog communications; modulation coding, and noise. Examples of practical communication systems and channels, channel capacity. Prerequisites, 417 and 441, or permission.

EE 421 Electroacoustics (4) A Fundamentals of acoustics and the electroacoustic aspects of electromechanical systems. Characteristics of transducers. Synthesis of systems. Includes laboratory to be arranged. Prerequisite, 383 or permission.

EE 433 Electronic Circuit Design (4) A Sp Electronic circuit design using modern electronic devices. Topics include application of integrated-circuit amplifiers and multipliers, design of solid-state amplifiers for low noise, wide bandwidth, high frequency, high power output, and the application of modulation theory to modern systems. The design aspect of solid-state electronic circuitry is emphasized. Prerequisites, 353 and 354.

EE 439 Applied Electronic Design (3) A Sp Laboratory-oriented course in applied digital and analog circuit design. Stresses are practical aspects of circuit design, including specification, interpretation, application of theory, error analysis, component selection, breadboarding, test preparation, and interpretation of results. Instruction by practicing electronics design engineers. One-hour lecture and three-hour laboratory weekly. Prerequisites, 353, 354 and permission.


EE 442 Linear Analysis (3) W Sampling theorem, linear constant coefficient difference equations, state variable formulation, linear time-invariant digital filters, Z-transform techniques, frequency response, design of low-pass and band-pass digital filters, discrete Fourier transform and fast-Fourier transform with application.

EE 445 Nonlinear Systems Analysis (4) W 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.

EE 446 Control System Analysis I (4) A WSp Analysis of linear servomechanism theory and design principles. Pole-zero analysis, stability of feedback systems by root-locus and real-frequency response methods. Design methods of Bode and Nichols. Introduction to advanced topics in automatic control theory. Prerequisite, 441 or permission.


EE 460 Wave Effects in Bio-Materials (3) Sp Ultrasonic, electromagnetic, and optical wave effects in biological materials. Applications to biomaterials used in diagnostic technology, therapeutic and surgical applications. Prerequisite, 381 or other course in wave propagation as approved by instructor. Offered jointly with the Bioengineering Program as Biomedical Engineering 460.

EE 461 Electrochemistry (3) Sp Fundamentals of electrochemistry with applications to batteries and industrial processes. Emphasis is on obtaining a basic working knowledge in the field. Offered jointly with the Department of Chemical Engineering as Chemical Engineering 461. Prerequisite, senior standing in engineering or permission.

EE 467 Introduction to Radio Science (3) Sp Introduction to radio astronomy, including radio telescope antennas and interferometry, radio telescope receivers, nature of 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. Sensing of the propagating medium by passive (radiometric) and active (scattering, acoustic sounding) techniques, ionosphere, and magnetosphere. Prerequisite, 383 or permission.

EE 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.

EE 469 Boundary Value Problems and Wave Fundamentals (4) A Wave propagation in varying types of material media of practical importance, including ionized, lossy, layered, anistropic. Techniques for the solution of boundary value problems, including wave guides and other passive elements of microwave systems. Emphasis on electromagnetics problem-solving methods, together with their relevance to modern optics, bioengineering, and radio science. Prerequisite, 383; senior standing recommended.

EE 472 Computer Software Systems (3) W Principles of operating systems, compilers, assemblers, interpreters, and loaders for digital computers. Not intended for graduate students in computer science or electrical engineering with emphasis on advanced programming. Not open to students who have taken 501 or 502. Offered jointly with the Computer Science Group as Computer Science 472. Prerequisite, 478.

EE 473 Wave Shaping (5) AW Generation and transmission of special waveforms, including pulses, square waves, and linear ramps; clipping, clamping, and d-c restoration; bistable, monostable, and bistable multivibrators; applications to analog and digital systems. Includes one four-hour laboratory on alternate weeks. Prerequisites, 353 and 354.

EE 475 Digital Systems (4) Sp Synthesis of digital systems, from functional electronic subassemblies; integrated logic circuits; shift registers; generation and conversion of digital codes; analog to digital conversion. Includes one four-hour laboratory on alternate weeks. Prerequisites, 353, 354 and 371.


EE 477 Digital Computer Applications (4) A Sp Advanced topics in numerical analysis and their application to the solution of engineering problems, with additional work on computer graphics and nonnumerical problem solving. Theory and practice are involved, and the facilities of the Computer Center are utilized. Prerequisite, Engineering 390.

Offered jointly with the Computer Science Group as Computer Science 478. Prerequisites, Engineering 141 and 315, or equivalent.

E E
481 Fundamentals of Microwaves (4) Sp
Microwave circuit elements, waveguides and resonators; microwave measurement techniques; high-frequency triodes, klystrons, and other transit-time devices; beam-type and solid-state amplifiers. Includes one three-hour laboratory per week. Prerequisites, 383, 353, and 354.

E E
485 Semiconductor Devices (4) AW
Physics of p-n junctions and semiconductor surfaces; operating principles of various semiconductor devices. Development of small-signal and switching circuit models. Includes junction transistors, controlled rectifiers, field effect transistors, microwave and integrated circuit devices. Prerequisite, 383 or equivalent.

E E
488 Laser Systems and Devices (3) 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 nonlinear phenomena for material diagnostics, energy conversion, and optical communications. Prerequisite, 383 or permission.

E E
493 Guidance and Control (3) Sp
Analysis and design problems in attitude control and flight-path guidance of aerospace vehicles. Principles of inertial instruments and navigation systems. Prerequisite, 446.

E E
498 Control System Components and Measurements (3) Sp
Study of control system components and formulation of their mathematical models. Amplifiers, servos, synergetic, gyroscopes, and fluid-power devices. Experimental determination of dynamic parameters, and behavior of closed-loop systems. Two three-hour laboratory periods per week. Prerequisite, 446, which may be taken concurrently, or permission.

E E
499 Special Projects (2-5, max. 10) AWSp
Assigned construction or design projects carried out under the supervision of the instructor. Prerequisite, permission of department chairman.

Courses for Graduates Only

E E
501 Compiler Construction I (3) Sp
Golde
Basic concepts and design of interpreters, assemblers, and compilers. Lexical analysis, syntax analysis, storage management, and code generation for general-purpose languages. Prerequisite, Computer Science 505.

E E
502 Compiler Construction II (3) A
Golde

E E
504 Theory of Digital Computer Arithmetic (3) W
Fundamental principles of arithmetic processors; classical number systems. Algorithms and design principles for implementing fast binary arithmetic; efficient addition, multiplication, division, square rooting, and floating-point hardware. New number systems and their application; residue, negative radix, and signed-digit codes. Error detecting and correcting for arithmetic processors. Prerequisite, 588 or permission.

E E
505 Analysis of Random Processes (4) S
Lyle, Martin
Probability theory; discrete and continuous random variables; stochastic processes. Spectral analysis of random signals and noise. Prerequisite, graduate standing.

E E
506, 507 Stochastic Processes and Communication Theory I, II (3, 3) W, Sp
Lyle, Martin

E E
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 state equations, topological analysis and synthesis of networks, signal flow graphs, applications to switching circuits, automata and communication nets. Prerequisite, graduate standing or permission.

E E
510 Introductory System Theory (4) A
Dambord, Lyle, 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.

E E
511 Principles of Network Synthesis (3) W
Lyle
Network representation in the complex frequency domain, realizability criteria, synthesis of driving point and transfer impedance and coupling networks for prescribed transfer characteristics. Canonical forms, and network equivalents, frequency and time domain aspects of approximating response functions. Prerequisite, 411.

E E
513 Active Circuit Theory (3) Sp
Andersen
Principles of analysis and synthesis of linear active circuits. Emphasis on general principles, including conservation theorems, invariants, performance limitations in the presence of parasitic elements and realizability conditions. Illustrative applications related to negative resistance amplifiers, feedback amplifiers, and active filters. Prerequisite, 441 or permission.

E E
515 Physical Principles in Instrumentation (3) Sp
Harris, Helms, Sigelmann, Yee
Physical laws that underlie the operation of selected electronic instruments are discussed. Generation and detection of sensory signals and wave interactions with materials are treated. Topics include electron microscopy, X-ray and infrared imaging and spectroscopy; motion, density, and biomedical measurements. Prerequisite, graduate standing or permission.

E E
517 Introduction to System Optimization (3) W
Hsu
Systems engineering and optimization; classical optimization techniques; equality constraints and inequality constraints; Kuhn-Tucker conditions; linear inequalities and linear programming; nonlinear optimization and programming; Fibonacci, Golden-section, and minmax 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.

E E
518 Digital Signal Processing (4) A
Principles of systems that process signals by digital means. Difference equations, Z transforms and discrete linear systems theory. Effects of computational error caused by A/D conversion, arithmetical roundoff and parameter quantization, Discrete and fast Fourier transforms, real-time systems, and the design and the simulation of digital filters. Special-purpose software for digital signal-processing facilities. A three-hour laboratory session is held each week. Offered jointly with the Computer Science Group as Computer Science 518. Prerequisite, graduate standing in electrical engineering or computer science or permission.

E E
519 Analysis of Random Data (3) A
Martin
Techniques of exploratory data analysis; resistant techniques; data transforms; parameter estimation; estimation of probability density functions; hypothesis testing; linear and non-linear least squares technique; computational aspects for recursive and updating forms of least squares. Introduction to robustness concepts; techniques of robust estimation and regression for linear and nonlinear models.

E E
525 Acoustics in Engineering (3) Sp
Harris, Ishimaru, Sigelmann
Acoustic wave transmission, reflection, refraction, and diffraction in solids, liquids, and gases. Includes review of continuum mechanics and linear field theories for electromechanical systems. Offered jointly with the Department of Mechanical Engineering as Mechanical Engineering 525. Prerequisite, graduate standing
in electrical or mechanical engineering, or permission.

EE 526 Acoustics in Engineering II (3) A
Auth, Harris, Sigelmann

Continuation of 525. Material differs each year; covering such topics as scattering, moving media, ultrasonics, acoustic holography, optoacoustics, transducer propagation in anisotropic medium, etc. Offered jointly with the Department of Mechanical Engineering as Mechanical Engineering 526. Prerequisite, 525 or permission.

EE 529 Optical Electronics (4) A
Auth


EE 530 Electromagnetic Properties of Materials (4) W
Bjorkstam, Yee

Matrix formulation of quantum theory, perturbation theory, Dirac matrix formulation of quantum theory, Dirac notation. semiclassical theory of the interaction between electromagnetic radiation and matter. Lattice vibrations and specific heat. Dielectric and magnetic properties of materials. Prerequisite, 383 or permission.

EE 531 Electronic Conduction in Solids (4) Sp
Bjorkstam, Yee

Electron transport in periodic solids; solutions to the Boltzmann equation, scattering mechanisms. Thermoelectric and thermomagnetic effects. High magnetic field effects in metals and semiconductors. Optical properties of semiconductors. Some aspects of superconductivity. Prerequisite, 530 or permission.

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 between electromagnetic radiation and matter. Quantum theory of the laser. Photon counting, correlation and noise. Parametric conversion; Raman and Brillouin scattering. Prerequisite, 530 or permission.

EE 533 Advanced Semiconductor Devices (3) W
Carlson, Harris, Ishimaru, Sigelmann

Analysis of selected devices with heavy emphasis on extreme operating conditions of bias, temperature, and frequency; includes p-n junctions, Schottky barriers, microwave devices; recent developments from the current literature. Prerequisite, 485 or permission. (Offered odd-numbered years.)

EE 535 Semiconductor Circuits (3) Sp
Clift, Lautzen

 Modeling of transistors, resistors, and other devices used in integrated circuits. Design of digital and analog integrated circuits. Design of digital and analog high-frequency transistor models and circuits. Prerequisite, 485 or permission.

EE 538 Topics in Electronic Circuit Design (1-5) A
Guifor

Topics of current interest in electronic circuit and system design. Course content varies from year to year, and is based on current professional interests of the faculty member in charge. May be repeated for credit by permission. Prerequisite, permission.

EE 539 Advanced Topics in Solid State Electronics (1-5, max. 5) A
Auth, Bjorkstam, Lauritzen, Yee

Lectures or discussions of topics of current interest in the field of solid-state electronics for advanced graduate students having adequate preparation in solid-state theory. Subject matter may vary according to the interests of students and faculty. Prerequisite, permission.

EE 545 Linear Control System Analysis (3) A
Bergoth, Clark

Linear continuous system theory applied to feedback control systems. Block diagrams and signal flow graph representations. Steady-state errors and performance. Stability, and dynamic response by root-locus, Nyquist, and Bode techniques. Not open to those who have taken 446. Prerequisite, graduate standing.

EE 546 Advanced Topics in Control System Theory (3) A
Stibbe

Topics of current interest in control system theory, for advanced graduate students having adequate preparation in linear and nonlinear system theory. Prerequisite, permission. (Offered when sufficient students develop prior to close of advance registration.)

EE 547 Neural Communication and Control in Biological Systems (3) Sp
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.

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 optimal control. Prerequisite, advanced graduate standing or permission.

EE 551 Power System Control and Protection (3) Sp
Bergoth

Dynamics of power system behavior, including the effects of the governor loop and the voltage regulator loop. System models in the small-signal and nonlinear cases. System faults and protection by relays and circuit breakers. Load shedding as a tool of system control and protection. Prerequisites, 454 and 446 or 545.

EE 560 Wave Phenomena (4) W
Rogers

General study of wave phenomena in which vibrations in physical structures and in elastic media are considered with electromagnetic waves. Interaction of physical materials with electromagnetic wave. Prerequisite, 383 or permission. (Offered when adequate enrollment develops prior to close of advance registration.)

EE 563 Noise in Electron Devices (3) W
Lauritzen

The physical mechanisms of noise generation in electronics; thermal noise, quantum noise, shot noise, flicker noise. Characterization of noise; noise figure, noise temperature, noise measurements. Optimum low-noise circuit design, low-noise operation of semiconductor and optical electronic devices. Prerequisites, 485, 505, or permission. (Offered even-numbered years.)

EE 570 Antenna Theory (3) A
Reynolds

Theory of radiation; impedance characteristics and radiation patterns of thin linear antenna elements; antenna arrays; pattern synthesis; aperture antennas. Prerequisite, graduate standing or permission.

EE 572 Electromagnetic Theory and Applications I (4) A
Carlson, Harris, Ishimaru, Sigelmann

Plane, cylindrical, and spherical electromagnetic waves, eigenvalues, and boundary value problems applied to waveguides, cavity microwave networks, junctions, and other guiding structures; fast and slow waves; wave propagation in magnetoplasma and ferrite; waves in dispersive, inhomogeneous and anisotropic media. Prerequisite, graduate standing or permission.

EE 573 Electromagnetic Theory and Applications II (4) W
Carlson, Harris, Ishimaru, Sigelmann

Boundary value problems for scattering, diffraction, and radiation of electromagnetic waves using Green's function, integral equation, and Fourier transform techniques. Approximation techniques using the saddle point method, WKB approximation, residue series, the WKB method, and variational principle. Prerequisite, 572 or permission.

EE 574 Electromagnetic Theory and Applications III (4) Sp
Carlson, Harris, Ishimaru, Sigelmann

Topics of current interest, including the radiation of waves, transients in dispersive medium, Wiener-Hopf techniques, fluctuations and coherence, and moving sources and media. Applications to radio wave propagation and optics. Prerequisite, 571 or permission.

EE 575 Waves in Random Media (4) A
Carlson, Ishimaru, Sigelmann

Propagation and scattering of electromagnetic, optical, and acoustic waves in turbulence and random media, and scattering from rough surfaces and randomly distributed particles. Examples include atmospheric turbulence, fog, rain, smog, clear-air turbulence detection, scattering from blood cells and tissues. Applications to atmospheric science, bioengineering, and ocean engineering. Prerequisite, graduate standing or permission.
ENGINENEG

EE 576, 577 Information Theory and Coding I, II
(3,3) W,Spring
Goldin, Martin
Mathematical theory of communication. Information theory for discrete and continuous systems. Channel capacity and coding; principles and techniques of algebraic and other types of error detecting, error-correcting codes. Prerequisite, 505 or permission.

EE 578 Radio Propagation I (3) W
Helms, Reynolds, Swarn
Theory of the propagation of radio waves in the neutral lower atmosphere, including effects of scattering, diffraction, and refraction. Techniques of remote sensing in the lower atmosphere using radio waves are investigated and related to geophysical problems. Prerequisite, graduate standing or permission.

EE 579 Radio Propagation II (3) Spring
Helms, Reynolds, Swarn
Propagation of radio waves in the ionosphere and beyond. The structure and phenomena of the ionosphere and magnetosphere of the earth is related to the overall solar system environment with topics that include plasmasphere diagnostics using Whistler waves, natural VLF emission mechanisms, polar cap absorption, and magnetic storms. Prerequisite, graduate standing or permission.

EE 582 Stochastic Control Systems (3) W
Alexandre, Hsu, Pinter
Performance measure and minimization techniques; continuous and discrete random processes in control systems; optimal design of systems having stochastic signals as outputs; application of the Weiner-Hopf method to control system design; the Wiener-Kalman filter and its application in stochastic control systems. Prerequisites, 505, 545, 584.

EE 583 Nonlinear Systems (4) Sp
Noges
Dynamical analysis of nonlinear control systems. Analytical, graphical, numerical, and simulation techniques for solving nonlinear control system problems. Lyapunov functions, phase space and describing functions. Introduction to contraction mappings method. Prerequisites, 545, 584.

EE 584 Continuous and Discrete State Variable Methods (3) W
Alexandre, Clark, Hsu
Matrices and linear spaces, quadratic forms; system representation in state variable form; selection and transformation of state variables; controllability and observability of multivariable control systems; state transition matrix for continuous and discrete time systems; difference equations and Z-transform; application of state space approach to control system design. Prerequisite, graduate standing or permission.

EE 585 Digital and Sampled-Data Systems (3) Sp
Alexandre, Hsu
Sampling process and data holds, state variables and state transition equations for sampled-data systems, frequency domain and time domain analysis of sampled-data systems, digital compensation of sampled-data systems. Prerequisites, 545, 584.

EE 586 Digital Computer Applications and Communications I (3) A
Goldin, Holden, Johnson
Theory and practice of number systems, logical analysis, digital computer system organization. Numeric and nonnumeric techniques and processes. Algorithmic and heuristic application by various representative languages. Prerequisite, FORTRAN and graduate standing.

EE 587 Digital Computer Applications and Communications II (3) W
Johnson
Evaluation and application of computational methods in solution of typical systems problems. Optimization, error analysis, stochastic and statistical methods, computer learning, pattern recognition. Prerequisite, 586.

EE 588 Logical Design of Digital Computers I (3) Sp
Johnson
Number systems, error detect-correct, Boolean algebra. Optimization of logical systems under various criteria. Topological methods of optimization and synthesis. Sequential logic, memory input, and application equations. Application of logical techniques to digital systems. Prerequisite, graduate standing.

EE 589 Logical Design of Digital Computers II (3) W
Johnson

EE 590 Advanced Topics in Digital Computers (2-5, max. 15) AWSp
Gold, Holden, Johnson
Lectures or discussions of topics of current interest in the field of digital computers. Subject matter depends on availability of faculty. Prerequisite, permission.

EE 591 Advanced Topics in Network Theory (2) Sp
Levis
Lectures and discussion of current developments in network theory. Selection of topics varies from year to year. May be repeated for credit with permission. Prerequisite, 511 or 513 or permission.

EE 595 Advanced Topics in Communication Theory (3) AWSp
Lyle, Martin
Extension of 507, 508, 577. Material differs each year, covering such topics as: detection theory, decision theory, game theory, adaptive communication systems, nonlinear random processes. Graded S, A, B, C, for credit by permission. Prerequisite, permission.

EE 599 Selected Topics in Electrical Engineering (*) AWSp
Prerequisite, permission of department Chairman.

EE 600 Independent Study or Research (*) AWSp
EE 700 Master's Thesis (*) AWSp
EE 800 Doctoral Dissertation (*) AWSp

HUMANISTIC-SOCIAL STUDIES

Courses for Undergraduates

HSS 300 Practice in Technical Reporting (1) ASp
Souther, Trimble, White
Application of the fundamentals of technical reporting to the specific reporting activity of students who are enrolled in a laboratory, project, or other designated course in the College of Engineering.

HSS 304 Introduction to Scientific and Technical Communication for Foreign Students (4)
Seiliniker, Trimble
Scientific and technical writing and reading for foreign students well grounded in oral English. Concentration on (1) application of rhetorical concepts most frequently used in scientific and technical writing, (2) grammatical analysis in areas traditionally difficult for foreign students, and (3) grammatical -rhetorical analysis of scientific and technical discourse. Offered jointly with the Department of English as English 304.

HSS 305 Scientific and Technical Report Writing for Foreign Students (4)
Seiliniker, Trimble
Application of the problem-solving approach to scientific and technical writing. Concentration on (1) undergraduate 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 the Department of English as English 305. Prerequisite, 304 or English 304 or permission.

HSS 310 Self, Symbol, and Society (3)
Skeels
Anthropological concepts of social institutions and psychological concepts of the self are used for the interpretation of myth and literature from one or more historical cultures, and for the comparison of these with the individual, his symbolic creations, and his situation in today's world.

HSS 330 Development of Western Cultural Institutions (3)
Higbee
The growth of modern institutions and of the ideas underlying them during the periods of the Renaissance, the Protestant Revolt, the Commercial Revolution, the Enlightenment, and the Industrial Revolution. Major emphasis is on political, economic, religious, and intellectual change.

HSS 351 The Human Image in Medieval and Renaissance Literature (3)
Eliott, White
Selected literary figures and works of Western
civilization in the Middle Ages and the Renaissance.

HSS 401 Scientific and Technical Writing (4) A
Principles and practice of writing to communicate scientific and technical information in government and industry. Writing assignments include such types of communication as reports, proposals, specifications, manuals, and procedures, as well as special projects of the student's choice.

HSS 402 Scientific and Technical Editing (4) W
White
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. Prerequisites, 401 or permission.

HSS 407 Thesis Guidance for Foreign Students (1, max. 3)
Trimble
Individual tutorial assistance in writing problems for the foreign student preparing to write or writing a thesis in one of the engineering disciplines. Offered on credit/no credit basis only. Prerequisite, permission.

HSS 410 Contemporary Political and Social Problems (3)
Botting, Higbee
Twentieth-century background and development of contemporary political and social problems; comparison of competing political philosophies and systems: democracy, fascism, communism; current international and national events and issues.

HSS 419 Technology's Impact on the Modern West (5)
Botting
Examines significant innovations of technology from the Industrial Revolution to the mid-twentieth century and explores the social consequences of these innovations, as well as the social reactions to them.

HSS 420 Technology in Contemporary Western Culture (5)
Botting
Examines the nature of technology, its relationship to culture and to the physical environment; treats with the problems and issues created by the impact of technology on society, including the relationship between technology and social change, effects of technology on economic and political organizations, and the relationship among technology, human values, and the individual; examines implications of future technological development for man and his culture.

HSS 421 Socioeconomic Consequences of Technology (3)
Douthwaite
Overviews the role of technology in forming public policies and in determining personal alternatives. A nonmathematical 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)
Douthwaite
Case studies in the social impact of contemporary technology and the present and possible future responses of industry and governmental agencies to technologically induced problems. Prerequisites, 420 or 421 or permission.

HSS 431 Human Rights and the Governmental Process (3)
Higbee
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 attendant issues, problems, and administrative solutions to leading cases are examined. Prerequisite, upper-division standing.

HSS 435 Impact of Technology on Human Rights (4) AWSp
Higbee
The impact of technology on human rights, ranging from its safeguarding of these rights to its incursions on them and associated constitutional processes. Particular attention is given to secret surveillance technology, indiscriminate data storage and retrieval, and other technologies ranging through those of mass media to bioengineering. The institutionalized and impersonal aspects of technology are examined, and possible remedies are explored. Upper-division standing recommended.

HSS 450 The Human Image in Twentieth-Century Literature (3)
Leahy
Selected literary figures and works of Western civilization in the twentieth century.

HSS 451 The Living Theater (3)
Leahy
Introduction to the art of theatrical performance by reading, attending, and discussing plays currently offered in theatres on campus and in the community.

HSS 461 Experience in the Arts (1) W
Leahy, Mueller
Informal experiences with the arts through attendance at theatres, concerts, art exhibits, etc.; through discussions with creative artists; and through personal attempts at producing a work of art. Offered jointly with the Department of Mining, Metallurgical, and Ceramic Engineering as Ceramic Engineering 442.

HSS 471 Introduction to the Folktale Among Literate Peoples (3)
Skels
Techniques of classification, geographic-historical distribution, theories of origin and interpretation, and related areas of investigation of the oral prose folk narrative of literate peoples. Offered jointly with the Department of English as English 415.

HSS 472 Introduction to American Folklore (5)
Skels
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 the Department of English as English 416.

HSS 480 Science Fiction and Fantasy: Prophecy and Symbol (3)
Leahy, Skels, 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 authors.

HSS 498 Special Projects (1-5, max. 5)
Work on a special project by a student under the supervision of an instructor. Prerequisites, upper-division standing and permission of the instructor and the department Chairman.

HSS 499 Special Topics (1-5)
Special topics in humanities and social sciences to be offered occasionally by permanent or visiting faculty. May be repeated for credit.

INDUSTRIAL ENGINEERING
For a description of courses required in this curriculum, see "College of Engineering" in the "Programs of Study" section of this catalog.

MECHANICAL ENGINEERING
Courses for Undergraduates

M E 215 Statistical Methods in Engineering (3)
AWSp
Roberts
Applications of elementary probability theory and statistics to engineering problems; continuous and discrete distributions, elementary statistical decision making; application of the least squares technique. Prerequisite, Mathematics 124.

M E 301 Metal Casting (3) AW
Ford
Introduction to the art and science of metal casting; principles of mold materials, gating, patterns and equipment. Primarily for students majoring in industrial education or industrial design. Lecture and laboratory.

M E 302 Welding (2) AWSp
Holt
Introduction to the art and science of thermal metal joining processes; weld design, sequence, and distortion. Primarily for students majoring in industrial education or industrial design. Lecture and laboratory.

M E 303 Metal Machining (2) WS
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.
ENGINEERING

M E 304 Manufacturing Processes (3) AWSp
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 308 Production Methods (3) Sp
Holt
Principles and application of thermal and mechanical processes in the production of manufactured parts. Lecture and laboratory. Prerequisite, 304.

M E 312 Machine Tool Fundamentals (3) A
Anderson
Study of machine tools and machining processes, including exercises on various machine tools. Lecture and laboratory. Prerequisites, major in industrial education and 303, or permission.

M E 320 Thermodynamics I (4) AWSp
Waibler
Introduction to classical macroscopic thermodynamics, including development of the basic laws applicable to energy transformations, with reference to engineering applications. Prerequisites, Mathematics 126 and Chemistry 140, or permission.

M E 322 Microscopic Thermodynamics (4) Sp
Roberts

M E 323 Thermodynamics and Heat Transfer (4) AWSp
Depew
Application of thermodynamic principles to power and refrigeration cycles. Study of reacting and nonreacting mixtures, chemical reactions, phase and chemical equilibria. Applications to combustion and fuel cells. Brief introduction to principles of heat transfer. Prerequisite, 320 or Engineering 260.

M E 331 Introduction to Heat Transfer (4) AWSp
McFeron
Study of heat transfer by conduction, radiation, and convection; elementary heat exchanger design. Prerequisites, 320 or Engineering 260, and 333 or CIVE 342, or permission.

M E 333 Introduction to Fluid Mechanics (4) AWSp
Gerst
Introduction to the basic fluid laws and their application. Conservation equations, dynamic similarity, potential flow, boundary layer concepts, effects of friction, compressible flow, fluid machinery, measurement techniques. Prerequisites, 320 or Engineering 260, and Mathematics 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 (4) AWSp
Sandwith
Study of the nature, properties, and behavior of engineering materials, involving strength, deformation, fracture, impact, creep, fatigue, and corrosion. Lecture and laboratory. Prerequisite, 352 or permission; Engineering 170 recommended.

M E 352 Introduction to Mechanics of Solids (3) AWSp
Sherrr
Development of relationships among loads, stresses, and deformations, in the elastic behavior of machine or structural elements in tension, bending, or torsion. Prerequisites, Mathematics 126 and Engineering 180.

M E 353 Mechanical Design Analysis (3) AWSp
Kiegling
Analysis, design, and selection of mechanical subsystems and elements, such as gears, linkages, casings, and bearings. Lecture and laboratory. Prerequisites, 343 and 352.

M E 365 Dynamics (4) AWSp
Merchant
Newtonian dynamics from a vector point of view, with topics applicable to mechanical design. Prerequisites, Engineering 180 and Mathematics 126.

M E 373 Dynamic Systems Analysis (4) AWSp
Jorgensen

M E 394 Design Seminar (1) AWSp
Lowe
Intended to consider topics and ideas that lead the student to the formulation of a design proposal proposal for 495. Lectures on various design problems and the associated economic, legal, ecological, and social constraints. Prerequisite, intention of taking 495 the following quarter.

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.

M E 403 Material-Removal Processes (3) A
Walck
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 relative costs. Prerequisites, 304 and 343, or permission.

M E 404 Theory of Welding (3) W
Holt
Theory of arc welding and flame cutting of metals. Prerequisites, 304 and 343, or permission.

M E 406 Corrosion and Surface Treatment of Materials (3) W
Sandwith
Corrosion, plating, coating, welding, diffusion bonding, carburizing, and nitriding, from the standpoint of solid-state diffusion theories, adhesion theories, and phase equilibria. Prerequisite, 343 or permission.

M E 410 Engineering Administration (3) AWSp
Drui
Overview of the operations of an industrial organization, interpersonal relationships of functions, and fundamental principles of management that lead toward effective coordination and control. Lectures and case studies in industry.

M E 411 Engineering Economy (3) AWSp
Ford
The evaluation of engineering alternatives. Use of interest computations, valuation, depreciation and cost estimates to predict the economic result of the application of engineered products or processes.

M E 412 Industrial Cost Analysis (4) AW
Drui
Examination of systems that provide economic and performance data for industrial management decisions. Use of quantified information from standard cost systems, inventory costs, product cost budgeting, overhead and cost accounting.

M E 413 Engineering Operations Research (4) AWSp
Marshall
Introduction to the major tools and techniques used to quantify decisions. Uses of mathematical modeling techniques to assist in the analysis and design of man-machine systems. Lectures and laboratory to illustrate application. Prerequisites, basic knowledge of statistics and computer programming.

M E 414 Industrial Safety (2) Sp
Anderson
Recognition of hazards; analysis of industrial accidents, their costs, and fundamentals of prevention; organization of safety programs; personnel training for safety. OSHA and WISHA standards.

M E 415 Statistical Analysis of Engineering Measurements (3) AW
Robert
Applications of statistics to the interpretation of engineering data; distribution theory; statistical estimation; design of experiments; linear and curvilinear regression; evaluation of experimental errors. Prerequisite, some prior knowledge of probability and statistics.

M E 417 Work Systems Design (4) AW
Drui
Work design and measurement principles; time utilization, flow and operations studies, principles of motion economy, time study
principles and practices, physiological and psychological aspects of work. Lectures and studies in local industry as laboratory. Corequisite, Humanistic-Social Studies 300.

M E 418 Work Simplification (2) Sp
Droll
Work study in service industries. Principles of motion economy; work distribution and human factors; flow-process charts and diagrams; layout of work areas; economic and human factors. Lecture and local business laboratory. Corequisite, Humanistic-Social Studies 300.

M E 419 Work Environment Design (3) WSp
Droll
Design of new or expanding industrial facilities. Considers layout, heating, ventilation, power, acoustics, sanitation, illumination, protection, and other environmental factors. Lectures and local industry as laboratory. Corequisite, Humanistic-Social Studies 300.

M E 420 Quantitative Analysis of Industrial Processes (4) ASp
Roberts
Applications of statistical and algebraic techniques to system reliability. Derivation and discussion of failure distributions; quality control; analysis of reliability test data; maintenance policies and Monte Carlo simulation techniques. Prerequisite, basic statistics.

M E 425 Air Conditioning (3) W
Crain
Theory and practice in the field of heating, ventilating, and air conditioning, including psychometry, air distribution, humidity and temperature control, cooling and dehumidifying equipment, and air cleaning. Prerequisite, 323.

M E 428 Noise Control (3) W
Chalupnik
Introduction to design for noise control. Includes summary of acoustical phenomena as pertains 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
Fundamental of thermodynamics, heat transfer, and fluid mechanics are reviewed and applied to practical engineering situations. Applications include: industrial heat transfer, cryogenics, solar energy, and effects of man's thermal environment. Prerequisite, 320 or Engineering 260.

M E 432 Gas Dynamics I (3) Sp
Childs
Dynamic and thermodynamic relationships for the flow of a gas. Application of thermodynamic processes involving nozzles, diffusers, compressors, and turbines. Prerequisite, 320 or Engineering 260, and 333 or CIVE 342.

M E 433 Turbomachinery (4) W
Firey
Basic principles of turbomachinery operation, design, and testing. Prerequisite, 333 or CIVE 342, or permission.

M E 434 Advanced Mechanical Engineering Laboratory (3) Sp
Crain
Planning and interpreting engineering experiments on prime movers, refrigerators, and other thermal equipment. Design and operation of complete multiproduct plants. Lecture and laboratory. Prerequisite, 323.

M E 436 Friction and Lubrication (3) A
Firey
Fundamental principles of friction and lubrication with applications to bearing design and materials selection. Prerequisite, senior standing in engineering or permission.

M E 440 Mechanical Behavior of Solids (3) A
Wolak
Mechanics of deformable bodies; transformations of stress and strain; yield criteria; equations of compatibility; elastic constants of crystalline and polycrystalline solids. Application to design and manufacturing. Prerequisite, 343 or permission.

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.

M E 451 Human Factors in Design (3) W
Walker
Engineering considerations of the abilities and limitations of the human operator in the design of industrial systems and components. Functional, physiological, psychological, and environmental aspects.

M E 460 Kinematics and Linkage Design (3) W
Kieling
Synthesis of linkage-type mechanisms, using graphical and computer methods. Prerequisite, senior standing in engineering, or permission.

M E 464 Analytical Methods in Engineering (3) A
Balise
Mathematical methods in modern engineering problems, emphasizing computer solutions. Transformations, discrete-variable problems, and matrix methods. Theory and applications in various areas of mechanical engineering, with use of the computer. Prerequisite, 373 or permission.

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.

M E 469 Applications of Dynamics in Engineering (3) AWSp
Sherry
Applications 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, 365 or Engineering 230, and 373 or permission.

M E 470 Mechanical Vibrations (3) Sp
Merchant
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.

M E 471 Automatic Control (3) ASp
Galle
Automatic control system analysis. Dynamic system modeling; identification of the control problem; stability analysis by Routh, Nyquist, Bode, and root locus techniques. Lecture and laboratory. Prerequisite, 373 or permission.

M E 473 Instrumentation (3) W
Galle
Principles and practice of industrial measurement. Dynamics of instrument response; theory of transducers for temperature, pressure, flow, and other measurements. Lecture and laboratory. Prerequisite, 373 or permission.

M E 474 Systems Modeling and Simulation (3) W
Balise
Use of graphical methods as a unified approach to modeling of systems, and computer simulation of systems behavior. Consideration of systems with linear and nonlinear behavior, lumped and distributed properties. Case studies of engineering, biological, and socio-economic systems. Prerequisite, 464 or permission.

M E 480 Engineering Data Analysis (4) AWSp
Emery
Introduction to engineering measurement problems and techniques, including interpretation of experimental data. Statistics and probability applied to measurement. Error analysis, sampling techniques, and elementary experiment design. Lecture and laboratory. Prerequisite, senior standing in engineering or permission.

M E 481 Internal Combustion Engines (3) ASp
Guidon
Study of Otto and Diesel cycles; fuels, combustion, and engine performance characteristics. Prerequisite, 323 or permission.

M E 482 Internal Combustion Engine Laboratory (3) W
Firey
Laboratory experiments on gasoline and diesel engines and gas turbines with analysis and interpretation of results. Effects of principal design and operating variables. Prerequisite, 481 or permission.

M E 483 Internal Combustion Engine Design (3) Sp
Firey
Fundamental principles of engine design and materials selection, including preliminary design of essential components of an engine. Lecture and laboratory. Prerequisite, 481.
M E 485 Rocket Propulsion (3) W
Gessner
Study of the types of rocket engines; thermo­
dynamic relations and nozzle theory; charac­
teristics of gaseous, liquid, and solid prop­
ellant systems; rocket testing; performance calculations. Prerequisite, 323.

M E 490 Naval Architecture (3) A
Love
Theory of naval architecture; ship's lines, hydrostatic curves, intact and damaged stability,
launching. Prerequisite, Junior standing in engineering or permission.

M E 491 Naval Architecture (3) W
Adee
Theory of naval architecture; strength, A.B.S.
rules, water waves, ship and platform motions. Prerequisite, junior standing in engineering or permission.

M E 492 Naval Architecture (3) Sp
Adee
Theory of naval architecture; dimensional anal­
ysis, resistance model testing, propellers, steering. Prerequisite, junior standing in engineering or permission.

M E 495 Mechanical Engineering Design (4)
AWSp
Design laboratory involving the identification and synthesis of engineering factors to plan and achieve specific project goals. Curr­
rent literature and prerequisite texts are used as reference sources. Lecture and laboratory. Prerequisites, 394 and senior standing in me­
chanical engineering.

M E 498 Special Toples in Mechanical Engineering (1-5, max. 6) AWSp
Lecture and/or laboratory. Maximum of 6 credits may be applied toward an under­
graduate degree. Prerequisite, permission.

M E 499 Special Projects (2-5, max. 9) A WSp
Prerequisite, permission of department Chair­
man.

Courses for Graduates Only

M E 501 Advanced Materials Processes (3) A
Sandwith
Consideration of hot and cold fabrication pro­
cesses with respect to their effects on the me­
chanical properties of engineering materials. Fundamental aspects of strengthening, anisot­opy, and thermal stability in materials pro­
cessing. Prerequisite, graduate standing in engi­
neering or permission.

M E 502 Plastic Metal Forming (3) Sp
Wolak
Stress-strain and stress-strain-rate relations in metal forming; plastic instability. Work of de­
formation. The slip-line field. Load bounding. Metal characteristics and forming. Applications to basic metal forming processes. Prerequisite, 552 or permission. (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. Boundary friction. Friction and antifriction materials. Prerequisite, graduate standing in engineering or permission. (Offered odd-numbered years.)

M E 516 Advanced Topics in Engineering
Statistics (3) W
Marshall, Roberts
Topics are flexible and tailored to the needs of the particular student group involved. Topics usually considered: regression, correlation, ex­
perimetal design, Monte Carlo techniques, Markov processes, extreme value theory, time­
series analysis. Prerequisite, graduate standing or permission.

M E 518-519-520 Seminar (0-0-1)

M E 521 Thermodynamics III (3) A
Depew, Waibler
Fundamental concepts of temperature, thermo­
dynamic properties, and systems. The first, second, and combined laws. Development of the relations of classical thermodynamics. Prerequi­
tities, 321 and graduate standing in mechanical engineering or permission.

M E 522 Thermodynamics IV (3) W
Corlett, Depew, Emery, Waibler
Topics from statistical thermodynamics, in­
cluding the Boltzmann, Bose-Einstein, and Fermi-Dirac statistics. Solutions of the Schrö­
dinger wave equation and evaluation of the par­
tition function for translation, rotation, and vibration. Prerequisite, 521 or permission. (Of­
ered odd-numbered years.)

M E 524 Combustion (3) W
Corlett, Firew
Chemical and physical processes of combus­
tion with applications to design of combustors, fuel selection, and consideration of environ­
mental effects. Prerequisite, graduate standing in mechanical engineering or permission. (Of­
ered even-numbered years.)

M E 525 Acoustics in Engineering I (3) W
Chalupnik, Merchant
Acoustic wave transmission, reflection, refrac­
tion, and diffraction. Review of continuum mechanics and examples from electromechan­
ical systems. Offered jointly with the Depart­
ment of Electrical Engineering as Electrical Engineering 525. Prerequisite, graduate stand­ing in mechanical or electrical engineering, or permission.

M E 526 Acoustics in Engineering II (3) Sp
Chalupnik, Merchant
Continuation of 525. Material differs each year, covering such topics as scattering, mov­ing media, ultrasonics, acoustic holography. Offered jointly with the Department of Elec­
trical Engineering as Electrical Engineering 526. Prerequisite, 525 or permission.

M E 528 Acoustics of Environmental Noise (4) A
Chalupnik, Merchant
Measurement and evaluation of environmental noise. Mathematical, physical, and psycholog­
al aspects of community noise; sources, scales for rating, propagation, and control of noise. Laboratory demonstration of lecture principles. Offered jointly with the Department of Civil Engineering as CEWA 528. Prerequisite, permis­
sion.

M E 530 Radiative Heat Transfer (3) W
Corlett, Depew, Emery, McFeron
Fundamentals of thermal radiation for black, gray, nongray, diffuse, and specular surfaces. Gaseous radiation and special applications of thermal radiation. Prerequisite, graduate stand­ing in mechanical engineering or permission. (Offered even-numbered years.)

M E 531 Conductive Heat Transfer (3) W
Corlett, Depew, Emery, McFeron, Waibler
Analysis of steady-state and transient heat conduction in single and multidimensional systems by mathematical, graphical, numerical, and analogical methods. Prerequisite, graduate standing in mechanical engineering or permission. (Offered odd-numbered years.)

M E 533, 534 Gas Dynamics (3,3) WSp
Bodola, Childs, Gessner
Dynamic and thermodynamic relationships for the flow of fluids; application of basic laws to flow processes in pipes, nozzles, diffusers, com­
pressors, turbines; wave phenomena; multi­
dimensional flow; unsteady flow; processes in­
volving chemical reactions.

M E 535 Computational Techniques in Heat Transfer (3) A
Corlett, Depew, Emery, Kippenhan, McFeron, Waibler
Advanced heat transfer studies of interest to mechanical engineers. Subject coverage varies from year to year. Prerequisite, permission. (Offered odd-numbered years.)

M E 537 Laminar Boundary Layer Theory (3) Sp
Bodola, Childs, Gessner
Development of the equations of motion for laminar viscous flow; characteristics of zero, favor­able and adverse pressure gradient flows; flow separation; integral techniques for exact solutions of the Navier-Stokes equa­tions; development of the boundary layer equations; methods of solution by similarity and momentum integral techniques; thermal boundary layers and compressibility effects; new developments and methods of solution. (Offered even-numbered years.)

M E 538 Turbulent Boundary Layer Theory (3) A
Bodola, Childs, Gessner
Characteristics of turbulent boundary layers; development of the turbulent boundary layer equations; equilibrium boundary layers; integral methods of solution based on power law and wall-wake velocity profiles; methods
of solution based on higher order constitutive equations; application to diffuser flows and free shear flows; new developments and physical models. (Offered even-numbered years.)

M E 541 Advanced Engineering Materials (3) W Daly, Mills, Taggart
Behavior of engineering materials as affected by various conditions of loading and environment. Prerequisite, graduate standing in mechanical engineering or permission.

M E 542 Topics In Engineering Materials (3) Sp Daly, Mills, Taggart
Selected topics of current importance concerning the nature and behavior of engineering materials. Lecture, laboratory. Prerequisite, 541 or permission.

M E 543, 544 Fluid Turbulence (3,3) A,W Gesher
Statistical and phenomenological theories of turbulence. Velocity correlations, the energy spectrum, the decay of turbulence, scalar fields, turbulent transport, shear turbulence, wall turbulence, phenomenological theories of energy transport, instrumentation, recent literature. Offered jointly with the Department of Chemical Engineering as 543, 544. Prerequisite, 6 credits in graduate fluid mechanics. (Offered Autumn Quarter in odd-numbered years, Winter Quarter in even-numbered years.)

M E 551 Applied Elasticity (3) A Kobayashi, Osborn, Sherrer, Wolak
General equilibrium and stress-strain relations in homogeneous, isotropic, elastic materials. Elastic stress distributions in machine components; plane-stress and plane-strain problems. Prerequisite, graduate standing in mechanical engineering or permission.

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 stresses in shells, rotating disks and plates. Prerequisite, 551 or permission.

M E 553 Applied Viscoelasticity (3) Sp Emery, Kobayashi, Osborn, Sherrer
Time-dependent aspects of stress and strain, and stability in mechanical engineering design. Stress analysis in the presence of creep and stress relaxation. Cyclic variation of load and temperature. Prerequisite, 551 or permission.

M E 554 Advanced Theory of Plasticity (3) Sp Kobayashi
Basic equations for three-dimensional problems of perfectly plastic and strain hardening materials. Variational principles in plasticity and their application to numerical analysis of elastic-plastic problems. Discussion of advanced topics from recent literature. Prerequisite, 551 or permission. (Offered odd-numbered years.)

M E 555 Thermoelasticity (3) W Emery
Basic equations of thermoelasticity for isotropic elastic solids. Analysis of disks, cylinders, spheres, beams, and plates under steady temperature and sudden and slow heating and cooling. Introduction to thermoelastic stability. Prerequisite, 551 or permission. (Offered even-numbered years.)

M E 556 Experimental Stress Analysis (3) A
Theory and practice of experimental techniques including photoelasticity; brittle coatings; birefringent coatings, and interferometry. Lecture and laboratory. Prerequisite, graduate standing or permission.

M E 557 Experimental Stress Analysis (3) W
Continuation of 556 with extended applications and theory of experimental mechanics techniques. Holography; residual stress analysis methods; moiré; three-dimensional photelasticity; acoustoelasticity. Lecture and laboratory. Prerequisite, 556 or permission.

M E 558 Experimental Stress Analysis (3) Sp
Seminar and individual research on special problems in experimental mechanics. Prerequisite, 557 or permission. (Offered odd-numbered years.)

M E 559 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 fatigue life prediction of mechanical components subjected to environmental effects.

M E 560 Advanced Theory of Fracture (3) Sp Kobayashi
Theories of linear fracture mechanics and fracture dynamics, ductile fracture, sustained stress crack growth and mixed mode fracture. Discussion of advanced topics from recent literature. Prerequisite, 559 or permission. (Offered even-numbered years.)

M E 564 Mechanical Engineering Analysis I (3) A Balise, Galle, Jorgensen, Osborn
Application of mathematical methods to the description and analysis of systems in mechanical engineering. Analogies in heat transfer, fluid flow, stress distribution, dynamics, and feedback control. Prerequisite, graduate standing in mechanical engineering or permission.

M E 565 Mechanical Engineering Analysis II (3) W Balise, Galle, Jorgensen, Osborn
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.

M E 567 Advanced Dynamics (3) Sp Chalupnik, Merchant, Sherrer
Dynamics of particles and of rigid bodies. Generalized coordinates, Lagrange's equations, Hamilton's principle. Prerequisite, graduate standing in mechanical engineering or permission.

M E 568 Analytic Methods In Vibrations (3) A Balise, Chalupnik, Merchant, Sherrer
Analysis of vibration phenomena in multi-degree-of-freedom and continuous systems. Prerequisite, graduate standing in mechanical engineering or permission.

M E 571 Servomechanisms I (3) W Balise, Galle, Jorgensen
Linear and introductory nonlinear feedback system analysis and design. Prerequisite, 471 or permission.

M E 572 Servomechanisms II (3) Sp Balise, Galle
State variable approach as applied to the analysis and synthesis of systems. System state vectors, response matrices, simulation diagrams, controllability and observability. Geometrical and physical interpretations of the mathematical methods. Prerequisite, 565 or permission.

M E 575 Systems Theory (3) Sp Balise, Galle
State variable approach as applied to the analysis and synthesis of systems. System state vectors, response matrices, simulation diagrams, controllability and observability. Geometrical and physical interpretations of the mathematical methods. Prerequisite, 565 or permission.

M E 579 Fluid Power Control (3) W Balise, Galle, Jorgensen
Analytical treatment of the hydraulic and pneumatic power applied in control systems. Valve actuators, hydraulic transmissions, block diagram representation, steady-state and dynamic analysis. Prerequisite, graduate standing in mechanical engineering or permission.

M E 584 Gas Turbines (3) Sp Boddia, Guidon
Applications of the gas turbine; gas turbine cycles; compressors; turbines; combustion systems, gas turbine power plant materials; plant performance. Prerequisite, graduate standing in engineering or permission. (Offered even-numbered years.)

M E 589 Nonlinear Mechanical Vibrations (3) W Chalupnik, Merchant, Sherrer
Systems with nonlinear damping and restoring forces, applications of the phase-plane delta and the Ritz averaging methods, and stability of nonlinear oscillations. Prerequisite, 568 or permission.

M E 590 Random Mechanical Vibrations (3) Sp Chalupnik, Merchant, Sherrer
Problems in measuring random vibrations, in designing simulation equipment, and in mechanical design for random vibration in aircraft and missiles. Prerequisite, 568 or permission.

M E 598 Topics In Research (1-5, max. 9) AWSp
Doctoral seminar. May be repeated for credit.

M E 599 Special Projects (1-5, max. 9) AWSp
Prerequisite, permission of department Chairman.
MINING, METALLURGICAL, AND CERAMIC ENGINEERING

CER E 186 Independent Study or Research (*)
CER E 200 Master's Thesis (*)
CER E 300 Doctoral Dissertation (*)

ENG E 600 Independent Study or Research (*)
ENG E 700 Master's Thesis (*)
ENG E 800 Doctoral Dissertation (*)

CER E 306 Ceramic Engineering Excursion (1) A
CER E 307 Ceramic Engineering Excursion (1) A
CER E 409 Ceramic Materials Laboratory (1) A

CER E 308 Physical Ceramics: Equilibrium I (3) A
CER E 310 Physical Ceramics: Equilibrium II (3) A
CER E 410 Physical Ceramics: Equilibrium II (3) A

CER E 411 Vitreous State (4) A

CER E 420 Colloidal Ceramics (3)
CER E 421 Colloidal Ceramics (3)
CER E 422 Electron Microscopy of Ceramics (3)

CER E 441 Undergraduate Seminar (1) A
CER E 442 Experience in the Arts (1) W

CER E 450 Introduction to Carbon Materials (3) Sp
CER E 455 Research Techniques (3) A

CER E 201 Introduction to Ceramic Engineering (5) A
CER E 401 Equipment and Plant Design (3) A
CER E 402 Equipment and Plant Design (2) W
CER E 403 Ceramic Process Analysis (3) Sp

CER E 202 Ceramic Engineering I (2) W
CER E 311 or permission.

CER E 203 Ceramic Engineering II (2) Sp
CER E 312 Physical Ceramics II: Microstructure and Kinetics (4) W
CER E 313 Physical Ceramics III: Properties of Ceramic Solids (4) Sp

CER E 322 Microscopy of Ceramics (3) W
CER E 323 Instrumental Analysis (3) Sp
CER E 400 Ceramie Materials (3) A
CER E 403 Ceramic Process Analysis (3) Sp

CER E 198 Career Planning II (1) W
CER E 204 Career Planning III (1) W

CER E 300 Introduction to Ceramic Engineering (5) A
CER E 401 Equipment and Plant Design (3) A
CER E 402 Equipment and Plant Design (2) W
CER E 403 Ceramic Process Analysis (3) Sp

CER E 301 Ceramic Raw Materials (4) A
CER E 302 Ceramic Processing I: Transport (4) W
CER E 303 Ceramic Processing II: Methods (5) Sp

CER E 304 Ceramic Processing III: Processing (5) Sp
CER E 404 Ceramic Processing (4) W
CER E 405 Research Techniques (3) A

CER E 305 Advanced Ceramics (3) W
CER E 406 Advanced Ceramics (3) W
CER E 407 Advanced Ceramics (3) W

CER E 306 Ceramic Engineering Excursion (1) A
CER E 307 Ceramic Engineering Excursion (1) A
CER E 409 Ceramic Materials Laboratory (1) A

CER E 308 Physical Ceramics: Equilibrium I (3) A
CER E 310 Physical Ceramics: Equilibrium II (3) A
CER E 410 Physical Ceramics: Equilibrium II (3) A

CER E 411 Vitreous State (4) A

CER E 420 Colloidal Ceramics (3)
CER E 421 Colloidal Ceramics (3)
CER E 422 Electron Microscopy of Ceramics (3)

CER E 441 Undergraduate Seminar (1) A
CER E 442 Experience in the Arts (1) W

CER E 450 Introduction to Carbon Materials (3) Sp
CER E 455 Research Techniques (3) A

CER E 201 Introduction to Ceramic Engineering (5) A
CER E 401 Equipment and Plant Design (3) A
CER E 402 Equipment and Plant Design (2) W
CER E 403 Ceramic Process Analysis (3) Sp

CER E 301 Ceramic Raw Materials (4) A
CER E 302 Ceramic Processing I: Transport (4) W
CER E 303 Ceramic Processing II: Methods (5) Sp

CER E 304 Ceramic Processing III: Processing (5) Sp
CER E 404 Ceramic Processing (4) W
CER E 405 Research Techniques (3) A

CER E 306 Ceramic Engineering Excursion (1) A
CER E 307 Ceramic Engineering Excursion (1) A
CER E 409 Ceramic Materials Laboratory (1) A

CER E 308 Physical Ceramics: Equilibrium I (3) A
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CER E 442 Experience in the Arts (1) W

CER E 450 Introduction to Carbon Materials (3) Sp
CER E 455 Research Techniques (3) A

CER E 201 Introduction to Ceramic Engineering (5) A
CER E 401 Equipment and Plant Design (3) A
CER E 402 Equipment and Plant Design (2) W
CER E 403 Ceramic Process Analysis (3) Sp

CER E 301 Ceramic Raw Materials (4) A
CER E 302 Ceramic Processing I: Transport (4) W
CER E 303 Ceramic Processing II: Methods (5) Sp

CER E 304 Ceramic Processing III: Processing (5) Sp
CER E 404 Ceramic Processing (4) W
CER E 405 Research Techniques (3) A

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CER E 442 Experience in the Arts (1) W

CER E 450 Introduction to Carbon Materials (3) Sp
CER E 455 Research Techniques (3) A

CER E 201 Introduction to Ceramic Engineering (5) A
CER E 401 Equipment and Plant Design (3) A
CER E 402 Equipment and Plant Design (2) W
CER E 403 Ceramic Process Analysis (3) Sp

CER E 301 Ceramic Raw Materials (4) A
CER E 302 Ceramic Processing I: Transport (4) W
CER E 303 Ceramic Processing II: Methods (5) Sp

CER E 304 Ceramic Processing III: Processing (5) Sp
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CER E 441 Undergraduate Seminar (1) A
CER E 442 Experience in the Arts (1) W

CER E 450 Introduction to Carbon Materials (3) Sp
CER E 455 Research Techniques (3) A
Courses for Graduates Only

CER E 460 Ceramic-Metal Systems (3) W
Campbell
Vitreous and crystalline coatings for metals; ceramic-metal composites.

CER E 470 Refractories (3) W
Whittemore
Chemical and mineralogical composition; processing methods; thermal, physical, and chemical properties and tests; application.

CER E 498 Special Topics (1-5, max. 6) A WSp
Special topics in ceramic engineering offered as a course with lectures, conferences, or laboratory. Prerequisite, permission of division head.

CER E 499 Special Projects (*, max. 5) A WSp
Problems in ceramics; laboratory investigations and bibliographic research. A total of 5 credits is required.

Course for Undergraduates

CER E 501 Process Ceramics I (3) W
Whittemore
Technology of ceramic fabrication processes. Characterization of ceramic materials at stages of processing.

CER E 502 Process Ceramics II (3) W
Campbell
Principles of process control as applied to the ceramic industry; methods of measurement and evaluation of data and its application to industrial production.

CER E 511 Advanced Physical Ceramics I (3) A
Sarin
Theories and principles of diffusion in solids: phenomenological and atomistic concepts; equilibrium defects; impurity, chemical potential gradient, grain boundary and dislocation effects in metals and nonmetals.

CER E 512 X-ray Diffraction Analysis (3) W
Miller
Application of X-ray diffraction and spectroscopic techniques and their evaluation in the structure and properties of materials. Laboratory practice in analysis, line broadening and displacement phenomena; structural effects on intensity. Prerequisite, 323 or equivalent.

CER E 513 Advanced Physical Ceramics II (3) Sp
Miller

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) A WSp
Required for all graduate students.

CER E 521 Mechanical Behavior of Ceramics (3) Sp
Scott
Dislocation structures in ceramics; influence of dislocations on the deformation and fracture of single crystals and polycrystalline ceramics; brittle fracture and theoretical strength. Prerequisite, 511 or permission.

CER E 590 Industrial Minerals Research (*) A WSp

CER E 599 Special Topics in Ceramics (*) A WSp

CER E 600 Independent Study or Research (*)

CER E 700 Master’s Thesis (*) A WSp

CER E 800 Doctoral Dissertation (*)

MATERIALS ENGINEERING

Course for Undergraduates

MTL E 444 Nuclear Materials (3) W
Miller
Structure, properties, and performance of materials in nuclear reactor applications; engineering requirements and selection of materials for reactors; technology of materials for reactor fuels, moderators, shields, control elements, and structural components; corrosion and oxidation effects of radiation on the structure and properties of materials. Offered jointly with the Department of Nuclear Engineering as Nuclear Engineering 444. Prerequisite, Engineering 170 or equivalent.

METALLURGICAL ENGINEERING

Courses for Undergraduates

MET E 198 Career Planning in Metallurgy (1) WSp
Stoebe
Introduction to the field of metallurgical engineering, followed by individual or group projects related to the topics of interest. The projects may consist of laboratory, library, or field work, or a combination of these. Projects can be continued into subsequent quarters in 202.

MET E 201 Modern Metallurgy (2) A Sp
Jones
Lectures on topics of current interest in metallurgical engineering. Includes interdisciplinary aspects of the field, lecture-demonstrations, introduction to laboratory tools and techniques, and discussions on curriculum and career opportunities with current students.

MET E 202 Special Projects (1-3) A WSp
Jones
Continuation of projects started in 201. Prerequisites, 201 and permission.

MET E 301 Metallurgical Systems and Instrumentation (3) A
Archbold
Instrumentation, equipment, and laboratory techniques in metallurgical engineering. Metallographic laboratory practice, mechanical property measurements, X-ray generation and detection, heat generation and control, vacuum methods. Laboratory experiments designed to illustrate basic metallurgical principles.

MET E 306 Metallurgy Excursion (1, max. 2) Sp
Plant inspection trip junior and senior year. Required of all majors.

MET E 322 Metallurgical Thermodynamics (3) A
Jones
Quantitative application of thermodynamics to systems of interest to metallurgists. A detailed review of thermodynamic quantities and equations of state.

MET E 323 Metallurgical Transport Phenomena (3) W
Jones
Introduction to the principles of momentum, heat, and mass transfer. Review of the principles of chemical kinetics. Application of transport phenomena to systems of metallurgical interest. Prerequisite, 322.

MET E 325 Extractive Metallurgy I (4) W
Brien
Physical and chemical principles of mineral preparation and concentration. Communion; classification, thickening, filtering of mineral suspensions; sampling; transport; and related physical processes. Physical and chemical theory applied to concentration processes; surface phenomena, electromagnetic, electrostatic, dimensional, solution, and precipitation. Laboratory illustrates fundamental principles.

MET E 326 Extractive Metallurgy II (4) Sp
Jones
Application of physical and chemical principles to high-temperature and electrolytic extraction and refining of metals. Descriptions of processes and unit operations, with emphasis on the thermodynamic and kinetic aspects involved. Prerequisites, 322, 323.

MET E 361 Structure of Solids (4) A
Archbold
Elements of crystallography and the structure of metals and alloys, intermediate phases, superlattices. Theory and application of X-ray and electron diffraction for the determination of crystal structure. Laboratory experiments related to these principles.

MET E 362 Properties of Solids (4) W
Jones
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 experience...
ments related to the measurement of the properties of engineering solids. Prerequisite, 361.

MET E 363 Reactions in Solids (4) Sp
Polons
Application of elementary kinetics and thermodynamics to solid-state reactions. Theories of nucleation and growth and their application to diffusional and diffusionless transformations. Recovery and recrystallization. Heat treatment of alloy systems and relations between properties and microstructure. Laboratory experiments related to these topics. Prerequisite, 362.

MET E 400 Applied Materials Science for Teachers I (3) A
Jones, Stoebbe
Designed to give junior high school and high school science teachers and science consultants a broad background in the structure and properties of solids, solid-state reactions, and phase equilibria, and in typical engineering applications of these principles. Laboratory and discussions on the educational implications and applications of this material in the classroom. Prerequisite, knowledge of freshman chemistry.

MET E 401 Applied Materials Science for Teachers II and W Jones, Stoebbe
Continuation of 400, with more information on engineering applications of materials. Discussion sessions and special curriculum projects in place of laboratories; special seminars and field trips on arrangement. Prerequisite, 400 or equivalent.

MET E 402 Educational Projects in Materials Science (1-5) A WP
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, 400 or equivalent.

MET E 403 Materials in Modern Technology (3) Sp
Hammer
Description of the relationship between technology and areas of current social interest in the context of modern materials science and engineering. Includes discussion of utilization of natural resources, energy and nuclear power, biomedical applications of materials, and new materials and applications in engineering. Laboratory and assignments primarily for secondary school teachers. Prerequisite, 400 or permission.

MET E 421 Thermodynamics of Solids (3) W
Applications of thermodynamics to the solid state. Statistical interpretation of entropy. Heterogeneous equilibria. Theories of solutions. Thermodynamics of surfaces and of defects in solids. Prerequisite, 322 or equivalent.

MET E 423 Corrosion of Engineering Materials (3) Sp
Applications of physical chemical principles to the reaction of materials with their environment, particularly the control of corrosion and oxidation processes. Corrosion problems in materials applications including chemical process industries, nuclear engineering, and marine environments.

MET E 426 Process Metallurgy (3) Sp
Jones
Application of physical chemistry and transport theory to metal process engineering. Prerequisite, permission. (Formerly 422.)

MET E 455 Metallurgical Experimental Techniques (3) A
Polons
Modern research techniques in physical metallurgy. Design and execution of experiments and the analysis of data. Laboratory experiments to illustrate solid-state phenomena. Prerequisite, 363.

MET E 460 Advanced Physical Metallurgy (3)
Current engineering topics in physical metallurgy. May be repeated for credit.

MET E 461 Deformation and Mechanical Behavior of Metallic Systems (3) A
Theories of elastic and plastic behavior of solids. Role of imperfections in mechanical behavior. Yielding, work hardening, strengthening mechanisms, creep, and fatigue. Prerequisite, 362.

MET E 462 Engineering Physical Metallurgy (3) W
Polons

MET E 463 Reliability and Design in Metallurgical Systems (3) Sp
Archbold
Properties of commercially important engineering alloys. Metallurgical design problems and failure analysis. Prerequisite, 363.

MET E 465 Theory of Metals (3) A
Stoebbe
Application of wave mechanical concepts to assemblies of atoms. Atomic bonding, statistical mechanics, free electron and band theories. Application of principles to conduction in metals, insulators, semiconductors, and to magnetic and optical processes.

MET E 468 Undergraduate Seminar (1, max. 3) A WP

MET E 470 Minerals Processing Flotation (3) A
Brien
Theory and practice; applied surface chemistry, adsorption, surface tension, flocculation and dispersion and related fundamentals. Laboratory illustrates basic phenomena, practical testing and flotation variables. Prerequisite, 325.

MET E 471 Hydrometallurgy (3) Sp
Brien
Physical-chemical principles of solution processes; fundamental theory applied to effects of pressure, temperature, diffusion rates, pyrometallurgical pretreatment, activities, oxidation and reducing conditions, impurities, contact time, interphase areas and associated variables. Ion exchange and solvent extraction principles. Laboratory. Prerequisite, 325.

MET E 472 Mineral Processing Practices (3) A
Jones
Methods of laboratory investigations and recent plant and process innovations reported in the current literature. Prerequisite, 325.

MET E 473 Mineral Process Plant Design (2) W
Brien
General arrangement planning and design calculations on a project basis. Prerequisite, 325.

MET E 474 Ore Opaque Minerals Microscopy (2) Sp
Brien
Microscopic determination of the ore minerals; physical and optical properties, etch reactions; microchemical testing of polished sections; mineral associations, liberation, grain counting.

MET E 475 Pollution Control of Metallurgical Plants (3) W
Current topics related to the causes and control of pollution in metallurgical extraction and processing plants. Analysis of environmental pollutant 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 495 Special Projects (*) (max. 5) A WP
Laboratory investigation of a metallurgical problem on an independent basis. Maximum of 5 credits may be counted toward graduation.

Courses for Graduates Only

MET E 511 Advanced Theory of X-ray Diffractions (3) W
Archbold
Use of the reciprocal lattice concept and Fourier analysis in the study of atomic arrangements in crystals. Line shape and diffuse scattering analysis. Analytical interpretation of diffraction patterns. Prerequisite, 361 or equivalent.

MET E 512 Transmission Electron Microscopy (3) Sp
Archbold
Fundamentals of electron optics as applied to microscopy. Applications of contrast theory and electron diffraction with emphasis on defect and multiphase structures in crystalline solids. Prerequisite, 511 or equivalent.

MET E 520 Seminar (1) A WP
Review of research problems and recent literature. Required for all graduate students.

MET E 525 Thermodynamic Topics in Metallurgy (3) Sp
Jones
Selected topics in application of classical and statistical thermodynamics to systems of current metallurgical interest.

MET E 531 Advanced Metallurgy (*) A WP
Study of selected problems, with particular attention to recent publications and scientific applications in physical or extractive metallurgy.
MET E 541 Theoretical Structural Metallurgy I (3) A
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) W
Dislocation arrays in crystals and their plastic properties: the elastic and plastic properties of real crystals; cold work, annealing, polygonization, recrystallization and grain boundaries; creep, cleavage. Prerequisite, 541.

MET E 543 Theoretical Structural Metallurgy III (3) W
Nature of the interactions of dislocations with impurities. Influence of impurities and precipitates on the mechanical properties of crystals. Prerequisite, 541.

MET E 561 Phase Transformations in Metals and Alloys I (3) A
Polonis
Thermodynamics and kinetics of solid-state reactions in metals, phase stability, theories of nucleation and growth, precipitation from solid solutions, applications to specific metal and alloy transformations.

MET E 562 Phase Transformations in Metals and Alloys II (3) Polonis
Theory of transformation processes in solids, with emphasis on energetics and structural mechanisms; melting and freezing, role of imperfections in solid-state reactions, martensite transformation, eutectoid decomposition, cellular precipitation.

MET E 563 Phase Transformations in Metals and Alloys III (3) Stoebel
Theory of diffusion; application of diffusion theory to solid-state reactions; thermodynamics of irreversible processes. Prerequisite, 561.

MET E 566 Magnetic Materials and Phenomena (3) W Stoebel
Theories of magnetic phenomena, including diamagnetism, paramagnetism, ferromagnetism, and ferrimagnetism. Details of magnetization processes in materials; anisotropy, magnetostriiction; domain energies and configurations; applications to magnetic materials. Prerequisite, 466.

MET E 567 Electronic Processes in Materials (3) W Stoebel
Lattice dynamics, including vibrational modes and phonon effects. Brillouin zone theory, and Fermi surfaces with applications in the theory of electrical conductivity and in the semiconducting theory. Optical properties of solids, including color centers and luminescence. Prerequisite, 466.

MET E 568 Advanced Topics in the Physical Properties of Materials (1, max. 6) AWSp Stoebel
Advanced topics and recent research related to electrical, magnetic, and optical properties of solids. Prerequisites, 466 and 566 or 567, or permission.

MET E 570 Topics in Advanced Mineral Processing (* A Brien
Special topics of current interest in the preparation and concentration of minerals; the application of physical and surface-chemical fundamentals in investigative research, rate-controlling mechanisms in hydrometallurgy.

MET E 571 Advanced Mineral Processing Theory I (3) W Brien
Thermodynamics and electrochemistry of surfaces. Potential differences across interfaces; electrical double layer, surface tension; Gibb's adsorption equation in three-phase flotation systems; anionic and cationic selectivity; ion exchange and solvent extraction.

MET E 572 Advanced Mineral Processing Laboratory (* A Brien
Experimental study of theoretical principles in preparation, concentration, and hydrometallurgy.

MIN E 325 Mineral Land Valuation (2) W Anderson
Sampling methods in mines and placers; drill hole and coring methods; geological aspects; estimation of deposits and reserves; use of computers in ore reserve calculations; metallic and nonmetallic depletion and financial calculations; reports. Prerequisite, 322 or permission.

MIN E 330 Mine Surveying (3) Sp Anderson
Practice in underground methods, use of special instruments, stope measurements, shaft surveying, solar observations, and carrying of midgets underground; production of working and geologic maps and sections.

MIN E 350 Mineral Resource Development, Production, and Valuation (5) 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, including delineation of ore bodies; underground and surface planning; production costs, including labor and productivity studies. Mineral land valuation; geologic aspects; estimation of ore reserves by sampling, core drilling; financial calculations. Prerequisite, Geological Sciences 101 or 205 or Engineering 140 or permission.

MIN E 426 Exploration and Development of Mineral Deposits (4) Sp Anderson
Mineral geology; procurement of data by geologic mapping and drilling; solution of mine structural and fault problems; physiographic, mineralogical, and structural guides to ore applied to mine exploration; exploration and development programs; evaluation of prospects. A feasibility report is required after field study of a mineral deposit.

MIN E 432 Mine Plant Design (5) Sp Anderson
Principles and application; design of transport systems; air compression practice and distribution; pumping plant and mine water handling; electrical equipment and distribution systems in mines; plant design and construction. Prerequisites, 322 and Electrical Engineering 306.

MIN E 433 Environmental Control in Mines (3) A Anderson
Principles and practices. Physical and chemical aspects of mine atmosphere, gases, and dusts; physiological considerations; air flow and measurement; mechanical ventilation, and air conditioning equipment and systems. Prerequisite, 322.

MIN E 481 Mineral Industry Economics (3) W Anderson
World mineral resources, their distribution, exploitation, and depletion; social, economic, and political effects; international control and trade, industrial organization, government policies, taxation, tariffs, marketing, and pricing; elements of production costs. Offered jointly with the Department of Geological Sciences as Geological Sciences 481. Prerequisite, Economics 211.
Courses for Graduates Only

MIN E 499 Special Projects (*) max. 5) A WSp
Topics of current interest and importance in engineering, equipment and maintenance, safety and special problems. Arranged in accordance with student's major interest.

MIN E 520 Seminar (1, max. 6) A WSp
Lectures and discussions; review of research papers and recent literature. Required for all graduate students.

MIN E 521 Mining Systems (*) A WSp
Anderson
Production methods; mining control; support; applied efficiency methods; administration; equipment and machinery; health and safety; special problems. Arranged in accordance with student's major interest.

MIN E 522 Mine Shfts (3) A Anderson
Location and design, surface plant, collar preparation; sinking, mechanization, and organization of mining, lining, stations and bottoms; equipment and maintenance, safety and costs; special attention to modern circular shafts.

MIN E 551 Special Topics (3-5, max. 15) A WSp
Topics of current interest and importance in the mineral industries or individual study on a subject of special interest.

MIN E 600 Independent Study or Research (*) A WSp

MIN E 700 Master's Thesis (*) A WSp

NUCLEAR ENGINEERING

Courses for Undergraduates

NUC E 400 Introduction to Nuclear Reactor Analysis (4) A Barber
Fission reactor theory covering interactions of neutrons with matter; neutron diffusion and slowing down; solution methods of boundary value problems in elementary nuclear reactor theory. Prerequisite, Physics 327 and Mathematics 238.

NUC E 444 Nuclear Materials (3) W Miller
Structure, properties, and performance of materials in nuclear reactor applications; engineering requirements and selection of materials for reactors; technology of materials for reactor fuels, moderators, shields, control elements, and structural components; corrosion and oxidation; effects of radiation on the structure and properties of materials. Offered jointly with the Department of Mining, Metallurgical, and Ceramic Engineering as Materials Engineering-Laboratory. Prerequisite, Engineering 170 or equivalent.

NUC E 447 Introduction to Radioactive Tracer Techniques (3) A Robkin
Basic concepts of the use of radioactive tracers to measure the transfer between the compartments of a biological system. The theoretical analysis is restricted to systems with no more than three compartments. The experiments are designed to permit the student to utilize the theory discussed and to make actual determinations of transfer coefficients. Offered jointly with the Department of Radiology as Radiology 477.

NUC E 484 Introduction to Nuclear Engineering (4) A Woodruff
Introductory course in nuclear engineering for undergraduate students, and practicing engineers. The course is designed to demonstrate the application of the principles of nuclear science to the processes associated with the release, control, and utilization of all forms of energy from nuclear sources, including nuclear reactors; elementary nuclear reactor theory; control of nuclear reactors; thermonuclear reactions. Prerequisite, Mathematics 238 or permission.

NUC E 485 Nuclear Instruments (3) W Robkin, Woodruff
Lecture and laboratory devoted to the principles of measurement and detection of various types of radiations encountered in nuclear energy systems. Laboratory demonstrations include the use of Geiger, proportional, and scintillation detectors; ionization chambers; analog-digital data logging equipment; proportional, solid-state, and multichannel analyzers. Sources of radiation include the 100-kw. UW nuclear reactor and pulsed neutron generators. Typical applications of neutron activation analysis and various radioactive tracer techniques in medicine, oceanography, forensic science, and engineering also are presented. Prerequisite; Junior or senior standing.

NUC E 486 Nuclear Power Plants (3) Sp Babb
Applications of nuclear energy to power generation. Discussions of various types of nuclear reactor systems include pressurized water, boiling water, high temperature gas cooled, sodium graphite, as well as advanced concepts of broad reactors. Particular attention is given the problem of world energy resources and the United States and world views of the availability and consumption of nuclear fuels. The use of nuclear energy in land, sea, air, and space transportation is described, and various design concepts including radiation shielding and materials selection are considered. The economics of nuclear power is emphasized throughout the course. Prerequisite, senior standing; 484 recommended.

NUC E 487 Radioactive Tracer Techniques (2) A Robkin
The use and behavior of radioactive tracers are studied; attention is given to the dynamics of the distribution of trace elements after their introduction into the system. Analysis of current models and application to samples from both living and nonliving systems. Offered jointly with the Department of Radiology as Radiology 487. Prerequisite, permission.

NUC E 488 Nuclear Systems Design I (4) W Babb, Chalk, Garlid
Design laboratory involving the synthesis of nuclear technology, engineering analysis, material specifications, and economics to meet the design specifications for modern nuclear industry applications. Prerequisite, 400 or 484.

NUC E 489 Nuclear Reactor Laboratory (3) Sp Chalk, Woodruff
Laboratory designed to acquaint the student with fundamental measurement techniques for the magnitude of energy and number flux of various radiations under most environmental conditions. Experimental verification of fundamental nuclear and nuclear reactor parameters using the University nuclear reactor facilities. Selected experiments are performed to demonstrate practical applications of nuclear energy in medicine, oceanography, forensic science, and engineering. Prerequisite, 400 or 484.

NUC E 498 Special Topics in Nuclear Engineering (1-6, max. 6) A WSp
Discussions, conferences, and lectures on topics of current interest in nuclear fission and fusion engineering. Prerequisite, permission of department Chairman.

NUC E 499 Undergraduate Research Projects (1-6, max. 6) A WSp
Independent research projects in nuclear engineering. Prerequisite, permission.

Courses for Graduates Only

NUC E 500 Nuclear Reactor Theory (4) A McCormick
Covers the angle-independent transport equation and reduction to specialized forms; multi-group and multigroup diffusion theory; calculations of eta, thermal utilization, and resonance escape probability; reactor kinetics; perturbation theory. Prerequisite, 400, which may be taken concurrently with permission.

NUC E 506 Nuclear Engineering Laboratory (4) Sp Chalk, Woodruff
Advanced laboratory course in which experimental research is conducted. Selected experiments are performed that involve the use of such equipment as the reactor as a neutron and gamma-ray source, pulsed neutron generator, helical neutron monochrometer, neutron diffraction spectrometer, pile oscillator, pile noise, analysis equipment, time-of-flight equipment, and analog and digital computers. Prerequisite, 485 or permission.

NUC E 510 Nuclear Reactor Engineering (3) A Babb
Advanced course in engineering analysis of nuclear reactor systems. The course covers core design methods; heat generation and distribution in nuclear reactor systems; the removal and utilization of heat for power production; fuel cycles; shielding of nuclear radiations. Prerequisite, 500, which may be taken concurrently.

NUC E 512 Nuclear System Design (4) W Babb, Chalk, Garlid
Design laboratory involving the synthesis of reactor theory, engineering analysis, material specifications, and economics in the conceptual and preliminary designs of systems, facilities, or processes. Projects are selected from topics of current interest, and one usually engaged by team effort. Prerequisite, 510.
NUC E 551, 552, 553 Graduate Seminar (0,0,1) AWSp

NUC E 554 Seminar in Nuclear Systems Analysis (1-2, max. 10) AWSp
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.

NUC E 550 Advanced Reactor Technology (3) A Wirz
Considers the advanced technology required for modern nuclear power reactors. Both thermal and fast reactor technology are evaluated from theoretical and engineering points of view.

NUC E 540, 541 Nuclear Energy, Man, and His Environment I, II (3,3) W,Sp
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 sources and energy conversion systems. Offered jointly with the Department of Radiology as Radiology 540, 541.

NUC E 550 Neutron Transport Theory (3) A McCormick
Exact solutions of specialized neutron transport problems and relationship of the results to those obtained by approximate techniques are considered; additional topics include synthesis methods and Monte Carlo techniques. Prerequisite, 531.

NUC E 552 Nuclear Reactor Statics I (4) W McCormick
Covers the Boltzman equation for neutrons and offers an introduction to the solution of one-speed model problems. Emphasis is placed upon the multigroup spherical harmonics and the discrete ordinates techniques. Prerequisite, 500.

NUC E 553 Nuclear Reactor Statics II (3) Sp McCormick
Adjoint equation, perturbation theory, and variational methods are considered; other topics include neutron thermalization, resonance absorption, applications of theory to practical problems. Prerequisite, 530.

NUC E 556 Introduction to Plasma Theory (4) W Vlasov
Introduces plasma theory and lays the foundation for application to a variety of research and development areas. Topics covered include dynamics of charged particles in electromagnetic fields, plasma kinetic theory, transport phenomena, development of various fluid models, and waves in plasma.

NUC E 557 Plasma and Controlled Fusion (3) Sp Vlasov
Emphasis on the problem of controlled thermonuclear fusion. After an introduction to the general problem, the basic principles of magnetic confinement, stability, and laser fusion are discussed. Final section deals with a review of current research in this field, including status of currently promising fusion devices. Prerequisite, 556.

O ENG 498 Special Topics in Ocean Engineering (1-5, max. 6)
Special topics in ocean engineering offered to lecture and/or laboratory. Prerequisite, permission.

O ENG 551, 552 Ocean Engineering Systems Design I, II (3,3) W,Sp Vesper
Interdisciplinary ocean systems design, choice of system motivated by problems of current interest; participation by students and faculty from engineering, law, oceanography, business, etc., in order to study complete system; preliminary design and analysis of engineering hardware; direct interaction with government and industry concerned with chosen problem. Prerequisites, graduate standing; 551 for 552.

OCEAN ENGINEERING

COLLEGE OF FISHERIES

FISHERIES

Courses for Undergraduates

FISH 101 Introduction to Fisheries Science (5) ASF Salo, Smith
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.

FISH 311 Functional Anatomy of Fish and Shellfish (4) A Smith
Diversity in the structure, function, and habits of fishes viewed as an expression of variations in their biological and physical environment. Prerequisite, 10 credits in biology.

FISH 341 Methods and Instruments for Fishery Investigations (3) ASF
Theory and practice of instrumentation and sampling in fisheries; shipboard experience with equipment, collecting and recording data from biological samples, and the physical environment. Prerequisites, 5 credits in fisheries.

FISH 340 Applications of Digital Computers to Biological Problems (4) AW Smith
Methods and procedures for processing biological data by means of digital computers; problem analysis, elementary programming, use of package programs for statistical analysis. Prerequisite, Quantitative Science 281 or 381.

FISH 367 Recreational Fisheries (3) WS
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. Prerequisite, 10 credits of biology.

FISH 379 Fisheries of the World (3) A Van Cleave
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.

FISH 395 Literature Search in Fisheries and Food Science (3) AWSp
Training in methods of searching fisheries and food science literature with emphasis on organizing and communicating the material.

FISH 401 Classification of Economically Important Fishes (5) ASF Welander
Classification, identification, and distribution of fishes. Prerequisite, 10 credits in biology.
FISHERIES

Classifications, life histories, distribution, methods of cultivation, and economic importance of oysters, clams, scallops, abalones, cephalopods, and other mollusca. Prerequisite, 10 credits in biology.

FISHERIES 405 Economically Important Mollusca (5) A Brannon
Classifications, life histories, distribution, methods of capture, and economic importance of crabs, shrimps, lobsters, crayfish, and the smaller crustacea. Prerequisite, 10 credits in biology.

FISHERIES 406 Economically Important Crustacea (5) B Brannon
Classifications, life histories, distribution, methods of capture, and economic importance of crustaceans. Prerequisite, 10 credits in biology.

FISHERIES 415 Principles of Fish Physiology (4) W Smith
Survey of the functions of the organ systems of teleost fishes, emphasizing salmonids. Prerequisite, 10 credits in biological science.

FISHERIES 425 Life History of Marine Fishes (5) W Fecundity, spawning, incubation, and hatching of marine fishes; identification and survival of larvae and juveniles; food and feeding of adults; migration; recognition of subpopulations. Prerequisite, 401.

FISHERIES 430 Biological Problems in Water Pollution (5) W Biological and ecological changes in the aquatic environment resulting from domestic, industrial, radioactive, and agricultural wastes and methods for their evaluation. Prerequisite, permission. (Formerly 530.)

FISHERIES 434 Ecological Effects of Waste Water (4) 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 the Department of Civil Engineering as CEWA 434.

FISHERIES 435 Physiological Effects of Water Pollutants (3) Sp Brown, Welch
Physiological effects of water pollutants on economically important or endangered fishes, especially with respect to waste water. Types of industrial, urban, and agricultural entities that contribute wastes to natural waters. Monitoring procedures and assessment of changes in fisheries as a consequence of waste effluents. Offered jointly with the Department of Civil Engineering as CEWA 435. Prerequisites, 340, 401, and 425. Credit for both 434 and 435 allowed. Review of bacterial, algal, and protozoan reactions and the role of these organisms as components of the food chain.

FISHERIES 444 Fisheries Genetics (3) W Seal
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 genetic analysis of fish populations. Prerequisite, Genetics 451 or equivalent.

FISHERIES 451 Reproduction of Salmonid Fishes (5) A Brannon
Spawning and incubation; natural and artificial methods of hatching and rearing, rates of development; racial strains, and selection; evaluation of procedures; design, structure, and maintenance of facilities. Prerequisites, 401 and 10 credits in chemistry.

FISHERIES 452 Nutrition and Care of Fishes (5) W Brannon
Basic nutritional requirements of fish in natural and artificial environments; feeding and efficiency of diets; nutritional diseases; stocking policies; quality evaluation. Prerequisites, 401 and 10 credits in chemistry.

FISHERIES 454 Communicable Diseases of Fishes (5) Sp Chew
Organisms causing diseases in fishes; prevention and known treatments of fish diseases. Prerequisites, 401 and Microbiology 401.

FISHERIES 456 Aquatic Entomology (5) Sp Laboratory and field course dealing with the taxonomy, ecology, and life history of selected aquatic insects, with special reference to the impact of man on stream systems. Prerequisite, Zoology 331 or Forest Resources 335, or permission.

FISHERIES 459 Aquatic Food Chains (5) W Taub
Survey of the sources and nutritional values of foods for fisheries resources. Efficiencies, rates of transfer through the food chain, pollution effects, and the potential for using pollution are considered. Prerequisite, upper-division standing in a biology program.

FISHERIES 460 Water Management and Pollution Studies (5) Asp M. C. Bell
Stresses the mechanics of freshwater environment, and other problems such as natural propagation; water flow measurement in streams and pipes; use of weirs; hatchery water requirements; screening of water diversions for protection of downstream migrants; nomenclature, water rights, and protective laws. Prerequisites, 401, Mathematics 105, and physics, or permission.

FISHERIES 463 Principles of Resource Assessment (3) Sp Alverson, Pereyra
Theory and methods of conducting resource assessment surveys, including survey planning, survey execution and data acquisition, analysis, interpretation, and presentation. Emphasis on the use of direct survey techniques to understand the status of fishery resources. Prerequisites, 314, 340, Quantitative Science 281, or permission.

FISHERIES 465 Problems in Fish Biology (6) S Taub
Taxonomy, genetics, and life history of the fishes of the San Juan Islands and northeast Pacific. Prerequisite, permission. (Offered at Friday Harbor Laboratories Summer Quarter only.)
logentic. Under each topic, the discussion is phylogenetic and comparative. Prerequisite, permission.

FISH 505 Research Techniques in Shellfish Biology (5) W Chew
Study of research methods in field surveys of invertebrates and of research techniques involved with the studies of reproduction, growth, and mortality of oysters and clams. Prerequisite, permission.

FISH 506 Shellfish Sanitation (5) Sp
Matches
Problems of the shellfish industry with emphasis on chemical and microbiological contamination and control during culture, harvest, and processing. Prerequisite, permission.

FISH 507 Special Problems in Fisheries (1-5, max. 15) A W
Classroom, laboratory, or field studies on problems of current interest. Prerequisite, permission.

FISH 515 Topics in Fish Physiology (3) Sp Smith
Analysis of recent advances in salmonid physiology with detailed coverage on organ systems having greatest importance to class members. Prerequisite, 415 or permission.

FISH 556 Introduction to Quantitative Population Dynamics (3) A Mathews
Introduction to the use of advanced techniques in analysis of population size, composition, and distribution. Emphasis on applications to fish populations. Prerequisite, permission.

FISH 557 Theoretical Models of Exploited Animal Populations (3) W Mathews
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.

FISH 558 Estimation of Population Parameters (3) Sp Mathews
Statistical analysis of population data; design and analysis of mark-recapture experiments on natural populations; laboratory work on digital computer. Prerequisite, 557 or permission.

FISH 560 Methods of Stock Assessment (3) W Mathisen
Theory and implementation of processing of fish target signals. Application for estimation of fish stocks and the statistical properties of the estimation procedure.

FISH 600 Independent Study or Research (*) A W

FISH 700 Master's Thesis (*) A W

FISH 800 Doctoral Dissertation (*) A W

FOOD SCIENCE

Courses for Undergraduates

FD SC 102 Food—The Technological Challenge (5) A
Reviews the scientific and technological developments leading to the present food supply and food industry. Outlines principles of food science related to preservation, nutritional quality, food safety, and food supply. Considerantors, additives, health and organic foods, preservative, food-born illness, and other topical concerns related to foods in terms of technological function, utility, and safety. Present 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 378 Principles of Fishing Gear and Vessel Development (3) A Jones
Principles of fishing techniques used in the major commercial fisheries related to vessel design and instrumentation required in the operation and handling of specialized fishing gear, together with shipboard experience.

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, Chemistry 102 or 160.

FD SC 381 Environment, Food, and Technology (3) Pigott
Principles of process operations for seafood production and consideration of pollution problems arising from food processing wastes.

FD SC 481 Introduction to Food Technology (5) Sp Liston
Chemical and biological properties of foods; principles of processing, storage, distribution, and spoilage. Prerequisite, permission.

FD SC 482 Principles of Food Analysis I (5) A
Acidity and pH in foods. Methods of proximate analysis. Quantitative analysis of inorganics, lipids, and nitrogenous substances by physical and chemical methods. Quality assessments and rancidity methods. Prerequisite, Biochemistry 408 or permission.

FD SC 483 Principles of Food Analysis II (5) W
Quantitative analyses of carbohydrates, vitamins, pectins, organic acids, food additives, and chemical contaminants by physical, chemical, enzymic, and microbiological methods. Prerequisite, 482.

FD SC 484 Principles of Food Processing I (5) A
Liston, Matches
Unprocessed foods: their composition, nutritional availability, associated microorganisms, storage, and distribution. Prerequisite, 481 or permission.

FD SC 485 Principles of Food Processing II (5) W Pigott
Unit operations in food processing, engineering, and technological bases of food operations. Prerequisite, 484 or permission.

FD SC 486 Deteriorative Processes in Foods (5) Sp Liston, Matches
Biochemical, microbiological, physical, and chemical changes occurring in foods. Prerequisites, 483, 485, or permission.

FD SC 487 Principles of Food Analysis III (4) Sp Pigott
Selected topics in quality assessment of foods. Spillage, rancidity, organoleptic, and microbiological methods. Prerequisite, 483.

FD SC 498 Undergraduate Thesis (2-6, max. 6) A W
Prerequisite, permission.
FOREST RESOURCES

Courses for Graduates Only

FD SC
504 Principles of Technological Research in Food (3, max. 6) A WSp
Liston
Lecture and laboratory course designed to familiarize graduate students with the methods used in technological research. Prerequisite, permission.

FD SC
521 Graduate Seminar in Food Science (2, max. 6) A WSp
Lectures and discussions of current problems and current research in food science. Prerequisite, permission.

FD SC
522 Biological and Chemical Origins of Foods and Food Components and Their Functional Characteristics (3) W
Primary sources of natural food materials with emphasis on living plant, animal, and microbial cells. Natural and synthetic food adjuncts such as flavorings, coloring agents, preservatives, and conditioning agents. Prerequisite, graduate standing in food science or equivalent.

FD SC
523 Advanced Marine Food Processes (5) S
Liston, Pigott
Principles and laboratory studies of advanced processes used in the extraction, concentration, and preservation of food from fish and other marine animals. Prerequisite, graduate standing in food science or equivalent.

FD SC
524 Micro-organisms in Foods (4) 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. 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.

FD SC
536 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 225.

FD SC
600 Independent Study of Research (*) A WSp

FD SC
700 Master’s Thesis (*) A WSp

QUANTITATIVE SCIENCE
See Interschool or Intercollege Programs.

WILDLIFE SCIENCE
See Interschool or Intercollege Programs.

COLLEGE OF FOREST RESOURCES

Courses for Undergraduates

FOR R
100 Introduction to Forest Resources Management (5) A Sp
Dowdle, Waggener
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 R
101 Introduction to Wood and Paper (1) W
Gardner
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 R
201 Conflicts in Forest Resource Use (2) A
Waggener
Analysis of resource management policies, with particular emphasis on the social, political, economic, and resource implications of conflicting resource uses. Examination of major policies and practices designed to deal with conflicting uses, including critical review of operational criteria for resource allocation.

FOR R
202 The Conservation Movement—Past, Present, and Future (2) W
Manwalu
Origins of the conservation movement, factors that have shifted its direction, and directions it may take in the near future. Principles relating conservation to society are discussed.

FOR R
203 Crisis in the Quality of the Forest Environment (2) W
Zasoski
The forest is an essential component of the total environment in a number of essential ways. The facts and fallacies of this relationship are discussed, both in terms of natural processes and of those processes initiated by man.

FOR R
204 Public Land Management: Resource Policy in Transition (2) Sp
Waggener
Overview of current legislation and policy affecting public land management, with emphasis on the implications for future public land use. Consideration of the major premises established for resource policy, with a critical interpretation of management objectives.

FOR R
205 Pollution Problems in the Forest Industries (2) A
Huntford
Considers 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, harvesting, and conversion into the many forest products. The state of the art in controlling these problems is reviewed and future trends are indicated.

FOR R
206 Bloedes in the Forest Environment (2) Sp
Gara
Analysis of short-term benefits and costs to the forest ecosystem through use of pesticides. Considerations of control alternatives and their consequences to management objectives. A presentation of new trends in forest insect manipulation.

FOR R
207 Regulation of Environmental Impact In Forest Resource Management (2) W
Burns

FOR R
208 Air Pollution and the Forest Environment (2) A
Edmonds
Types and sources of natural and man-made air pollutants, their dispersion in the atmosphere, and their ecological and economic impact on forest ecosystems. Local, regional, and global scales are considered.

FOR R
209 Creativity and Innovation (2) W
Allan
Meaning and understanding of the basic nature of creativity and creative thinking. Challenge in thinking and the necessity of creative innovation. Dynamics of thinking and creative thinking. Blocks in creative thinking—emotional, social, cultural, economic, environmental, and habitual. Requirements for creative innovation: knowledge, judgment, planning, creative techniques of creative thinking and brainstorming, horizontal thinking, design and development of creative games. Computer-aided creative thinking in scientific and artistic literature, bargaining and negotiations. Creation of a useful idea, protection and exploitation of a created idea.

FOR R
300 Dendrology (5) A SpS
Hatleyway, Stettler
Concepts of taxonomy, genetics, and organic evolution as applied to the classification of major tree genera of North America; lectures, laboratory demonstrations, and field exercises. Prerequisite, introductory biology or permission.

FOR R
301 Forests in the Life of Man (3) W
Gessel
The forest ecosystem—forests throughout the world. History of forest use by man. Ecological principles and forest land use. Forest conservation. For nonmajors.

FOR R
303 Wood In Art and Decoration (3) A Sp
Erickson
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 use in musical instruments, carvings 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 R 304 Wood Properties and Best Use (3) WSp
Service course for the nonspecialist. Description of wood as a fibrous material, its properties and variability as influenced by species differences and growth conditions. Causes and prevention of wood deterioration in service; physical and strength properties important in common use. Types of solid wood and fiber products. Role of wood in man's physical and economic environment.

FOR R 305 Wood Properties and Best Use Laboratory (1) WSp
Erickson, Leney
Demonstrations and laboratory experiments on topics presented in 304 that should precede or be taken concurrently.

FOR R 310 Forest Soils (5) ASp
Usolti, Zaremba
Physical, chemical, and biological properties of forest soils; soil development and classification; and soils in relation to use of forest resources. Prerequisite, Geological Sciences 205.

FOR R 311 Soils and Land Use (3) W
Colt
Intended for students who are concerned with environmental problems in the Puget Sound basin, as well as those who intend to become professionally involved in land-planning decisions. Focus is on the significance of soils in understanding environmental problems and in promoting intelligent land-use decisions. Basic concepts of soil systems are presented, stressing those aspects important in making land-planning decisions. Prerequisite, permission.

FOR R 320 Forest Ecology (5) ASp6
Scott
Introductory course in ecology for students with particular interest in forest ecosystems, organismal interactions as related to environment; ecological characteristics of trees; structure patterns and successional dynamics of forest communities, productivity of forests; and applications of forest ecology. Lectures and field exercises. Prerequisite, 10 credits in biology or permission.

FOR R 322 Silvicultural Methods (3) Sp
Scott
The theory and technique of applying silvical knowledge in controlling establishment, composition, and growth of forest stands. Includes reproduction methods and intermediate cuttings. Prerequisites, 320, 360.

FOR R 323 Forest Biology I (3) A
Gara, Woolridge
Systematics, genetics, evolution, and identification of forest trees as related to structure and environment.

FOR R 324 Forest Biology II (3) W
Gara, Woolridge
Consideration of environmental parameters and specific forest ecology, after an initial exposure to plant ecology and physiology.

FOR R 326 Range Ecology (5) Sp6
Driver
Interrelations of plants, animals, and men on range lands. History of rangeland use. One Saturday field trip required. Prerequisite, permission.

FOR R 329 Micrometeorology (3) Sp
Fritsch
Study of the interaction of biological and meteorological processes with applications to forestry, recreation, wildlife, 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 the Department of Atmospheric Sciences as Atmospheric Sciences 329. Prerequisite, Atmospheric Sciences 101 or 201 or permission.

FOR R 331 Introductory Forest Pathology (4) W
Driver
Study of typical forest diseases stressing significance of forest ecology on disease occurrence and control. Prerequisites, 310, 320, Botany 220.

FOR R 333 Forest Protection (3) W6
Introduction to biological aspects of forest protection, with emphasis on insect, disease, and animal damage related to Western forests and forest products. For non-forestry major only. No credit given if 331 or 335 has been taken.

FOR R 335 Forest Entomology (3) Sp
Gara
Introduction to general entomology, characteristics, life histories, ecological relations, prevention, and control of forest insects. Prerequisite, permission.

FOR R 336 Laboratory in Forest Entomology (1) Sp
Gara
Introduction to the insect orders; identification of forest insects and their damage. One field trip to study insect problems required. Prerequisite, 335, which may be taken concurrently.

FOR R 340 Forest Surveying (3) ASp
Schaeffer
Basic elements of forest surveying. Emphasis on plane surveying techniques, as related to forest areas.

FOR R 341 Timber Harvesting (4) Sp
Stenzel
Timber harvesting methods and planning procedures. Logging cost and production control. Environmental considerations as related to logging and road construction. Prerequisites, 320, 340, 360.

FOR R 350 Field Studies in Outdoor Recreation (3) A
Sharpe
Studies of outdoor recreation in action. An introduction to the problems of managing large recreation complexes or private, county, state, or federal lands during the period of maximum visitor use. Field trips. Prerequisites, outdoor recreation major and permission.

FOR R 351 Introduction to Outdoor Recreation (5) A
Sharpe
History and philosophy of outdoor recreation development as it pertains to the natural environment. A survey of visitor needs and preferences, trends in use, and objectives of outdoor recreation in a modern society. Emphasis on county, state, and national levels. One field trip.

FOR R 353 Principles of Natural History Interpretation (3) W
Sharpe
Consideration of the interpretive specialist in outdoor recreation. Increasing visitor enjoyment and manipulating visitor impact through interpretation. Special emphasis on promoting visitor interest and an ecological understanding through information progress. Prerequisite, permission.

FOR R 354 Introduction to Management of Recreation Areas (3) A
Bradley
Acquaints the student with the problems of administration and management of large recreational land areas. Includes control of public use, protection of environmental quality, determining carrying capacity, organization structure, and other administrative details. Prerequisite, permission.

FOR R 355 Introduction to Planning and Design of Recreation Areas (3) Sp
Bradley
The physical planning process in resource-oriented recreation and urban development. Relates both the general influences of sun, climate, access, and urban proximity with specific site influences of topography, vegetation, soil, and water in recreation design. The laboratory includes graphic methods of communication and field trips.

FOR R 360 Forest Measurements (5) W
Turnbull
Evaluation of information needs for decision making by forest manager. Study of geometry, sampling design, and estimation procedures applied to forestry. Measuring instruments and procedures. Inventory management. Laboratory and field exercises to study contents and growth of tree and forest stand.

FOR R 361 Field Studies in Forest Measurement (3) S
Atkinson
Study of sampling and estimating procedures applied to forestry. Use of measuring instruments and field applications, including individual tree measurement, log scaling, timber cruising, and forest inventory techniques. Intended to complement 360 for students who wish to increase their field skills. Prerequisite, 360 or permission.

FOR R 362 Aerial Photos in Forestry (3) ASp
Photo interpretation and photogrammetry with applications to forest and land management. Uses of panchromatic, infrared, color, and false color photos; remote sensing. Simple map making. Prerequisite, permission.
FOREST RESOURCES

FOR R 365 Forest Resources Management I (5) A Sp
Analytical techniques from economics, management, and operations research applied to the planning and the control of the production of goods and services from forested lands. Forestry principles are interfaced with modern management techniques within a decision-making framework to provide a basis for the efficient allocation of forest and land resources. (Formerly 460.)

FOR R 374 Wood Utilization (3) A
Bryant
Nature of wood products industry; processing; demand and specifications for raw material and end products.

FOR R 375 Wood Utilization Laboratory (2) W
Bryant
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.

FOR R 377 Elements of Timber Design (4) A
Bryant
Mechanical properties of wood, beam theory, and structural engineering concepts, beam design, force systems, and design of simple wood structures.

FOR R 400 Wood and Fiber Structure (5) A
Leney
Woody plants. Growth of the tree stem. Development of the woody cell and the structure of coniferous woods including fiber characteristics. Structure of hardwoods, including fibrous relationship of wood structure to its total physical properties. Natural defects in wood and fiber. Prerequisite, Botany 110 or equivalent.

FOR R 401 The Physics of Wood and Fiber Composites (4) W
Jayne
Equilibrium physical properties of composite systems. Structure and models, mass density, equilibrium moisture properties and equilibrium thermal properties. Stress, strain, Hook's law for orthotropic materials. Electrical polarizatation, axial and bending stress, dielectric heating. Prerequisites, Mathematics 126, Physics 116.

FOR R 402 The Physics of Wood and Fiber Composites (4) Sp
Jayne
Equilibrium properties, mass and energy transport, temperature-dependent electrical behavior, inelastic behavior and vibration. Prerequisite, 401. (Offered alternate years; offered 1975-76.)

FOR R 403 Fibrous Structure and Rheology I (3) W
Allan
Review of the synthetic and natural fibers and their chemical, physical, microscopic, and submicroscopic properties interfaced with fiber characteristics. The bonding behavior of fibers in networks. Analysis of the structure of fiber networks with reference to nonwovens and paper.

FOR R 404 Fibrous Structure and Rheology II (3) Sp
Allan
Behavior of fibers in fluid suspensions and properties of webs formed therefrom. Physics and chemistry of fiber-polymer interactions and adhesion. Fiber reinforcement by physical and chemical processes and theory and design of fiber composite materials. Prerequisite, 403. (Offered alternate years; offered 1974-75.)

FOR R 405 Microtechnique (3) W
Leney
The technique of preparing, sectioning, staining, and mounting woody tissues and fibers for microscopic study. Prerequisite, permission.

FOR R 406 Wood Chemistry I (3) A
Sarkinen
Chemical and physical properties of cellulose, lignin, hemicellulose, and extractives. Wood as a raw material for the chemical industry. Prerequisite, Chemistry 102 or equivalent.

FOR R 407 Wood Chemistry I Laboratory (2) W
Sarkinen
Laboratory to supplement 406.

FOR R 408 Wood Chemistry II (3) W
Sarkinen
Review of the chemistry of conversion of wood to pulp, paper, and by-products. Prerequisite, 406.

FOR R 409 Wood Extractives Chemistry (3) Sp
Hrutfiord
The nature, origin, and occurrence of the extraneous components of wood, their influence on pulp and paper preparation, and their utilization.

FOR R 411 Soil and the Forest Ecosystem (3) Sp
Cole
Study of soil in the field with emphasis on measurement of properties. Relationship of soils to forest vegetation. Prerequisite, 310.

FOR R 412 Soil Genesis (4) W
Ugolini
Soil, the channeled skin of the earth. Processes of soil formation and weathering distribution of major soils in the world.

FOR R 413 The Geography of Soil (4) Sp
Ugolini
Study of the distribution and morphology of soils in relation to environmental factors. Lectures and field trips to illustrate the properties and the processes of the soils throughout the unique terrestrial ecosystems of the state of Washington.

FOR R 415 Applied Forest Hydrology (4) A
Waldridge
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 or permission.

FOR R 416 Micrometeorological Measurements and Instrumentation (5) W
Fritschen
Principles and theories of biometeorological instrumentation. Accuracy, measuring solar and thermal radiation, heat flux, air and soil temperature, atmospheric moisture content, wind. Prerequisites, Mathematics 126, Physics 123, or permission.

FOR R 421 Dendroecology (4) Sp
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 epidemics, etc., in relation to yearly 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 R 422 Forest Regeneration Operations (3) WS
Kenady
Procedures and problems of regenerating forest lands, including cone collection and processing, seed processing and treatment, seed orchard and nursery management, and field techniques for establishing forest plantations. Three field trips required. Prerequisite, major in forest resources.

FOR R 423 Advanced Forest Ecology (3) AW
Scott
For students with some previous training in ecology. Discussion centered around primary processes and growth, patterns in forest tree species, and forest community dynamics and productivity as affected by environment. Several one- to three-day trips throughout the Pacific Northwest. Prerequisite, permission.

FOR R 424 Selected Topics in Silviculture (3) AW
Scott
Detailed discussion of special problems or subjects in silviculture of interest to advanced students. Prerequisite, permission.

FOR R 425 Introduction to Population Biology (4) Sp
Applications of elementary mathematical methods, including digital computer techniques, to population and community ecology. Subject matter includes topics from population genetics, population dynamics, and community and ecosystem dynamics. Prerequisites, 300, 320, Quantitative Science 292, or permission.

FOR R 427 Forest Genetics (3) W
Stettler
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 practice. Prerequisite, 300 or permission.

FOR R 430 Elementary Forest Fire Science and Technology (3) W
Schaeffer
Forest fire behavior; fire and ecology; organization and management of forest fire control systems; economics of fire control; use of fire in forest land management. Meteorological and thermophysical bases for forest fire behavior.

FOR R 433 Biology of Forest Diseases (5) W
Driver
Detailed studies on the biology of host-
pathogen relationships exhibited by certain forest diseases. Prerequisite, 331. (Offered alternate years; offered 1975-76.)

FOR R 436 Ecology of Forest Insects (4) W Gare Host-insect interactions, introduction to popula-
tion dynamics, research technique, and perti-
inent forest entomological literature. One field
trip required. Prerequisite, permission. (Of-
fered alternate years; offered 1975-76.)

FOR R 440 Construction (4) W Stenzel Design and construction of forest roads; earth-
moving methods and costs, explosives, surfac-
ing, drainage facilities. Laboratory: design of
bridge timber bridges. Prerequisite, 377 or permission.

FOR R 441 Forest Engineering (5) A Stenzel Planning the logging operation: logging meth-
ods, route projection, selection of landings and
settings, logging cost control. Prerequisite,
CETC 310.

FOR R 442 Financial Analysis of Logging Equipment
and Operations (4) W Dowdle Business investment management in logging
industry with particular emphasis on equipment
replacement. Engineering performance of var-
ious types of logging equipment. Individual
student project includes some field work. Pre-
requisite, 441 or permission.

FOR R 443 Safety Practices in Forest Industries (1) A Stenzel Accident costs and frequency rates; accident
investigations; safety inspection; safety organi-
zation and program. Prerequisite, forest engi-
nearing major or permission.

FOR R 444, 447, 448, 449 Senior Forest Engineering
Field Studies (2,5,5,5) SpSspSspSsp Atkinson, Stenzel
446: route projection and logging planning.
447: reconnaissance and preliminary surveys.
448: road location and construction surveys.
449: cost estimates and reports. Development of
a complete logging plan for a timber tract.
Courses given consecutively in Spring Quarter.
Prerequisite, 441.

FOR R 451 Outdoor Recreation Economics (3) Sp
Waggener The application of economic principles to out-
door recreation problems. The elements of
Demand for demand for outdoor recreation opportunities,
the evaluation of recreational alternatives, and
the allocation of resources for recreational use
on public and private lands. Prerequisite, Eco-
nomics 200.

FOR R 452 Sociology of Leisure and Outdoor
Recreation (3) W Field
Focuses upon an understanding of human
behavior in leisure settings. An examination of
basic sociological concepts as well as contempo-
rary theories concerning leisure behavior; re-
search techniques and problems of measure-
ment in leisure research. Implications for the
management of recreational areas provide an
applied orientation and integration of sub-
stantive material. Prerequisite, Sociology 110.

FOR R 453 Advanced Natural History Interpretation
(5) Sp Sharpe Independent study projects dealing with the
interpretation of physical and natural phe-
mona for the enjoyment of recreational visi-
tors. Practical experience in the design and the
use of interpretative materials for better under-
standing of the outdoor recreation activity. Pre-
requisite, 353 or permission.

FOR R 455 Advanced Planning and Design of
Outdoor Recreation Areas (5) A Bradley
Independent study projects in the planning and
the design of outdoor recreation areas and facil-
ties. Integrated consideration of the resource
base, social factors, and management objectives
in recreation area planning. Selected case
studies in area planning and design. Prerequi-
site, 355.

FOR R 456 Wilderness Preservation and
Management (3) A Hendee Review of American wilderness philosophies,
concepts, and values. Development of the Wil-
derness Act. Examination of current wilderness-
management policies, problems, trends in
use, issues and controversies, wilderness re-
search, social costs, and benefits of wilderness.
Prerequisite, permission.

FOR R 459 Case Studies in Outdoor Recreation (5)
Sp Bradley Investigation of the problems, the policies, and
the procedures of selected public and pri-
ivate lands used for outdoor recreation, using
the comprehensive master planning approach.
Extensive field trips. Prerequisites, 351, 353,
354, 355.

FOR R 461 Advanced Forest Mensuration (3) W
Turnbull Forest tree and stand models. Studies of forest
tree and stand parameters. Estimation proc-
esses. Growth and yield analysis. Prerequisite,
360, Mathematics 281, or permission.

FOR R 463 Contemporary Problems in Forest Land
Use (3) W Dowdle, 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. Prerequisite, permis-
sion.

FOR R 464 Economics of the Forest Products
Industry (3) W Waggener Market structure of major forest-related indus-
tries. Changing pattern of forest land use and
impact on forest industries. Economic factors
affecting the distribution and marketing of forest
products, including international, interregional,
and intraregional competition. Prerequisite,
Economics 200.
FOREST RESOURCES

FOR R 476 Pulp and Paper Technology (3) W
Gardner
Chemical and technological aspects of the manufacture of mechanical and chemical pulps and of paper and paper products. Prerequisite, Chemistry 102 or 232 or permission.

FOR R 477 Pulp and Paper Laboratory (2) Sp
Gardner
Laboratory experiments in the pulping of wood, fiber technology, and physical and chemical characteristics of paper and pulp. Prerequisite, 476.

FOR R 479 Analysis of Wood Processing Facilities (3) A
Bethel
Application of wood science and technology to analysis of the effectiveness of wood processing facilities. Production control and quality control related to materials and processes. Procurement control problems. Decision making with respect to product mix, equipment modification, analysis of inventory control, and material movement.

FOR R 480 Wood Process Development and Design (3) W
Bethel
Study of the factors influencing feasibility judgments with respect to industrial development and factory design. Feasibility of new forest products manufacturing installations with reference to raw material supply, markets, transportation, and labor supply. Analysis of case histories of forest products manufacturing and facility development. Use of operations research methods in feasibility studies. Prerequisite, permission.

FOR R 481 Pulp and Paper Unit Operations (4) Sp
Gardner
Unit operations of particular interest in the pulp and paper industry in addition to those covered in Chemical Engineering 340 and 435. Prerequisite, Chemical Engineering 435.

FOR R 485 Undergraduate Research (1-3, max. 3).
AWSp
Undergraduate research or independent study project under the supervision of the faculty; usually one credit per quarter. Prerequisite, senior standing in Wood and Paper Division.

FOR R 487 Introduction to Wood Biochemistry (3) A
Porter
Basic biochemical concepts; emphasis on the chemistry of photosynthesis, plant metabolism, and protein biosynthesis. (Offered alternate years; offered 1974-75.)

FOR R 488 Polymer Chemistry (3) Sp
Allan
Fundamental review of synthetic and natural polymers, including kinetics of formation, molecular weight distributions, and solid-state and solution properties.

FOR R 489 Wood Biotechnology (3) W
Brattford
Biochemistry of carbohydrates, phenolic and terpenoid compounds in forest trees, and biochemistry of wood degradation. Prerequisite, 487 or Biochemistry 405.

FOR R 490, 491, 492 Undergraduate Studies (1,5,6,1,5,1,5)
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. Prerequisite, permission.

FOR R 493 Ecology of the Northwest I (2) W
Gara, Ugolini
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 R 494 Ecology of the Northwest II (2) Sp
Gara, Ugolini
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 R 500 Graduate Seminar (2) A
Gara, Gesell
Discussion of current issues and problems in forestry and forestry research.

FOR R 501 Elasticity of Wood and Fiber Composites (4) W
Jayne

FOR R 502 Transport Processes in Composite Systems (4) Sp
Jayne

FOR R 511 Forest Soils Seminar (2) W
Gessel
Discussion of current topics in forest soils research and management. Prerequisite, permission.

FOR R 512 Soil Chemistry (4) W
Ugolini
Topics in soil chemistry and physical chemistry: organic fraction, exchangeable process, clay mineralogy, and short range order minerals.

FOR R 513 Soil Formation and Classification (3) Sp
Gessel
Study of soil-forming factors, processes, and principles of soil classification. Distribution of soils. Prerequisite, 310.

FOR R 514 Forest Influences (4) Sp
Wooldridge
Study of the interacting effects of climate, soil, and plants as a basis for understanding the hydrologic cycle. Places special emphasis on disposition and movement of water in forest ecosystems. Prerequisite, graduate standing or permission.

FOR R 517 Soil-Plant-Air Atmosphere Relations (3) W
Fritsch
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, Mathematics 126, Physics 123, Atmospheric Sciences 329. (Offered alternate years; offered 1975-76.)

FOR R 521 Current Problems In Forest Ecology (3) W
Scott
Consideration of current literature and topics in forest ecology and tree physiology. Prerequisite, permission.

FOR R 522 Current Problems in Silviculture (3) Sp
Scott
Detailed study of the literature dealing with recent applications of silviculture in world forestry. Prerequisite, permission.

FOR R 524 Tropical Forests (3) Sp
Bethel
Comparative study of the forests of temperate and tropical regions. Diversity in tropical ecosystems. Comparisons among tropical forest biomes. The structure and properties of tropical forest trees and woods. Problems in the utilization of tropical woods basic to the development of tropical forestry management practice. Forest land use practices and problems in the tropical regions of the world. Prerequisite, permission.

FOR R 527 Advanced Forest Genetics (3) W
Stettler
Discussion course relating concepts of quantitative and population genetics to forest-tree populations, both natural and artificial. Prerequisite, Genetics 451, or equivalent. (Offered alternate years; offered 1974-75.)

FOR R 531 Forest Fire Science Seminar (2) W
Martin
Presentation and discussion of current issues in forest fire prevention, control, use, and discussion of ongoing fire research. Prerequisite, permission.

FOR R 532 Planning, Management, and Analysis of Forest Fire Control Systems (3) Sp
Martin
The forest fire control systems. Study of plans, service, finance, line, and command functions.
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.

FOR R
510 Graduate Studies in Forest Soils (1-5)
Cole, Gesell, Ugolini

FOR R
515 Graduate Studies in Forest Influences (1-5)
Fritschen, Wooldridge

FOR R
516 Graduate Studies in Forest Meteorology (1-5)
Fritschen

FOR R
520 Graduate Studies in Forest Ecology and Silviculture (1-5)
Scott

FOR R
526 Graduate Studies in Forest Genetics (1-5)
Hatheway, Stettler

FOR R
530 Graduate Studies in Forest Fire Control (1-5)
Martin, Schaeffer

FOR R
534 Graduate Studies in Forest Pathology (1-5)
Driver

FOR R
535 Graduate Studies in Forest Entomology (1-5)
Gara

FOR R
540 Graduate Studies in Logging Engineering (1-5)
Atkinson, Stenzel

FOR R
550 Graduate Studies in Forest Recreation (1-5)
Field, Hendee, Sharpe, Wagar

FOR R
554 Graduate Studies in Wildlife Management (1-5)
Manuwal, Taber

FOR R
556 Graduate Studies in Forest Zoology (1-5)
Welsbrod.

FOR R
559 Graduate Studies in Forest Resource Planning (1-5)
Bradley

FOR R
560 Graduate Studies in Forest History and Policy (1-5)
Dowdle, Waggener

FOR R
563 Graduate Studies in Forest Mensuration (1-5)
Turnbull

FOR R
565 Graduate Studies in Forest Management (1-5)
Bare, Schreuder, Waggener

FOR R
566 Graduate Studies in Forest Photogrammetry (1-5)
Schreuder

FOR R
568 Graduate Studies in Forest Economics (1-5)
Dowdle, Waggener

FOR R
570 Graduate Studies in Forest Products (1-5)
Allan, Bryant, Erickson, Gardner, Hratjord, Jayne, Lantry, Sarkanes, Thomas

INTERDISCIPLINARY GRADUATE DEGREE PROGRAMS

These programs are administered by interdisciplinary groups of the Graduate School. Certain courses carrying the particular program prefix appear below; other courses with the same prefix appear elsewhere as indicated. Other courses included in these programs are selected from many disciplines throughout the University and carry the prefix of the respective discipline.

ART HISTORY

ART H
600 Independent Study or Research (*)

ART H
800 Doctoral Dissertation (*)

BIOLOGY TEACHING

No courses have this program prefix; all courses included in this interdisciplinary program appear under the appropriate discipline headings.

BIOMATHEMATICS

BMA TH
554 Stochastic Processes in the Life Sciences (3) Sp
Gallucci

Stochastic processes is the major unifying theme; a secondary theme is the role and appearance of energy in biological problems. Theory behind spectral analysis and correlation type of processing of physiological signals, its problems and shortcomings. Application to systematic sampling. Development of statistical mechanics as a stochastic process; laws of thermodynamics; information; discussion of the applicability of the preceding to living systems. Biological cell membrane structure and function, Brownian motion, membrane transport theories. Ecological applications of statistical mechanics and information. Prerequisites, some knowledge of stochastic processes and some biology course work.

BMA TH
597 Seminar in Quantitative Ecology (1, max. 5) AWSp
Hatheway

Lectures and discussions of current problems in quantitative ecology. Prerequisite, permission.

BMATH
598 Special Topics in Quantitative Ecology (1-3, max. 12) AWSp
Special topics in quantitative ecology, including population and community-ecology, systems ecology, and physical processes in ecosystems.

BMATH
599 Research in Quantitative Ecology (1-5, max. 5) AWSp
Gallucci, Hatheway, Jayne
Special advanced topics in quantitative ecology. Topics can be of a theoretical nature or combined theory and experiment. Prerequisite, permission.

BMATH
600 Independent Study or Research (*)

BMATH
700 Master's Thesis (*)

BMATH
800 Doctoral Dissertation (*)

COMPARATIVE LITERATURE

CLIT
600 Independent Study or Research (*)

CLIT
700 Master's Thesis (*)

CLIT
800 Doctoral Dissertation (*)

COMPUTER SCIENCE

C SCI
470 Design of Digital Data Systems (4) AW
Fundamental gating circuits are developed into large logic gating structures. The use of these structures in the design of central processing units, memories, and peripheral equipment is illustrated. Course for majors in computer science. Prerequisite, permission.

C SCI
472 Computer Software Systems (3) W
Principles of operating systems, compilers, assemblers, interpreters, and loaders for digital computers. Not intended for graduate students in computer science or electrical engineering with emphasis on advanced programming. Not open to students who have taken Electrical Engineering 501 or 502. Offered jointly with the Department of Electrical Engineering as Electrical Engineering 472. Prerequisite, 478.

C SCI
478 Computer Organization and Machine Language Programming (4) ASp
Differences and similarities in computer structure, Flow of control, instruction codes and their execution for arithmetic, logical, character manipulation, and input-output operations. Indexing and indirect addressing; subroutine linkage. Study of information representations and their relationship to processing techniques. Offered jointly with the Department of Electrical Engineering as Electrical Engineering 478. Prerequisites, Engineering 141 and 315, or equivalent.

C SCI
590 Computers and Society (2) W
Gillessie, Shaw
Study of the impact of computer technology on present and future societies; computer technology and economics; political, economic,
C

INTERDISCIPLINARY GRADUATE DEGREE PROGRAMS

cultural, social, and moral issues. Seminar with frequent guest lecturers and discussion leaders. Each student is required to complete a term project. Offered on credit/no credit basis only. Prerequisite, graduate standing in computer science or permission.

C SCI 501 Compiler Construction I (3) A
Basic concepts and design of interpreters and compilers. Lexical analysis, syntax analysis, storage management, and code generation for general-purpose languages. Offered jointly with the Department of Electrical Engineering as Electrical Engineering 501. Prerequisites, 478 and working knowledge of a block-structured programming language.

C SCI 502 Compiler Construction II (3) W
Advanced topics in compiler construction. Translator writing systems, incremental compilation, compiler-interpreters. Practical considerations for production compilers. Offered jointly with the Department of Electrical Engineering as Electrical Engineering 502. Prerequisite, 501.

C SCI 504 Comparative Study of Programming Languages (3) Sp
Important programming languages from various traditions are studied and compared so that major contributions of each language can be understood. Possible languages for study include TRAC, LISP 1.5, ALGOL 60, PASCAL, SIMULA 67, SNOBOL 4, and APL. Prerequisite, 478.

C SCI 505 Concepts of Programming Languages (3) A
Herrriot
Programming language semantics define virtual machines that serve as interfaces between man (programmers) and actual machines (computers). Methods of defining virtual machines (semantic modeling) and concepts of virtual machines are examined. Such concepts include: data structures (arrays, records, etc.), operators on data structures, the assignment operator, references, typing, environments and binding of identifiers to values, functions, and labels and their relationship to environment. Examples from existing programming languages are given. Prerequisite, 478.

C SCI 508 Representation and Handling of Data (3) A

C SCI 510 List Processing and String Manipulation (3) W
Structure of information sets that reflect the syntactic or semantic relationships in the information. The generation and processing of structures such as lists and trees. Generalized information systems. Pattern recognition and manipulation of symbolic strings. Markov algorithms. Algebraic symbol-manipulation processes. Syntax, semantics, and use of recent versions of languages such as LISP, FORMULA-LISP, SNOBAL, and FORMAC. Prerequisite, 508 or permission.

C SCI 518 Digital Signal Processing (4) Sp
Signal classification and representation; data collection, processing and display. Emphasis on the derivation, evaluation, and application of various information-extraction algorithms and their realization on a digital computer. Offered jointly with the Department of Electrical Engineering as Electrical Engineering 518. Prerequisite, graduate standing or permission.

C SCI 520 Computer Science Seminar (0) W
Weekly discussion by students and faculty or visitors on topics of current interest. Must be taken by all graduate students for three quarters.

C SCI 531 Automata Theory I (3) W

C SCI 532 Automata Theory II (3) Sp
Continuation of 531. Selected topics from closure properties of languages, time and tape bounded Turing machines, Lambda calculus, lambda calculus, decision problems, abstract complexity theory, and other topics in automata theory. Prerequisite, 531.

C SCI 537, 538 Computability Theory (3,3)
Introduction to the theory of effective computability. Formulation of the concepts of recursive and partial recursive function and recursively enumerable set. Study of the relationship between a program and the properties of the function computed by that program. Introduction to reducibility, procedures, construction of undecidable problems, degrees of unsolvability, recursive invariance, and isomorphism. Classification of unsolvable problems, the arithmetical hierarchy, the relation of the degree of unsolvability of a set to the logical complexity required to describe the set. Connection with mathematical logic, the theorems of Godel, Church, and Tarski. As time permits, introduction of various related topics in computational complexity. Prerequisite, Mathematics 502, or permission.

C SCI 540 Discrete System Simulation (3) W
Noe
Principles of simulation of discrete, event-oriented systems. Model construction, simulation, and validation, and relationship to other techniques for system analysis and design. Use of special-purpose simulation languages such as SIMSCRIPT and SIMULA, and study of their functional components and data structures, with examination of the equivalent tasks necessary to use general-purpose languages for simulation. Prerequisite, knowledge of ALGOL.

C SCI 541 Computer Measurements and Evaluation Techniques (3) Sp
Viewpoints, problems, and techniques in assessment of computer systems and subsystems. Selection of models, analysis, simulation, and instrumentation assignments making use of computers available on campus. Prerequisite, 540 or permission.

C SCI 542 Central Processor Architecture (3) W
Several central processing units are examined at the gate level. Included are the logic structures of: I/O bus, memory bus, ALU, address modification, control logic, combinatorial and multiphase instructions, access priority, cycle stealing, etc. Prerequisite, 470.

C SCI 548 Computer Systems Architecture (3) W

C SCI 551 Operating Systems (3) Sp

C SCI 552 Systems Programming Practicum (3-5, max. 12) W
Sp
Practical experience in the design and implementation of computer software (e.g., language processors, operating systems, graphics system). Students work in groups under the supervision of a faculty member for several quarters, typically using the equipment in the Computer Science Teaching Laboratory. Seminars on the concepts of systems design and software engineering are part of the laboratory work. Projects may be proposed by groups of students or by a faculty member. Offered on credit/no credit basis only. Prerequisite, permission.

C SCI 557 Computer Graphics (3) Sp

C SCI 573 Artificial Intelligence I (3) A

C SCI 574 Artificial Intelligence II (3) W
Continuation of studies of artificial intelligence systems, emphasizing theorem proving, symbolic problem solving, pattern recognition, and natural language processing. Students are required to do projects. Prerequisite, 573 or permission.
INTERSCHOOL OR INTERCOLLEGE PROGRAMS

C SCI
590 Special Topics In Computer Science (*)
AWSp
Lectures and discussions of current interest in computer science. May be repeated for credit. Prerequisite, permission (May not be offered every quarter; content may vary from one offering to another.)

C SCI
600 Independent Study or Research (*)
AWSp

C SCI
700 Master's Thesis (*)
AWSp

C SCI
800 Doctoral Dissertation (*)
AWSp

DRAMA ARTS

D ART
800 Doctoral Dissertation (*)

EAST ASIAN STUDIES

See also Institute for Comparative and Foreign Area Studies.

EASIA
600 Independent Study or Research (*)
AWSp

EASIA
700 Master's Thesis (*)
AWSp

INDIVIDUAL PH.D. PROGRAM

PHD
800 Doctoral Dissertation (*)

REVISED Ph.D. PROGRAM

Restricted to graduate students approved for a special individual Ph.D. program in the Graduate School. Requires permission of the student's Supervisory Committee Chairman. Name of dissertation supervisor should appear on the student's Program of Studies.

PHYSIOLOGY PSYCHOLOGY

PSY
800 Doctoral Dissertation (*)

QUATERNARY STUDIES

No degree program is offered.

QUAT
417 The Late Cenozoic Glacial Ages (3)
History of climatic changes during the Quaternary Period, as revealed by physical and biological data. Global chronology and correlation of quaternary sediments. Prerequisite, senior standing or permission. (Not offered 1974-75.)

QUAT
501 Seminar in Quaternary Environments (2, max. 6) W
Interdisciplinary seminar in the changing natural environments of the Quaternary Period, with emphasis on climatic changes and their effects. (Last time offered: Spring Quarter 1975.)

QUAT
502 Interdisciplinary Quaternary Investigations (3-5, max. 15)
Research course for interdisciplinary investigations of Quaternary problems. Problem-oriented case study required if taken in conjunction with 501. (Last time offered: Spring Quarter 1975.)

QUAT
513 Quaternary Stratigraphy of the Western Hemisphere (3) Sp
Porter
Quaternary stratigraphy of North and South America, Antarctica, and Greenland. Emphasis on glacial record of North America and on nonglacial record of selected areas throughout the hemisphere. Offered alternate years jointly with the Department of Geological Sciences as Geological Sciences 513. (Last time offered: Spring Quarter 1975.)

QUAT
514 Quaternary Stratigraphy of the Eastern Hemisphere (3) Sp
Quaternary stratigraphy of Europe, Africa, Asia, and Pacific islands. Emphasis on European glacial record and on nonglacial record of South Asia and Africa. Offered alternate years jointly with the Department of Geological Sciences as Geological Sciences 514. (Last time offered: Spring Quarter 1978.)

RADIOLOGICAL SCIENCE

RAD S
520 Radiological Science Seminar (1, max. 6)

RAD S
600 Independent Study or Research (*)
AWSp

RAD S
700 Master's Thesis (*)
AWSp

RUSSIAN AND EAST EUROPEAN STUDIES

See also Institute for Comparative and Foreign Area Studies.

REEU
600 Independent Study or Research (*)
AWSp

REEU
700 Master's Thesis (*)
AWSp

INTERSCHOOL OR INTERCOLLEGE PROGRAMS

BIOENGINEERING

Administered by the School of Medicine and the College of Engineering.

BIOEN
299 Introduction to Bioengineering (1) ASp
Lectures, discussions, and reading assignments on the various aspects of bioengineering; orientation in bioengineering studies and practice.

BIOEN
402 Essentials of Bioengineering II (3) W
Huntsman, Rushmer
Coverage includes principles of measurements and materials, followed by case studies of engineering in the musculoskeletal, cardiovascu-
lar, and respiratory systems. Prerequisite, Physiology and Biophysics 360.

BIOEN
403 Essentials of Bioengineering III (3) Sp
Holloway, Moritz
Coverage includes case studies of engineering in the renal system, digestive system, skin, eyes, and ears, and reproductive system; computer applications in bioengineering also are covered, and the course finishes with consideration of engineering opportunities in health care and its delivery. Prerequisite, Physiology and Biophysics 360.

BIOEN
410 Engineering Prescriptions for Health Care Crises (3) A
Designed to present and discuss current crises in health care with cause or cure related to applications of modern technology. The nature and scope of bioengineering is considered in relation to manpower requirements, health care facilities, distribution of care, and emphasis on nonglacial data sources, and projections of future technological needs for various clinical specialties. Primarily for students in medicine, public health and community medicine, or bioengineering. (Offered alternate years.)

BIOEN
460 Wave Effects in Bio-Materials (3) Sp
Ultrasonic, electromagnetic, and optical wave effects in biological materials. Applications to biomedical uses in diagnosis, therapy, and surgery. Prerequisite, Electrical Engineering 381 or other course in wave propagation, as approved by instructor. Offered jointly with the Department of Electrical Engineering as Electrical Engineering 460.

BIOEN
470 Engineering Approaches to the Cardiovascular System (3) Sp
Concerned with the engineering techniques and physiological concepts appropriate to a quantitative approach to the cardiovascular system. Current literature is used together with texts, and guest lecturers discuss specialized topics. Prerequisites, senior standing and permission; some previous exposure to physiology recommended.

BIOEN
472 Diagnostic Ultrasound (2-6) ASp
Basic principles of ultrasound. A-mode applications, including delineation of midbrain structures, differentiating solid from cystic lesions, and measurement of biparietal diameters. TM-mode applications, including delineation of intracardiac 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.

BIOEN
490 Engineering Materials for Biomedical Applications (3) W
Combined application of the principles of physical chemistry, biochemistry, materials engineering, mass transfer, and fluid mechanics to biomedical problems. Case studies include considerations of the selection of materials, design, and the operation of instruments, components of, or entire, artificial organs (heart, kidney, lungs) and artificial structural elements (bone, teeth, skin), all for use in contact with
body fluids. Offered jointly with the Department of Chemical Engineering as Chemical Engineering 490.

BIOEN 499 Special Projects (2-6, max. 6) A.Wsp Individual undergraduate bioengineering projects under the supervision of an instructor. In addition, classes on selected topics of current interest as announced. Prerequisite, permission.

INSTITUTE FOR MARINE STUDIES

IMS 471, 472 Scientific Perspectives on the Marine Environment (2,2) A,W Fleming Descriptions of marine environments and the regional and seasonal variations in their characteristics. Scientific principles and the magnitude of natural processes. Constraints imposed by the environments upon technology and social management. Prerequisites, permission; 471 for 472.

IMS 499 Undergraduate Research (1-3, max. 6) A.Wsp Research on assigned topics under the supervision of faculty members. Prerequisite, permission.

IMS 520 General Seminar in Marine Studies (1-3, max. 6) A.Wsp Examination of representative regional, national, and international marine policy issues. Faculty and graduate student participation in multidisciplinary scholarly study from the scientific, political, economic, and social perspectives. Prerequisite, permission.

IMS 600 Independent Study or Research (*) A.Wsp

QUANTITATIVE SCIENCE

Administered by the College of Fisheries and the College of Forest Resources.

COMPUTER PROGRAMMING

Q SCI 340 Applications of Digital Computers to Problems in Resource Management (4) A,W Methods and procedure for processing biological and natural resource data by means of digital computers; problem analysis, elementary programming, use of package programs for statistical analysis. No credit given if Fisheries 340 has been taken. Prerequisite, 281 or 381.

QUANTITATIVE ECOLOGY

Q SCI 450 Ecological Models (4) Sp Empirical models; energy flow and compartmental models and their use in ecology; spatial patterns; ecological diversity; other special models. Prerequisite, 456. (Formerly 460.)

Q SCI 451, 452 Ecosystem Dynamics (3,3) A,W Unified overview of the physical and biological processes that make up natural and managed ecosystems. Facets of the physical environment—production, consumption, decomposition, nutrient cycling, and exploitation by man—are discussed as interrelated aspects of a whole ecosystem. Mathematical techniques for representing the interrelationships are emphasized; examples are drawn from aquatic and terrestrial systems of the biotic provinces of North America (biomes). Prerequisite, 292, 340, 450, or permission for 451; 451 for 452.

Q SCI 456 Mathematical Models in Population Biology (4) A Definition and role of mathematical models in population biology; types of models; population processes and population growth; use of computer in model building; sampling and other methods of estimation of population parameters. Prerequisites, 281, 292, Fisheries 425 or Biology 210 or permission.


PHYSICAL PROCESSES IN BIOLOGICAL SYSTEMS

Q SCI 461 Thermodynamics of Life Processes (4) W Thermodynamics of life processes with particular application of the free energy function to descriptions of life processes. Applications to processes in the atmosphere, dilute solutions, soil systems, and living cells. Introduction to the concepts of entropy in biology. Prerequisites, 291, 292, Biology 210, 211, 212.

Q SCI 462 Irreversible Thermodynamics in Biology (4) Sp Flows and forces in irreversible processes in biological systems; basic and sedimentation. Membrane permeability. Transport in biological systems. Electrochemical processes. Prerequisites, 461, 493, or equivalent.

OPERATIONS RESEARCH

Q SCI 270 Introduction to Operations Research and Resource Management (4) Sp Elementary introduction to systems analysis methodology and selected techniques of management science and their application in natural resource management. Emphasis is on the identification, definition, and structure of management problems. Selected case studies are presented to illustrate applications to natural resource management. Use of computer where applicable.

Q SCI 376 Operations Research in Resource Utilization I (3) A 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 and of resource product manufacturing. Emphasis is placed on networks and graphs, principally PERT analysis, and on linear programming and its extensions, such as the transportation assignment and transshipments models. Sensitivity analysis and duality also are presented. Prerequisite, 391, which may be taken concurrently. (Formerly 396.)

Q SCI 471 Systems Analysis in Resource Management (4) A Nature of systems; systems goals and objectives; models; transformation of inputs to outputs; control systems; information; survey of methods of optimization; general systems; comparative systems; fishing systems; design and analysis of actual systems. Prerequisite, 291 or Mathematics 124. (Formerly 491.)

Q SCI 476 Operations Research in Resource Utilization II (3) W Presents additional operations research methods, principally model-building techniques and simulation approaches. Existing biological and physical models largely are taken for granted. These models are extended and interpreted within a social science framework. Specifically economic and managerial decision making under uncertainty, both when information survey can be obtained and when they cannot, form the core of the course. This course can be taken independently from 376. Prerequisites, 281, 291. (Formerly 496.)

Q SCI 477 Advanced Mathematical Programming With Applications in Resource Management (3) Sp Selected techniques from mathematical programming, with primary emphasis on the formulation of solution and interpretation of natural-resource-oriented problems. Material presented includes: (1) selected techniques from linear programming (i.e., the revised simplex, dual simplex, and primal-dual algorithms); (2) integer programming; (3) classical optimization techniques; (4) Kuhn-Tucker conditions; (5) quadratic programming; (6) general convex programming; (7) separable programming; and (8) dynamic programming. Prerequisites, 376 and 476, or Quantitative Methods 450 and 451. (Formerly 497.)

STATISTICAL METHODS

Q SCI 281 Elementary Statistical Methods (5) A.Wsp Elementary concepts of probability; multinomial and normal distributions; point and interval estimation; basic concepts of hypothesis testing; binomial problems; "t" tests and simple analysis of variance; chi-square tests; simple linear regression; applications to biological problems. Prerequisite, Mathematics 105 or equivalent.

Q SCI 381 Introduction to Probability and Statistics (5) A.Wsp Elementary concepts of probability; sample space set theory, random variables, expectations, variances, covariance; multinomial, normal, hypergeometric Poisson, negative-binomial, geometric, uniform normal, chi-square, "t" and "f" distributions discussed; point and interval estimation, basic concepts of hypothesis testing; applications to biological problems. Prerequisite, Mathematics 105 or equivalent.

Q SCI 382, 383 Statistical Inference in Applied Research (5,5) A.Wsp Analysis of variance and covariance; chi-square tests; multiple and curvilinear regres-
INTERSCHOOL OR INTERCOLLEGE PROGRAMS

sion; sampling theory; discrete distributions; experimental design and power of tests. Application to biological problems. Use of computer programs in standard statistical problems. Prerequisites, 381, Mathematics 124 or Quantitative Science 291 or permission for 382; 382 for 383.

Q SCI 480 Sampling Theory for Biologists (4) 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 determinations, applications in fisheries and forestry. Other topics include sampling plant and animal populations, sampling distributions, estimation of parameters and statistical treatment of data. Prerequisites, 382 or permission.

Q SCI 486 Experimental Design (3) Sp Topics in analysis of variance and experimental design and power of tests. Theory and applications of sampling finite populations, 'sampling design, sample size determinations, independent individual or team undergraduate research projects dealing with technology, society, and public policy. Prerequisites, 3.00 grade-point average and permission of program director.

SOCIAL MANAGEMENT OF TECHNOLOGY

SMT 498 Special Topics: Technology, Society, and Public Policy (3-5) AWPsp Special topics dealing with technology, society, and public policy offered as lectures and seminars. Topics include technology assessment, energy policy, role of technology in social policy formation, and institutional means of regulating technology. Prerequisite, permission.

SMT 499 Special Research Projects: Technology, Society, and Public Policy (3-5, max. 10) AWPsp Independent individual or team undergraduate research projects dealing with technology, society, and public policy. Prerequisites, 3.00 grade-point average and permission of program director.

APPLIED ANALYSIS

Q SCI 291, 292 Analysis for Biologists (3,3) AWP, AWPsp Differentiation; integration including multiple integrals and partial derivatives. Numerical and computing techniques in analysis. Emphasis on biological problems, particularly in ecology. Prerequisites, Mathematics 105 for 291; 291 or Mathematics 124 for 292.

Q SCI 391 Introduction to Matrices and Their Applications (3) A Elementary concepts of matrices and matrix operations; use of computer in inverting matrices, solving systems of equations and other matrix operations; applications in operations research and biology. Prerequisites, 211, Mathematics 125 and 114, or Fisheries 340 or equivalent course in computer use, or permission.

Q SCI 492 Techniques of Applied Mathematics in Biology I (3) A Ordinary differential equations—linear and nonlinear; systems of differential equations; approximation techniques, numerical solution techniques; applications to biological processes. Prerequisite, 292 or Mathematics 126, or permission. (Formerly 392.)

Q SCI 493 Techniques of Applied Mathematics in Biology II (3) W Applications of advanced ordinary differential equations, special functions, and partial differential equations to descriptions of biological phenomena. Particular emphasis on transport in biological systems, including diffusion and fluid flow. Prerequisite, 492 or permission.

Q SCI 499 Undergraduate Research (1-5, max. 5) AWPsp Special studies in quantitative ecology and resource management for which there is not sufficient demand to warrant the organization of regular courses. Prerequisite, permission.

UNIVERSITY CONJUNCT COURSES

UCONJ 440 Applied Math. in Science 5, 6, 7, 8

WILDLIFE SCIENCE

Administered by the College of Fisheries and the College of Forest Resources.

WLF 8 350 Survey of Wildlife Biology and Conservation (3) W Manaval

Wildlife technology and population biology, and interrelationships between wild animals and man, including encouragement of wildlife pop-
ulation growth and productivity, control of pest populations, and preservation of endangered species. Prerequisite, junior standing.

WLF S 401 The Biology and Conservation of Birds (4) A Manuwal
Major principles of avian population biology, reproductive biology, and conservation strategies for both game and nongame birds. Laboratory and field trips are required, and students may be asked to share travel costs. Prerequisites, 350, two quarters of college biology, and permission.

WLF S 402 Wildlife and Man (3) W Taber
Human customs, attitudes, and institutions with regard to wild bird and mammal populations. Economics of wildlife populations. Governmental administration and custodianship of wildlife. Frictional relationships between human and wildlife populations (crop damage, public health, etc.). Prerequisite, 350 or permission.

WLF S 403 Wildlife and Land Use (3) Sp Taber
Review of natural habitats and faunas. Wildlife diversity and abundance in relation to range management, forest management, agricultural land management, wetlands; and in relation to human population growth and engineering developments (cities, highways, airports, dams, etc.), wildlife diversity and development. Prerequisite, 350 or permission.

WLF S 404 Biology and Conservation of Mammals (4) W Manuwal
Major principles of mammalian population biology, reproductive biology, ecology, and conservation strategies for mammals of all categories. Laboratory and field trips are required, and students may be asked to share travel costs. Prerequisites, 350, two quarters of college biology, and permission.

SCHOOL OF LAW

LAW 443 The Legal Process (6) S
Fletcher, Huston
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. Purpose of the course is to assist the students to understand the system of law and its functions in our society rather than to learn the substantive law pertaining to any particular subject or to any particular academic discipline. Offered on credit/no credit basis only.

LAW 444 Constitutional Freedom and American Education (3-4) max. 6 S Morns
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 the College of Education as EDEPS 444. Satisfactory/not satisfactory option available to nonlaw students only.

FIRST YEAR

LAW 500 Administrative Law IV (4) Section A, Sp Andersen, Tunks
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, a considerable portion of the course 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 501 Contracts (8) AWSp
Corker, Casway, Rieke
Principles that regulate the creation, operation, and extinguishment of the legal relation known as contract. The major subdivisions covered are mutual assent, consideration, conditions (express and constructive), performance, breach, damages, discharge, assignment, and beneficiaries. More limited coverage is accorded interpretation, the parol evidence rule, the statute of frauds and illegality. (Formerly 400.)

LAW 504 Civil Procedure (6) AW
Meisnerholder, Trautman
Fundamentals of procedure in civil litigation. The major subdivisions include jurisdiction of courts, venue, commencement of actions, pleading, parties, discovery and other pretrial devices, and trials. The effect of former adjudication may be discussed. (Formerly 410.)

LAW 512 Legal Research and Analysis (6) AWSp
Crooks, Dybdaw, Lynes, Rombauer
Integrated introduction to analysis, research, and writing as necessary components of legal practice. In the introductory phase, how to study law including briefing, basic decision analysis, synthesis of decisions, and problem-solving elements are discussed. The next phase continues a more intensive introduction to basic research tools through instruction in legal bibliography. Students integrate their research, analysis, problem solving, and writing skills through preparation of office memoranda or exercises in drafting or preparation of memoranda for lower courts. In the final phase, students prepare appellate briefs and argue orally before a moot appellate court. (Formerly 416.)

LAW 514 Property I (8) AWSp
Cross, Dybdaw, Proctor, Stockbuck
Ownership and transfer of realty and personalty. The course analyzes the legal relations of persons to things, from both a historical and a contemporary point of view. Specific subjects included are bailments, fixtures, leases, real estate contracts, deeds, the recording system, title insurance, and transfers of personal and real property. There is also a brief introduction to the law of nuisance and water rights. (Formerly 430.)

LAW 517 Torts (8) AW
Fletcher, Millar, Seawell
Liability for civil injuries arising from the intentional and unintentional interference with personal and property interests. (Formerly 440.)

LAW 518 Criminal Law (5) Sp
Hardisty, Junker
Definitions of principal crimes and defenses to criminal prosecution, both common law and statutory, along with a critique of these definitions in light of the actual roles and goals of criminal law practices in a democratic society.

SECOND- AND THIRD-YEAR ELECTIVES

LAW 502 Land Use Controls (3) W Hunt
Limitations imposed on the use of land, with primary emphasis on regulation by public action. Particular attention is devoted to the official map, the comprehensive plan, zoning (substance and procedure), subdivision regulation, urban redevelopment, and building and housing codes. Some attention also may be given to private restrictive covenants, such as the law of nuisance and running covenants.

LAW 503 Associations I (3) A Tunks
Introduction to law relating to association in business and its nonprofit analogues through agency, partnership, other unincorporated forms of business enterprise. Emphasis is on the legal, financial, and tax factors bearing upon the type of structure to be selected for 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 also serve as a foundation for further study in such areas as business or nonprofit group behavior.

LAW 505 Corporations VI (6) AW
Kummert
Basic corporation law and practice. The course covers state law provisions and common contract arrangements governing the formation of corporations; the allocation of control, profit, and risk among the constituents of the corporation; the financing of corporations through the issuance of debt and equity securities; the duties of officers, directors, and controlling shareholders; the rights of shareholders; corporate and shareholders' litigation; mergers, sales of assets, and other fundamental changes in the corporate structure. Emphasis is placed on the "federal corporation law" evolving out of the SEC proxy rules and Rule 16-b-5.

LAW 506 Corporations IV (4) Sp
Jorisch, Price
A shorter version of 505.

LAW 507 Business Planning (6) AW
Kummert
Advanced work in corporations and federal taxation in the context of business planning and counseling. Examination is made of a series of problems involving common business transactions and presenting corporate and tax issues for analysis and resolution. The prob-
lems covered include such topics as the formation of corporations, both closely held and publicly owned, stock redemption, the sale and purchase of businesses, mergers and other forms of acquisition, and recapitalization, dissolv-
tion, and dissolution of corporations. Prerequisite, 505 or 506. Students normally should complete 532 before taking 507. With permission of the instructor, however, students may take the necessary tax course concurrently with 507.

**LAW**

**508 Securities Regulation (3) Sp**

Hunt

Legal controls over the issuance and distribution of corporate securities with primary emphasis on federal regulation: registration and distribution under the Securities Act of 1933; regulation of trading under the Securities and Exchange Act of 1934; regulation of investment companies under the Investment Company Act of 1940; regulation under state Blue Sky laws. Prerequisite, 505 or 506. (Not offered every year.)

**LAW**

**509 Federal Courts and the Federal System (4) Sp**

Chisholm

Study of the role of the federal courts in the operation of the federal system. The course is planned as an advanced course in public law and judicial administration, presupposing a foundation in constitutional law, criminal procedure, and administrative law. Prerequisite, 520. May be taken concurrently with section B of 520.

**LAW**

**510 Legal Problems Relating to Women (3) Sp**

Dybwad

Includes an examination of existing bases for attacking unjustified discrimination against women (e.g., the equal protection clause, the Ninth Amendment, the Civil Rights Act of 1964, EEOC guidelines under the Civil Rights Act, federal antidiscrimination statutes and executive orders, the Washington equal employment statute) and of the vehicles by which unjustified discrimination against women might best be attacked (constitutional amendment, court actions, etc.). Selected problems with respect to discrimination under state and federal statutes and regulations are examined with a view to identifying unjustified discrimination, the legal processes by which change might best be effected, and the possible impact of required changes in reverse discrimination (laws discriminatory against men, for the benefit of women). (Not offered every year.)

**LAW**

**511 Individual Rights From a Purveyor State (3) S**

Tanks

Focus on the legal problems of persons entitled to governmentaly supplied housing, goods, or services.

**LAW**

**513 Law and Psychiatry (2) A**

Haridy

Study of the standards and procedures (1) for the voluntary and involuntary civil commitment of persons who are mentally disordered, (2) for the involuntary commitment of persons who are incompetent to stand trial because of a mental disorder, and (3) for the involuntary commitment of persons found not guilty because of insanity. The course also considers what legal devices, if any, are desirable to provide supervision of the administration of mental hospitals.

Both legal and nonlegal materials bearing on these problems are considered.

**LAW**

**515 Law of Political Parties (3) S**

Price

The common law of political parties and the statutory and constitutional provisions and principal judicial decisions dealing with the qualifications of candidates and electors (e.g., citizenship, residence, age, literacy, race, and property ownership); processes for the selection of party candidates; ballot propositions and reporting and similar topics. Some of the problems involved in redistricting in accordance with the one-man-one-vote principle may also be examined. Open to law students; offered on credit/no credit basis for nonlaw students only. (Not offered every year.)

**LAW**

**516 Commercial Transactions V (5) WSp**

Cowsey, F. W. Smith

Payment, financing, and other problems in the distribution of merchandise, real, personal property, and storage of goods, as well as commercial paper, including notes, drafts, and checks, are studied. Emphasis is given the Uniform Commercial Code.

**LAW**

**519 Negotiation: Dispute Settlement and Planning (3) Sp**

Lyness

Study of the negotiation process and its interrelationship with litigation and counseling. The materials used include actual case histories of settlements negotiated with respect to such matters as personal injuries, property distribution in contested divorces, will contests, contract disputes, and the like. Readings include selections from work on social psychology and studies of small-group behavior. Negotiation between paired students on various problems is included to simulate development of the skills inherent in the process and the familiarity with the pressures the process generates.

**LAW**

**520 Constitutional Law VIII (8) Section A, AW; Section B, AWSp**

Corker, Fletcher

Principles of constitutional law under the United States Constitution as they relate to the scope of, and limitations on, the powers of state and national governments in dealing with matters of life, liberty, and property. Federal-state relationships and the constitutional role of the courts are also analyzed.

**LAW**

**521 Economic Analysis of Law (3) S**

Andersen

Introduction to exploration of the applicability of general economic methodology to the analysis of a wide variety of legal subjects, including contracts, property, criminal law, government regulations, taxation, wealth transmission, federalism, and the legal process. No prior background in economics necessary.

**LAW**

**523 Evidence III (3) Sp**

Gallagher

Selected rules of evidence analyzed, with emphasis on the hearsay rule and its exceptions.

**LAW**

**524 Contemporary Maritime Law Problems (2) Sp**

Roddit

Conducted by Seattle practitioners, this course deals with current maritime problems on a practical basis, contrasted with the more theoretical treatment in 550. It deals with a broad spectrum of problems (e.g., shipping documents, safety at sea, pollution, multinational organization, federal regulation, marine insurance, port facilities, maritime litigation, and the impact of various courts). (Not offered every year.)

**LAW**

**526 Equitable Remedies III (3) Sp**

Seewell

Basic substantive and procedural rules developed and applied in equity. Emphasis on issues arising out of the formulation, modification, and enforcement of an equitable decree. Procedural devices developed in equity for managing multiparty litigation and for hastening the determination of rights also considered.

**LAW**

**527 Contemporary Problems in Copyrights, Patents, and Trademarks (3) Sp**

Gallagher

Introduction to the federal laws of copyrights, patents, and trademarks and their relation to unfair competition doctrines under state law. Taxation, licensing, and litigation aspects are considered. Contemporary issues examined include photocopying, CATV broadcasting, computer programs, and franchising. (Not offered every year.)

**LAW**

**528 Public International Law (3) S**

Hjorth

International law as a process of decision: recognition and diplomatic intercourse; allocation of international resources; agreements between states; jurisdiction. (Not offered every year.)

**LAW**

**529 Natural Resources (3) S**

Corker

Legal problems of water use and environmental problems. Riparian and appropriation systems; evolution of administrative controls; changing relationships of local, state, and federal governments; interstate compacts. (Not offered every year.)

**LAW**

**531 Federal Income Taxation III (3) WS**

Hjorth, Kummert

Survey of the basic structure of federal income taxation undertaken in the context of planning personal and commercial 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.

**LAW**

**532 Federal Income Taxation VI (6) AW**

Hjorth, Tunks

Study of the nature of income and the gross income concept; statutory exclusions from income; personal deductions; business deductions; income splitting through trust and nontrust arrangements; special provisions for the treatment of gains and losses in respect to capital assets; partnership taxation; and the basic provisions relating to corporate income tax treatment. Procedural rules and the principal accounting devices are examined.
The coastal zone has three main physical components—the sea, the seabed, and the uplands. Legal questions arise with respect to the outer boundaries of the zone and the lines separating the components (e.g., whether an area is within state or federal jurisdiction, whether a resource is publicly or privately owned). The potential uses of resources within the zone are varied and often incompatible, and subject to a broad range of decision-making bodies and techniques. Consider the uses of the coastal zone, who the decision makers are, how their decisions are made, and how they are implemented. Because Washington's law is relatively well formed, it often is possible to consider specific questions in the Washington context without risking provincialism.

LAW 551 Community Property (3) A Cross
Dealing with all aspects of community property, including what constitutes community property as distinguished from separate property. The course may be offered every year. (Not offered every year.)

LAW 552 Comparative Law (3) W
Topics are those deemed most useful to American lawyers seeking a career specialty: brief history of Japanese law and reception of Western common law; constitutional framework, with emphasis on the judicial power and courts; the training and roles of the bench and bar; elements of the Japanese codes as a system, with emphasis on the Code of Civil Procedure, Civil Code, and Commercial Code, and the relationship between them and between these general codes and the vast bulk of special statutes. Enrollment limited at the discretion of the instructor. Japanese language proficiency not required.

LAW 556 Legal History (3) W
In-depth study of selected episodes important to the development of the Anglo-American legal system. Such episodes include, among others, the development of the system. English seventeenth-century constitutional struggles, the role of legislatures in the formation of American law, and the development of education in America. Especially in dealing with English affairs, readings are assigned in basic historical source material. The primary objective of the course is to give a perspective on the legal system, and a secondary objective is to develop familiarity with legal history research materials. (Not offered every year.)
during the session (unless confidential); (2) an analysis of the experience; (3) a detailed report on some particular aspect of the legislative process and how it might be improved. (Not offered every year.)

**LAW**

**555 Creditor-Debtor Law (4) W**  
*F. W. Smith*
Principal rights and remedies of unsecured creditors, individually and collectively. Among matters discussed are judgments and judgment liens, executions, attachments, garnishments, fraudulent conveyances, compositions, assignments for the benefit of creditors, and debtors' examinations. Bankruptcy emphasized. Strongly recommended that student has taken or is currently taking 538.

**LAW**

**556 Criminal Procedure VI (6) AW**  
*Junker*
State and federal rules of criminal procedure, including the constitutionally derived procedural rights of those accused of crime.

**LAW**

**558 Death and Gift Taxation (3) A**  
*Huston*
Federal and state death and gift tax systems. The majors subdivisions covered include basic application of death and gift taxes, transfers subject to both, and the application of death and gift taxes to joint interests, community property, and life insurance. Territorial jurisdiction to impose these taxes is considered, as are the various components of the tax liability and the valuation for tax purposes of property transferred.

**LAW**

**559 Domestic Relations (3) Section A, A; Section B, W**  
*Hardisty, Rieke*
Law pertaining to marriage, protection of the marital relation, disintegration of the family relation, divorce, adoption, and legitimacy. Washington law is emphasized, with comparisons being made to the law of other jurisdictions. Consideration is given to related problems such as conflict of laws, jurisdiction, procedure, costs, alimony, support, property division, custody, and modification of orders and their enforcement.

**LAW**

**560 Estate Planning Workshop (3) W**  
*Price*
The 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. The course includes a consideration of selected provisions of the federal income, estate, and gift tax laws and the analysis of problems. Prerequisites, 555 and 558.

**LAW**

**561 Evidence (5) AW**  
*C. Z. Smith*
Scope and function of rules of evidence analyzed in the context of trial practice. Major problems covered include examination of witnesses, some particular exclusion of evidence, competency of witnesses, privilege, relevancy, demonstrative evidence, hearsay and its exceptions, authentication of writings and the best evidence rule, burden of proof and presump tions, judicial notice and the parol evidence rule. Emphasis throughout is laid on trial evidence and trial problems.

**LAW**

**562 Juvenile Courts (3) W**  
*Hardisty*
The following aspects of the juvenile justice system are covered: philosophical bases, criminal and noncriminal delinquency jurisdiction, neglect and dependency jurisdiction, constitutional procedural safeguards, police investigation, case intake, preliminary screening, detention, waiver of juvenile court jurisdiction, hearing and corrections. (Not offered every year.)

**LAW**

**563 Government Regulation of Business (5) WSp**  
*Armitage*
Control of economic activity by attempts to encourage and maintain competition. The law of antitrust is studied and contrasted to government ownership and direct supervision. Particular attention is given to monopolies, restraints of trade, mergers, and price discrimination. Emphasis on statutory interpretation, including Sherman Act, Clayton Act, Robinson-Patman Act, and Federal Trade Commission Act. Preservation of competition is examined as the fundamental national economic policy.

**LAW**

**564 Insurance (3) A**  
*Roddis*
Legal principles governing formal mechanisms for the distribution of the risk of loss. Primary emphasis on property and casualty and life and disability insurance. Areas considered include insurance marketing, the principle of indemnity, insurable interests, amount of recovery and subrogation, persons and interests protected, the risk transferred by insurance, rights at variance with policy provisions. Some attention also given to existing insurance institutions, the selection and control of risks, reinsurance, and governmental regulation of the insurance enterprise. (Not offered every year.)

**LAW**

**566 Jurisprudence and Legal Philosophy (4)**  
*Markwell*
Introduction to legal philosophy. The coverage in this course varies each year. Some of the traditional schools of jurisprudence as represented by selected authors are considered, and usually there is an analysis of the method and aims of jurisprudence in light of recent writings. Occasionally the course focuses on one or two legal concepts. Enrollment limited to ten students.

**LAW**

**567 Labor Law (3) A**  
*Chisum*
Labor problems preceding the establishment of a collective bargaining relationship. More specifically, the course is concerned with the relationship of the individual employee with the union and the organizational rights of the employee and the union. Included is a coverage of the economic weapons available to parties to labor disputes. Since this background provides the basis for understanding the bargaining process in which the parties engage, it is desirable that this course be taken by students who plan to take 568. It is also recommended that students taking this course first take either 500 or 501.

**LAW**

**568 Labor Relations (3) W**  
*Peck*
Processes of collective bargaining. Included is a coverage of the statutory duty to bargain and problems that arise under specific contract clauses. Administration of the contract is also the subject of lengthy discussion. Because an understanding of the limitations on the economic weapons available gives meaning to the bargaining processes, it is desirable that students taking this course have taken 567 and recommended that they take either 500 or 501. (Not offered every year.)

**LAW**

**569 Professional Responsibility (1) Sp**  
*Hunt*
Selected problems arising under the Code of Professional Responsibility: maintaining the integrity and competence of the legal profession; making legal services available; preventing unauthorized practice of law; preserving clients' confidences and secrets; exercising independent professional judgment; representing a client competently and zealously within the bounds of the law; improving the legal system; and avoiding professional impropriety.

**LAW**

**570 Workshop in Legislation (4) WSp**  
*Johnson*
Each student selects a bill or group of bills then pending in the state Legislature and prepares a research paper around that bill or group of bills. The class makes group field trips to Olympia. Individual students are urged to attend legislative hearings in connection with their selected bills and to interview legislators, lobbyists, and others. The class meets to discuss background materials from a standard casebook and to go over individual projects. No final examination is given. The grade depends on the report noted above. The report should cover the origin of the proposed legislation, the lobbying groups for and against it, the soundness of the approach, a section-by-section analysis, statutory drafting, and constitutional questions. Enrollment is limited to fifteen students.

**LAW**

**571 Local Government Law (3) A**  
*Sp

Legal problems encountered in the conduct of government at the local level (e.g., cities, counties, school districts, and other specialized units of government). The course examines the general organization and powers of local government units and the intergovernmental relations between local and federal, local and state, and the different levels of government. There is some specialized consideration of problems in the areas of police power regulation, special assessments, borrowing, public expenditures, contracting, and tort liability. (Not offered every year.)

**LAW**

**572 Private Land Development (3) W**  
*Steinbeck*
Emphasis is on the problems encountered by a lawyer representing developers of land for commercial use, such as a retail shopping center. Some attention is given to the development of land, such as subdivisions, for housing purposes. Problems considered include, among others, financing, choice of developing entity, commercial leases, platting, and those of "over-promoting." (Not offered every year.)

**LAW**

**573 Workshop in the Legal Rights of Prisoners (1) (*) WSp**  
*Chisum*
Workshop on the legal rights of prisoners and the procedures for protecting them. Areas cov
course, but an alternate course to 523 and 561 on the basic subject matter.

LAW 586 International Legal Order (3) W Prost

Consideration of the function of public international law in conflict resolution and in creation of "minimum world order," in relation to a series of specific problems: arms control and disarmament (nuclear test ban, nonproliferation and biological weapons treaties), Cuban missile crisis, and the civil war in Cyprus. This is done against a broader background of analytical materials on the causation and prevention of large-scale lethal violence.

LAW 587 International Law of the Sea (3) A Burke

Examination of the way nation-states regulate activities on and under the ocean. The course covers the international regulations and institutions concerned with fishery exploitation, pollution, transit rights, scientific research, fuel and nonfuel mineral development, and the boundary issues involved in these various ocean uses.

LAW 588 Workshop in Land-Use Planning Law (3) W Hunt

Workshop in selected problems of land-use controls, with specific reference to planning, zoning, and subdivision regulations. The emphasis is on the interrelationship of the respective roles of lawyer and planner in the planning process. Certain concepts, problems, practices, and procedures are discussed in depth, and several short written memoranda are required. Open to second- and third-year law students and to applicants for a graduate degree in urban planning. Enrollment limited at the discretion of the instructor. (Not offered every year.)

LAW 590 Corporate Income Tax (3) Sp Bjorndahl

Study of the tax consequences of conducting business in corporate form, with consideration of such items as the formation of corporations; distributions of dividends; complete and partial liquidations; stock redemptions; stock dividends; and corporate acquisitions, divorisions, and reorganizations. Special problems arising from distorted capital structures and unreasonable accumulations of earnings, and special treatment of personal holding companies, collapsible corporations, and corporations electing to be taxed as partnerships are also discussed.

LAW 591 International Utilization and Management of World Fisheries (3) Sp Burke

Existing and expected utilization of living marine resources (including mammals), the source, intensity, and details of management problems, and the legal framework and specific arrangements devised to cope with such problems on a worldwide basis. (Not offered every year.)

LAW 593 Social Legislation (3) Sp Romback

Consideration of major problems arising under selected income maintenance legislation, including the Fair Labor Standards Act, workmen's compensation, and the Social Security Act (unemployment compensation, "insured" retirement and disability benefits, and public assistance for the aged, the disabled, and families with dependent children), with special emphasis on public assistance legislation.

LAW 594 Transnational Tax (3) Sp Hjorth

United States taxation of foreign income and tax treaties; concern mainly with tax problems of American investors and businessmen who have investments, other income-producing property, and business operations abroad. Prerequisite, 531 or 532. (Not offered every year.)

LAW 600 Independent Study or Research (*) AWSp

Qualifies students, with the consent of a member of the law faculty and the Dean, to receive from 1 to 6 credits for independent study in any of the major fields covered by the curriculum.

LAW 605 Research and Writing (*)

Alternative to satisfy the research and writing requirement for graduation, in addition to offerings presently designated as six-hour seminars.

SEMINARS

LAW 613 Corporate Finance and Investment Regulation Seminar (6) AWSp Chisholm, Staff

Examination of problems in the area of corporate finance and the regulation of securities sales and securities trading markets. Selected readings and one or more research papers required.

LAW 614 Criminal Procedure Seminar (6) AWSp Junker

A critical study of the criminal law and related processes at various stages from detention to appeal, including a study of state and federal rules of criminal procedure, and the constitutionally derived procedural rights of persons accused of crime or other deviant behavior. Possibilities for research include field studies of enforcement practices and studies of the procedure in "quasi-criminal" proceedings involving juveniles, paroles and probationers, alleged mental incompetents, and other persons subject to a loss liability based on a violation of official norms. Enrollment limited to eight students. Prerequisites, 556, 520.

LAW 615 Indian Legal Problems Seminar (6) AWSp Johnson

Students in this seminar may choose topics for research that concern Indian tribal laws, con-
LAW

'ricts of laws between Indian and non-Indian laws, federal laws concerning Indians, or state laws concerning Indians. A major piece of re-
search and writing is required.

LAW 616 Federal Court Seminar (6) AWSp
Jeziensky
Selected topics in the structure, function, and power of federal courts. Problems not covered in depth in federal courts and the federal system are considered. Primary emphasis is placed on individual research in the production of a written paper. Enrollment limited to eight third-year students.

LAW 617 Federal Tax Policy Seminar (6) AWSp
Meisenhelder
Intensive examination of the substance of limited areas of federal tax law and the policy underlying that law. Different aspects of federal tax law, such as the tax treatment of exempt organizations, taxation of capital gains, problems of income splitting, etc., are considered each year. The seminar focuses upon individual research and writing, and upon the mutual examination and discussion of the research efforts of the group. Enrollment limited to eight third-year students. Prerequisite, 531 or 532.

LAW 622 Consumer Protection Seminar (6) AWSp
F. W. Smith
Examines selected problems in consumer protection, including those arising from the use of consumer credit, the dissemination of credit information, fraudulent and deceptive practices, and those related to health and safety protection. Consideration is given to methods of providing protection, such as existing legislation of the proposed Uniform Consumer Credit Code, and consumer education. Each student is expected to produce a high-quality paper.

LAW 623 Natural Resources Seminar (6) AWSp
Coker
Selected legal problems relating to natural resources. Problems are chosen from among those relating to (1) water allocation; (2) environmental impacts of electric power generation by (a) fossil fuel, (b) nuclear, (c) nuclear energy. Preference in enrollment given to those who have completed 574 and to those who will complete that course during the year. (Not offered every year.)

LAW 624 Ocean Resources Seminar (6) AWSp
Morris
International law of the high seas, concerned with fisheries, mineral, and other resources of the continental shelf, navigation, and territorial waters; treaties and the law of international organizations as they relate to the resources of the sea. Special attention paid to the four conventions concerning the use of the high seas adopted at the Geneva Law of the Sea Conference of 1958. Enrollment limited to eight students and open to second-year students with permission.

LAW 625 The Supreme Court and the Constitution (4) AWSp
Browns
Concentrates upon the basic problems inherent in the relationship of the individual to authority and in the protection of political and civil rights including the rights of minority groups.

Current problems, as illustrated by recent or pending Supreme Court cases, are emphasized. Students are required to do substantial amounts of in-depth research, including, but not limited to, an isolation of the history of the doctrines involved, their relations to intellec-
tual endeavor in related areas, and an explication of alternative competing solutions to modern problems. The seminar, runs throughout the year, but there are times of recess to facilitate student preparation of a high-quality paper which, in turn, is thoroughly discussed by the seminar group, plus rewriting(s). Enrollment is limited to six second- or third-year students, with permission.

LAW 627 Selected Problems on Environmental Protection Seminar (6) AWSp
Durning
Examines legal problems resulting from impairment of the environment by technological advances and urban growth. Various issues, including air and water pollution, the use of pesticides, protection of wildlife, and transportation are considered. Special emphasis on examining the utility of litigation as an instrument for assuring protection of the environment. Pending cases are examined. The current and political and legal efforts of groups such as the Sierra Club and the Washington Environmental Council are also considered. Experts in various fields are invited to participate.

LAW 628 Problems in Urban Government and Finance Seminar (6) AWSp
Andersen
An opportunity to explore in depth selected legal problems arising from our efforts to govern urban areas and to finance the services they require. More specific subject matter coverage is contained in course descriptions for 575 and 577. Prerequisite, 571 or 575.

LAW 631 Human Ecology Seminar (6) AWSp
Rieke
Selected problems drawn from such areas as poverty, welfare, health, or correction programs. Emphasis on the relation of a non-legal system and the legal system with respect to specific problem (e.g., medicine and law related to the law of society and the law related to child abuse; parole board opera-
tion and law related to deviancy; community organization and law related to "model city" structure, etc.) in order to evaluate interaction. It is anticipated that students will work with materials from one discipline other than law. Students are expected to develop the requisite personal contacts with professionals or students in such other disciplines. Joint research with a graduate or professional student in another discipline is welcomed.

LAW 633 Donative Transmission of Wealth Seminar (6) AWSp
Sehgal
Studies the adequacy with which modern law facilitates the donative transmission of wealth, effectuating the reasonable wishes of the donor, providing for the needs of the immediate family, meeting the reasonable expectations of family and others as to the donor's property, and satisfying other demands of society. Inci-
dent to that study, it considers the relative availability of various types of property to the reach of creditors, of taxing bodies, and of other claimants, and the cost and adequacy of the various mechanisms by which donative trans-
mission is effected. Specific topics may include an intensive study of parts of the Uniform Pro-
bate Code, the Probate Code, and other statutory pat-
terns and may also include the preparation of proposals for comprehensive statutory treat-
ment of various subjects. The seminar presup-
poses a basic knowledge of wills, trusts, and future interests, some knowledge of the wealth transmission aspects of various forms of prop-
erty ownership and of certain contractual rela-
tionships such as insurance, and at least a modest acquaintance with federal estate and gift taxation. A paper is required. Prerequisite, 533; 551 and 558, which may be taken concur-
cently, recommended. (Not offered every year.)

LAW 635 International Legal Order Seminar (6) AWSp
Prosterman
Focuses on the international legal context, especially bilateral or multilateral foreign-aid mechanisms, which promote or inhibit democ-
itary, and to insularity defenses. The primary objective is the production by each student of a high-quality paper resulting from research, writing, and rewriting. Experts in various fields are invited to participate in the seminar. Enrollment limited to eight second- or third-year students. Prerequisite, 513, which may be taken concurrently.

LAW 638 Estate Planning Workshop (6) AWSp
Price
Supplement to the Estate Planning Workshop, which is problem or practice oriented. In the seminar, some of the problems taken up in the workshop are subjected to an advanced analysis (e.g., estate and gift taxes, probate law, trust law, and related problems), including the special problems of migratory clients (i.e., those who came to community property states from "community property states" and vice versa). Their problems are considered in light of the existing law (including Cal. Probate Code sec. 201.5) and proposals made for legislation in common law states. Seminar papers are based on traditional research and, possibly, directed empirical re-
search. Prerequisite, 533; 532 and 558, which may be taken concurrently, recommended. (Not offered every year.)

LAW 640 Land Use Controls Seminar (6) AWSp
Hunt
Preparation of a series of papers on state land use control programs and proposals, with par-
ticular emphasis on the efforts of the Wash-
ington State Land Planning Commission.

LAW 641 Federal Tax Seminar (6) Hjorth
Intensive examination of selected areas of federal taxation. The student is expected to
prepare a high-quality paper. Enrollment limited to eight third-year students who have had 590 or by permission.

LAW 642 Race, Racism, and American Law Seminar (6) AWSp Swisher
In-depth view of that body of law that has been developed as a result of attempts to resolve racial inequities through the legal process. Explanation of statutory and common law approaches to alleviating racism, focusing on the strengths and weaknesses of such an approach.

Postgraduate Courses

LAW 545 Legal Analysis and Research for Students Not Trained in the Common Law System (4) AW Rombauer
Integrated introduction to legal analysis, research, and writing for students trained in a non-common-law system. Papers on two or three major research projects are required. This course is for graduate students who have already attained a professional standing in law, but who require experience in using American law sources.

LAW 548 United States-Japanese Tax Problems (4) Sp Huston
Operation of the income-tax laws of Japan on income earned in Japan by American nationals and on income earned in the United States by Japanese nationals; and with 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.

LAW 549 United States-Japanese Administrative Law Problems (3) W Swisher
Course is concerned with selected administrative law problems, discussed comparatively in terms of Japanese and United States law. Especially emphasized are the legal principles that govern the procedural and decision-making aspects of the administrative process, the Japanese concept of "administrative guidance," and the possibilities that gaps between theory and practice may exist. (Not offered every year.)

LAW 596 Justiciability Under the Civil Law and the Common Law (4) A Henderson
Problems of justiciability in the transnational setting, with particular emphasis on the differences between civil law and common law. Considered are the potential and limitations in litigation, arbitration, and conciliation in transnational transactions; problems about the legal status of aliens; functions of bureaucracies in private transactions.

LAW 597 United States-Japanese Contract and Sales Problems (4) A Swisher
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. (Not offered every year.)

LAW 598 United States-Japanese Corporate Relations (4) S
Corporate law problems with emphasis on trans-Pacific business planning, and United States-parent, Japanese-subsidiary problems.

LAW 600 Independent Study or Research (*)
A major research project required in lieu of a master's thesis. In the case of a student whose basic training was in a civil law jurisdiction, the subject matter of the research is a topic of common interest in his or her country and in the United States. The emphasis is on the United States law and practice. The discussion is comparative. In the case of a student whose basic training was in a common law jurisdiction, the subject of the research is a topic of common interest in his or her country and in the country of his or her Asian language competence. The emphasis is on the law and practice of the Asian country (Japan or Republic of China). Discussion is comparative.

LAW 620 Tutorial in Japanese Law (6) AWSp Henderson, Staff
Individual research project handled on a tutorial basis, involving an area of law of mutual interest to student and teacher. In the case of a student whose basic training was in a civil law jurisdiction, the subject matter of the tutorial is a topic selected from the law and 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 practice of Japan or of the Republic of China, 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 700 Master's Thesis (*)

LAW 800 Doctoral Dissertation (*)

SCHOOL OF LIBRARIANSHIP

Permission of the Director of the school is required for all librarianship courses.

LIBR 440 Libraries and Society (3)
Lieberman
Introduction to the principal types of libraries and to issues and trends in modern librarianship. A prerequisite to graduate courses in librarianship.

LIBR 441 Basic Library Materials (3)
Nelson
Presentation of the materials, book and non-book, which form the sources of reference for the informational function of the library. A prerequisite to graduate courses in librarianship.

LIBR 442 Book Selection (3)
Nelson
Basic principles of book selection applicable to library work. A prerequisite to graduate courses in librarianship.

LIBR 443 Organization of Library Materials: Theory and Practice (3)
Page, Soper
Current problems and practices in the organization of recorded information, including an introduction to principles of classification and cataloging. A prerequisite to graduate courses in librarianship.

LIBR 450 Library Materials for Teachers (3)
Ahlers
The evaluation and use of various types of instructional materials in teaching, with emphasis on the role of the library program in implementing the curriculum. Not open to librarians or education minors in librarianship.

LIBR 451 Survey of Children's Literature (3)
Benne, Shaw
Designed for educators, librarians, and others interested in the selection and utilization of children's books for family, school, and library enrichment.

LIBR 452 Storytelling (3)
Shaw
Exploration of the history of storytelling, its development as an art form and the materials used by storytellers in the past and present. Study of essential techniques necessary to select, prepare, and present stories and poetry for various groups and situations.

LIBR 453 Literature for Young Adults (3)
Ahlers
Reading and appraisal of literature appropriate to the needs, interests, and abilities of young adults. For the general student as well as the librarian and teacher.

LIBR 454 Administration of the School Library Media Center (3)
Ahlers
Role of the librarian as a media specialist and the library as a media center, with emphasis on the program of services and management techniques.

LIBR 465 Hospital and Institution Libraries (3)
Ahlers
Orientation in the field: organization and techniques that apply to different types of hospitals, institutions, and public library extension services. Special emphasis on bibliotherapy and the library's contribution to rehabilitation. (Not offered every year.)

LIBR 470 History of the Book (3)
Skelley

LIBR 476 Archival Management (3)
Ahlers
Lectures and demonstrations in archival administration, organization of manuscript collections, and study of the principles and techniques em-
played by state archival and historical institutions.

**LIBR 480** Supervision of Public School Library Systems (3) Ahlers
Designed to aid school personnel in the administration and supervision of district-wide school library programs; emphasis on problems involved in the organization and development of library systems.

**LIBR 491** Documentation (3) Page, Soper
Various means of recording, organizing, locating, and duplicating informational materials. Emphasis on practical methods of the documentation cycle.

**LIBR 496** Library Analysis (3)
The library as an object of study. Introduction to some concepts and notation of systems analysis, with application to libraries.

**LIBR 497** Computers and Libraries (3) Mignon
Development of computers and their role in libraries. Introduction to library automation.

**LIBR 498** Introduction to Document Retrieval Systems (3) Mignon
Introduction to computer-based information storage and retrieval systems for collections of documents. Design sequence including: goals, specifications, functional components, measures of performance, and evaluation. Prerequisite, 497 or permission.

**LIBR 502** Library Organization and Administration (3)
Study of public and academic library service, including a consideration of legal structure; finances and statistics; buildings and equipment; personnel; public relations; and other phases of library management. The extension of library service is also considered.

**LIBR 509** Directed Field Work (2-4) Lieberman
Four weeks of professionally supervised field work in various types of libraries.

**LIBR 513** Government Publications (3) Nelson
Government publications of the United States and foreign countries, their acquisition, organization, and use.

**LIBR 514** The Library and Audio-Visual Materials (3) Lieberman
Types, cost, utility, and characteristics of modern sensory aids employed in communicating ideas; organization for handling films, filmstrips, recordings and transcriptions, slides, pictures, exhibits, and similar materials in the library; experience in operating various types of equipment; techniques in extending the use of audiovisual materials by community groups; sources of information about materials and equipment. Prerequisite, EDCAI 480, 481 or equivalent.

**LIBR 515** Bibliography Library Materials in the Humanities (3) Nelson, Skelley
Examination of national and international problems of bibliographic control. Study and evaluation of library resources in the humanities. Prerequisite, 441.

**LIBR 516** Library Materials in the Social Sciences (3) Nelson, Skelley
Study and evaluation of library resources in the social sciences, with attention to information problems peculiar to these fields. Prerequisite, 515.

**LIBR 517** Library Materials in Science and Technology (3)
Study and evaluation of library resources in the natural and physical sciences and in technology. Attention is given to the special characteristics peculiar to library materials in the sciences. Prerequisite, 515.

**LIBR 535** Organization of Library Materials: Comparative Methods (3) Page, Soper
Consideration of current practices in technical services and a critical study of comparative methods of classification, subject analysis, and descriptive cataloging. Prerequisite, 443.

**LIBR 536** Organization of Special Library Materials: Monograph, Serial, and Nonbook (3) Page, Soper
Considers problems of organizing certain monographs, serials and nonbook materials in various types of libraries. Includes descriptive and subject cataloging, physical arrangement, and new developments in technical services as they affect these materials. Prerequisite, 535.

**LIBR 537** Library of Congress Classification (3) Page, Soper
Extensive consideration of the basic principles of Library of Congress classification and subject headings. Emphasis is on theory and practice in the use of the scheme. Prerequisites, 443, 535.

**LIBR 540** Advanced Legal Bibliography (2) Gallagher
Bibliographical data and use of federal and state law reports and statutes; quasi-legal and commissioners' reports of the states; bar association records, legal periodicals, indexes and digests, and cooperative bibliographies of law collections.

**LIBR 541** Selection and Processing of Law Library Materials (4) Gallagher
Aids to selection, processing, microphotography of legal material, etc.

**LIBR 543** Law Library Administration (5) Gallagher
Staff, patrons and public relations, circulation, architecture, book arrangements, equipment, rules, publicity, publications, budgets, reports, professional societies, regional service.

**LIBR 550** Library Materials for Children I (3) Benne
Introduction to materials for libraries serving children with emphasis given to literature, criteria used in evaluation, and approaches and problems in selection.

**LIBR 555** Public Library Service for Children (3) Benne, Shaw
Administration of children's departments in public libraries; planning and promoting programs and services; evaluation of library collections; community and professional roles of the children's librarian. Prerequisite, 451 or 550.

**LIBR 554** Library Materials for Children II (3) Benne, Shaw
Current and contemporary book and nonbook materials, focusing upon the re-evaluation of classic and standard titles, social changes and trends affecting form and content, and the international influences on literature for children. Prerequisite, 451 or 550.

**LIBR 560** Seminar In School Library Media Programs (3) Ahlers
Problems and trends that affect the school library media program are considered in group discussion and independent study. Prerequisite, 454 or equivalent. (Formerly 485.)

**LIBR 590** Special Topics in Librarianship (3)
Seminar dealing with various topics in librarianship. Offered by visitors or resident faculty. Topics of changed from quarter to quarter. May not be offered every quarter. May be repeated for credit. Prerequisite, permission.

**LIBR 599** Methods of Research in Librarianship (3) Mignon
Introduction to research methods commonly used in library and information science. Emphasis on problem selection, study design, data interpretation, and dissemination of results.

**LIBR 600** Independent Study or Research (*)

**LIBR 700** Master's Thesis (*)

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**SCHOOL OF MEDICINE**

**ANESTHESIOLOGY**

**ANEST**

**480** Basic Anesthesia Clerkship (3) AWSpe Bonica
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; 2 weeks, full time. Limit: one to six students. All affiliated hospitals.
ANEST
481 Advanced Clerkship In Anesthesiology (6)
AWSpS
Bonica
Clerkship for students interested in some facet of anesthesiology or desiring greater exposure to anesthesia as a specialty. Individual programs can be arranged in the following areas: respiratory care, surgical anesthesia, obstetrical anesthesia, and pain clinic. Prerequisite, 480 or first two weeks on surgical anesthesia. (4 weeks, full time. Limit: one student in each area.) All affiliated hospitals.

ANEST
497 Anesthesiology Special Electives (*)
AWSpS
Bonica
By specific arrangement for qualified students, special clerkships, externship, or research opportunities can at times be made available at institutions other than the University of Washington. Faculty can advise students of possible opportunities. Students wishing to elect this course would obtain a "Special Assignment" form from the Dean's office at least one month before advance registration. Prerequisite, permission. (6 to 12 weeks.)

ANEST
498 Undergraduate Thesis (*) A WSpS
Bonica
By special arrangement. Time and credit to be arranged.

ANEST
499 Undergraduate Research (*) A WSpS
Bonica
Specific research problems relating to pulmonary, cardiovascular, renal, obstetric, and central nervous system functions, and their alteration by anesthetic techniques and agents. (6 weeks, full time. Limit: two students.)

BIOCHEMISTRY
BIOC
400 General Chemistry and Molecular Biology (5) S
Lectures and laboratory exercises dealing with the general principles of biochemistry and molecular biology. Designed for teachers of high school and junior college science. Laboratory exercises utilize equipment available, or potentially available, in high school laboratories. Prerequisites, general biology and organic chemistry.

BIOC
405 Introduction to Biochemistry (5) WSp
Introductory course in general biochemistry offered two times each year covering basic principles. Emphasis is placed on a broad understanding of the chemical events in living systems in terms of the metabolism and the structure-function relationships of biologically important molecules. This course does not fulfill the prerequisites for advanced courses in biochemistry (see 440, 441, 442). Prerequisite, organic chemistry or permission.

BIOC
408 Introduction to Biochemistry Laboratory (3) Sp
Laboratory exercises in general biochemistry for students in medical technology and other undergraduate students by permission. Prerequisite, 405, which may be taken concurrently.

BIOC
412 Medical Students' Laboratory (3) Sp
Bard
Content 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 medical students and others by permission. Prerequisites, Human Biology 414, 424 or equivalent and permission.

BIOC
415 Biochemistry Review I (1) A
Elective quiz section to clarify and amplify material presented in Human Biology 414.

BIOC
425 Biochemistry Review II (1) W
Elective quiz section to clarify and amplify material presented in Human Biology 424.

BIOC
440, 441, 442 Molecular Biology (3,3,3)
AWSpS
Davie, Fangman, Morris, Walsh
Interdisciplinary course in general biochemistry with a strong component in molecular biology designed for undergraduate students enrolled in the new curriculum in molecular and cellular biology and graduate students in other science departments. Prerequisites, Chemistry 337 or permission for 440; 440 for 441; 441 for 442; introductory physical chemistry recommended.

BIOC
444 Molecular Biology Laboratory (3) W
Bard
Laboratory projects and conferences designed to acquaint the student with many of the current techniques of biochemistry. All students perform certain basic experiments, but a number of optional experiments are available. Prerequisite, 440 or equivalent and permission.

BIOC
498 Undergraduate Thesis (*) A WSpS
For senior medical students. Prerequisite, permission.

BIOC
499 Undergraduate Research (*) A WSpS
Investigative work on enzymes, proteins, lipids, nucleic acids, protein biosynthesis, intermediary metabolism, physical biochemistry, and related fields. Offered on credit/no credit basis only. Prerequisite, permission.

Courses for Graduates Only

BIOC
520 Seminar (1-3, max. 9) A WSp
Seminar dealing with special topics in the field of biochemistry. May be repeated for credit.

BIOC
530 Advanced Biochemistry (3) A
Graduate-level discussion of the structure, function, and chemistry of proteins, control of enzymatic reactions. Prerequisites, a comprehensive course in biochemistry and permission.

BIOC
531 Advanced Biochemistry (3) W
Graduate-level discussion of the action of hormones, membrane structure and function, electron transport, oxidative phosphorylation, photosynthesis. Prerequisites, a comprehensive course in biochemistry and permission.

BIOC
532 Advanced Biochemistry (3) Sp
Graduate-level discussion of nucleic acid structure, RNA viruses including oncogenic viruses, RNA biosynthesis, protein biosynthesis, and eukaryotic cell cycle. Prerequisites, a comprehensive course in biochemistry and permission.

BIOC
540, 541, 542 Literature Review (2 or 3, 2 or 3, 2 or 3) A, WSp
Emphasizes critical evaluation of original articles in the literature. Coordinated with 440, 441, 442, and to be taken concurrently. For first-year graduate students in biochemistry and students of other science departments, with permission.

BIOC
560 Physical Biochemistry (3) A
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
574 The Biochemical Basis of Disease (2) Sp
Bonstein, 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 Human Biology 414, 424 or permission.

BIOC
583 Advanced Techniques in Biochemistry (3) W
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. Prerequisites, 441, 444, and permission.

BIOC
585 Nucleic Acids in Biochemistry (1) A WSp
Young
Weekly research conferences on the role of nucleic acid in biochemistry. Offered on credit/no credit basis only. Prerequisite, permission.

BIOC
586 Enzyme Regulation (1) A WSpS
Davie, Fischer, Gordon
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.

BIOC
587 Seminar on Animal Cell Membranes (1) A WSp
Hauschka, Keller, Nameroff
Weekly conference in which recent literature on animal cell membranes is discussed. May be repeated for credit. Prerequisite, permission.
BIOC 588 Current Topics in Molecular and Cellular Biology (1) AWSpS
Byers, Keller, Morris, Shapiro, Young
Critical evaluation of the biochemical literature in areas related to molecular and cellular biology. May be repeated for credit. Prerequisite, permission.

BIOC 589 Connective Tissue Macromolecules (1) AWSpS
Borst, Bock
Seminar designed to discuss current knowledge of the biochemistry and pathophysiology of fibrous proteins and other structural macromolecules. Prerequisite, 442 or Human Biology 414, 424 or permission.

BIOC 590 Proteins and Enzymes Seminar (1, max. 6) AWSpS
Neurath, Teller, Walsh
Weekly conferences on current research in proteins and enzymes. For graduate students in biochemistry. May be repeated for credit. Prerequisite, permission.

BIOC 591 Seminar on Protein Structures (1) AWSpS
Hermann, Jensen
Topics on the determination of protein structure by X-ray crystallography, and on relationships between structure and chemical properties in solution and in the crystalline state. May be repeated for credit. Prerequisite, permission.

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.

BIOC 594 Glycogen Metabolism Seminar (1) AWSpS
Fischer
Weekly conferences on research in glycogen metabolism. May be repeated for credit. Prerequisite, permission.

BIOC 595 Cell Surfaces and Cell Division (1) AWSpS
Shapiro
Weekly research conferences on the role of the cell surface in cell division and development. May be repeated for credit. Offered on credit/no credit basis only. Prerequisite, permission.

BIOC 596 Clinical Chemistry Seminar (1) AWSpS
Kaplan
Conference on research and development in clinical chemistry. For postdoctorals in clinical chemistry and graduate students with permission. May be repeated for credit. Prerequisite, permission.

BIOC 597 Plant Viruses Seminar (1) AWSpS
Gordon
The structure and mode of replication of plant viruses are discussed in detail. The effects of ultraviolet radiation on plant viruses and their component protein and nucleic acids are examined. May be repeated for credit. Prerequisite, permission.

BIOC 598 Seminar in Developmental Biology (1) AWSpS
Hausska
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.

BIOC 599 Seminar in Physical Chemistry of Polymers (1) Teller
Weekly conferences on current research in the physical chemistry of macromolecules. For graduate students in biochemistry. May be repeated for credit. Prerequisite, permission.

BIOC 600 Independent Study or Research (*)

BIOC 700 Master's Thesis (*)

BIOC 800 Doctoral Dissertation (*)

BIOENGINEERING
See Interschool or Intercollege Programs.

BIOLOGICAL STRUCTURE

B STR 350 Surgical Anatomy for Dental Students (4) Sp
Kashiwa
Dissection of oral cavity and related areas, emphasizing the location, relationships, and functions of anatomical structures pertinent to the practice of dentistry. Prerequisite, 340.

CONJ 400 Human Anatomy and Physiology (6 or 9)
(See Conjoint Courses.)

B STR 401 Gross Anatomy (2-6) A
Graney, Rosse
Lecture and dissection course in regional human anatomy: thorax, abdomen, pelvis, and perineum. For graduate students and medical students; others by permission. (Formerly 403.)

B STR 402 Gross Anatomy (3) W
Graney, Rosse
Lecture and dissection course in regional anatomy: upper and lower extremities. For graduate students and medical students; others by permission. (Formerly 402.)

B STR 404 Human Embryology and Development (3) A
Blundau
Lectures and laboratory demonstrations covering the development of the human embryo and fetus, with emphasis on abnormal development; special attention to problems of maturation, fertilization, and physiology of the gametes. For graduate students and medical students; others by permission.

B STR 411 Structure and Function (3-4) W
Eddy, Koehler
Introduction to the principles of cytological experimentation, including a survey of microscopic and other instrumental techniques. Emphasis is toward a detailed analysis of cellular architecture, particularly as it can be related to functional considerations and the dynamic behavior of cells. Cellular membranes, organelles, nuclear constituents, and organization are discussed. Laboratory optional. Prerequisite, permission.

B STR 412 Human Microanatomy (4) Sp
Roosen-Runge
Lectures and laboratory treating the specialized tissues and organs of the body from the microscopic and ultramicrorscopic points of view. Prerequisite, permission.

B STR 415 Histological Basis of Biomechanics (3) W
Lutfi, Prothero
Certain biological structures are specifically adapted to a biomechanical function. Examples include muscle, skin, and bone. The structure and the mechanical properties of selected biomechanical systems are studied. Prerequisites, Conjoint 400, Mechanical Engineering 340, or permission.
B STR
429 Neuroanatomy (3½) Sp
Lundeen
Comparative approach to the nervous system-
om-nanials, more particularly, priwates, in-
cluding man. Prerequisite, permission.

B STR
440 Special Toples in Dissection
(1-6, max. 6) AWSpS
Broderston, Graney, Kashiwa, Rosse
Guided dissection. Primarily for advanced med-
ical students. Prerequisite, permission.

B STR
475 Cellular Differentiation (4, max. 2) WSp
Nemeroff
Seminar in which students read and critically
discuss papers on the literature on cellular dif-
erentiation. The first part of the course covers
basic cellular and intercellular phenomena. The
second part covers differentiations of specific
tissue and cell types in relation to the basic pro-
cesses discussed in the first part of the course.

B STR
497 Biological Structure Special Electives (*)
AWSpS
By specific arrangement, for qualified students, spe-
cial clerkship, externship, or research oppor-
tunities can at times be made available at insti-
tutions other than the University of Wash-
ington. The faculty can advise students of possible opportunities. Students wishing to
elect this course should obtain from the Dean's of-
cice a "Special Assignment" form at least one
month before preregistration. Prerequisite, permission. (5-12 weeks.)

B STR
498 Undergraduate Thesis (*) AWSpS
Prerequisite, permission.

B STR
499 Undergraduate Research (*) AWSpS
Prerequisite, permission.

Courses for Graduates Only

B STR
501 Hemopoesis (3) W
Rosse
Students study the histology and the cytology of
blood, lymph, bone marrow, and lymphoid tissue with the light microscope. Experimental
methods (chromosome markers, radiotrupgra-
phy, transplantation, culture, etc.) for the study of cellular kinetics and differentiation are
discussed in lectures and demonstrations. Sem-
nars cover topics relating to stem cells, origin,
fate, and function of hemopoietic cells, the
microenvironment, the kinetics of red cells,
granulocyte and lymphocyte production, and
some immunological responses. Prerequisite, permission.

CONJ
505 Histological and Cytochemical
Methods (3)
(See Conjoint Courses.)

B STR
505 Comparative General Histology (3) W
Rosen
Study of biology, histology, and ultrastruc-
ture of general tissues in vertebrates and inver-
tebrates. Prerequisite, permission.

B STR
515 Biological X-ray Structure Analysis (3) W
Lundgren
Theory of X-ray diffraction, with emphasis on
applications to biological systems. Prerequisite, permission.

B STR
516 Bioinstrumentation and Research
Methods (2-3) W
Luft, Prothero
Introduction to instrumentation, physical and
cytological methods employed in medical re-
search generally and biological structure in par-
ticular. Emphasis on principles. Prerequisite, permission.

B STR
525 Brain Dissection (2) AWSpS
Everett, Lund, Sundsten
Detailed consideration of the macroscopic
anatomy of the human brain (individual study).
Prerequisite, permission.

B STR
532, 533, 534 Electron Microscopy
(1-5, 1-5, 1-5) AWSpS
Luft
Theoretical and applied aspects of microscopy in
biology, with emphasis on newer methods.
Prerequisite, permission.

B STR
540 Embryology and Anatomy of Human
Cardiovascular System (2) W
Blandau
Detailed study of the embryology of the heart
and great vessels during the first eight weeks
of life. Prerequisites, gross anatomy of thorax
and abdomen and permission. (Offered 1974-75
only.)

B STR
557 Seminar (1, max. 9) AWSp
May be repeated for credit. Required of gradu-
ate students. Prerequisite, permission.

CONJ
585 Surgical Anatomy (1-3, max. 12)
(See Conjoint Courses.)

B STR
600 Independent Study or Research (*)
AWSpS

B STR
700 Master's Thesis (*) AWSpS

B STR
800 Doctoral Dissertation (*) AWSpS

BI HS
401 Historical Development of Medical
Thought (3) A
Gomberg
Survey of the history of medicine from antici-
pity to the twentieth century, emphasizing con-
cepts and ideas that influenced and were influ-
enced by medicine.

BI HS
403 Issues of Life and Death in Historical
Perspective (2) Sp
Bederman
Examination, in terms of their historical devel-
opment and relation to human values, of some
topical contemporary issues arising from ad-
vances in biology and medical technology.
Topics include: the creation, prolongation, and
termination of life, the control of human re-
production, transplanted and artificial organs,
behavior modification, and human experimen-
tation are considered in the context of past
and present concepts of life, death, and the
individual, and the value judgments that im-
fluence the ethical dilemmas of modern medici-
ne and society.

BI HS
414 Public Health and Hygiene in Nineteenth-
Century America (3) Sp
Whorton
Detailed examination of the health problems
(including infectious disease, chemical pol-
ution, industrial hazards, and injurious living,
habits) that afflicted nineteenth-century Ameri-
cans, and the public health institutions and prac-
tices and the hygienic measures established to ameliorate these problems.

BI HS
415 The History of Physiological Chemisty
(3) Sp
Whorton
Examination of the application of chemistry
and psychology to the investigation and the expan-
sion of the physiological phenomena, from the pe-
riod of the Renaissance through the nine-
teenth century.

BI HS
416 The History of Chemical Therapy (3) A
Whorton
Survey of the use of drugs to treat illness, by
antibiotics to the antibiotics. Emphasis
on the historical development of the biologic and
chemistry and their influence on the evolution
of pharmacy.

BI HS
417 History of Disease and Public Health (3)
W
Whorton
Investigation of the role played by infectious
disease in the development of Western civil-
lization, of the theories devised to account for
the origin and spread of epidemics, and of the
practices adopted and institutions created
to combat epidemic disease.

BI HS
418 History of American Medicine (3) A
Whorton
Study of the development of the American
medical profession from the early colonial
period to the twentieth century. Attention is
given to the education and regulation of
American physicians, the theories of disease
to which they have subscribed, the treatments
that they have prescribed, the significant con-
tributions to medical progress that they have
made, and to the attitudes of the American
public toward its physicians.

BI HS
419 Historical Foundations of Modern
Biology (3) A
Sloan
Survey examining the origins and develop-
ment of the biological sciences from antiquity
to the twentieth century. Major emphasis
on the conceptual foundations of biology in
antiquity, the relation of the biological sciences
to the scientific revolution of the seventeenth
century, and the subsequent diversification of
the biological sciences.

BI HS
420 Biology and the Scientific Revolution (3)
A
Sloan
Detailed analysis of the personalities and the
concepts in the development of the biological
MEDICINE

sciences in the sixteenth, seventeenth, and early eighteenth centuries. Under consideration are the renaissance in the biological sciences, and the impact of the new mechanistic science of Galileo, Descartes, and Newton on the creation of a mechanistic biological science.

BI HS 421 Biology in the Nineteenth Century (3) W Sloan
General survey of the development of the biological sciences from the 17th to 1900. Consideration is given both descriptive and experimental biology. With major topics treated, including the impact of intellectual movements on biology, the professionalization of biology, and the consideration of the major scientific developments in biological science.

BI HS 422 Evolutionary Thought and Society (3) Sp Sloan
General exploration of issues involved in attempts to relate evolutionary biology to current social concerns. Examined through lectures and discussions as they relate to this theme are the writings of such figures as Darwin, Konrad Lorenz, Robert Ardrey, contemporary Marxists, and Teilhard de Chardin.

BI HS 424 Philosophical Foundations of the Biomedical Sciences (3) W Sloan
Introductory course in the general philosophy and methodology of the biological sciences. First portion of the course consists of an introduction to the philosophy of science. The second portion analyzes the application of these philosophical principles to specific methodological issues in the life sciences, treating such topics as the conflict of organicist and reductive biology, philosophical issues in evolutionary theory and taxonomy, and general questions of theory formulation, testing, and scientific explanation in biology.

BI HS 430 Medicine and Society in the Age of Reason (3) A Bodemer
Detailed consideration of medicine and its institutions during the seventeenth and eighteenth centuries. Emphasis on the interacting forces and ideas leading to the 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 methodological 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. Prerequisite, 432 or permission.

BI HS 434 Seminar in the History of Psychology (2) Sp Bodemer
To be taken concurrently with 433 or by permission. Readings and discussion of primary works appropriate to topics considered in 433.

BI HS 497 Biomedical History Special Electives (*) AWSp Prerequisite, permission.

BI HS 498 Undergraduate Thesis (*) AWSp
Prerequisite, permission.

BI HS 499 Undergraduate Research (*) AWSp
Investigative work in history of the biomedical sciences. Prerequisite, permission.

BI HS 500 Biomedical Historiography (4, max. 12) AWSp
Emphasis is placed on bibliography and utilization of bibliographic sources. Practice in techniques of organizing and writing history of medicine. Prerequisite, permission.

BI HS 505 The Growth of Biological Thought (3) A Bodemer
Survey course intended for, but not limited to, teachers of biology, 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.

BI HS 506 Historical and Ethical Aspects of Modern Biology (3) W Bodemer
Detailed consideration, through lectures, discussion, readings, and student presentations, of selected topics in the historical development of biological thought since the beginning of the nineteenth century. Special consideration is given to the ethical issues arising as a consequence of the advances in the modern biomedical sciences. 505 is highly recommended, but not required.

BI HS 510 Topics in Biomedical History (3, max. 9) 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 backgrounds and interest. Prerequisite, permission.

BI HS 530 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.

BI HS 521 The Ethical Challenges of Modern Medicine (3) W Bodemer
Readings and discussion of critical contemporary ethical issues arising from progress in the biomedical sciences and medical technology. The impact of modern biology and medicine upon human values, the relation of medical practices to the moral consensus, and the role and responsibilities of the physician.

BI HS 525 Seminar in the History and Philosophy of Biology (3) A Sp Sloan
Graduate student seminar on selected issues in the history and philosophy of the biological sciences. A sequence of four seminars explores (1) current issues in the philosophy of biology; (2) biology and the mechanical philosophy of the seventeenth century; (3) selected figures in eighteenth-century biology; (4) Darwinism and nineteenth-century biology. Open to majors and graduate students in medicine, the arts and sciences, and others with appropriate background and interest. Prerequisite, permission.

BI HS 530 Seminar in the History of Public Health (3) W Whorton
Seminar to analyze the evolution of man's understanding of the causes of epidemic disease, the 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.

BI HS 600 Independent Study or Research (*) AWSp Prerequisite, permission.

BI HS 700 Master's Thesis (*) AWSp
Prerequisite, permission.

CONJOUR COURSES

CONJ 317-318 Introductory Anatomy and Physiology (6-6) AS,WSp Landau
Human physiology with anatomical demonstrations. An elementary course integrating gross and microscopic anatomy, physiology, and biochemistry of the human body. Offered jointly by the departments of Biological Structure and of Physiology and Biophysics. Prerequisite, Chemistry 101 and 102, or equivalent; for nursing and dental hygiene students; others by permission. Coordinator: Department of Physiology and Biophysics.

CONJ 400 Human Anatomy and Physiology (6 or 9) A Skahen
Advanced course integrating anatomy, histology, physiology, and biochemistry of the human body. Designed to meet the needs primarily of graduate students in psychology, physiology and biophysics, and bioengineering, who have no background in histology, anatomy, and physiology. Offered jointly by the departments of Biological Structure and of Phys-
iology and Biophysics. Prerequisite, permission.

CONJ 411 Functional Neuroanatomy (3) W
Smith, Sundsten
Lecture and laboratory course in neuroanatomy, the sections being coordinated with Physiology and Biophysics 411, Neurophysiology. Laboratory includes some experience in histological techniques as well as conventional study of gross brain and slide material. Cat and monkey material, as well as human material, is provided. Offered jointly by the departments of Biological Structure and of Physiology and Biophysics. Prerequisite, permission. Coordinator: Department of Physiology and Biophysics.

CONJ 425 Preventive Medicine in Primary Care (2) AWSp
Browder, Cole
Practice of health maintenance is discussed in a seminar format, using the students’ patients or other clinical cases from the Family Medical Center as a focus. Presently existing preventive techniques, risk factors, and parameters influencing health maintenance are discussed in the course of designing individualized health maintenance programs. Prerequisite, Human Biology 465. Coordinator: Department of Family Medicine. (Formerly 462.)

CONJ 444 Medical Aspects of Sexual Problems (11/4) W
Hampson
Lecture-discussion format, covering a body of information on sexual behavior, both normal and disturbed, with particular focus on the permissiveness to medical practice. Elective open to medical students. Prerequisite, permission. Coordinator: Department of Obstetrics and Gynecology.

CONJ 450 Clinical Infectious Diseases (3) A
Davis, Foy, Holmes
Important infectious diseases in the United States are reviewed by systematic didactic presentation and by case study. Emphasis is placed on etiology, epidemiology, pathogenesis, clinical manifestations, laboratory diagnosis, treatment, and prevention. Permission required for graduate students in microbiology and pharmacology. Graduate students who have not had Human Biology 421 would have considerable difficulty with this course. Coordinator: Department of Pediatrics. (Offered 1974-75.)

CONJ 460 Clinical Research Center Clerkship (9 or 18) AWSp
Endick
Students are introduced to a variety of clinical investigations that are being undertaken in the clinical research centers of Harborview Medical Center and the University Hospital. Through association with investigators from the clinical faculty, the students become familiar with experimental design and laboratory techniques used in clinical research. Each student is expected to prepare a scholarly treatise on a research problem. In addition, students attend the CRC Scientific Advisory Committee and Biomedical Sciences Review Committee, where critical evaluation of research protocols and the ethical considerations of clinical investigation are considered. 9 credits allowed for half-time participation, 18 credits for full-time participation. Prerequisites, basic curriculum and permission. (6 to 12 weeks.) Coordinator: Department of Medicine.

CONJ 464 Perinatal Clerkship (9) AW
Vonvver
A full-time program that allows the student to provide family-oriented continuing care through pregnancy, labor, delivery, and the puerperium. Time is spent in each major specialty area, but this is flexible to allow attendance at appropriate scheduled conferences and lectures in each field. Stresses continuity of patient care. Prerequisite, Human Biology 465. Coordinator: Department of Obstetrics and Gynecology.

CONJ 473 Musculoskeletal Pathology (3) Sp
Clawson, LaZerte
Musculoskeletal pathology with electron microscopic, light microscopic, X-ray, and clinical correlation. Subjects include normal histology and electron microscopy of the MS system, biochemistry and physiology of normal and abnormal specialized connective tissues, embroyology of the MS system, repair, infections, and circulatory disturbances. This course is offered in even- and odd-numbered years alternately with Joint 474. The courses need not be taken in sequence. Offered jointly by the departments of Pathology and Orthopaedics. Prerequisites, Human Biology 465, Orthopaedics 481, or permission. Coordinator: Department of Orthopaedics.

CONJ 474 Advanced Musculoskeletal Pathology (2) Sp
Clawson, LaZerte
Advanced musculoskeletal pathology with electron microscopic, light microscopic, X-ray, and clinical correlation. Subjects include tumors of the musculoskeletal system, benign and malignant, and hamartomas. This course is offered in even- and odd-numbered years alternately with Joint 473. The courses need not be taken in sequence. Offered jointly by the departments of Pathology and Orthopaedics. Prerequisites, Human Biology 465, Orthopaedics 481, or permission. Coordinator: Department of Orthopaedics.

CONJ 477 Clinical Allergy (*) AWSp
Bierman, Van Arsdale (University Hospital)
Clinic and office experience in diagnosing and managing allergic disease, clinical conferences, hospital rounds on hypersensitivity and immunology and allergy research seminars. Students taking four-week elective may have two half-days free for other electives. Student may elect a flexible program, depending on his interests, emphasizing adult or pediatric allergy with a balanced introduction to the entire field of clinical allergy. Offered jointly by the departments of Pediatrics and Medicine. Prerequisites, Pediatrics 465 or Medicine 465 or Family Medicine 465. (4 or 6 weeks, full time.) Coordinator: Department of Medicine.

CONJ 503 Somatic Cell Genetics (2, max. 6) A
Garlitt, Martin, Pious
Introduction to the methodology and the biology of cultured somatic cells; analysis of heritable phenomena in somatic cells. A series of seminars emphasizes selected original literature concerned with such topics as mutation cell fusion, and the mitotic cell cycle in mammalian cells. Required of all pathology graduate students. May be repeated for credit. Prerequisites, basic courses in biochemistry and genetics. Offered jointly by the departments of Genetics, Pathology, and Pediatrics. Coordinator: Department of Pathology. (Formerly Pathology 503.)

CONJ 508 Histochcmical and Cytochemical Methods (3) Sp
Broderston, Kashiva, Lagunoff
Introduction to principles and techniques of tissue fixation, paraffin sections, and staining; theory and application of department of Pathology for carbohydrates, lipids, nucleic acids, minerals, and proteins, including enzyme histochemistry and fluorescent antibody methods. Prerequisites, Human Biology 414, 424 or permission. Coordinator: Department of Biological Structure.

CONJ 509 Neurochemistry (3) W
Stahl, Staff
Introductory neurochemistry course covering chemical and metabolic pathways of disorders of lipid, amino acid, and carbohydrate metabolism, transport phenomena, neurotransmitters, memory, the visual system, and unique proteins of the central and peripheral nervous systems. This course is recommended for graduate students in the biological sciences and for medical students. A general knowledge of biochemistry is strongly advised. Offered jointly by the departments of Physiology and Biophysics, Neurological Surgery, Biochemistry, Ophthalmology, and Biological Structure. Prerequisite, permission. Coordinator: Department of Pathology and Biophysics. (Offered alternate years; offered 1974-75.)

CONJ 510 Animal Models and Comparative Pathology in Biomedical Research (3) W
Giddens
Historically comparative pathology in the various ways in which naturally occurring animal diseases are used as models in biomedical research. Selected examples of animal models of human disease are reviewed. Students develop and present research plans utilizing animal models within the students' areas of interest. Medical or zoology background in anatomy, physiology, and pathologic processes is desirable. Prerequisite, permission. Coordinator: Department of Pathology.

CONJ 560 Tumor Biology (3) S
Champoux, Hakomori, J. Hellstrom, K. E. Hellstrom, Smuckler
Primarily designed for graduate students, but may also be taken by interested medical students. Given as a combination of lectures and conferences. The general areas covered are the basis of carcinogenesis, tumor progression and metastasis, virus-induced tumors, tumor genetics, and tumor immunology. Offered jointly by the departments of Microbiology and Pathology. Required of all pathology graduate students. Prerequisite, permission of Department of Microbiology. Coordinator: Department of Microbiology.

CONJ 585 Surgical Anatomy (1-3, max. 12) AWSp
Guided dissection of selected regions, supplemented by conferences. Offered jointly by
the departments of Biological Structure and Surgery. Prerequisite, permission. Coordinator: Department of Biological Structure.

FAMILY MEDICINE

FAMED
420-421-422 Ambulatory Care In Family Practice (1½-1½-1½) AWSp Baker
In the University or an affiliated teaching family practice unit, the student works up and follows a small group of families for whom he and the faculty preceptor are responsible for comprehensive care. The student's cases are the subject of the coordinated electives dealing with health maintenance, interview technique, and special topics in primary care. Prerequisite, basic hospital clerkship. (Limit: fifteen students.) (Formerly 464.)

FAMED 423-424 Seminar: Topics In Family Medicine (1-1) AWSp Baker
Major topics in primary care that arise in the course of treating patients in 464 are discussed. These include issues in patient care, office management, and counseling. Prerequisite, basic hospital clerkship. (Limit: fifteen students.)

FAMED 461 Interviewing for Comprehensive Care (1) WSp Baker
Comprehensive care to patients; identification of problems accurately and completely, to include somatic, emotional, and social realms; assessment of "who" the person is in order to determine and solve his problems most effectively. Focus is on interviewing patients when there is the general problem. Prerequisite, Human Biology 465. (Limit: fifteen students.)

FAMED 465 Community Clinical Clerkship in Family Medicine (9) AWSp Wiegert
Stresses the common and important clinical problems in family practice. Student functions as clinical clerk in a community clinical unit of the Department of Family Medicine, where he participates in care of assigned patients, using office, hospital, home, and community resources. Prerequisites, Human Biology 465 and Medicine 465 or permission. (6 weeks, full time.)

FAMED 475 Advanced Preceptorship in Family Medicine (*) AWSp. Phillips
An opportunity for the student to apply and extend his clinical skills by working with a selected family physician in an active practice. The preceptor and the location are chosen to fit individual student's interests. Opportunities are available throughout Washington and in adjoining states. Student must have completed several general clinical clerkships previously (e.g., Medicine 465, Pediatrics 465, Surgery 465, etc.). Prerequisite, Human Biology 465.

HUMAN BIOLOGY

This sequence is required for all medical students. Other students may enroll by permission of the Assistant Dean for Curriculum, School of Medicine.

HUBIO 400 Medical Practice Preceptorship at WAMI Sites (1) A
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 stationed with carefully selected clinical faculty members in their offices in accordance with the student's preference of discipline at the WAMI sites.

HUBIO 411 Anatomy (4) A
Eddy
Development of the embryo from fertilization and implantation to full organ and organ system differentiation, with illustration of basic body plan. Important examples and etiology of faulty prenatal morphogenesis. Cell differentiation leading to a study of basic histology. Developmental and morphological aspects of hemopoietic system.

HUBIO 412 Mechanisms in Physiology and Pharmacology (4) A
Davies, Gordon
Physiological mechanisms. Membrane transport, epithelial transport, excitability, sensory receptors, junctional transmission, contractility, energy metabolism, hormonal mechanisms of homeostasis control, integration of mechanisms, neural and hormonal control, autonomic nervous system, endocrine, gastrointestinal secretions and motility, temperature regulation.

HUBIO 413 Introduction to Clinical Medicine (1) A
Baker
Instruction in communication skills and interview techniques to form the basis for the eventual doctor-patient relationship and for the skill of communicating with patients. The patient profile is obtained, and the concept of problem identification is introduced.

HUBIO 414 Molecular and Cellular Biology I (3½) A
Bornstein
Coordinate course covering classical molecular and cellular biochemistry, cellular physiology, and molecular genetics. Metabolic interrelationships as they occur in the individual are stressed and related to disturbances in disease states.

HUBIO 415 The Ages of Man (2) A
Shepard
Physical and psychological development of the whole individual from birth through old age, including neonatal adaptation, nutrition, and developmental milestones in childhood and adolescence, degenerative processes of senescence.

HUBIO 420 Cell and Tissue Response to Injury (4) W
Smucker

HUBIO 421 Natural History of Infectious Diseases and Chemotherapy (4½) W
Sherris

HUBIO 422 Introduction to Clinical Medicine (1½) W
Baker
Continuation of communication skills especially as related to and dealing with effective material. The medical history is introduced and instruction in data collection begins. There is some experience with patients in conducting a medical interview for the purpose of obtaining the medical history and patient profile.

HUBIO 423 System of Human Behavior I (2) W
Bakker
Overview of conceptual systems and models of behavior, normality and abnormality, environment and social learning, conditioning, learning, conditioning, learning in the autonomic nervous system, catecholamines and behavior, illness behavior, feelings, emotion and cognition, physician-patient interaction and disease and techniques of behavior change.

HUBIO 424 Molecular and Cellular Biology II (2½) W
Bornstein
Continuation of 414.

HUBIO 430 Epidemiology (1½) Sp
Peterson
Introduction to statistical inference and basic concepts of variance and statistical significance as applied to problems in human biology and medicine; statistical and epidemiological health information systems and measurements of morbidity and mortality; computer usefulness, potentialities and limitations; epidemiological approaches to infectious and noninfectious diseases. Interaction of agent, host, and environment in causation and transmission.

HUBIO 431 Head, Neck, Ear, Nose, and Throat (2½) Sp
Schwarz

HUBIO 432 Nervous System (5½) Sp
Crill
Integrated approach to: normal structure and function of the nervous system, including the eye. Basic neuropathology and diseases of the eye. Neuropharmacology with emphasis on modes of action and classes of drugs. Clinical evaluation of the nervous system and eye with illustrative examples of the manifestations of specific and important neurological lesions, and common and rare, but important and reversible, conditions.
HUBIO 433 Medicine, Health, and Society (1½) Sp
Gibson
Social and cultural determinants of health and disease. Interrelationships of patient, physician, family, and community. Health as the physical, mental, and social well-being of the individual.

HUBIO 434 Endocrine System (2) Sp
Wood
Gross and microscopic anatomy of the endocrine system. Principles of endocrine physiology as illustrated by model systems (extending the concepts of homeostasis, control and feedback systems previously learned), hormonal biosynthesis and important pathophysiological states. The endocrine integration of metabolism.

HUBIO 435 Introduction to Clinical Medicine (1½) Sp
Baker
Screening physical examination is taught. Further experience and instruction in the medical history are offered. The problem-oriented write-up is an additional objective of this course.

HUBIO 440 Cardiovascular-Respiratory System (6) A
Scher
Anatomy of heart, vessels, and lungs; physiology of heart, circulation, respiration (including gas transport); major pathological disorders of the heart, great vessels, and lungs; physical examination of the chest and cardiovascular system.

HUBIO 441 Gastro-Intestinal System (3½) A
Rao
Anatomy of the gastrointestinal system; physiology and pathology of digestion and hepatic function; and physical and laboratory examination.

HUBIO 442 Introduction to Clinical Medicine (1½) A
Gill
Advanced instruction in interview technique, history taking, and physical examination, with emphasis on detection of abnormalities.

HUBIO 443 Medicine, Health, and Society (2) A
Gilson
Community medicine and environmental health. Organizational aspects of medical care and public health. Socioeconomic factors in health care delivery and environmental health.

HUBIO 449 Genetics (½) A
Flatow
Review of basic genetic principles in the context of their applications in clinical medicine. Topics discussed include human chromosomal disorders; patterns of inheritance, genetic counseling, amniocentesis; pathogenesis of hereditary diseases, monogenic and multifactorial; role of genetics in common diseases; behavioral genetics; drug-gene interactions (pharmacogenetics); and prevention and treatment of genetic diseases, including prenatal diagnosis and population screening.

HUBIO 450 Introduction to Clinical Medicine (3½) W
Goodell
Continuation of 442 with emphasis on identification of problems and correlation of findings with pathophysiological mechanisms.

HUBIO 451 Hematology (3) W
Hillman
Familiarizes students with the basic pathophysiologic mechanisms leading to disturbances of red cell, white cell, and platelet production, as well as abnormalities of hemostasis presenting clinical problems. Physiology, rather than minute details of individual disease, is stressed.

HUBIO 452 Urinary System (4) W
Chapman
Physiology, pathology, and examination, including radiology, of the lower urinary tract; kidney microscopic anatomy; physiology of the kidney, including fluid and diuretic therapy; pathology, microbiology, and immunology of renal disease with clinical examples; physical and laboratory examination.

HUBIO 453 Musculoskeletal System (3½) W
Rooke
Gross, surface, applied, and X-ray anatomy of system, including entire spine but excluding head and neck. Histology of bone, cartilage, tendon-myo-tendinous junction and joints. Musculoskeletal trauma and healing. Pathology and clinical manifestations of other degenerative, inflammatory, metabolic, nutritional, and congenital disorders. Physical examination.

HUBIO 455 Basic Hospital Clerkship (7½) Sp
Hillman
Hospital routine and staff interrelationships; developing basic skills in history taking, physical and laboratory examination, and diagnostic synthesis acquainting the student with specific, but limited, variety of clinical problems; fundamentals of clinical pharmacology and therapeutics.

HUBIO 460 Introduction to Clinical Medicine (5) Sp
Goodell
Continuation of 450. Introduction to clinical and laboratory diagnosis.

HUBIO 461 Skin System (1½) Sp
Odland
Gross and microscopic anatomy. Physiology, protection, temperature control, pigmentation, and photosensitivity. Pathology and genetics of skin abnormalities, including tumors. Introduction to clinical evaluation, including physical examination and illustrative examples of inflammatory, vascular, immunological (including drug hypersensitivity), and neoplastic diseases.

HUBIO 462 Reproductive Biology (3) Sp
Gibson
The microscopic anatomy, physiology (including endocrine physiology), pathology, and physical diagnosis of the reproductive system; gametogenesis, gamete transport, fertilization, implantation, placental development, ovulation, and its control, menarche and menstruation, the physiology of pregnancy and labor, the gynecologic examination, and gynecologic pathology.

HUBIO 463 System of Human Behavior II (2) Sp
Carr, 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 determine and contribute to behavioral disorders and diseases states; the process of diagnosis and problem definition and selection of appropriate modes of intervention and behavioral change.

LAB M 320 Introduction to Clinical Conjugation (3) A
Brent
Lecture and laboratory covering the theory and pathology of conjugation with inclusion of selected diagnostic procedures. Prerequisite, permission.

LAB M 321 Medical Technology Introductory
LeCrone
Clinical Hematology (5) W
Behrens, LeCrone
Lecture-laboratory coverage of the theoretical and practical concepts associated with cellular morphology, instrumentation, quality control, and selected hematological diagnostic studies. Prerequisite, permission.

LAB M 401 Clinical Laboratory Diagnosis (3) W
Heywood, Ray
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 demonstrations. Prerequisites, Human Biology 413, 422, 435, 442, 450, 465, or permission.

LAB M 420 Clinical Microscopy (3) S
Hamernyik
Lecture and laboratory covering urinalysis testing procedures and associated disease entities. Prerequisite, permission.

LAB M 421 Medical Microbiology (5) S
McGonagle
One-quarter lecture and laboratory designed to prepare medical technology students for further training in a clinical microbiology laboratory. Prerequisite, permission.

LAB M 422 Medical Technology Seminar (5)
Behrens, Szabo, Staff
Advanced didactic coverage of topics relating to the clinical and practical concepts of laboratory medicine. Prerequisite, permission.
LAB M 423 Clinical Chemistry (11) 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.

LAB M 424 Clinical Microbiology (9) AW McGonagle, Staff
Clinical review of general techniques, study of clinically significant bacteria, including specific methods of specimen examination, fluorescence microscopy, and testing for antibiotic susceptibility. Prerequisite, permission.

LAB M 425 Clinical Hematology (7) 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.

LAB M 426 Clinical Immunohematology (5) AW Hamernik, Staff
Clinical study of immunohematology of the red cells and hemagglutination techniques.

LAB M 427 Selected Studies in Laboratory Medicine (15) Sp Behrens, Hamernik, LeCrone, McGonagle, Szabo
Selected study in either one of the major disciplines of laboratory medicine, in all major disciplines of this field; or pursuance of a clinical research problem. Prerequisite, permission.

LAB M 477 Clinical Electroencephalography (*) AWSp Whitaker
For students who desire to acquire familiarity with the techniques, interpretive criteria, and clinical applications of electroencephalography. Prerequisites for medical students, Human Biology 432 and permission; others by permission. (2 or 4 weeks). (Formerly Neurological Surgery 477.)

MEDICAL PRACTICE

MED P 401 Medical Practice Preceptorship (1) AWSp
Provides opportunity for first- and second-year medical students to gain personal experience with, and insight into, the medical practice situations. The student is stationed with clinical faculty members in their offices to observe and participate in the care of their patients, and to gain insight into the management aspects of the clinical practice of the student's preference of discipline (i.e., medicine, family, pediatrics, etc.), one-half day each week for ten weeks, by arrangement.

MED P 402 Medical Practice Management (1)
Seminar directed toward students in clinical clerkships that deals with the management aspects of medical practice: setting up of an office, partnership arrangements, incorporation, trusts, wills, insurance programs, and personal finances are the subjects of discussion. Guest faculty is drawn primarily from professionals in the practice of law, investment counseling, estate managements, as well as physicians in various types of medical practice. Prerequisite, third- or fourth-year medical student standing.

MEDICINE

MED 404 Clinical Preceptorship in Internal Medicine-Bremerton (6) AWSp 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 manages inpatients and outpatients on a primary care, consultative, and emergency basis. In addition to varied subspecialty exposure through his tutors, the student has supplemental teaching sessions. The student assumes responsibility for all aspects of patient care in parallel with his interest and ability. Prerequisite, 465. (4 weeks, full time.)

MED 431 Human Genetics (*) AWSp Fialkow, Motulsky
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 432 Applied Blood Group Genetics (2) Sp Giblett
Lecture and laboratory work including individual projects that are related to blood transfusion, immune hemolysis, and inheritance. Prerequisites, Human Biology 434 and 465.

MED 433 Major Considerations in Clinical Endocrinology (3) Sp Williams
Emphasis on the most major and dependable symptoms, signs, laboratory tests, and therapy for clinical endocrinopathies. Patient illustrated.

MED 440 Dermatology Clinic (*) AWSp Oslund
Students attend dermatology clinic on Monday mornings and Thursday afternoons for twelve weeks. Prerequisite, Human Biology 465.

MED 441 Clinical Gastroenterology (6) AWSp Fenster (Virginia Mason Hospital and Mason Clinic)
Combined inpatient-outpatient elective in clinical gastroenterology, which includes practical experience in GI endoscopy and liver biopsy. Directed tutorial work. Special arrangements can be made for students with special interests. Prerequisite, 465. (4 weeks, full time.)

MED 442 Clinical Oncology (*) AWSp Thomas (Providence Hospital)
Students are responsible for the work-ups 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 rotating Medical Medicine rotations. Students function as the primary physicians for assigned patients under supervision of the fellows or residents on the wards. Prerequisite, 465. (4, 6, or 12 weeks, full time.)

MED 447 Clinical Pharmacology and Therapeutics (1) AWSp Aase, Holcenberg
Seminar that reviews significant and timely therapeutic problems in the field of internal medicine. Prerequisite, Human Biology 465.

MED 448 Genetics, Medicine, and Society (1) WSp Fialkow, Motulsky
Students and faculty discuss in lectures and seminars the aspects of genetics relevant to medicine and society. Prerequisite, Human Biology 449.

MED 449 Application of Genetic Principles to Medicine (4%) AWSp Fialkow, Motulsky, Onnen
Ward rounds, clinic, and seminar discussions of patients and topics in clinical genetics. Students attend medical genetics clinic Tuesdays, examine families and obtain pedigrees under supervision, and attend genetics rounds on the wards Thursdays. Prerequisites, Human Biology 449, 462.

MED 465 Clinical Clerkships (*, max. 18) AWSp Beatty, Griepe, Pope, Turk, Van Arsdale
Hospital patients are assigned to each student for a complete work-up. Ward rounds are held daily; lectures, clinics, and conferences are weekly. Prerequisite, Human Biology 465. (6 or 12 weeks, full time.)

MED 466 Clinical Preceptorship in Internal Medicine—WAMI (9) AWSp Wallace
Advanced clinical preceptorship in internal medicine in the 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 commonly encountered by the practicing internist. Continuity of care and the relationship between care given in the ambulatory setting and in the hospital, as well as by other community health services, is emphasized. Prerequisite, 465. (6 weeks, full time. Limit: six students.)

MED 478 Clinical Dermatology (6) AWSp Oslund (University Hospital)
Participants in dermatology 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 clinical conferences each week with entire staff. A continuing series of teaching seminars and weekly dermatopathology conferences. Prerequisite, Human Biology 465. (4 weeks.)

MED 479 Clinical Gastroenterology (*) AWSp Vohwiler (University Hospital)
Participants in inpatient ward rounds, procedures, conferences, and selected clinics with full-time divisional staff at University, Veterans
MED 480 Rheumatology (6) AWSp
Manalik
Full-time inpatient-outpatient clerkship in rheumatology. Clinical experience provided in diagnosis and treatment of rheumatic diseases, utilizing outpatient clinics and hospitalized patients at the University Hospital and the Harborview Medical Center. Emphasis on concepts in pathophysiology, diagnosis, and treatment of these diseases. In addition to patient contact, reading, seminars, and preceptorial sessions are the methods of instruction. This course is offered each quarter except Summer Quarter. Prerequisite, 465 or Human Biology 465 or Pediatrics 465 or Family Medicine 465.

MED 481 Advanced Clinical Endocrinology (*)
AWSpS
Paulsen (United States Public Health Service 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, Human Biology 465. (4, 6, or 12 weeks.)

MED 482 Clinical Cardiology and Electrocardiography (6) AWSpS
Blackmon (University Hospital), Preston (Harborview Medical Center), Kennedy (Veterans Administration Hospital), McDonough, Wills (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, 465. (4 weeks.)

MED 483 Clinical Respiratory Disease and Pulmonary Physiology (6 or 9) AWSpS
Butler (University Hospital), Hudson (Harborview Medical Center), Sullivan (Veterans Administration Hospital), Dohner (United States Public Health Service Hospital)
Training in respiratory disease diagnosis and pulmonary therapy, with special emphasis on cardiopulmonary function testing and interpretation. Inpatient and outpatient teaching rounds, conferences, and basic science integration. Prerequisite, Human Biology 465. (4 weeks.)

MED 484 Clinical Hematology or Oncology (*)
AWSpS
Finch (University Hospital), Harker (Harborview Medical Center), Adamson (Veterans Administration Hospital), Huff (Virginia Mason Clinic), Wright (Swedish Hospital)
(a) University Hospital—4 weeks, AWSpS
(b) Harborview Medical Center—4 weeks, AWSpS
(c) Veterans Administration Hospital—4 weeks, AWSpS
(d) Virginia Mason Clinic—4 weeks, AW
(e) Swedish Hospital—4 weeks, AW
Outpatient and inpatient experience with hematologic or oncologic disorders. The elective includes teaching rounds, conferences, and evaluation of laboratory work. Prerequisite, 465.

MED 485 Clinical Genetics (*) AWSpS
Flitkow, Matsuyuki
Intensive study of genetic principles required in clinical work. May work in dysplastic on one, or more clinical problems or get broader experience in working up a variety of clinical cases. Prerequisite, Human Biology 465. (6 weeks.)

MED 486 Advanced Clinical Neurology (*) AWSpS P. Swanson (University Hospital)
Inpatient and outpatient experience in clinical neurology at the University Hospital, Veterans Administration Hospital, or Harborview Medical Center. Students work closely with staff, attend clinical conferences, present patients on attending rounds, participate in seminars on topics in clinical neurology, and become more familiar with diagnostic neurological procedures. In addition, students attend one clinic per week. Following that clinical quarter, an exclusively outpatient experience can be arranged. Prerequisite, 465. (4 weeks.)

MED 487 Ambulatory Medicine Elective (*)
AWSpS
Zimmermann (University Hospital), Clark (Harborview Medical Center)
Students acquire knowledge and skill in dealing with ambulatory patients with problems commonly encountered in the office practice of intern medicine. By assuming first-line responsibility for patient care under the supervision of an attending physician, students become acquainted with the demands that long-term personal medical care places on the internist. Students may elect to spend from two to five half-days each week in the general internal medicine clinics either at University Hospital (morning clinics) or at Harborview Medical Center (afternoon clinics). Prerequisite, 465 or Family Medicine 465. (12 weeks.)

MED 488 Ward Medicine Subinternship (*) AWSpS
Turck (Harborview Medical Center), Evans (Veterans Administration Hospital), Gripp (United States Public Health Service Hospital)
Students act in the capacity of interns on the medical wards under supervision of house staff and attending physicians. They attend all regular medicine rounds and conferences as their schedules permit. Prerequisite, 465. (6 or 12 weeks.)

MED 489 Clinical Infectious Diseases (*) AWSpS
Kirby (University Hospital)
Students participate in the consulting service throughout the hospital, attend daily patient rounds, conferences, and seminars. Prerequisite, 465. (2, 4, or 6 weeks.)

Turck (Harborview Medical Center), Holmes (United States Public Health Service Hospital)
Students participate in the consulting service throughout the hospital. They are given the opportunity to work on various aspects of infectious diseases through the clinical laboratories. Prerequisite, 465. (4 weeks.)

MED 490 Cardiology Subinternship (*) AWSpS
Blackmon
Students act in the capacity of interns on the white service under the supervision of house officer. Prerequisite, 465. (4 weeks.)

MED 492 Clinical Endocrinology and Metabolism (*) AWSpS
Goodner (Harborview Medical Center), Bulas (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 (inpatient clinic only) scheduling may be arranged with instructor. Prerequisite, Human Biology 465. (4 or 6 weeks.)

MED 493 Nephrology and Fluid Balance (*)
AWSpS
Schrier
Nephrology/fluid balance clerkship at University Hospital, Harborview Medical Center, Veterans Administration Hospital, and the Virginia Mason Clinic. Students see clinical nephrologic problems under close supervision, participate in nephrology and transplant rounds, see consults with renal fellow and attending, and work up patients in renal clinics. Students also attend a series of seminars throughout the clerkship in which clerks at all four hospitals participate. Prerequisite, 465. (4 weeks.)

MED 494 Metabolism and Diabetes (3 or 6) AWSpS
Nielsen (Virginia Mason Clinic)
In addition to clinical 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. Prerequisite, 465. (2 or 4 weeks, full time.)

MED 495 Clinical Aspects of Aging (1½) AWSpS
Bierman, Hazzard
On-the-scene training and experience in the special medical and social problems of old age are offered in a variety of actual community situations ranging from public hospitals to private nursing and retirement homes. Local physicians devoted to delivery of health care to this group with its special problems are used as preceptors. This is an opportunity for the student to incisively examine one's own approach to chronic illness and to the dying patient. Students work up and follow individual diagnostic, therapeutic, and social problems. Prerequisite, 465 or Human Biology 465. (12 weeks, 1 morning per week.)

MED 497 Medicine Special Electives (*) AWSpS
By specific arrangement, for qualified students, specific clerkship, externship, or research opportunities can at times be made available at institutions other than the University of Washington. The placement is for the 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. (6 or 12 weeks.)
MEDICINE
MED 498 Undergraduate Thesis (*) AWSpS
For medical students. Prerequisite, permission.

MED 499 Undergraduate Research (*) AWSpS
Case studies, with laboratory research. For medical students. Prerequisite, permission.

MICROBIOLOGY

MICRO 101 The Microbial World (5) W
Lara
For majors in the social sciences and humanities but open to science majors other than biologists. Using the nature and activities of bacteria and viruses as the focus of interest, a view of the biology of life and cooperation of cells. Credit will be given for one of 101 and 201. Consent of instructor is required.

MICRO 301 General Microbiology (5) AWSpS
Nester
One-quarter lecture course designed to acquaint students in the physical and biological sciences with micro-organisms and their activities. The understanding of basic biological concepts elucidated through investigations of micro-organisms emphasized. 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 a biological science is desirable but not required.

MICRO 302 General Microbiology Laboratory (2) AWSpS
Laxson, Nester
Laboratory course primarily for students taking 301. The laboratory exercises cover a variety of microbiological techniques, with experiments designed to illustrate major concepts of microbiology, virology, and immunology. Prerequisite, concurrent or previous registration in 301 or permission.

MICRO 319 Laboratory Techniques in Microbiology (1) AWSpS
Lara, Portman
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. Prerequisites, prior or concurrent enrollment in a microbiology course or permission.

MICRO 320 Media Preparation (2) AWSpS
Parkhurst
Practical work in the preparation of culture media and solutions. Nutritional requirements of micro-organisms are considered. For students expecting to enter vocations involving laboratory work with bacteria. Offered on credit/no credit basis only. Prerequisites, 301 or equivalent, and permission.

MICRO 322 Applied Bacteriology (5) AWSpS
Schoenknacht
Practical experience in a clinical or public health laboratory; fifteen hours per week. For students majoring in medical microbiology. Prerequisites, 443 and permission. Three quarters advance sign-up in G313A Health Sciences necessary. Applicants are selected by interview. (Limit: three students.)

MICRO 351 Introduction to Medical Microbiology (3) Sp
Evans
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 a laboratory to fulfill their degree requirements should register concurrently in 319. Other students are encouraged to take 302 or 319 if 302 is full. Because 351 is a modification of 301, students who take both 301 and 351 receive credit and grade in 351 only. Prerequisite, Biology 211 or equivalent.

MICRO 400 Fundamentals of Bacteriology (3) ASp
Douglas, Lara, Ordal
Basic bacteriology; comparative morphology, taxonomy, physiology of bacteria. For students majoring in microbiology and others interested chiefly in the biological and chemical aspects of microbes. Required for students majoring in microbiology. Recommended for graduate students in biochemistry or biology. Prerequisites, 6 credits in organic chemistry. Biology 210, 211, and 212, or 10 credits in botany or zoology.

MICRO 401 Fundamentals of Bacteriology Laboratory (3) ASp
Douglas, Lara, Ordal, Portman
Laboratory course correlated concurrently by students taking 400. Isolation by enrichment culture techniques of a wide selection of nonpathogenic bacteria. The isolates are identified, and experiments are performed to investigate the genetics of growth, quantitation of micro-organisms, genetic transfer in bacteria and yeast, and isolation of bacteriophage. Prerequisites, 6 credits in organic chemistry; Biology 210, 211, and 212, or 10 credits in botany or zoology.

MICRO 430 Microbial Metabolism (3) W
Douglas, Whiteley
The major patterns of fermentative and oxidative metabolism of yeasts and bacteria. For students majoring in microbiology or food science. Prerequisite, 400 or 301.

MICRO 431 Microbial Metabolism Laboratory (2) W
Douglas, Portman
Exercises include tests for carbon compound utilization, nutritional requirements, quantitative determinations of fermentation products, isolation of mutants, and assays of enzymes in cell-free extracts. Prerequisite, concurrent registration in 430.

MICRO 435 Microbial Ecology (3) A
Staley
Consideration of the various roles that microorganisms, particularly bacteria and bluegreens, play in energy flow and interactions among microorganisms 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.

MICRO 436 Microbial Ecology Laboratory (3) A
Staley
Laboratory exercises designed to illustrate important techniques in microbial ecology (e.g., enumeration, autoradiography, and uptake of dissolved substrates). The lake ecosystem is used as a model ecosystem for studies in which each student conducts an individual research project. Prerequisites, concurrent registration in 435 and permission. (Limit: ten students.)

MICRO 441, 442 Medical Bacteriology, Virology, and Immunology (3,3) A W
Evans, Falkow, Weiser
441: brief survey of general bacteriology, immunology, and virology. During the last part of 441 and throughout 442 specific pathogens and viruses are studied in detail. The laboratory course, 443, coordinates with this sequence. Prerequisites, 10 credits in basic biology and 6 credits in organic chemistry for 441; 441 for 442.

MICRO 443 Medical Microbiology Laboratory (3) AW
Coyl, Memmer, Schoenknacht
Laboratory course for medical technology students, microbiology majors, and on an elective basis for medical students. Procedures used in the medical microbiology laboratory for isolation and identification of pathogenic microorganisms and testing of their susceptibility to antibiotics. Selected reading assignments and a one-hour demonstration period each week. Prerequisites, enrollment in 441, 442 sequence or Human Biology 421, and permission.

MICRO 444 Medical Mycology and Parasitology (4) Sp
Coyl, Cramer, Plobr
Consideration of medically important fungi and parasites, with emphasis on their biology in relation to disease and its laboratory diagnosis. For medical technology students, microbiology majors, and medical students as an elective. Prerequisites, 10 credits in basic biology and 6 credits in organic chemistry, and permission.

MICRO 447 Fundamentals of Immunology (4) Sp
Hellstrom, Pearsall, Weiser
Broad coverage in immunology with stress on fundamentals. For students in specialized areas of medicine and dentistry and various undergraduates and graduates with interests in areas requiring substantial knowledge in immunology. Occurrence and properties of antigens and hapten; synthesis, nature, fate, and activities of antibodies; antigen-antibody interactions; immunity to infection; cell-mediated immunity, immune response, and immune regulation; blood groups and transfusion; tumor immunology; Rh diseases; allergic and autoimmune diseases; and immunity to parasites. Prerequisites, 6 credits in basic biology or biology; 5 credits in organic chemistry, and upper-division standing; for medical students, Human Biology 421.

MICRO 450 Molecular Biology of Viruses (3) Sp
Champos, Kiehn
Introduction to the molecular biology of viruses and virus-host relationships. Designed for advanced undergraduates and graduate students in the biological sciences. Coverage
includes bacterial and animal viruses, the nature of infection, the variety of virus-host relationships and discussion of some models of viral pathogenesis. Prerequisite, knowledge of biochemistry and molecular biology at the level of Biology 211 or introductory biochemistry courses at Watson's Molecular Biology of the Gene.

MICRO 495 Honors Undergraduate Research (*) A WSps
Groman
Specific problems in medical and general microbiology. Prerequisite, permission.

MICRO 496 Undergraduate Library Research (2) A WSps
Staley
Introduction to library research and to the microbiological literature. Topics are assigned and supervised by staff members. Offered on a credit/no credit basis only. Prerequisite, permission; senior standing desirable.

MICRO 497 Microbiology Special Electives (*) A WSps
Sherris
By specific arrangement with the Department of Microbiology, 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 and contact the Chairman of the Department of Microbiology at least one month before preregistration. Limited to medical students. Prerequisite, permission.

MICRO 498 Undergraduate Thesis (*) A WSps
For medical students. Prerequisite, permission.

MICRO 499 Undergraduate Laboratory Research (*) A WSps
Specific problems in medical and general microbiology. Prerequisite, permission; senior standing desirable.

Courses for Graduates Only

MICRO 501 Research Techniques in Virology (*, max. 5) A
Groman
Introduction to the basic experimental techniques in virology. Prerequisite, permission.

MICRO 502 Research Techniques in the Study of Microbial Enzymes (*, max. 5) W
Whiteley
Cultivation of large quantities of bacteria; purification of proteins, enzyme kinetics; sedimentation properties; control of enzyme activity and synthesis; localization of enzymes in bacterial structures. Prerequisites, 400, Biochemistry 440, 441, 442, and permission.

MICRO 503 Research Techniques in the Study of Nucleic Acids (*, max. 5) W
Champoux, Whiteley
Techniques used in the isolation and characterization of nucleic acids. Prerequisite, permission.

MICRO 504 Research Techniques in Microbial Genetics (*, max. 5) A
Nester
The isolation and characterization of mutants by biochemical and genetic techniques. Prerequisite, permission.

MICRO 505 Immunological Techniques (*, max. 5) Sp
Storb
Theory and use of current immunological techniques. Prerequisite, permission.

MICRO 506 Techniques in Electron Microscopy of Microorganisms (3) Sp
Lara
Techniques used in the preparation of microorganisms for electron microscopy, the operation of the electron microscope, and the photographic reproduction of observations. Prerequisites, major in a biological science and permission.

MICRO 510 Physiology of Bacteria (3) Sp
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 Biochemistry 440, 441, 442, or permission. (Offered alternate years; offered 1974-75.)

MICRO 520 Seminar (1) A WSps
May be repeated for credit.

MICRO 525 Cell Surface Membrane in Cell Sociology and Immunology (3) Sp
Hakomori
Structure and function of cell surface membranes in relation to various immunobiological and pathobiological phenomena (differentiation, organization, phenomena). Offered jointly with the Department of Pathobiology as Pathobiology 525. Prerequisites, 447, Biochemistry 440, 441, 442, and permission.

MICRO 530 Advanced General Microbiology (4) W
Ordal
Enrichment, isolation, and comparative morphology and physiology of selected bacteria. Open to qualified undergraduates. Prerequisites, 400 and 401, or equivalent, and permission.

MICRO 540 Virology (3) Sp
Champoux, Kiehn
Prerequisite, permission. (Offered alternate years; offered 1975-76.)

MICRO 550 Selected Topics in Immunology (2, max. 18) A WSps
Weber
Formal seminar-discussion course for advanced students focused on recent developments in the field of immunology and consisting of literature research and intensive in-depth study of important and timely topics. Three-hour seminars semimonthly and a comprehensive final examination. Prerequisites, 441, 442, or equivalent, and permission.

MICRO 553 Pathogenesis of Infectious Diseases of Man (4) W
Weber
Discussion course focusing on the pathogenesis of infectious diseases, with emphasis on bacterial 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 Human Biology 421, Pathology 444 or Human Biology 420, Biochemistry 405 or Human Biology 421 and permission. (Offered alternate years; offered 1975-76.)

MICRO 555 Advanced Clinical Microbiology (2½) A WSps
Coyle, Schoenknecht, Sheris
Attendance at daily plate rounds and the weekly journal club of the Division of Clinical Microbiology. This is designed to increase understanding of clinical microbiological work and its application to the care of the patient. Prerequisites, 443 and permission.

MICRO 556 Clinical Microbiology Training and Research (*, max. 12) A WSps
Ray, Schoenknecht
Training in clinical microbiology and research. Attendance at daily laboratory rounds in addition to bench-side training and research. For medical students and microbiology graduate students only. Prerequisites, 443 and permission.

MICRO 599 Topics in Microbiology (*, max. 6) A WSps
Sheris
Current problems in microbiological research. Prerequisite, permission.

MICRO 600 Independent Study or Research (*) A WSps

MICRO 700 Master's Thesis (*) A WSps

MICRO 800 Doctoral Dissertation (*)

NEUROLOGICAL SURGERY

NR 428 Neurological Surgery Seminar (1) A WSps
Calvin
Weekly seminar centered around neurological research topics with discussion by staff and students. Prerequisite, Human Biology 432 or permission.

NR 441 Neurosurgery for the Generalist and Clinical Specialist (2) W
Kelly, Loester
Series of lectures, seminars, and clinical demonstrations designed to identify and describe those diagnostic and therapeutic aspects of neurosurgical disease, 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 man-
OBSTETRICS AND GYNECOLOGY

OB GY 465 Introduction to Obstetrics and Gynecology (*) AWSpS
Gibson
Clinical clerkship in obstetrics and gynecology that complements Human Biology 462. Directed at the third- and fourth-year-level students and includes private office experience, lecture seminars, delivery and operating experience, and some preceptorial sessions. The clerkship is offered six times each year, and each class is limited to seventeen students. Prerequisite, Human Biology 462. (4 weeks.)

OB GY 466 Community Clinical Clerkship in Boise, Idaho (*) AWSpS
Gibson
May be taken in lieu of 465 with departmental approval, and for less than six weeks (two or four) if the student has passed 465. The student spends six weeks as a clinical clerk on obstetrics and gynecology at a clinical unit in Idaho. The student actively participates in obstetric deliveries and closely follows the management of obstetric patients. He does histories and physical examinations on surgical patients and attends their surgery. Hospital rounds are made on both obstetric and gynecologic patients. In addition, the student spends time in the local physician's office (there are several physicians) and is afforded a varied experience in the office practice of the specialty. Prerequisites, 465, Human Biology 462 (for those choosing two- or four-week clerkships).

OB GY 479 Obstetric and Gynecologic Investigation (*) AWSpS
Heinrichs
The investigation may cover any one of the following: uterine muscle physiology, toxemias of pregnancy, hormone assays in obstetrics and endocrinology, obstetric and gynecologic oncology. By arrangement.

OB GY 480 Clinical Clerkships (*) AWSpS
Gibson
University Hospital (two students), Madigan Army Hospital (two students; starting August, 1974, students must register for at least four weeks), Harborview Medical Center (two students, gynecology only), Virginia Mason Clinic (one student, office orientation). The student spends two or more weeks as a clinical clerk on obstetrics and/or gynecology at one of the above hospitals. On the obstetrical service, the student actively participates in the deliveries and closely follows the management of all obstetric patients. In addition, he is assigned to the obstetric and gynecologic outpatient clinic that afford him the opportunity to learn the office problems of the specialty. Some changes in assignments at various hospitals are made as services offered at these hospitals change. Prerequisite, 465 or Conjoint 464.

OB GY 484 Endocrinology of Reproduction (*) AWSpS
Herrmann
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 497 Obstetrics and Gynecology Special Electives (*) AWSpS
Gibson
By specific arrangement, for qualified students, special clerkship, externship, or research opportunities can at times be made available at institutions other than the University of Washington. The faculty can advise students of possible opportunities. Students wishing to elect this course should obtain from the Dean's office a "Special Assignment" form at least one month before preregistration. Prerequisites, 465 and permission.

OPHTHALMOLOGY

OPHTH 424 Special Topics in Vision (3) ASp
Hendrickson
Seminar covering special topics concerned with recent research in the anatomy, the biochemistry, and the physiology of vision. Prerequisite, permission.

OPHTH 481 Ophthalmology Clinical Elective (6) AWSp
McCLean (University Hospital)
Inpatient and outpatient diagnosis and treatment of eye disease. Student attends regularly scheduled conferences in eye pathology and lectures in ophthalmic basic and clinical sciences. In-depth exposure to ophthalmology provided for the student planning a career in a neurological science or considering a career in ophthalmology. Prerequisites, Human Biology 465 and concurrent registration in 464. (4 weeks. Limit: one student.)

OPHTH 482 Ophthalmology Externship (3) AWSpS
Kramer
Student works with a faculty member in the diagnosis and treatment of ocular disease in both outpatient and inpatient populations. Experience in common ocular disorders is gained, and neurological and other consultations seen. Prerequisite, Human Biology 465. (Limit: one student.)

OPHTH 483 Pediatric Ophthalmology (1½) AWSpS
Kalina
Student observes and examines children with ocular diseases. He observes treatment and learns to differentiate trivial from potentially blinding disorders. A programmed text in general ophthalmology is loused. Prerequisite, Human Biology 465. (Limit: two students.)
OPHTH 484 Ophthalmic Pathology (4) AWSp
Student participates with the eye pathologist in gross and microscopic examination of surgical and autopsy eyes. Emphasis is placed upon aatomic study and upon correlation of observations with clinically recognized ocular and systemic disease process. Prerequisite, Human Biology 465. (Limit: two students.)

OPHTH 497 Ophthalmology Special Electives (*) AWSp
Kalina
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.

OPHTH 498 Undergraduate Thesis (*) AWSp
Futtermann
Thesis based on research on the visual system conducted in the Department of Ophthalmology. Elective. Prerequisite, permission. (Limit: two students.)

OPHTH 499 Undergraduate Research (*) AWSp
Futtermann
Laboratory or clinical research in physiology, anatomy, or biochemistry of the visual system. Elective. Prerequisite, permission. (Limit: two students.)

ORTHOPAEDICS
CONJ 473 Musculoskeletal Pathology (2) Sp (See Conjoint Courses.)

CONJ 474 Advanced Musculoskeletal Pathology (2) Sp (See Conjoint Courses.)

ORTH 415 Orthopaedic Biomechanics (2) Sp
Lippert
Designed to provide a relevant engineering background for the understanding and solution of orthopaedic problems. Encompasses statics, dynamics, strength of materials, and metallurgy. Prerequisite, member of the hospital staff or, by arrangement, a student enrolled in bio-engineering courses.

ORTH 475 Preceptorship in Orthopaedics (*) AWSp
Student spends full time with the preceptor during all his working days in order to gain a better understanding of the diagnosis and the management of problems of the musculoskeletal system as seen in the private orthopaedic practitioners. Human Biology 465 or Surgery 465 and permission of the department. (2 weeks, full time.)

ORTH 476 Pediatric Orthopaedics (*) AWSp
Staheli
Specifically designed to acquaint the student with all aspects of musculoskeletal problems in childhood. In addition to the didactic con-

ferences and seminars, the student has opportunities for active participation in both inpatient and outpatient care at the Children's Orthopaedic Hospital and Medical Center, and the correlation anatomy and pathology as in 480. Prerequisite, Human Biology 465 or Surgery 465. (4 weeks, full time.)

ORTH 477 Musculoskeletal Trauma (6) AWSp
Hansen, Staff (Harborview Medical Center)
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, if necessary, 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 corelative anatomy and pathology as in 480. Prerequisites, Human Biology 465 and Surgery 465. (4 weeks, full time.)

ORTH 480 General Orthopaedic Clerkship (6) AWSp
Clawson, Staff
This clerkship offers the student the unique opportunity to study the wide variety of problems presented to a general orthopaedic service. The 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 principally 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, Human Biology 461 or Surgery 465. Students automatically are registered for corelative 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. (4 weeks, full time.)

ORTH 483 Sports Medicine (*)
Preceptorship experience including observation of methods of injury prevention, establishment of proficiency in the examination of the injured athlete and assisting in the operative and nonoperative treatment of injured athletes. Students attend all sports medicine clinics and in-service teaching sessions.

ORTH 497 Orthopaedic External Elective (*) AWSp
Clawson
Special arrangements can be made for students desiring to take orthopaedic electives at other institutions. Programs generally approved include orthopaedic clerkships at other universities and orthopaedic institutes. Prerequisites, Human Biology 465 and permission of the department.

ORTH 498 Undergraduate Thesis (*) AWSp
Clawson, Staff
Student works directly with a preceptor in selecting a suitable area for laboratory or clinical research in the area of orthopaedics and develops a thesis recognition. Prerequisites, Human Biology 423 and permission of department. (12 weeks.)

ORTH 499 Undergraduate Research (*) AWSp
Greenlee, Staff
Investigation of problems pertinent to the study of musculoskeletal problems in the orthopaedic laboratories as part of a research group. Prerequisite, permission of department. (12 weeks.)

OTOLARYNGOLOGY
OTOL 481 Otolaryngology Clerkship (*) AWSp
Donaldson (University Hospital)
Student participates in evaluation and care of outpatients and inpatients at the University Hospital. In addition he attends department conferences. Prerequisite, Human Biology 465. (4 weeks, full time.)

OTOL 482 Otolaryngology Externship (*) AWSp
Morrison (United States Public Health Service Hospital)
Student serves externship in otolaryngology in outpatient clinic, where visits average 600 per month, supplemented by inpatient assignments. Individual training provided, giving student opportunity to utilize his own diagnostic abilities; student performs or assists instructor in all phases of patient work-ups and care; attends ward rounds and conferences. Prerequisite, Human Biology 465. (4 weeks, full time.)

OTOL 483 Otolaryngology Externship (*) AWSp
Hayes (Madigan Hospital)
Individual externship training at outpatient clinic, where visits average 1,200 per month, supplemented by inpatient assignments. Student is responsible for patient work-ups; follows assigned patient to operating room; participates in ward rounds and hospital conferences. Students reside at the hospital during externship, using facilities of BQ and hospital mess. (Subsistence and quarters charges, approximately $2 per day.) Prerequisite, Human Biology 465. (2 or 4 weeks, full time.)

OTOL 484 Otolaryngology Clerkship (6) AWSp
Strothers
Student participates in evaluation and care of outpatients and inpatients at Harborview Medical Center. He assists in surgery, and in addition, he attends department conferences at both Harborview Medical Center and University Hospital in conjunction with department training. Prerequisite, Human Biology 465.

OTOL 485 Otolaryngology Externship (6) AWSp
Novack
To give medical students additional training in pediatric otolaryngology at Children's Orthopaedic Hospital and Medical Center. Students attend inpatient at the Children's Orthopaedic Hospital and Medical Center, and postoperative care, and study general otolaryngology problems with special emphasis on childhood disease entities. Prerequisite, Human Biology 465 or Surgery 465. (4 weeks.)

OTOL 487 Otolaryngology Clerkship (6) AWSp
West
Student participates in the evaluation and care of outpatients and inpatients at the Veterans
Administration Hospital, to provide him or her with an adequate introduction to ear, nose, and throat problems. In addition, the student must attend department conferences at University Hospital. Prerequisite, Human Biology 431. (4 weeks. Limit: one student.)

OTOL
497 Otolaryngology Special Electives (*) AWSpS
Donaldson
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 prereregistration. Prerequisite, permission.

OTOL
498 Undergraduate Thesis (*) AWSpS
Donaldson, 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.

OTOL
499 Undergraduate Research (*) AWSpS
Donaldson, Miller
Research opportunities offered under direction in the area of otolaryngology. May be repeated for credit. (12 weeks.)

PATHOLOGY
PATH
310 Introduction to Pathology (3) A
Barker, Wiegensstein, Wolf
Study of causes, processes, and effects of important diseases. Required course for students in medical technology, dental hygiene, physical therapy, and pharmacy. Prerequisites for other parts: Anatomy 317-318, and Microbiology 301 or equivalent courses in human anatomy, human physiology, or microbiology.

PATH
430 Human Cytogenetics (2) A
Hoehn
Sources and methods of preparation and identification of human chromosomes. Human cytogenetic pathology; karyotype-phenotype interactions. Prerequisite, permission.

PATH
444 General Pathology (4) A
Page
Study of basic pathologic processes that underlie disease, including inflammation, neoplasia, infarction, 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, graduate students, and others with a reasonable grounding in biologic and chemical science. Prerequisite for nondental students, permission.

PATH
445 Systemic Pathology (3) W
Kohnen
Survey of pathologic processes affecting organs and systems of particular pertinence to the practice of dentistry. Lectures and demonstrations to present a coherent picture of systemic disease presented. For second-year dental students or graduate students. Prerequisite for nondental students, permission.

PATH
460 Introduction to the Analysis of Human Disease I (3) AWSpS
Reichenbach (University Hospital, Harborview Medical Center, Virginia Mason Hospital)
Autopsy participation and review serve as an introduction to the analysis of disease. The aim is to integrate morphologic, biochemical, and physiologic parameters to gain an understanding of the pathogenesis of disease and of the effects of therapy. The course includes both autopsy and surgical material and covers gross and microscopic aspects, regional and applied anatomy, and biochemical and physiologic abnormalities as they relate to disease processes. Students are assigned in groups of three or four in one of the hospitals indicated. Prerequisites second-year medical student standing and permission, in order to make appropriate group assignment.

PATH
461 Introduction to the Analysis of Human Disease II (*) W
Martin
The goal is to illustrate and integrate histologic, biochemical, and physiologic parameters in disease and their modification by therapy. Emphasis is on disease at the level of the microscopic autopsy review, but includes both autopsy and surgical material and covers gross, microscopic, biochemical, and physiologic abnormalities as they relate to understanding the pathogenesis of disease. Prerequisite, permission. (Limit: ten students.)

PATH
462 Cardiovascular Pathology Conference (*) AWSpS
Reichenbach
Course consists of two parts: a laboratory review of gross and microscopic cardiovascular pathology of selected autopsied cases followed by a combined clinical (medical and/or surgical) and pathology conference discussing these cases. Prerequisites, Human Biology 440 and permission.

PATH
463 Neuropathology (*) AWSpS
Alvord, Leech, Shaw, Sumi
Course consists of ten parts, some or all of which may be taken separately or concurrently. Conferences on gross neuropathology (brain cutting and clinic ophthalmic correlations) held at various hospitals—Children's Orthopedic Hospital and Medical Center, Harborview Medical Center, University Hospital, Veterans Administration Hospital, Mason Hospital, and Swedish Hospital—constitute, respectively, the first six parts of the course. Students may additionally elect to attend weekly surgical neuropathology conferences (as part 7) and/or weekly neurology-neuropathology conferences (as part 8), at which current cases coming to biopsy or autopsy are discussed. Participation in a scheduled neuropathology slide show is another option in this course, as is a neuropathology laboratory case study (parts 9 and 10, respectively). Designated as surgical students, residents, and interns, and open to interested medical students. Prerequisite, permission.

PATH
464 Neuropathology Brain Modeling (4 or 8)  S
Alvord
Three-dimensional neuroanatomical relationships, critical for understanding neuropathology, are best obtained in the construction of a model of the brain. Students may elect to participate in the actual brain modeling and/or attend a series of accompanying lectures that emphasizes comparative (phylogenetic) and developmental aspects of the segmental, intersegmental, and suprasegmental components of the human nervous system.

PATH
465 Surgical Pathology (*) AWSpS
Huang
Study of fresh gross surgical specimens and review of microscopic sections of diagnostic problems in general surgery. Prerequisites, Human Biology 465 and permission.

PATH
466 Renal Pathology Conference (1-6) AWSpS
Striker
Light and electron microscopic study of human and experimental renal disease. Conference discussions and individual study. Students should concurrently register for Medicine 493. Prerequisite, Human Biology 420.

PATH
468 Skin Pathology (1) AWSpS
Barker
Histopathological aspects of skin diseases are presented and discussed in a group-conference type of seminar. Current dermatologic cases also are discussed. Prerequisites, dermatology elective and permission.

PATH
469 Oral Pathology (1-3) W
Page
Experience in, and recognition and interpretation of, the histopathologic and clinical manifestations of the oral cavity, and study of basic biological mechanisms responsible for these conditions. Prerequisites, Human Biology 420 and 431, and permission.

PATH
470 Gastrointestinal Pathology (1) S
Norris
Laboratory elective for medical students and certain graduate students covering the developmental, inflammatory, neoplastic, and degenerative diseases of the gastrointestinal tract, liver, gall bladder, and pancreas. The gross, light, and electron microscopic features of these diseases are correlated with biochemical and physiologic changes and symptomatology. Prerequisites, permission and Human Biology 441. (Limit: six students.)

PATH
471 Neuropathologic Pathology (2/4) W
Alvord, Leech, Shaw, Sumi
The particular diseases occurring in specific parts of the nervous system are considered in terms of the segmental (motor, sensory, and association plates), intersegmental (reticular formations), and suprasegmental (cerebellum, colliculi, and forebrain) components. Clinico-pathologic correlations are emphasized in the discussions of the syllabus and study sets of human, lantern slides. Prerequisites, Human Biology 432 and permission; 472 recommended; 463 recommended as concurrent course.
The spectrum of cardiovascular pathology is covered in depth by case studies and by gross and microscopic material. Case analysis for presentation, including clinical and gross and microscopic material, is prepared outside of class time. Topics covered include cardiac, pulmonary, and peripheral vascular disease, diseases of the pericardium, valvular disease, hypertension, arteriosclerotic heart disease, and congenital heart disease. Clinical-pathologic correlation is emphasized. Prerequisite, Human Biology 432 and permission; 463 recommended as concurrent course.

PATH 472 Neuropathologic Reactions (2/4) A Reichenbach
Alford, Leech, Shaw, Sumi
The reactions of the nervous system, only more or less similar to those of other organs of the body, are considered in terms of congenital malformation, inflammations, vascular, traumatic, metabolic-toxic, degenerative, and neoplastic diseases peculiar to the nervous system as a whole. Clinicopathologic correlations are emphasized in the discussions of the syllabus and study sets of 35-mm. lantern slides. Prerequisites, Human Biology 432 and permission; 463 recommended as concurrent course.

PATH 473 Cardiovascular Pathology (3) W Reichenbach
The spectrum of cardiovascular pathology is covered in depth by case studies and by gross and microscopic material. Case analysis for presentation, including clinical and gross and microscopic material, is prepared outside of class time. Topics covered include cardiomyopathy, pathology of the pulmonary vasculature, vasculitis, neoplasms, inflammatory diseases, diseases of the pericardium, valvular heart disease, hypertension, arteriosclerotic heart disease, and congenital heart disease. Clinicopathologic correlation is emphasized. Prerequisite, Human Biology 440. (Limit: fourteen students.)

CONJ 473 Musculoskeletal Pathology (2) Clowson, LaZerte
(See Conjoint Courses.)

CONJ 474 Advanced Musculoskeletal Pathology (2) Clowson, LaZerte
(See Conjoint Courses.)

PATH 475 Systemic Pathology (3, max. 6) Wsp Lagunoff, Reichenbach
Systematic presentation of disease processes organized on the basis of the organ systems with emphasis on dynamic morphology and clinicopathologic correlation. Prerequisite, Human Biology sequence through 440.

PATH 476 Clinical Pathological Conference (*) Awp
Interesting, unusual, or provocative cases principally from the University Hospital are presented for discussion by senior staff of the clinical and basic sciences. For medical students; graduate student participation by permission. May be repeated for credit. Medicine 465, Surgery 465, and Pathology 480 are recommended as concurrent courses.

PATH 480 Diagnostic Pathology Clerkship (*) Awp
Medically oriented participation in the dissection and study of autopsy and surgical pathology cases. Each student is responsible for the work-up of cases assigned to him or her under the direction of a senior staff member. This may include dissection, microscopic examination, and literature review. The student also attends pathology conferences and seminars. Clerkships are available at the University Hospital, Veterans Administration Hospital, Harbor-UCLA Medical Center, and Children's Orthopedic Hospital and Medical Center, and selected community hospitals. Prerequisites, Human Biology 420 and permission. (6, 8, 10, or 12 weeks)

PATH 498 Undergraduate Thesis (*) AwpS Benditt, Staff
Elective. Prerequisite, permission.

PATH 499 Undergraduate Research (*) AwpS Benditt, Staff
Elective. May be repeated for credit. Prerequisite, permission.

Courses for Graduates Only

PATH 500 Principles of Pathology (5) A Benditt, Staff
The basic pathologic processes, such as inflammation, neoplasia, cell alteration, and genetic and developmental pathology. Lectures, laboratory exercises, and demonstrations of human pathologic materials are used to teach the basic concepts of pathology that are important in medical and biologic research. Suitable knowledge of gross anatomy, histology, physiology, and biochemistry is required. Prerequisite, permission.

PATH 501 Cellular Response to Injury (2) A Smuckler
Lecture-seminar. Considerations of current concepts of cellular and subcellular reactions to injury, including neoplasia, as studied by modern techniques of cell biology. Required of all pathology graduate students. Prerequisite, permission. (Offered even-numbered years.)

PATH 502 Inflammation and Repair (2) Sp Lagunoff
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. Prerequisite, permission. (Offered odd-numbered years.)

CONJ 503 Somatic Cell Genetics (2, max. 6) Garder, Martin, Pious
(See Conjoint Courses.)

CONJ 505 Histochecmail and Cytochemical Methods (3) Sp Broderson, Kostiveva, Lagunoff
(See Conjoint Courses.)

PATH 507 Ultrastructural Pathology (2) S Reichenbach
Lectures on various developments in pathology and cell biology, with an emphasis on ultrastructural features. Various aspects of cell and tissue structure and function, as well as recent developments in methodology, are presented. May be repeated for credit. Prerequisite, permission.

PATH 508 Ultrastructural Pathology (4-6) Wsp Lowe, Reichenbach
Instruction in techniques of electron microscopy. May be repeated for credit. Prerequisite, permission.

PATH 510 Anatomical Analysis of Disease (*) , max. 30) AwpS Mottet
The anatomical features of human disease as revealed at surgery or postmortem by gross examination and light microscopy are correlated with chemical and physiologic changes. Prerequisites, graduate student standing and permission.

PATH 512 Introduction to the Anatomical Analysis of Animal Disease (5, max. 10) AwpS Giddens
Designed for students who will use animals in the experimental study of disease, and with an introduction to: (1) techniques of animal necropsy, (2) characterization and interpretation of gross and microscopic lesions, (3) correlation of lesions with altered physiological processes, (4) differentiation between naturally occurring and experimentally induced lesions. Under supervision, students conduct necropsies, gross and microscopic examination of tissues, correlate findings with clinical and laboratory data, work up a final report, and present cases at a conference. Laboratory primates with both naturally occurring and experimentally induced diseases are utilized for necropsy. (Limit: two students per quarter.)

PATH 520 Experimental Pathology Seminar (1) AwpS Wolf
Review of current research in various areas of experimental pathology by members of the department and visiting scientists. May be repeated for credit. Prerequisite, permission.

PATH 551 Experimental and Molecular Pathology (2-5, max. 20) AwpS Benditt, Staff
Introduction to experimental pathology. A tutorial course designed to introduce a graduate student (medical, dental) or senior undergraduate to selected methods and problems through literature surveys and/or laboratory experience. Exploration of causes at the cellular and molecular levels in the study of disease is emphasized. May be repeated for credit. Prerequisite, permission.

PATH 552 Contemporary Anatomic Pathology (2-5, max. 20) AwpS Mottet
Study of recent developments in anatomic pathology. Subject includes areas of basic science and review of systemic pathology. Recent developments and interpretation of these findings are stressed. For pathology residents, fellows, and trainees. May be repeated for credit. Prerequisite, permission.

CONJ 560 Tumor Biology (3) Champoux, Hakomori, I. Hellstrom, K. Hellstrom, Smuckler
(See Conjoint Courses.)

PATH 600 Independent Study or Research (*) AwpS
PATH 700 Master's Thesis (*) AwpS
PATH 800 Doctoral Dissertation (*)
PEDiATRICS

PEDS 401 Survey of Human Growth and Development (1½) AWSp Kirschner, Wener (Clinical Training Unit) Clinical observation and study of normal well-child care. Observation and increasing participation in patient interview, examination, and treatment plan. This course covers briefly the subjects covered in more detail in 402 and 403. Credit is not allowed for both 401 and 402-403-404. Prerequisite, permission.

PEDS 402-403-404 Human Growth and Development (1½-1½-1½) AWSp Wener 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 observations take place in the Newborn Nursery, Well Child Clinic, and the child's home. The contribution of the child's constitution, particularly as manifested at the time of birth, is shown as interacting with the situational peculiarities of his family environment. A synthesis of information about the child, reflecting the student's experience in the course, is required in lieu of a final examination. This is an opportunity to observe, to discuss, and to participate in the doctor-patient relationship. Two hours of clinic demonstration and conference a week, with five hours of additional special activities, such as home visits, nursery observation, etc., each quarter, and the preparation of two papers in lieu of examinations. Prerequisite, permission.

PEDS 405 Longitudinal Pediatric Management (4) AWSp Wener Opportunity for the student to continue contact with the child who has been the focus of his learning in 402-403-404. Emphasis is placed on the emergence of longitudinal trends in the development of the child, with the increasing clinical skills of the student making appropriate his assumption of the principal role in relation to this child. Allows longitudinal study of development and the relating of this to clinical medicine. Prerequisites, 402-403-404 and permission.

UCONJ 410 Study of Interdisciplinary Evaluation and Management of Handicapped Children (3) AWSp For course description, see "Interschool or Intercollegiate Programs."

PEDS 411 Community Night Clinics (2) AWSp Deisher Students attend at least two night clinics per week for youth and young adults with medical and social problems. Treatment and rehabilitation are emphasized. Prerequisite, Human Biology 465.

PEDS 412 Laboratory in Human Embryology and Teratology (3) W Shepard (University Hospital) Allows the student to specialize in the area of human embryology and teratology. Exact stages of human development (Streeter's Horizons) are described, and studies are conducted in the embryological basis of common abortuses and seriously sectioned human embryos. The mechanisms of abnormal development (teratology) are emphasized by techniques used in the Central Laboratory for Human Embryology. Prerequisite, permission.

CONJ 450 Maternal and Child Health (3) (See Conjoint Courses)

PEDS 451 Pediatric Electrocardiography (2) W Gunereth Brief review of the physiology and physics pertinent to clinical electrocardiography is followed by a presentation of terminology and methods in clinical use. Normal electrocardiograms are studied, followed by abnormal tracings, with emphasis on pediatric material, but including adult material such as myocardial infarction.

PEDS 452 Nutrition for Physicians (2) W Smith Clinically related nutritional considerations in both health and disease. The material is presented in a basic information series of self-teaching tapes and slides. This series covers basic nutrients, nutritional requirements, dietary practices, and nutritionally related pathologic states. Emphasis on the interpretation of normal dietary practices and their deviations, particularly as related to changing life styles in our current culture. (Limit: thirty students.)

CONJ 460 Clinical Experience in Child and Adolescent Medicine (9) (See Conjoint Courses)

PEDS 465 Pediatric General Clerkship (*, max. 16) AWSp Robertson General inpatient and outpatient pediatric clerkship at a variety of locations, including Children's Orthopedic Hospital and Medical Center, University Hospital, Harborview Medical Center, Madigan General Hospital, and WAMI units in Idaho, Montana, and Washington. Besides his clinical experience, the student has a faculty preceptor and attends seminars on major pediatric subjects. Prerequisite, Human Biology 465.

PEDS 469 Neonatal Pediatrics—Clerkship (*) AWSp Tudden Participation in the activities in the newborn and premature divisions; ward rounds, seminars, conferences, and familiarization with certain laboratory techniques; particularly those relating to acid-base balance. Prerequisite, 465.

PEDS 470 Pediatric Infectious Diseases and Immunology (*) AWSp Ray (Children's Orthopedic Hospital and Medical Center) Elective dealing with the development of immune mechanisms and diagnosis and treatment of infectious diseases and immunologic defects in children. Prerequisite, introductory microbiology and physiology, and extensive laboratory experience. Prerequisite, 465 or permission.

PEDS 472 Clinical Experience in Child Development and Education (*) AWSp Wener Experience at the Clinical Training Unit in the common problems met in clinical practice among children from infancy through adolescence. Emphasis is on normal development and behavior. Prerequisite, Human Biology 465.

PEDS 473 Office Practice (*) AWSp Bergman Opportunity to observe and function in the private office settings of a number of clinical pediatricians and to accompany pediatricians as they pursue their daily activities in the community. Prerequisite, 465.

PEDS 474 Social Problems Related to Child Development and Health Care (*) AWSp Deisher Combined experience with normal and handicapped infants, children, and adolescents from low-income families and minority cultures and races. Special emphasis on the effect of environment on the child and his functioning. Prerequisite, Human Biology 465.

PEDS 475 Pediatric Clerkship With the Mentally Handicapped (*) AWSp Reicher (Rainier School, Hayden (Fircrest School) Total care involvement with mentally handicapped patients, incorporating general pediatric knowledge of mental retardation and neurology, plus other specialties related to mental deficiencies. Additional information may be obtained from Dr. W. O. Robertson, Children's Orthopedic Hospital and Medical Center. Prerequisite, 465. (4 or 6 weeks, full time.)

CONJ 477 Clinical Allergy (*) (See Conjoint Courses)

PEDS 480 Pediatric Clinics (*) 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, pediatric surgery, ophthalmology, and poison control center. Prerequisite, Human Biology 465.
Clinical and laboratory experience related to clinics per week, and rounds of catheterizations and cardiovascular procedures. On average, one cardiac surgery is performed.

Advanced course in pediatrics providing diagnosis, and care. This externship type of experience can be obtained at any one, or combination, of the hospitals in the affiliated program, including WAM units in Idaho, Montana, or Washington. Students interested in this option should make arrangements well in advance of registration. May be repeated for credit. Prerequisite, 465.

Advanced course in pediatrics providing diagnosis, and care. This externship type of experience can be obtained at any one, or combination, of the hospitals in the affiliated program, including WAM units in Idaho, Montana, or Washington. Students interested in this option should make arrangements well in advance of registration. May be repeated for credit. Prerequisite, 465.

By specific arrangement, for qualified students, special clerkship, externship, or research opportunities can at times be made available at institutions other than the University of Washington. The faculty can advise students of possible opportunities. Students who wish to elect this course should obtain from the Dean's office a "Special Assignment" form at least one month before preregistration. Prerequisite, permission.

For medical students. Prerequisite, permission.

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, inborn errors of metabolism, infectious diseases, neonatology, neuroembryology, pediatric cardiology, metabolic aspects, pediatric cardiology: physiological aspects, pediatric endocrinology and metabolism, pediatric immunology, respiratory disease, dysmorphology. Prerequisite, permission.

Nine weekly seminars (18 hours). Presentation by departmental staff of relationships between growth and development and diseases as they pertain to dental health. For twenty graduate students in dentistry. (Offered even-numbered years.)

Lectures and demonstrations concerning the action of drugs on physiological and pathological processes with special emphasis on agents of special importance in the practice of dentistry. For dental students.

Current concepts of the actions and effects of therapeutic and toxic chemicals. Prerequisites, 100 or 101 and Biology 100 or 101-102, or permission.

Introduction to general aspects of pharmacology. Consideration of principles governing drug action, disposition, excretion, metabolism, interaction with living systems, and dose-effect relationships. General pharmacology of drugs influencing the autonomic and cardiovascular systems, with emphasis on sites and mechanisms of action. For pharmacy students; others, including medical and graduate students, by permission. Prerequisites, Chemistry 236, Physiology and Biophysics 360, Biological Structure 301, Pathology 310, and Biochemistry 405, or their equivalents, or permission.

Further consideration of general aspects of pharmacology, including actions of drugs on endocrine and central nervous systems and on neoplastic processes. Demonstration laboratory/conference sessions are utilized to illustrate basic pharmacologic phenomena and to consider their relationships to present-day pharmacy, medicine, and society. For pharmacy students, others by permission. Prerequisite, 401 or equivalent, or permission.

Emphasis on approaches to the understanding of the basic underlying mechanisms of drug effects. Drug-receptor theory, drug disposition, and enzymic biotransformation discussed in detail; considerations of pharmacogenetics, drug-allergic responses, drug-induced teratogenesis, carcinogenesis, and mutagenesis are stressed. Mechanisms of drug resistance, tolerance, psychic and physical dependence are considered. Prerequisites, 401, 402 or Human Biology 440, or permission.

Study of drugs acting on the autonomic nervous and cardiovascular systems. Emphasis on physiological and biochemical mechanisms with consideration of their therapeutic and adverse effects. Prerequisite, 441 or Human Biology 432 or permission.

Lectures and discussions on the pharmacology of the kidney, gastrointestinal system, and chemotherapeutic of parasitic, microbial, and neoplastic disease. Prerequisite, 441 or Human Biology 415 or permission.

Advanced elective neuropsychopharmacology as a basis for therapeutic applications of drugs for use in neurology, psychiatry, and anesthesiology. Neuropsychopharmacological and psychopharmacological correlates presented with clinical demonstration material when applicable and available in an attempt to understand drug choice, efficacy, mechanism of therapeutic action, interactions, safety, and limitations of therapeutic effectiveness. Prerequisite, 411 or Human Biology 432, or permission.

Selected laboratory experiments in pharmacology of selected basic principles of drug actions. Autonomic nervous system, central nervous system, and cardiovascular drugs are employed in both intact and isolated mammalian systems.
malian systems. One lecture and one four-hour laboratory per week. Prerequisite, permission.

PHCOL 497 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 498 Undergraduate Thesis (*) AWSpS
For medical students. Prerequisite, permission.

PHCOL 499 Undergraduate Research (*) AWSpS
Participation in departmental research projects. For medical students. Prerequisite, permission.

Courses for Graduates Only

PHCOL 507 Pharmacology Seminar (1) AWSpS
Davis
Presented of comprehensive reports on recent medical and scientific literature in fields of current importance. Research progress reports, and reports on results of completed research.

PHCOL 510 Current Topics In Pharmacology (2) W Davis
Recent progress in pharmacological research. Considered areas include renal pharmacology, polypeptides, and selected aspects of toxicology. Prerequisite, permission. (Offered alternate years; offered 1975-76.)

PHCOL 511 Special Pharmacological Techniques (3)
Laboratory treatment of biochemical, biophysical, and surgical approaches employed in pharmacological investigation. Prerequisites, 401, 402 or 234, or permission.

PHCOL 525 Cardiovascular Pharmacology (2) Sp Vincentz
Advanced considerations of drug actions on the cardiovascular system. Emphasis on cellular and membrane actions of drugs influencing cardiac automaticity, excitability, contractility, and interpretation of original research in these areas. Open to medical and graduate students. Prerequisites, 401, 402 or 442 or 444 or Human Biology 440, or permission. (Offered alternate years; offered 1974-75.)

PHCOL 526 Autonomic Pharmacology (2) W Hortin
Advanced treatment of pharmacologic effects on storage, release, and action of autonomic transmitter substances. Prerequisites, 442 or 401, 402 or 234, or permission. (Offered alternate years; offered 1974-75.)

PHCOL 527 Biochemical Pharmacology (2) A Juchau
Considerations of the biochemical mechanisms for the biotransformation of drugs and foreign compounds. Included are reaction mecha-

nisms, ultrastructural considerations, induction mechanisms, methodology, kinetics of inhibition and activation, steroid and amino metabolism, and implications in modern therapy. Open to medical and graduate students. Prerequisite, one year graduate, medical, or dental biochemistry, or permission. (Offered alternate years; offered 1974-75.)

PHCOL 538 Neuropsychopharmacology (2) A Halpern
The pharmacology of the central nervous system. Prerequisites, 444 or 401, 402 or 234, or permission. (Offered alternate years; offered 1975-76.)

PHCOL 539 Essentials of Toxicology (2) Sp Loomis
Study of harmful effects and various factors that influence the harmful effects of chemicals on biological tissue. Prerequisites, 401, 402 or 234, or permission. (Offered alternate years; offered 1975-76.)

PHCOL 533 Methods of Toxicology (2) Sp Loomis
A combined laboratory demonstration and didactic consideration of chemical, physical, and biological methods involved in studies of harmful effects of chemicals on biological tissue. Prerequisites, 401, 402 or 234, or permission. (Offered alternate years; offered 1974-75.)

PHCOL 531 Advanced Dental Pharmacology (3) Sp In-depth treatment of the pharmacology of those drugs commonly employed in the practice of dentistry. Prerequisite, 234 or equivalent.

PHCOL 534 Advanced Dentalt Phamacology (3) Sp In-depth treatment of the pharmacology of those drugs commonly employed in the practice of dentistry. Prerequisite, 234 or equivalent.

PHCOL 532 Advanced Dental Pharmacology (3) Sp Loomis
A combined laboratory demonstration and didactic consideration of chemical, physical, and biological methods involved in studies of harmful effects of chemicals on biological tissue. Prerequisites, 401, 402 or 234, or permission. (Offered alternate years; offered 1974-75.)

PHCOL 600 Master's Thesis (*) AWSpS
PHCOL 800 Doctoral Dissertation (*) AWSpS

PHYSIOLOGY AND BIOPHYSICS

CONJ 317-318 Introductory Anatomy and Physiology (6-6) AS,WSpS
(Sec Conjoint Courses.)

P BIO 350 Basic Human Physiology I (2-6, max. 6) AWSpS
Brown
Neurophysiology. The function of the human nervous system; peripheral nervous system, sensory function, the brain. At present, offered only through the Division of Evening and Extension Credit Programs. Prerequisite, general chemistry or zoology or permission.

P BIO 351 Basic Human Physiology II (2-6, max. 6) AWSpS
Brown
Transport and exchange organ systems responsible for distribution of materials within the body and regulation of the internal environment: cardiovascular system, respiratory system, renal (kidney) system. At present, offered only through the Division of Evening and Extension Credit Programs. Prerequisite, general chemistry or zoology or permission.

P BIO 352 Basic Human Physiology III (2-6, max. 6) Brown
Metabolism and endocrinology. The systems associated with energy metabolism and body hormones: blood, body fluids, and energy exchange; the gastrointestinal system; endocrinology and reproduction. At present, offered only through the Division of Evening and Extension Credit Programs. Prerequisite, general chemistry or zoology or permission.

P BIO 360 General Human Physiology (5) A Conrad
Special laboratory sections are designed for engineering students. Full credit toward the inter-engineering M.S.E. degree is allowed. Prerequisite, permission from Bioengineering Center.

CONJ 400 Human Anatomy and Physiology (6 or 9) A
(See Conjoint Courses.)

P BIO 405 Human Physiology (6) W Brengelmann, Latche
Intensive coverage of advanced physiology through lectures, laboratories, and demonstrations. Required for first-year dental students; graduate students and others by permission.

P BIO 409 Physiology of Transport Organ Systems (3½) A Stirling
Detailed biophysical discussion of diffusion and active sodium-potassium transport provides a foundation for a subsequent presentation of transport phenomena of the alimentary canal (motility, secretion, and absorption) and of the kidney (filtration, reabsorption, and secretion). Although integration of these functions is discussed, their cellular and membrane transport mechanisms are stressed. Prerequisite, permission. (Formerly 413.)

P BIO 410 Nerve-Muscle Physiology (3) A Gordon, Hille
Detailed consideration of the active ion transport, nerve-impulse conduction, neuromuscular synaptic transmission, excitation-contraction coupling, and contraction coupling and contractile processes of vertebrates. Aim is to convey the concepts of excitable, synaptic, and contractile phenomena. Prerequisite, permission.

P BIO 411 Neurophysiology (3½) W Paton
Functioning of the central nervous system (somatic and visceral); special senses (audition, vision, vestibular); descending systems (cortical and subcortical); cerebellum; hypothalamus; behavior and neurophysiology; comparative neurophysiology. Prerequisite, permission.

CONJ 411 Functional Neuroanatomy (3½)
(See Conjoint Courses.)

P BIO 412 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.

P BIO 413 Regulation of Temperature, Respiration, and Acid-Base Balance (3½) Young
Introduction to control systems theory covering, in moderate depth, temperature regulation, metabolism, respiratory gas transport, mechanisms and control, respiratory control, and acid-base regulation, primarily as related to humans. Prerequisites, elementary physics, mathematics, biology, and permission.

P BIO 414 Physiology of Metabolic and Endocrine Regulation (2½) Sp Gale
Control functions of endocrine system: pituitary, hypothalamus, target organs, thyroid, adrenal cortex and medulla, pancreas, parathyroid, reproduction physiology. Prerequisite, permission.

P BIO 415 Physiology Laboratory (1-2) AWSp Fuchs
Small-group experiments to complement the course content of 409 through 414. Four or five different laboratories are scheduled for each quarter. May be repeated for credit. Prerequisite, permission.

P BIO 418 Biological Instrumentation (4) S Brengelmann, Laschel
Principles of biological instrumentation systems, transfer relations, transient and frequency response of simple systems, noise, feedback and control systems, analog computation. Oriented toward biology, medical, and premedical students. Prerequisites, beginning calculus and permission.

P BIO 419 Biological Instrumentation Laboratory (2) Brengelmann, Fetz, Laschel
Laboratory to illustrate and extend material presented in 418. Prerequisite, permission.

P BIO 424 Vision and Its Physiological Basis (5) A. Teller
Phenomena of human vision, including: spectral sensitivity, color vision, spatial interactions, light and dark adaptation, distance perception, and binocular interactions. Techniques for the study of vision in human subjects are included. The correlation of human visual functioning with known optical, biochemical, anatomical, and physiological factors is stressed. Offered jointly with the Department of Psychology as Psychology 424. Prerequisite, permission; some background in a physical or biological science is recommended.

P BIO 427 Abnormal Physiology (2) W Crill, Stevens
Selected topics in the cardiovascular, renal, respiratory, and nervous systems that illustrate physiological changes in clinical disease and clinical examples of basic physiologic principles. Prerequisite, permission.

P BIO 430 Mathematical Methods of Physiology and Biophysics (3) A Stevens
Selected mathematical methods particularly useful in physiology and biophysics are developed. Emphasis is on deriving mathematical descriptions, usually in the forms of ordinary or partial differential equations, for physiological systems. Topics covered usually include solution of differential equations using the Laplace transform linear approximation of nonlinear systems, transfer function, and Green's function description of physiological systems. Prerequisite, permission.

P BIO 431 Theory of Biological Control Systems (3) W Brown
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; m-plane description of feedback systems; synthesis of descriptive functions of experimental results; effect of non-linearities on control system response. Basically a course in mathematical analysis of feedback systems, using biological examples. Recommended background includes some acquaintance with differential equations and course work in vertebrate or mammalian physiology. Prerequisite, permission. (Offered alternate years with 432; offered 1975-76.)

P BIO 432 Applications of Biological Control Systems (3) W Fuchs
Examples of biological control systems are discussed in detail. Problems in research on respiratory, cardiovascular, hormonal, metabolic, ocular motor, and other regulatory systems are presented. Prerequisite, permission. (Offered alternate years with 431; offered 1974-75.)

P BIO 437 Computer Programming for Biological Research (3) S Kehl
Application of procedure-oriented languages to biological research. Stress is placed on programming in FORTRAN IV, ALGOL, and digital-analog simulator. Programming practice on various computers is assigned with term-program written at conclusion of course. Prerequisite, permission.

P BIO 470 Selected Topics in Endocrinology and Metabolism (3) A Gall
Reading and discussion of current literature with emphasis on regulatory mechanisms in mammals. May be repeated for credit. Prerequisite, permission.

P BIO 472 Pulmonary Mechanics and Gas Exchange (2-5) A Young

P BIO 474 Neurological Study Unit (2) AW Crill
Faculty and student discussion of neurological topics illustrated with clinical cases or demonstrations including the following: physiology, neuroanatomy, neurology, neuropathology, neurosurgery, and psychiatry. May be repeated for credit. Offered on credit/no credit basis only. Prerequisite for medical students, Human Biology 432 taken prior; others by permission.

P BIO 499 Undergraduate Thesis (*) AWSp
For medical students. May be repeated for credit. Prerequisite, permission.

P BIO 499 Undergraduate Research (*) AWSp
For medical students. May be repeated for credit. Prerequisite, permission.

Courses for Graduates Only

P BIO 505 Physiological Acoustics (3) Sp Miller
Seminars on the physiological basis for audition. Includes discussion of the function and the structure of the auditory system, the ear, mechanics, transmission processes, and physiology of control pathways. Prerequisite, permission. (Offered alternate years with 546; offered 1975-76.)

P BIO 506 Physiological Basis of Dental Science (3) S Van Hassel
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 the Department of Endodontics as Endodontics 525. Prerequisite, permission.

CONJ 509 Neurochemistry (3) W (See Conjoint Courses.)

P BIO 515-516-517 Physiological Prosemnar (7-7-7) A, AWSp
Guided survey of the experimental literature of major topics in physiology. Course conducted as seminar with oral analysis of assigned papers and topics. Prerequisite, permission.

P BIO 519 Membrane Biophysics Seminar (1) AWSp Hille
Detailed discussion and study of current topics in cell membrane function and structure. May be repeated for credit. Prerequisite, permission.

P BIO 520 Physiology Seminar (*) AWSp
Selected topics in physiology. May be repeated for credit. Prerequisite, permission.

P BIO 521 Biophysics Seminar (*) AWSp
Selected topics in biophysics. May be repeated for credit. Prerequisite, permission.

P BIO 522 Pulmonary Mechanics and Gas Exchange (2-5) A Young
tribution within the body. Properties of cutaneous and deep temperature receptors. Neural integration and homeothermy. Prerequisite, permission.

P BIO 524 Advanced Membrane Potentials (*) Sp Hill

P BIO 525, 526, 527 Readings in Advanced Physiology and Biophysics (**) A, W, SpS
Guided study of the experimental literature of physiology and biophysics. Essays are written and discussed with the staff. Emphasis is placed on critical analysis, accuracy of expression, bibliographical technique, and other factors of good scholarship. Each course may be repeated for credit. Prerequisite, permission.

P BIO 528 Advanced Physiological Control Systems (2-5, max. 10) A Young
Theories of nonlinear mechanics and their applications to physiological systems. May be repeated for credit. Prerequisite, permission.

P BIO 530 Synapse 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.

P BIO 531 Biophysics of Circulation (3) A Scher, Wiederhilm
Study of cardiovascular physiological areas where quantitative models have been seriously proposed: dynamic models of arterial circulation, characteristics of microcirculation, transport across capillary wall. Prerequisite, permission. (Offered alternate years; offered 1974-75.)

P BIO 535 Operative Techniques in Neurophysiology (2-5) S Laschei, Smith
Decerebration, cortical ablation, stereotactic lesions, cardiovascular surgery, chronic electrode implants, anesthesia, and psychology management. Prerequisite, permission.

P BIO 536 Behavioral Techniques in Neurophysiology (2-3) Sp Laschei
Study and use of behavioral methods applicable to nervous system studies. Quantification of activity and physiological variables, interpretation of neural lesions and chronic electrode implants. Prerequisite, permission.

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.

P BIO 540 Physiology of Vision (3) Sp Stevens, Teller
Selected readings from recent literature on visual systems. Emphasis is placed on studies of single neuron discharge, but other topics, such as biochemistry of visual pigments and optical properties of the eye, are usually included. May be repeated for credit. Prerequisite, permission.

P BIO 546 Advanced Physiological Acoustics (3) Sp Miller
Advanced seminars in physiological acoustics, including experimental anatomy of peripheral and central auditory system, receptor encoding of auditory information, frequency discrimination, binaural hearing, sound localization, efferent modulation of auditory activity. Prerequisite, permission. (Offered alternate years with 505; offered 1974-75.)

P BIO 549 Properties of Neurons (*) Sp Stevens
Selected readings from recent literature comparing properties of neurons from different regions of the vertebrate central nervous system. Emphasis is on the critical evaluation of data obtained by intracellular recording. May be repeated for credit. Prerequisite, permission.

P BIO 550 Cortical Potentials (4) Towe
Properties of continuous and evoked potentials and their interactions. Relationship of cortical unit activity to cortical potentials. Prerequisites, 515, and permission.

P BIO 551 Physiology of Cerebellum (3) Sp Kennedy
Function of cerebellum and its afferent and efferent systems; discussion of current physiological literature. Prerequisite, permission.

P BIO 559 Integrative Neurophysiology (3) Sp Towe
Interpretation of neurophysiological phenomena from comparative, biophysical, and evolutionary standpoints. Prerequisite, permission.

P BIO 560 Contraction of Skeletal Muscle (*) Sp Gordon
Structure and properties of skeletal muscle leading to contraction theories. Length-tension relations. X-ray diffraction and fine structure studies. Sliding filament hypothesis. Mechanical properties. Heat and chemical studies. Excitation-contraction coupling. May be repeated for credit. Prerequisite, permission.

P BIO 580 Special Topics in Physiological Control Systems (*) W, SpS Young
Selected physiological control systems are covered in detail. Literature survey of pertinent papers is used as a basis for indicating the direction of future research. May be repeated for credit. Prerequisite, permission.

P BIO 600 Independent Study or Research (*) W, SpS

P BIO 700 Master's Thesis (*) W, SpS
P BIO 800 Doctoral Dissertation (*) W, SpS

PSYCHIATRY AND BEHAVIORAL SCIENCES

PBSCI 267 Preventive Methods for Mental Health (2) W, Taylor
Explores the concepts of mental health and mental illness and the factors that produce each, with analysis of methods of primary, secondary, and tertiary programs, including psychological, social, and cultural factors. For nonmedical students.

UCONJ 410 Study of Interdisciplinary Evaluation and Management of Handicapped Children (3)
For course description, see "Interschool or Intercollege Programs."

PBSCI 440 Physiology of Emotions (*) W, SpS Holmes
Seminar based on discussion of selected reading of original articles from psychophysiological and psychosociological literature. Designed to orient and interest students for participation in current or future research projects and clinical medicine. Seminar format with guided reading and appropriate case material. For medical students; graduate students by permission.

PBSCI 441 Clinical Geropsychiatry (3) AW, SpS Preston, B. A., Stotsky, M. A., Stotsky
Combined clinical and didactic experience in the prevention, diagnosis, and treatment of emotional disorders in the aged. Includes observation and interaction with both well and ill old persons in community agencies and in extended care facilities. A didactic seminar explores such topics as psychotherapeutic interventions and psychopharmacology in the elderly, reality orientation, alternatives to institutionalization, and successful life styles for the elderly. For medical students; others from health sciences with permission of instructor.

PBSCI 442 Cross-Cultural Mental Health (2) AW, SpS James
Examination of several social systems with regard to the manner in which patterns of mental illness are developed, maintained, or modified by cultural elements. Lecture-discussion course with guided reading. May be repeated for credit. (Limit: fifteen students.)

CONJ 444 Medical Aspects of Sexual Problems (1-4)
(See Conjoint Courses.)

PBSCIL 445 Sensitivity Training Group (1) A Sata
An unstructured small-group experience in which the participants learn from experience about group functioning and increase their awareness to group interaction and feedback on themselves and their perception of others. Medical students only. (Limit: twelve students.)
PBSCI 447 Problems and Dynamics of Families and Small Groups (2) W Townes
Discussion of the dynamics of family and small-group functioning include cross-cultural data, the structure of communication, leadership, influence and attitude change, cohesiveness, modeling, role assignment, and the relation of poverty to family style, with particular focus on the pertinence to medical practice. Medical students and advanced graduate students only. Seminar format with guided reading. (Limit: fifteen students.)

PBSCI 448 Aging and Adult Development (2) A Wsp Preston
Aging in Western technologically advanced societies frequently involves losses in status, in stamina, and in economic and social supports. Consideration is given to various adaptations to losses among the aged. Seminar format, guided reading; content tailored to individual student interests.

PBSCI 449 Principles of Research in Psychopathology (2) W Becker
Review of current literature on selective aspects of personality deviation. Theoretically relevant research on the functional psychoses is stressed. Open to medical students and advanced undergraduate students with the equivalent of an introductory or abnormal psychology course. Can be combined with a research project of the student's own choosing. (Limit: ten students.)

PBSCI 451 Principles of Personality Development (2) S Heilbrunn
Consideration is given to the psychologic, psychologic, and cultural factors from maturity through old age. Prerequisite, senior or graduate standing.

PBSCI 452 Clinical Psychiatry (2 or 3) W Scher
Traces the development of psychiatric concepts to the present day, including theories of causation, prevention, and treatment. Emphasis on the use of therapies appropriate to the diagnosis. Didactic earns only two credits; didactic plus patient demonstrations earns three credits. Prerequisite, permission.

PBSCI 455 Psychoanalytic Theory (1) A Ripley
Basic concepts of psychoanalysis, including the psychology of errors, dreams, the meaning of symptoms, transference and the libido theory are considered. Seminar format with guided reading. Medical students only. (Limit: fifteen students.)

PBSCI 456 Classical Readings in Psychiatry (2) W Ripley
Selected readings from writings of leading contributors to psychiatric theory. Among them are Janet, Freud, Adler, Jung, Sullivan, Meyer and Erikson. Seminar format with guided reading. Medical students only. (Limit: fifteen students.)

PBSCI 457 Theory of Learning and Behavior Modification (2) A W Armstrong
Theory and technique of behavior modification as they are applied to behavioral adjustment problems of adults and children. Seminar format with guided reading. Prerequisite, permission. (Limit: forty students.)

PBSCI 458 Psycho-Social Growth and Development (2) A Townes
Reviews the current literature on psychosocial influences on development and modification of self-esteem, affiliation, cognitive complexity, self-control, conformity, productivity, and cooperation. Open to medical students and to advanced undergraduate students.

PBSCI 459 Interviewing Techniques (1) W Ripley
Practice with interviewing psychiatric patients, followed by discussion of the technical and clinical aspects. Medical students only. Prerequisites, Human Biology 423, 463. (Limit: ten students.)

PBSCI 460 Community Psychiatry (3) A Taylor
Familiarizes students with the role of medicine and psychiatry in the community mental health center movement. Introduces the student to community resource systems and analyzes some of the social problems contributing to community mental health concerns. Open to medical students and graduate students by permission. (Limit: ten students; minimum: five students.)

PBSCI 462 Principles of Hypnosis (2) Sp Ripley
History and theory of hypnosis. Induction techniques. Application to the treatment of illness. Medical students only. Prerequisite, permission.

PBSCI 463 Experience in the Child Day Care Unit (9) A Wsp Davis
Involves working in the Child Day Treatment Unit with a seriously disturbed child, especially in group activities, and participating in team conferences around the child and general discussions of treatment. Opportunity for involvement with the schools, because some of the children are ready to go into a public school special education program. It also permits work with some of the parents and observation of the efforts to engage parents in working with their own children. Students also participate in the didactic exercises of the Division of Child Psychiatry. Prerequisite, Human Biology 465. (6 weeks, full time. Limit: one student.)

PBSCI 464 Clerkship in Ambulatory Services, HCMHC (9) A Wsp Nash
Trains in an opportunity to experience a variety of ambulatory services in the Harborview Community Mental Health Center. Focus is on teaching the student to learn techniques of initial evaluation and diagnosis, crisis intervention, aspects of suicidology, individual, family, and group psychotherapy. Minority and disadvantaged populations also are considered. Prerequisites, Human Biology 465 and Psychiatry 465, or permission. Medical students; graduate students by permission. (6 weeks, full time; 12 weeks; half-time. Limit: four students.)

PBSCI 465 Clinical Clerkships (9 or 18) A Wsp Ely, Johnson
Closely supervised experience under an attending physician on a psychiatric inpatient service. The student is responsible for diagnostic evaluations of, and primary patient responsibility for, patients with a variety of psychiatric disorders at University Hospital, Harborview Medical Center, or Veterans Administration Hospital. He also receives emergency room service experience at Harborview Medical Center, which supplies numerous opportunities for crisis intervention methods. The student is introduced to the principles of the use of psychologic tests, ward milieu management, group psychotherapy, and the physical and pharmacological treatments. Clinical conferences with discussion of psychoses, psychoneuroses, and psychosomatic disorders. Limited contact time and screening experience available. Third- and fourth-year medical students only. (Limit: eighteen students.)

PBSCI 466 WAMI Psychiatry and Behavioral Sciences Clerkship (9) A Wsp Kraus, Womack
Clinical training experience for junior and/or senior medical students. The rotation aims at increasing the student's skills in basic psychiatry, social psychiatry, transcultural psychiatry, and office management. Orientation is around the diagnostic, treatment, and clinical management of white, Aleut, Indian, and Eskimo children and adults in outpatient and community settings, both urban and rural. Prerequisite, previous clerkship in psychiatry or demonstration of equivalent experience. (6 weeks, full time.)

PBSCI 470 Chemical Aspects of Behavior (2) Sp Maudu
Behavior from the point of view of biochemistry and physiology (e.g., some genetic aspects of behavior, aberrant biochemistry and disease, brain biochemistry, learning and biochemistry, and use of psychopharmaceuticals). Seminar format with guided reading. Open to third- and fourth-year medical students only. (Limit: ten students.)

PBSCI 475 Psychiatric Externship (*) A Wsp Holmes
Opportunity to learn, from first-hand experience and active participation, the methods used in caring for seriously ill patients at a state psychiatric hospital. Elective open to medical students only. Prerequisite, 465. (Limit: four students.)

PBSCI 490 Adult Development Program (9 or 18) A Wsp Armstrong, Bakker
In the Adult Development Program (ADP), the student functions as a team member. He is expected to participate in all the classes offered in the program. He functions as a consultant to a client assigned to him. He has opportunity to acquire experience with a wide variety of behavior change techniques, including group experiences, role playing, couples workshops,
MEDICINE

fixed-role workshop, etc. Prerequisite, Human Biology 465. (6 or 12 weeks, full time. Limit: three students.)

PBSCI 491 Seminars and Conferences in Psychiatry (5) AWSp
Ripley
Special seminars and conferences on a variety of topics can be arranged to accommodate the particular interests of students. Prerequisite, permission.

PBSCI 492 Behavioral Science Study Unit (*) AW Masuda
A variety of topics is presented under the sponsorship of the Department of Psychiatry and Behavioral Sciences, with participation of faculty members from many departments of the total University as well as from the health sciences. When practicable, selected patients illustrate topics presented. Medical and graduate students. May be repeated for credit.

PBSCI 497 Psychiatry Special Electives (*) AWSp
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.

PBSCI 498 Undergraduate Thesis (*) AWSp
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. (2, 4, or 6 weeks, full time.)

PBSCI 499 Undergraduate Research (*, max. 15) AWSp
Opportunities are available for participation in a wide variety of ongoing research in the behavioral sciences and clinical psychiatry, or for the development of an individual investigative project under the supervision of a faculty sponsor. May be repeated for credit. Prerequisite, permission. (4, 6, or 12 weeks.)

Courses for Graduates Only

PBSCI 553 Psychodynamics of Psychopathology (2) A Hellbrunn
General psychopathologic phenomena and their defense reactions are traced to the developmental history of the individual with due attention to constitutional and organic causes. The general phenomena are applied to the most important psychotic syndromes. Relevant case illustrations are offered as basis for therapeutic intervention. Medical and graduate students.

PBSCI 566 Biological Correlates of Psychiatry (2) Sp Hellbrunn
-Anatomical and physiological factors involved in various forms of psychopathology. Medical and graduate students.

RADIOLOGY

RADGY 460 Introduction to Clinical Radiology (1) Sp Figley, Parker, Troupin
A basic clerkship in both diagnostic and therapeutic radiology designed to familiarize the student with clinical radiology and to expand and demonstrate application of knowledge acquired in the basic curriculum. Prerequisite, Human Biology 420.

RADGY 477 Introduction to Radioactive Tracer Techniques (3) A Robkin
Introduces the student to the basic concepts of the use of radioactive tracers to measure the transfer between the compartments of a biological system. The theoretical analysis is restricted to systems with no more than three compartments. The experiments are designed to permit the student to utilize the theory discussed and to make actual determination of transfer coefficients. Offered jointly with the Department of Nuclear Engineering as Nuclear Engineering 477.

RADGY 480 Nuclear Medicine Techniques, Physics, and Instrumentation (2½) S Nelp
Provides familiarization with basic nuclear phenomena and with the instrumentation used in the practice of nuclear medicine. There are discussions and laboratory exercises. Practical experience in instrument operation and sample counting are provided. Prerequisite, permission.

RADGY 487 Radiocative Tracer Techniques (2) A Robkin
The use and behavior of radioactive tracers is studied; attention is given to the dynamics of the distribution of trace elements after their introduction into the system under analysis. Analysis of current models and application to examples from both living and nonliving systems. Offered jointly with the Department of Nuclear Engineering as Nuclear Engineering 487. Prerequisite, permission.

RADGY 493 General Radiology Clerkship (3 or 6 or 9) AWSp Troupin
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 ongoing film interpretation, fluoroscopy, and special procedures. A variety of X-ray and clinical conferences can be attended, supplementing daily film reading sessions and seminars with the staff. 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 recently has been added to provide insight into radiologic care delivery in community practice. Prerequisite, Medicine 465 or Human Biology 465.

RADGY 495 Clinical Cancer Management (*) AWSp (University Hospital) Parker
Supervised participation in clinical management of the patient with cancer. Includes clinical evaluation, planning of treatment, and follow-up examination of patients. Daily teaching conferences. Prerequisite, Medicine 465 or Human Biology 465, or permission. (2 weeks.)

RADGY 496 Nuclear Medicine Clerkship (*) AWSp Nelp
Student participates from 8:00 a.m. to 5:00 p.m. daily in the nuclear medicine clinical labora-
tory, where diagnostic studies of various types are performed. The student has responsibility for examining patients and assists in the diagnostic or therapeutic procedure. He assists in ward consultation, attends daily clinical conferences, and participates in the ward rounds of the division. Prerequisite, permission. (2, 4, or 6 weeks.)

RADGY 497 Radiology Special Electives (*) AWSp
Toyo
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.

RADGY 497 Undergraduate Thesis (*) AWSp
Fugle
The student may write a thesis in either therapeutic or diagnostic phases of radiology. Medical students only. Prerequisite, permission.

RADGY 499 Undergraduate Research (*) AWSp
Fugle
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. Fugle, Dr. Parker, or Dr. Nelp.

RADGY 501-502 Biological Effects of Ionizing Radiation (2-2) A,W
Jackson
Effects of ionizing radiation at the molecular, cellular, organ, and organism levels, with emphasis on mammalian systems. Prerequisite, permission.

RADGY 503-504 Laboratory in Radiation Biology (1-1) A,W
Christensen
Laboratory study of the biological effects of ionizing radiation. Prerequisite, permission.

RADGY 505 Radiological Physics (3) W
Wootton
Application of physical-concepts methodology and instrumentation in the study, production, and measurement of ionizing radiations and their interactions with biological materials. Prerequisite, permission.

RADGY 507 Radiation Hazards Analysis and Control (1) Sp
Baltz
Emphasizes methods and procedures rather than facility or equipment design.

RADGY 510 Special Topics in Radiation Biology (2) Sp
Christensen
Details study of current research of special significance to the development of radiation biology. Prerequisite, permission.

RADGY 515 Chemical Mechanisms in Radiation Biology (2) ASp
Christensen
Discussion of radiation-induced chemical reactions and their contribution to biological radiation damage, including alterations in enzymes, viruses, bacteria, and mammalian cells. Prerequisite, permission.

RADGY 517 Radiation Dosimetry (3) Sp
Bichsel
Basic principles of the interaction of radiation with, and the energy deposition in, matter. Definition and measurements of radiation fields. Radiation transport. Prerequisite, permission.

RADGY 520 Seminar (2)
May be repeated for credit.

RADGY 540, 541 Nuclear Energy, Man, and His Environment I, II (3,3)
For majors and nonmajors interested in evaluating the impact of nuclear power technology on man and his environment. Studies of modern nuclear nuclear reactor cycles, nuclear powered safeguards, thermal effects, control of radioactivity releases, biological response to radiation, environmental monitoring, evaluation of new energy sources and energy conversion systems. Offered jointly with the Department of Nuclear Engineering as Nuclear Engineering 540, 541.

RADGY 550 Field Practice in Radiological Health (*, max. 6) S
Christensen
Student rotates through laboratories engaged in radiological health and radiation safety work to gain experience in the problems encountered in practice. Prerequisite, permission.

RADGY 600 Independent Study or Research (*) AWSp
Prerequisite, permission.

REHAB 290 Pre-Occupational Therapy Clerkship (2) AWSp
Supervised observations and work participation with patients in local occupational therapy clinics concurrent with lectures on professional ethics concepts and major roles of the therapist, and on elementary techniques of occupational therapy. Prerequisite, permission.

REHAB 320-321 Medical Science (4-4) W,Sp
Staff 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, radiology, and roentgenology. 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 (5) A
Anderson
Emphasis on normal and pathologic physiology of the circulatory, respiratory, central nervous, and musculoskeletal systems as basis for treatment in occupational therapy and physical therapy. Required for occupational therapy, physical therapy, and prosthetics and orthotics students; others by permission. Prerequisites, Biological Structure 301, Zoology 208 or 118, and permission.

REHAB 335 Engineering Concepts in Prosthetics and Orthotics (2) Sp
Kirkpatrick
Instruction in the physical principles that underlie modern prosthetic-orthotic devices and practice. Hydraulic control, material behavior, force analysis, and basic electronics are discussed, with emphasis on application to prosthetic-orthotic practice.

REHAB 340 Spinal Orthotics (3) Sp
Simons
Instruction in, and experience with, the use of orthotic components and materials, including layout, measurement, and fitting of materials for management of spinal pathology. Each student plans, fabricates, and fits orthoses for lumbar, dorsal, thoracic, and cervical regions. Required for prosthetics and orthotics majors; others by permission.

REHAB 341 Upper Extremity Prosthetics (8) W
Simons
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. (Formerly 341-342.)

REHAB 343 Upper Extremity Orthotics (6) S
Simons
Instruction in, and experience with, the use of orthotic components and materials. Students will evaluate and fabricate partial and functional orthoses, including externally powered devices. Required for prosthetics and orthotics majors; others by permission.

REHAB 380 Professional Relations in Occupational Therapy (2) W
Study of fundamentals applicable to all areas of occupational therapy: relationships of physical therapy, occupational therapy, nursing, rehabilitation counseling, social service, and other allied services in carrying out the team concept of a complete rehabilitation program. Prerequisite, occupational therapy student.

REHAB 408 Tests and Measurements in Physical Therapy (4) Sp
Herling, McGee
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 evaluation. Laboratory. Required for physical therapy students.
REHAB 410 Study of Interdisciplinary Evaluation and Management of Handed and Disabled Children (3)
For course description, see "Interschool or Intercollege Programs."

REHAB 414 Psychological Aspects of Disability (3) A, W Fordyce
Psychological processes underlying adjustment to disability; application of behavioral/analysis systems in patient therapy management; effects of intellectual and perceptual deficit on patient performance and treatment strategies. Required for physical therapy students; others by permission.

REHAB 415 Undergraduate Seminar for Physical Therapy Students (1-2-2) 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 (3) Sp Trotter
 The nature of administration, economic trends, operational policy, aspects of supervision, ethical and legal influences applicable to a physical therapy department. Required for physical therapy students.

REHAB 420 Lower Extremity Prosthetics I (8) A Simmons
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 leg and duplication devices, as well as methods of suspension. Required for prosthesis and orthotics majors; others by permission.

REHAB 421 Lower Extremity Prosthetics II (11) W Simmons
Instruction in stump casting, cast modification, socket fabrication, static and dynamic alignment, alignment duplication, and suspension system. Required for prosthetics and orthotics majors; others by permission.

REHAB 422 Lower Extremity Prosthetics III (4) Sp Simmons
Instruction in, and experience with, the use of prosthesis components and materials, including casting techniques and alignment procedures used for hip disarticulation patients, and the Symes prosthesis. Required for prosthetics and orthotics majors; others by permission.

REHAB 423 Lower Extremity Orthotics (8) A Simmons
Instruction in, and experience with, the use of orthotic components and material, including measurement and fitting of lower-extremity orthotics and shoe modifications to patients. Each student evaluates patients and plans, fabricates, fits, and checks out several orthoses. Required for prosthesis and orthotics majors; others by permission.

REHAB 425 Child Amputee Prosthetics (3) Sp Simmons
Instruction in, and experience with, the use of special prosthetic components and materials, including measurement and fitting of the patient with congenital anomalies. Required for prosthetics and orthotics majors; others by permission.

REHAB 427-428 Applied Prosthetics and Orthotics I, II (4-7) Sp, S Simmons
Funding clinical experience in patient evaluation, planning, fabricating, 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.

REHAB 429 Immediate Post-Operative and Early Fitting (3) Sp Simmons, Zetti
Lecture and laboratory designed to introduce the student to the principles of immediate post-surgical prosthetic fitting, including patient management for both upper and lower extremities.

REHAB 442 Advanced Clinical Kinesiology and Biomechanics (6) Sp Lehmann
Study of joint motion and muscle function in relation to both the normal and abnormal state. Specific techniques employed in the field of rehabilitation medicine are analyzed. Required for occupational therapy and physical therapy students; others by permission.

REHAB 444-445 Function of the Locomotor System (4-4) A, W Lehmann
Functions of musculoskeletal system as applied to normal and pathologic patterns of motion. Emphasis on upper extremity, shoulder girdle, lower extremity, and trunk. Anatomy of peripheral-vascular and peripheral-nervous systems. Required for occupational therapy and physical therapy students; others by permission.

REHAB 446, 447 Anatomy Laboratory for Occupational Therapists (1, 1) A, W McGee
Study of musculoskeletal, peripheral-vascular, and peripheral-nervous systems from prospected material. Required for occupational therapy students.

REHAB 451, 452 Anatomy Dissection for Physical Therapists I, II (1, 1) A, W McGe
Dissection of musculoskeletal, peripheral-vascular, and peripheral-nervous systems. Required for physical therapy students.

REHAB 453 First-Year Clinical Elective in Physical Medicine and Rehabilitation (5) A W, Sp Emphasis on comprehensive evaluation of the patient, his disability, and the interaction of the patient and his disability with his environment. Experience in the use of physical therapy for various disabilities, discussion of the psychological aspects of disability, and the evaluation of the patient for ability to function are included. (10 weeks.)
actotherapy, hydrotherapy, low-frequency and high-frequency currents. Required for physical therapy students.

REHAB 466-467 Advanced Biophysical and Physiological Effects of Modalities (2-3) A,W Lehmann
Biophysical principles of equipment employed in physical therapy, physiological effects produced. Required for physical therapy students; others by permission.

REHAB 468 Therapeutic Activities I (1-4) A WSp
Laboratory study of the use of arts, recreation, and audiovisual aids, with emphasis on their therapeutic application to occupational therapy. Prerequisite, occupational therapy major.

REHAB 469 Therapeutic Activities II (1-3) A WSp
Laboratory study of special skills in occupational therapy adjusted to meet the needs of the individual student. Prerequisite, occupational therapy major.

REHAB 470-471-472 Therapeutic Exercise (3-5-2) A,W,Sp Trotter
Methods of application, physiologic and therapeutic effects of exercises commonly used for treatment purposes in physical therapy. Opportunities are provided for supervised clinical practice of skills, and special attention is given to correlation of techniques to appropriate age level and handicap. New developments from the field are analyzed and evaluated. Required for physical therapy students.

REHAB 473 Administration and Supervision in Occupational Therapy (3) W
Designed to introduce principles of organizing an occupational therapy department, its basic administrative principles and procedures, and an understanding of the functions of supervision. Prerequisite, occupational therapy major.

REHAB 474 Pre-Vocational Evaluation and Exploration (2) W
Study of various types of prevocational programs; evaluation techniques, training procedures, and other considerations pertinent to job placement. Prerequisite, occupational therapy major.

REHAB 475 Physical Restoration (4) A
Herlitig
Instruction in theory and methods of physical restoration of the severely handicapped patient. Laboratory demonstrations of observation, practice, and supervised clinical practice in: selection, care, and use of wheelchairs, crutches, canes, walkerettes, and other assistive devices; special problems in the area of activities of daily living. Required for physical therapy students.

REHAB 476 Prosthetic and Orthotic Evaluation and Use (2) A Simons
Instruction in mechanical component substitution for functional losses. Emphasis is on biomechanical principles, prosthetic components, and alignment and fitting techniques. Required for physical therapy and prosthetics and orthotics students; others by permission.

REHAB 477 Group Techniques (3) W
Experience in knowledge and understanding of self, group, and organizational behavior through participation in a learning group and through observation of patient groups. Focal point is directed around the use of activities. Prerequisite, occupational therapy major.

REHAB 479 Rehabilitation Medicine Information in Speech Pathology (3) A Bollinger
Orientation information for speech pathology and audiology students in rehabilitation principles and techniques. Offered jointly with the Department of Speech as Speech 452. Lecture and clinical observation in all areas of rehabilitation, emphasizing cooperation and coordination of various professions in rehabilitation.

REHAB 481 Principles in Occupational Therapy in Psychiatry (5) Sp
Preparation for defining, evaluating, planning, and administering an effective treatment program in psychiatric occupational therapy. Theories, treatment methods and media, and current research are explored. Clinical observations and practice under supervision required. Prerequisite, occupational therapy major.

REHAB 482 The Process of Development (3) W
Classroom and laboratory study of the development of man from infancy through old age, from the physical, psychosocial, perceptual-motor, cognitive, and cultural aspects. Emphasis is on developmental stages. Prerequisite, occupational therapy major.

REHAB 483, 484 Principles of Occupational Therapy in Physical Disabilities (4,3) A,Sp
Emphasizes the total rehabilitation of the physically disabled patient. Includes laboratory demonstrations and practice in assessment techniques, prosthetics, orthotics, and activities of daily living. New developments from the field are analyzed and evaluated. Prerequisite, occupational therapy major.

REHAB 485 Basic Rehabilitation Medicine (3) AW Stolov
Combined outpatient, inpatient, and consultation experience, in which the human organism is studied as a social being. The concept of disease is broadened to include the external environment. The student learns the functional consequences in the environment of disease or impairment, the need for modifying the environment to support maximal function, and the impact of the illness or the disability on the people around the patient, in his environment. The concern is with the relationship of disability to work, social functioning, and leisure time. Prerequisite, Human Biology 465.

REHAB 486 Rehabilitation Medicine Clerkship—Pediatrics (6 or 9) A WSp 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, Human Biology 465; Pediatrics 465 recommended.

REHAB 487 Rehabilitation Medicine Clerkship—Medical (6 or 9) A WSp Stolov
Clerkship experience for medical students in the specific rehabilitation approaches for the various "nonsurgical" diseases. Designed primarily for those interested in the medical (i.e., nonsurgical) specialties, and tailored to the individual student's requirements. Prerequisite, Human Biology 465.

REHAB 488 Rehabilitation Medicine Clerkship—Surgical (6 or 9) A WSp Stolov
Clerkship experience in the specific rehabilitation approaches for the various surgical problems. Designed primarily for those interested in the surgical specialties and tailored to the individual student's requirements. Prerequisite, Human Biology 465. (6 weeks.)

REHAB 489, 490, 491 Clinical Clerkships in Physical Therapy (2-3, 4) A, WSp Trotter
Observation, instruction, and supervised practice in treatment of patients in diverse clinical settings. Emphasis is given to the application of previously learned material and skills to specific clinical problems. Required for physical therapy students. Offered on credit/no credit basis only.

REHAB 494 Field Experience (1-14, max. 14) A WSp Harlock
Three months of directed and supervised clinical practice in occupational therapy clinics of the University Hospital or other affiliated hospitals. Required for occupational therapy majors. Offered on credit/no credit basis only.

REHAB 495 Clinical Affiliation in Physical Therapy (2-5, max. 5) S Trotter
Twelve to fifteen weeks with six hundred minimum working hours. Clinical application of physical therapy techniques under supervision in affiliated hospitals. Required for physical therapy students. Offered on credit/no credit basis only.

REHAB 496 Rehabilitation Medicine Outpatient Clinics (3) A WSp Stolov
Rehabilitation medicine outpatient clinic experience, two half-days per week, emphasizing continuing care of the patient with chronic disease and disability in order to maintain optimum health and function. Evaluation of new patient for inpatient or outpatient management, and use of physical treatment for ambulatory pain and motion problems also are stressed. Designed for those interested in family practice and internal medicine. Prerequisite, Human Biology 465.

REHAB 497 Rehabilitation Medicine Special Electives (*) A WSp Lehmann
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.

REHAB 498 Undergraduate Thesis (*) Lehmann
Prerequisite, permission.

REHAB 499 Undergraduate Research (*) AWSp
Lehmann
Students are given the opportunity to participate in clinical and basic research under the direct supervision of an instructor. Topics presently under study are: physiology of the locomotor system, effects of physical agents, and psychosocial-vocational aspects of disability. Common methods of the quantitative approach to basic and clinical problems as used in rehabilitation medicine are taught. Opportunities are given for the use of these methods in solving a research project. Prerequisite, permission.

Courses for Graduates Only

REHAB 500 Specialized Clinical Experience in Physical Therapy (3-5, max. 10) AWSp
Clayson, Lehmann
Student is assigned to an affiliated clinical facility. Activities could focus on a wide variety of processes. These might include acquisition of an advanced and/or specialized treatment skill to be used in direct patient care; the development and presentation of an in-service training program; the analysis and assessment of existing supervisory problems, such as scheduling procedures. Prerequisite, permission.

REHAB 502 Biophysics of Physical Agents (2-4, max. 4) AW
Clayson, Lehmann
Review of the biophysical basis of physical agents, with emphasis on analysis of clinical problems encountered in physical therapy. Prerequisite, permission.

REHAB 510 Somatopsychology: Psychological Aspects of Disability (3) Sp Fordyce
Psychological adjustment to disability; techniques of milieu management; application of conditioning techniques to treatment structuring; effects of intellectual and perceptual deficit; rehabilitation team management. Elective for majors.

REHAB 515 Therapeutic Media in Occupational Therapy (3)
Study of realistic, creative, and social activities as used in occupational therapy. Techniques of analysis, adaptation, and application of the media are investigated with an emphasis on a realistic approach. For majors only.

REHAB 516 Medical Information and Rehabilitation Counselors (4) Sp Clowers
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 disabili-

ity. Required for rehabilitation counseling students; others by permission.

REHAB 520 Seminar (1-5) AWSp
Conferences, seminars, discussions of advanced physical medicine and rehabilitation topics for residents and postdoctoral Fellows in rehabilitation medicine. Lectures, discussion, and laboratory 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 Neuropathological Basis for Neuromuscular Re-education (3) Sp 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 and permission.

REHAB 525-26 Approach to Treatment Strategies in Occupational Therapy (4-4)
Process of collecting, analyzing, and interpreting assessment data basic to formulating occupational therapy treatment objectives. Emphasis is placed on the importance of ascertaining all ability requirements for human functional performance with the social, emotional, physical, and culturally handicapped. Prerequisites, occupational therapy major; 525 for -526.

REHAB 530 Medical Aspects of Vocational Counseling (3) A Mott
Introduction to vocational implications of physical and emotional disabilities. Methods, 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
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.

REHAB 533 Clerkship in Psychology of Behavior Change for Occupational Therapists (5, max. 10) AWSp
Clerkship in application of occupational therapy techniques in a nonmedical setting. Prerequisite, permission.

REHAB 534 Normal Developmental Sequencing in Occupational Therapy (3) AWSp
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.

REHAB 535 Physical Medicine and Rehabilitation Administration (2-5) AWSp
Comprehensive analysis of the development of administrative processes in rehabilitation medicine. Theory and application in administrative and supervisory principles. Introduction of practical experience in clinical and academic situations. Offered to residents and postdoctoral fellows in rehabilitation medicine. Offered for Master of Occupational Therapy degree applicants.

REHAB 540 Application of Measurement Systems (3) Sand AWSp
Introduction to, and clinical application of, basic measurement concepts pertinent to rehabilitation therapy. Includes quantitative behavioral measurements, test administration and evaluation, and scaling methods. Prerequisite, permission.

REHAB 542 Assessment and Treatment of the Motor-Delayed Child in Occupational Therapy (3) AWSp
Seminar and clinical practicum concerned with the evaluation and therapy of the motor, perceptual, and adaptive skills of neurologically impaired and normal children. Prerequisites, 414, 540, 534, and permission.

REHAB 543 Biomechanics Basic to Therapeutics in Physical Medicine (3) Sp Lehmann, Simons
The physical and mechanical properties of the musculoskeletal system are discussed. Mechanical principles in the functional replacement, using ambulation aids, braces, and prosthesis 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 academic trainees. Prerequisite, resident standing in rehabilitation medicine; others by permission.

REHAB 550 Electromyography for Occupational Therapists (3) AWSp
Introduction to clinical electromyography methods as a research tool through lectures, demonstrations, and practice sessions. Prerequisite, permission.

REHAB 556 Biophysics as Applied to Physical Medicine (2) A Lehmann
Propagation and absorption characteristics of physical forms of energy used for treatment in physical medicine. Physiologic effects basic to prescription of the physical therapy modalities. Prerequisite, resident standing in rehabilitation medicine; others by permission.

REHAB 559 Electrotherapy and Electrodiagnosis (3) S Kraft
Comprehensive didactic course covering all aspects of clinical electromyography and electrodiagnosis. The course is given in two parts, the first covering basic neurophysiology and the second covering clinical electromyography, with emphasis on disease states. Prerequisite, residency in rehabilitation medicine; others by permission.
Elective work in clinical electromyography and other electrodiagnostic methods. Prerequisite, residency in rehabilitation medicine; others by permission.

REHAB 600 Independent Study or Research (*) A.W.Sp

REHAB 700 Master's Thesis (*) A.W.Sp

SURGERY

SURG 465 Clinical Clerkship (*, max. 16) A.W.Sp

Cantrell

Student is introduced to the diagnosis and the management of problems amenable to surgical therapy. A comprehensive program is offered that includes instruction in the physiological basis of surgical care, differential diagnosis and decision making, and the basic principles of surgical management. Active participation in the care of inpatients and outpatients, including participation in the operating rooms, provides practical experience in the application of these skills. Students are assigned to the surgical service of one of the major affiliated hospitals. Approximately twelve hours per week are devoted to seminars, conferences, and teaching rounds. The remainder of the time is spent working with assigned patients on the ward or in outpatient clinics, in the operating rooms, or in study. Students serve a significant role as a part of the total patient-care team. The course is designed to be of value to all students, regardless of their ultimate interests. The information presented serves as a basic fund of knowledge concerning an important therapeutic modality of nonsurgeons, and as a base for further study for prospective surgeons. Prerequisite, Human Biology 465. (6 weeks, full time. Limit: sixteen students.)

SURG 481 Peripheral Vascular Disease (3 or 6) A.W.Sp

Strandness

An intensive, in-depth look at peripheral arterial and venous problems. This includes: (1) methods of clinical evaluation; (2) new diagnostic procedures; and (3) the available methods of treatment. Emphasis on active student participation in patient work-up, performance of diagnostic studies, and presentation of case material to the staff. Two seminars are held weekly with the staff to discuss the pathophysiology of vascular disease. Texts are provided on a loan basis to the students. These cover the entire field and should serve as useful reference material for the student. Prerequisite, Human Biology 465. (2 or 4 weeks, full time. Limit: two students.)

SURG 482 Externship in General Surgery (*) A.W.Sp

Cantrell

Permits the student to develop further his knowledge of surgical disease and to enhance his ability to manage comprehensively the problems encountered in surgical patients. Students function at the intern level under close supervision of the staff and house staff. Diagnosis, preoperative care, and postoperative care are stressed. The management of surgical emergencies and complications of discharged patients are included. The extern attends all operative procedures on his assigned patients and participates in all rounds and teaching conferences. This course provides an opportunity for the student to perfect his clinical skills in dealing with medical, as well as surgical, problems and permits him to assume added responsibility. It should be of value as preparation for internship, particularly for the surgically oriented student. Prerequisite, 465. (4 or 6 weeks, full time. Limit: four students.)

SURG 483 Pediatric Surgery Externship (6 or 9) A.W.Sp

Stevenson

Students participating in the elective clerkship of pediatric surgery are based primarily at Children's Orthopedic Hospital and Medical Center. Instruction stresses surgical conditions peculiar to the particular age group. There is considerable emphasis on various congenital and neoplastic conditions that are amenable to surgical treatment. It is desirable, therefore, that students who plan to take this elective prepare themselves by acquiring a reasonable background of knowledge in human embryology and genetics. Prerequisite, 465. (4 or 6 weeks, full time. Limit: four students.)

SURG 484 Trauma and Emergency Care (3 or 6) A.W.Sp

Cantrell

Students are assigned to the emergency department of Harborview Medical Center or Valley General Hospital or Overlake Memorial Hospital. Patients with acute illnesses or trauma are evaluated and treated in the initial evaluation and emergency room. Prerequisite, Human Biology 465. (2 or 4 weeks, full time. Limit: four students.)

SURG 485 Cardiac Surgery Externship (*) A.W.Sp

Dillard

Students actively engage in the care and treatment of inpatients and outpatients with cardiovascular cases. They work closely with the cardiovascular team on preoperative diagnostic studies, in the operating room, and in postoperative patient care. Prerequisite, 465. (6 weeks, full time. Limit: two students.)

SURG 486 Plastic Surgery Clerkship and Preceptorship (*) A.W.Sp

DeVito

Students participate in all activities of plastic surgery service and staff at University Hospital and affiliated services. This includes patient work-ups, case presentations, operating room experience, and patient contact in the clinic. Prerequisite, Human Biology 465. (4 or 6 weeks, full time. Limit: one student.)

SURG 497 Surgery Special Electives (*) A.W.Sp

Cantrell

By specific arrangement, for qualified students, special clerkship, externship, or research opportunities can at times be made available at institutions other than the University of Washington. The faculty can advise students of possible opportunities. Students wishing to elect this course should obtain from the Dean's office a "Special Assignment" form at least one month before preregistration. Prerequisites, 465 and departmental permission. (4, 6, or 12 weeks, full time.)

SURG 498 Undergraduate Theses (*) A.W.Sp

Cantrell

Offered to those students who have engaged in undergraduate research in general surgery. (Full or part time.)

SURG 499 Undergraduate Research (*) A.W.Sp

Cantrell

Provides the student with an opportunity to participate in ongoing research projects in general surgery being carried out by members of the faculty of the Department of Surgery or to carry out an independent research project under supervision. Practical experience in experimental design and execution is provided under the direct supervision of a selected faculty member. Analysis of results and formulation of a report are included. The experience gained in experimental techniques and equipment depends upon the project chosen. This course should be of value to any student, regardless of his goals, but should be of particular importance to academically oriented individuals. (Full or part time.)

Courses for Graduates Only

SURG 525 Seminar in Plastic and Maxillofacial Surgery (*) A.W.Sp

DeVito

One two-hour session per week is devoted to a discussion of principles, practice, and scope of plastic and maxillofacial surgery. Elective for senior medical students and graduate students. Prerequisites, 465 and permission of department.

CONJ 585 Surgical Anatomy (1-3, max. 12)

(See Conjoint Courses.)

SURG 590 Applied Surgery: Practical Management and Surgical Techniques (1) AW Mohri

Seminars and practical instruction in the surgical techniques applicable to major surgical diseases. The seminars stress an understanding of the relationship between the clinical manifestations of disease and the rationale of surgical procedures in terms of pathophysiology. Preoperative and postoperative care are considered. Surgical techniques are taught in the animal laboratory, each student functioning as both surgeon and assistant during the instruction. Students work in teams of three. Nine operations are carried out. A selected bibliography is provided. Prerequisite, 465. (Limit: nine, twelve, or fifteen students.) A, (last six weeks) or W (first six weeks) only one afternoon a week.

SURG 600 Independent Study or Research (*) A.W.Sp

UROLOGY

CONJ 460 Clinical Research Center Clerkship

(9 or 18)

(See Conjoint Courses.)

UROL 475 Urology Preceptorship (*) A.W.Sp

Kiviat

Student follows a preceptor in all of his work in order to better understand the pathophysiology and management of the problems of
the urologic system and to become acquainted with the office management of urologic problems. Prerequisite, Human Biology 462. (2 or 4 weeks.)

**NURSING**

**UROL**

480 Urology Clerkship (4) ASp
Ansell, Chapman, Correa, Kviat, Mond, Tremann

Student participates in the full activities of the clinical service, which includes both outpatients and inpatients, principally the latter. Basic principles of urology are emphasized: infection, obstruction, trauma, tumors, stones, male fertility, renovascular hypertension, and pediatric urology. In addition to participation in seminars during the first two weeks, at the end of the clerkship the student gives a ten-minute talk on a urologic subject of his choosing. Prerequisite, Human Biology 462. (2 or 4 weeks.)

485 Urology Subinternship (6 or 9) ASp
Ansell, Chapman, Correa, Kviat, Mond, Tremann

Subintennship is available for patient work-ups and for preoperative and postoperative care and participates in the operating room at his level of competency and training. He participates in ward rounds and urology conferences at selected hospitals. Participating individuals should be prepared to work hard and, in turn, expect comparable dividends beyond those of the standard clerkship. Prerequisite, Medicine 465 or Pediatrics 465, or permission.

497 Urology Special Electives (4) ASp
Chapman, Correa, Kviat, Mond, Tremann

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. (6 or 12 weeks.)

498 Undergraduate Thesis (4) ASp
Ansell, Chapman, Correa, Kviat, Mond, Tremann

Provides an opportunity for medical students to write theses in the area of urology. Prerequisite, permission of sponsor and department.

499 Undergraduate Research (4) ASp
Ansell, Chapman, Correa, Kviat, Mond, Tremann

The student participates in current urologic research projects under supervision of full-time staff. Certain specific problems may be elected by the student and selected for medical students. Prerequisites, permission of sponsor and department.

**SCHOOL OF NURSING**

**Courses for Undergraduates** (Majors only)

**NURS**

281 Nursing Process I (6) WS
Beginning course in nursing process: systematic method of assessing human needs and maintaining optimal health. Theory, seminar, and clinical laboratory include application of the process to selected functional status abilities of patients in various clinical settings. Prerequisites, Chemistry 101, 102, Microbiology 301, Conjoint 317-318, Physical Education 205, Pharmacology 315, and Home Economics 319. Three hours theory, seminar: eight hours laboratory weekly. (First time offered: Winter Quarter 1975.)

297 Human Development I: Conception Through School Age (4) WS
Development of assessment skills and knowledge basic to management of infants, preschoolers, school-age children. Study and practice include parameters of normal growth and development from conception through school age; child-rearing practices; selected behavior patterns environmental influences on growth and development, and major parental concerns. Open to nonnursing majors with permission. Prerequisite, sophomore standing and Conjoint 317-318. Two hours lecture, four hours laboratory weekly. (First time offered: Winter Quarter 1975.)

298 Introduction to Normal Growth and Development (2) WS
Basic concepts and theories related to the physical, emotional, social, and cognitive development of children from infancy through preschool are considered. The student is directed to apply basic developmental knowledge to observation and assessment of children with concurrent implications of caretaking, and/or child health supervision stressed. Prerequisite, junior standing. Taken concurrently with 368 or 322. (Last time offered: Winter Quarter 1975.)

299 Introduction to Normal Growth and Development (2) ASp
Basic concepts and theories related to significant physical, emotional, and environmental factors in the developmental period from school age to young adulthood are emphasized. The student is introduced to major developmental deviations associated with "learning and behavior." Prerequisites, junior standing, and 298. (Last time offered: Spring Quarter 1975.)

300 Human Development II: Adolescence Through Aging (4) ASp
Further development of knowledge and skills established in 297. Study and practice include parameters of growth and development from adolescence, through early adulthood and middle age to old age; developmental tasks related to these age periods; environmental influences that affect maturation; contemporary life styles and developmental trends. Open to nonnursing majors with permission. Two hours lecture, four hours laboratory weekly. Prerequisite, 296. (First time offered: Spring Quarter 1975.)

301 Principles of Patient Teaching (3) WS
Designed to provide the nursing student with some fundamental concepts of the learning and teaching processes as they apply to nursing practices. The laboratory sections are utilized to assist students in applying the concepts to the planning for teaching family members, or auxiliary nursing personnel. One hour laboratory weekly. (Last time offered: Winter Quarter 1975.)

302 Nursing Process II (6) ASp
Continuation of 281. Theory and seminar: nursing process related to selected human needs. Clinical laboratory increases depth and breadth of nursing care and skills. Three hours theory, seminar: eight hours laboratory weekly. Prerequisite, 281; 300 and 303 may be taken concurrently or before. (First time offered: Spring Quarter 1975.)

303 Psychosocial Care in Adaptive and Maladaptive Behaviors (5) ASp
Behavioral responses to social, psychological, and physiological factors. Rationale and techniques for care and treatment: crises intervention, chemotherapy, counseling. Contemporary issues in prevention and treatment. Open to nonnursing majors with permission. Prerequisites, 263, sophomore standing, and Psychology 100 or later with permission. (First time offered: Spring Quarter 1975.)

321 Nursing Care of Ill Adults and Children I (4) ASp
Commonly occurring alterations, involving concept of dynamic equilibrium and compensatory mechanisms that produce homeostatic changes, are considered as a basis for comprehensive nursing interventions in the care of the ill adult and child. Prerequisites, 263, 300, 302, 303. Taken concurrently with 322 or later with permission. (First time offered: Autumn Quarter 1975.)

322 Nursing Care of Ill Adults and Children II Laboratory (8) ASp
Application of scientific principles to the nursing care of ill adults and children in the acute care setting. A problem-solving approach is used throughout the nursing process. Three weeks of operating room experience in this course or 324. Two hours clinical seminar, fourteen hours laboratory weekly. Prerequisites, 263, 300, 302, 303. Taken concurrently with 321 or later with permission. (First time offered: Autumn Quarter 1975.)

323 Nursing Care of Ill Adults and Children II (4) WS
Alteration of function in selected systems leads to broadening and deepening knowledge relevant to the care of ill adults and children. Emphasis is on the maintenance, and restorative elements of comprehensive nursing care; immediate, acute, and long term. Prerequisites, 321, 322, or permission. (First time offered: Winter Quarter 1976.)

324 Nursing Care of Ill Adults and Children II Laboratory (*) ASp
Application of scientific principles in caring for ill adults and children, with emphasis on identification of common elements and significant differences in providing care for patients with increasingly complex health problems. Comprehensive nursing care includes experiences with persons in the acute care setting, the community, and nursing homes. Two hours clinical seminar, fourteen hours laboratory weekly. Prerequisites, 321, 322. Taken concurrently with 323 or later with permission. (First time offered: Autumn Quarter 1975.)

325 Nursing Care of Ill Adults and Children III (4) ASp
Focus on alterations in function of specific systems in all age groups in the various phases of
illness. The nursing process is retained as the organizational framework. The student is assisted to integrate understanding gained in preceding courses and to extend knowledge of illness dynamics. Prerequisites, 323, 324 or permission. (First time offered: Spring Quarter 1976.)

NURS 356 Nursing Care of II Adults and Children III Laboratory (8) ASp Focus is on continuity of comprehensive nursing care of adults and children; understandings of theories and principles from previous courses are deepened; skills are increased, content areas are broadened and are more complex. Synthesis and application become the integral focus of critical thinking, clinical judgment, and evaluation in the nursing process. Two hours clinical seminar, fourteen hours laboratory weekly. Prerequisites, 323, 324. Taken concurrently with 325 or later with permission. (First time offered: Spring Quarter 1976.)

NURS 351 Changing Concepts of Professional Nursing (4) ASp Exploration of current concepts of nursing and nursing education including present and potential roles, responsibilities and required competencies of professional nurses in our society. Prerequisite, junior year in the registered nurse curriculum pattern. (Last time offered: Spring Quarter 1975.)

NURS 353 Scientific Basis for Nursing Actions (3) WS Homeostasis, particularly as related to fluid and electrolyte balance, is used as an organizing concept in determining nursing actions in preventing, correcting, and controlling disease. Prerequisites, 351 and junior year in the registered nurse curriculum pattern. (Last time offered: Summer Quarter 1975.)

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, and psychiatric nursing. Six hours of clinical laboratory weekly. Prerequisites, junior year standing in the registered nurse curriculum pattern, and 353. (Last time offered: Autumn Quarter 1975.)

NURS 355 Comprehensive Medical-Surgical Nursing (4) WS Theories, concepts and principles in assessing, planning, and evaluating the nursing care of selected adult medical-surgical patients. Emphasis on prevention, rehabilitation, continuity of care, and application of science principles. Six hours of clinical laboratory weekly. Prerequisites, junior year standing in the registered nurse curriculum pattern, and 351 and 353. (Last time offered: Winter Quarter 1976.)

NURS 358 Psychiatric Concepts for Nursing Actions (4) ASp Theory and clinical experience in application of selected concepts in interactions with patients with psychiatric emotional problems. Courses serve as transition from technical to professional education in application of interpersonal concepts in nursing interventions. Builds on student's knowledge of personality development, psychopathology, and psychodynamics of human behavior including interpersonal relations and communication skills. Student's responsibility for nursing diagnosis and action in managing emotional needs of patients is emphasized. Six hours of clinical laboratory weekly. Prerequisites, 353 and junior year standing in the registered nurse curriculum pattern. (Last time offered: Autumn Quarter 1975.)

NURS 361 Cultural Variation and Nursing Practice (3) AWSp Ethnomedical beliefs, values, and practices pertaining to illness-wellness, care seeking, and healing. A 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. Prerequisite, upper-division standing; ANTH 202 recommended. (First time offered: Autumn Quarter 1975.)

NURS 367 Family-Centered Maternal and Infant Nursing (4) AWSp Basic concepts and nursing principles in family-centered maternity care of women before, during, and after childbirth, and infants in the neonatal period. Prerequisites, junior year standing in the basic curriculum pattern and 368 taken concurrently. (Last time offered: Spring Quarter 1975.)

NURS 368 Laboratory in Maternal and Infant Nursing (5) AWSp Utilization of basic concepts and nursing principles in providing family-centered nursing for women before, during, and after childbirth, and for infants in the neonatal period. Fifteen hours laboratory experience per week. To be taken concurrently with 367. (Last time offered: Spring Quarter 1975.)

NURS 369 Family-Centered Nursing of Children (4) AWSp Basic concepts and nursing principles in family-centered care of children. Emphasis on health needs of children and families from infancy through adolescence. Includes health supervision and common illnesses and disabilities. Prerequisites, junior year standing in the basic curriculum pattern and 370 taken concurrently. (Last time offered: Spring Quarter 1975.)

NURS 370 Laboratory in Nursing of Children (5) AWSp Utilization of basic concepts and nursing principles in providing family-centered nursing for children in health supervision and during illness and disability. Fifteen hours laboratory experience per week. To be taken concurrently with 369. (Last time offered: Spring Quarter 1975.)

NURS 371 Principles of Medical-Surgical Nursing (4) WS Understanding of the scientific and nursing facts and principles that can be used to identify appropriate nursing interventions when caring for patients with selected medical and surgical conditions. Prerequisites, junior year standing in the basic curriculum pattern, and basic science courses, or permission. To be taken concurrently with 372. (Last time offered: Winter Quarter 1975.)

NURS 372 Medical-Surgical Nursing Practice (5) WS Application of scientific and nursing principles to the care of adult medical and surgical patients. The problem-solving approach is used with the particular emphasis being on how the student learn how to analyze and interpret information she obtains from her own observations and other sources; decide on a course of action that best fits the plan, and evaluate the outcome. Patient care and clinical conferences are selected to coordinate with the content of 371. When feasible, patients are assigned for a number of days so that changes may be observed and the effect of care evaluated. Three weeks experience in the operating room in this course or in 374. Prerequisites, junior year standing in basic curriculum pattern and 371 taken concurrently. (Last time offered: Winter Quarter 1975.)

NURS 373 Principles of Medical-Surgical Nursing (4) ASp Understanding of the scientific and nursing principles essential for the development of nursing care for patients with selected medical and surgical conditions. The major emphasis is placed on using knowledge about the patient, his illness, and his treatment to determine actions that can be taken to help them achieve an optimal state of health. Prerequisites, junior year standing in the basic curriculum pattern, 371 and 372, or permission. To be taken concurrently with 374. (Last time offered: Spring Quarter 1975.)

NURS 374 Medical-Surgical Nursing Practice (5) ASp The broad aim is to help the student apply scientific and nursing principles to the care of adult medical and surgical patients. The identification of common elements and significant differences in the care of complex medical-surgical patients is stressed. The problem-solving approach is continued. Patient care and clinical conferences are selected to coordinate with the content of 373. Three weeks experience in the operating room in this course or in 372. Fifteen hours weekly clinical laboratory. Prerequisites, junior year standing in the basic curriculum pattern, 371 and 372, or permission. To be taken concurrently with 373. (Last time offered: Spring Quarter 1975.)

NURS 400 Family-Centered Maternal and Child Nursing in the Community (6) AWSp Focus is on the normal family through pregnancy, childbirth, child rearing, and climacteric. Clinical experiences are provided in community and institutional settings. Two hours lecture, eight hours laboratory weekly. Prerequisites, 325, 326. (First time offered: Spring Quarter 1976.)

NURS 401 Maximizing Health in the Community (9) WS Emphasis on ecological, epidemiological, social, mental, and selected community health problems and the nurse's role in promoting optimal health conditions. Approximately half clinical time spent caring for the mentally ill. Two hours lecture, fourteen hours laboratory weekly. Prerequisites, 325, 326, 400. (First time offered: Winter Quarter 1977.)

NURS 405 Care Systems Analysis (3) AWSp 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 nonscience majors with permission. Prerequisite, upper-division standing. (First time offered: Autumn Quarter 1976.)

NURS 406 Introduction to Research in Nursing (3) A/WSp

Interdisciplinary team to conduct experiments to research utilized in investigation of nursing problems. Prerequisite, one elementary statistics course from Sociology 223, EDP/SY 490, or Biostatistics 472. (First time offered: Spring Quarter 1976.)

NURS 409 History and Trends of Nursing (3) A/WSp

History of nursing from antiquity to the present with emphasis on the trends influencing nursing and including study of the professional nurse and her responsibilities in the modern world. Prerequisite, senior standing in the School of Nursing.

UCONJ 410 Study of Interdisciplinary Evaluation and Management of Handicapped Children (3) A/WSp

For course description, see "Interschool or Intercollege Programs."

NURS 412 Scientific Principles in Nursing Care (3) A/WSp

Undergraduate seminar devoted to critical analysis of selected nursing situations, with identification of the natural and behavioral science principles that guide nursing actions. Prerequisite, senior standing in the School of Nursing. (Last time offered: Summer Quarter 1976.)

NURS 413 Principles of Psychiatric Nursing (5) A/WSp

Concepts and principles of psychiatric-mental health nursing used in planning care of mentally ill patients. Psychological and sociocultural dynamics of mental illness. Nursing approaches and interviewing techniques. The classification of mental illness, the signs and symptoms, and the treatment approaches are presented. Prerequisites, senior standing in the School of Nursing, and 414 taken concurrently. (Last time offered: Summer Quarter 1976.)

NURS 414 Psychiatric Nursing Practice (5) A/WSp

Application of psychiatric-mental health principles and skills in the care of selected psychiatric patients. Prerequisites, senior standing in the School of Nursing and 413 taken concurrently. Fifteen hours clinical laboratory weekly. (Last time offered: Summer Quarter 1976.)

NURS 415 Community Health Nursing Principles (3) A/WSp

Concepts and principles of community health nursing used in analyzing and implementing health programs in family and community settings. Prerequisites, senior standing in the School of Nursing and Health Services 323. (Last time offered: Summer Quarter 1976.)

NURS 416 Community Health Nursing Practice (5) A/WSp

Application of community health nursing principles and skills in family and community health situations. Problem-solving and interpersonal relationship skills emphasized. Fifteen hours a week, including two hours of conference. Prerequisites, senior standing in the School of Nursing and 415 taken concurrently. (Last time offered: Summer Quarter 1976.)

NURS 420 Special Fields of Community Health Nursing (3-8) A/WSp

Practicum devoted to nursing responsibilities in special fields such as school health nursing or occupational health nursing. Emphasis and credit of course varies with the interest and needs of the student. Weekly conference, Nine to twenty-four hours, including two hours of conference. Prerequisites, 415, 416, or equivalent, postbaccalaureate standing in the School of Nursing.

NURS 421 Nursing Leadership (4) A/WSp

Major focus is directed toward the student's understanding of the leadership role of the professional nurse as a beginning practitioner in organized health care services. The leadership role of the professional nurse, changing trends in organized health care services in our society, and the change agent's role of the professional nurse are emphasized. Prerequisites, senior standing in the School of Nursing, and 422 taken concurrently. (Last time offered: Summer Quarter 1976.)

NURS 422 Senior Clinical Nursing (6) A/WSp

Experience in providing care for a group of patients with complex nursing care problems. Planning, directing, guiding, implementing, and evaluating nursing care as an individual and as a member of the health care team. Eighteen hours clinical laboratory weekly. Prerequisites, senior standing in the School of Nursing, and 421 taken concurrently. (Last time offered: Summer Quarter 1976.)

NURS 423 Nurse Practitioner in Special Fields (15)

Further development, critical examination, and synthesis of nursing care in specialized area 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. The student selects a specialized area for clinical experience in an urban or rural setting. Four to eight lecture hours. Twenty-one to thirty-three laboratory hours weekly. Prerequisites, 401 and senior standing. (First time offered: Winter Quarter 1977.)

NURS 425 Nursing Functions in Gerontology (2) A/WSp

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 gerontological concepts. Prerequisite, senior standing in the School of Nursing. (Last time offered: Summer Quarter 1976.)

NURS 429 Undergraduate Research (1-5, max. 5) A/WSp

Supervised individual research on a specific nursing problem. Prerequisites, junior year standing in the School of Nursing, cumulative grade-point average of 3.00 or better, and permission.

Courses for Graduates Only

NURS 430 Field Study in Maternal and Child Nursing (3) W

Barnard, Rose

Guided clinical experience in midwifery nursing or in nursing of children with emphasis on the family. Includes diagnosing nursing problems, applying theoretical concepts, and evaluating results. A minimum of seven hours of guided experience weekly.

NURS 431 Field Study in Maternal and Child Nursing (3) S

Rose, Vendelman

The experience may be a continuation in the clinical area chosen in 430 or may be the alternate area. A minimum of seven hours of guided experience weekly.

NURS 432 Practice Teaching in Maternal and Child Nursing (3) S

Rose

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, 430, 431, 524, 530.

NURS 436 Practice Supervision in Nursing Service (3) S

Aeschliman

Guided experience in supervisory functions. Identification, analysis, and solution of selected supervisory problems in clinical nursing.

NURS 450 Advanced Field Work Community Health Nursing (2) W

Pittman

Guided experience in identifying nursing problems, identifying rationales for implementing nursing therapy, and evaluating results in selected situations in community health nursing. An application of core concepts presented in 523. A minimum of four hours of guided experience weekly. Prerequisite, 523.

NURS 451 Advanced Field Work Community Health Nursing (2) S

Farrand, Letich, Pittman

Continuation of 450, built on concepts from 550. Guided experience in selected situations in community health nursing. Course is planned jointly with students and focuses on the nurse role in community action for health. Prerequisites, 450 and 550. A minimum of four hours of guided experience weekly.

NURS 455 Practice Supervision Community Health Nursing (3) S

Dreyf, Farrand, Jones, Letich, Pittman

Guided experience in supervisory functions. Identification, analysis, and solution of selected supervisory problems in community health nursing. A minimum of seven hours of guided experience weekly. Prerequisites, 450 and 451.
NURS 456 Nursing Service Administration (3) W Aeschliman
Considers philosophies, purposes, and elements of administration as applied to organized nursing services. Concepts related to administrative behavior, the organization and delivery of services, and the management of personnel are explored. Emphasis on critical analysis of current literature and analysis of administrative problems in nursing. Prerequisite, 524.

NURS 458 Practice Teaching Community Health Nursing (3) Sp Cobb
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 460 Seminar in Interpersonal Approaches in Nursing (2) W Larson

NURS 461 Behavioral Analysis Through Multi-Media (3) S MacElveen
Consideration of various media through which behavior can be observed and recorded, identification of behavioral units and patterns for analysis; implications for therapy, education, and research are included. Laboratory experience focuses on the development and utilization of skills for recording overt behavior. Exploration of new approaches is encouraged.

NURS 464 The Community and Mental Health: Theory and Research Foundations (3) A MacElveen
Designed to examine the contributory factors related to mental illness and mental health. Comprehension of numerous indices of mental illness and mental health, including those employed in cross-cultural studies. Concept of community is contrasted and critiqued. The content includes the impact upon mental health and mental illness of values, ethnic and racial differences, social status differences, and other defined group dimensions. Natural social groupings are investigated and examined as a facet of community structure.

NURS 465 Practice Supervision in Psychiatric-Mental Health Nursing (3) A Poulsen
Guided experience in practice supervision in psychiatric nursing. Opportunity to supervise a nurse-patient relationship with assessment and written evaluation of the nurse's performance in the relationship. Literature on nursing supervision and consultation. A minimum of six hours of guided experience weekly. Prerequisite, 460.

NURS 466 Continuing Education in Nursing (3)
Planning, developing, and evaluating continuing education programs in various institutions and agencies. Includes the application of adult learning principles to a variety of situations, such as workshops, in-service and staff development programs. Prerequisite, graduate student.

NURS 467 Evaluation of Performance in Nursing (3) Sp
Philosophy and rationale of evaluation of nurses with administrative, teaching, and supervisory responsibility in various health agencies. The purposes of evaluation as they relate to guidance of students or staff toward personal satisfaction and growth in one's work, and to improved patient care.

NURS 468 Practice Teaching in Psychiatric-Mental Health Nursing (3) A Larson

NURS 470 Practicum in Interpersonal Approaches in Nursing (2-6) WSp Larson
Supervised experience in working with individuals to aid them in prevention and resolution of their emotional problems. Guided experiences in individual therapy approaches are oriented toward assisting the individual to identify and alter maladaptive behaviors. Prerequisites, 460 or equivalent, completed or taken concurrently, and permission.

NURS 488 Effects of Alcohol and Its Relation to Health and Disease (3) ASp Heineman, Woodden
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. Focus is on studying methods used in the assessment of patients, in patient management, and in evaluation of therapeutic intervention. Open to students in other disciplines. Prerequisite, permission.

NURS 489 Alcohol Problems in Family and Society (3) W Estes
Analysis of significant problems experienced by the family in the presence of alcoholism, with emphasis on sociocultural and psychological influences and related physiological implications. Theories of prevention and counseling are examined. Case studies and clinical presentations are utilized, and serve to synthesize learning in the process of nursing intervention. Open to baccalaureate students of junior and senior standing and to students in graduate programs.

UCONJ 490 Social Sensitivity in Health Care (3) A WSp
For course description, see "Interschool or Intercollege Programs."

NURS 495 Child Rearing, Culture, and Health (3) Sp Byerly
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 the Department of Anthropology as ANTH 440. Prerequisite, permission.

NURS 502 Applied Group Development Principles (3) A WSp Poulsen
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 505 Seminar in Administration of Schools of Nursing (3)
Gray
Application of principles of administration to schools of nursing. Case method with discussion and analysis of situations presented. (Not offered 1974-76.)

NURS 506 Seminar in Nursing Service Administration (3) A Poulsen
Critical analysis of problems affecting the administration of nursing services. Intensive directed study of selected problems by small groups. Prerequisite, 456.

NURS 507 Seminar in Family Treatment (2) A Sp Poulsen
Analysis of literature on crisis, skills of intervention, and family structure and interaction. The family is seen as one example of a group, and family role relationships, role disruption, and interaction process are basic concepts by which families are assessed. Sociocultural forces external to the family are examined.

NURS 508 Historical and Contemporary Perspectives in Personality Theories (3) A W Graves
Social history is examined as it influenced and was influenced by selected personality theories. A comparative analysis of psychoanalytic, learning, and philosophical personality theories with emphasis on orientations toward health, illness, and treatment.

NURS 509 Practice Teaching in Physiological Nursing (3) Sp Geitgey
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. (Formerly 448.)

NURS 510 Curriculum Development in Nursing Education (3 or 5) WSp Wolf
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 Psychosomatic Nursing (3) WSp
Graves
Seminar and clinical experiences centering on interrelationships of physical and emotional aspects of illness and development of principles of nursing care. Minimum of four hours of guided experience weekly.

NURS 515 Topics in Nursing and Pharmacy (2) Sp
Graves, E. Plein
Reading and discussion of assigned topics of current interdisciplinary interest in the fields of nursing and pharmacy. Offered jointly with the School of Pharmacy as Pharmacy Practice 515. Subject matter changes from year to year. Prerequisite, permission.

NURS 516 Theory of Child and Adolescent Psychiatric Nursing (3) WSp
Osborne
Extension and refinement of child and adolescent psychiatric nursing; the psychodynamics and psychosocial adaptations of childhood, adolescence, and parenthood; behavior disorders, learning disorders, and organic conditions with concomitant emotional reactions. Seminars, lectures, and discussions relate to assessing the psychodynamics of the various psychiatric and social disorders.

NURS 517 Therapeutic Approaches: Child and Adolescent Psychiatric Nursing (2) SpS
Egger
Content focuses upon exploration of primary and secondary prevention of emotional disturbances in children and adolescents as well as the role of the nurse in maintenance of mental health in families. Various treatment modalities are examined. Prerequisite for 518.

NURS 518 Practicum in Child and Adolescent Psychiatric Nursing (2, max. 6) SpS
Egger
Opportunity for the student to synthesize and organize knowledge essential to the care of emotionally disturbed children and adolescents and their families. Field study includes planning and implementing nursing interventions in a variety of community agencies. Prerequisite, 517.

NURS 520 Methods of Research in Nursing (3) Asp
Batey, Disbrow, Nakagawa
Research process as it applies to nursing. Use of the literature in building theoretical rationale. Selection of appropriate methods. Presentation of findings. A minimum of two laboratory hours weekly. Prerequisite, a course in statistics.

NURS 521 Methods of Research in Nursing (2) WSp
Batey, Disbrow, Nakagawa
Continuation of 520, emphasis on methods of research applied to the solution of problems in all fields of nursing.

NURS 523 Seminar in Therapeutic Nursing Process I (3) Asp
Crowley, Jones, Pittman, Worthy
Analysis and synthesis of concepts relevant to therapeutic nursing based upon consideration of the dynamics of man and selected aspects of theories related to the interaction process in nurse-patient relationships. Library research, field study, and two laboratory hours weekly.

NURS 524 Seminar in Nursing Leadership Processes (3) Asp
Benedict
Considers the dynamic processes involved in leadership roles assumed by nurses in a variety of settings. Included in the course is an exploration of the complex human relationships integral to leader functions in the attainment of health goals. A minimum of two laboratory hours weekly.

NURS 525 Seminar in Therapeutic Nursing Process II (3)
Analysis and synthesis of concepts relevant to therapeutic nursing based upon a consideration of responses to crises and factors in health and illness. Library research and field study and a minimum of two laboratory hours weekly. (Not offered 1974-76.)

NURS 527 Practicum in Family Treatment (2-6) WSp
Poulsen
Supervised experience as primary therapist or cotherapist in a family. Opportunities for primary and secondary intervention in family crises. Supervision provided by nursing faculty member. Prerequisites, 502, 507, or equivalent, completed or taken concurrently, and permission.

NURS 529 Practicum in Group Treatment (2-6) Asp
Laron
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. Prerequisites, 502, 513, or equivalent, which may be taken concurrently, and permission.

NURS 530 Theoretical Framework for Maternal and Child Nursing (4) A
Vandeman
The theoretical basis for understanding nursing problems is explored in depth. A rationale is developed for making nursing diagnoses and for assessing the role and function of nursing in the maternal and child nursing field.

NURS 535 Nursing the Child With Handicaps: Evaluation (3) Asp
Erickson
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. Enrollment limited. A minimum of four hours field study weekly. Prerequisite, permission.

NURS 536 Operant Techniques in Modification of Deviant Behavior (3) W
O’Neill
Systematic analyses of selected sequences of behavioral interactions among children, families, and health care personnel, and implementation of programs designed to influence and evaluate behavioral outcomes. Enrollment limited. A minimum of four hours field study weekly. Prerequisite, 523, 535.

NURS 537 Nursing the Child With Handicaps: Care Process (4) WSp
Worthy
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 nurse is provided a frame of reference within which each can operate. A minimum of eight hours field study weekly. Prerequisites, 523, 535.

NURS 538 Nursing the Child With Handicaps: Family Reactions (4) Sp
Worthy
Development of a framework for systematically evaluating parental behaviors in high-risk families and in families where there is a handicapped child, and for applying this knowledge to nursing interventions. The implications for nursing are derived from students’ clinical experiences, as well as from theoretical content and relevant research findings. A minimum of eight hours field study weekly. Prerequisite, 537.

NURS 539 Nursing the Child With Handicaps: Community (2) A
Erickson
Evaluation of essential components of resources for the handicapped that are presently or potentially available in the community, and the comparison of nursing practices within those resources. The leadership roles of the nurse as clinician, consultant, educator, and researcher are considered. A minimum of four hours field study weekly. Prerequisite, 538.
NURS 540 Seminar in Physiological Nursing (3) Asp
    Giblin, Mansfield, Wallke
Factors influencing the pathophysiology underlying selected manifestations of physical illness. Implications for nursing diagnosis and for nursing therapy.

NURS 541 Clinical Physiological Nursing Seminar I (5) AW
    Crowley, Mansfield, Ware
Guided experience in diagnosing nursing problems, identifying rationale for implementing nursing therapy, and evaluating results in selected situations in the clinical specialty. The general aim is to develop abilities in critical analysis of nursing problems of patients, in the design and implementation of plans of care, and systematic evaluation of outcomes of nursing actions. A minimum of seven hours of guided experience weekly. Prerequisite, 540. (formerly 440.)

NURS 542 Seminar in Cardiovascular Nursing (3) Sp
    Giblin
Systematic inquiry into the influence of physical and emotional factors on pathophysiology underlying selected cardiovascular conditions. Implications for management. The course is designed for nursing instructors, supervisors, consultants, and clinical specialists. Prerequisite, 540.

NURS 543 Seminar in Nursing in Gerontology (3) Sp
    Patrick, Ware
Gerontological research findings applied to complex nursing problems in maintenance of health and maximum functioning in the aged. Prerequisite, permission.

NURS 544 Clinical Physiological Nursing Seminar II (3) WSGS
    Crowley, Giblin, Mansfield, Ware
Continuation of 541. Guided experience in selected situations in area of clinical interest. A minimum of seven hours of guided experience weekly. Prerequisite, 541 or permission. (formerly 441.)

NURS 545 Special Topics in Physiological Nursing (2 or 3, max. 10) AWGS
    Wallke
Guided survey of the experimental literature of major topics in physiological nursing. 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)
    Analysis of selected theoretical components underlying rehabilitation and utilization of scientific rationale in clinical nursing studies, with emphasis on prevention and maintenance. Library research and field study (a minimum of seven hours weekly) are required. Prerequisite, permission.

NURS 547 Rehabilitation Nursing Seminar II (3)
    Reconceptualization of theories of rehabilitation through study of patients with a variety of disabilities, with emphasis on supportive aspects. Library research and field study (a minimum of seven hours weekly) are required. Prerequisite, 546.

NURS 548 Rehabilitation Nursing Seminar III (3)
    Assessment of the nursing problems and direction of nursing therapies for groups of patients with a variety of disabilities, with special emphasis on restorative needs. Library research, field study (a minimum of seven hours weekly), intradisciplinary and interdisciplinary conferences are included. Prerequisites, 446, 547.

NURS 549 Rehabilitation Nursing Seminar IV (6)
    Evaluation of nursing therapies used for rehabilitative problems in a variety of settings. Communication of pertinent rehabilitation nursing interventions. Library research and field study (a minimum of fourteen hours weekly) are required. Prerequisites, 546, 547, 548.

NURS 550 Advanced Community Health Nursing (3) W
    Pittman
Derivation of community health nursing concepts and principles. Identification of current and complex community health problems. Role of the nurse in their solution. Prerequisites, 415, 416, or equivalent, and Health Services 323.

NURS 551 Seminar in Advanced Community Health Nursing (3) Sp
    Pittman
Application of community health nursing concepts, principles, and research findings in analysis and solution of current and complex community health problems. Prerequisite, permission.

NURS 552 Implications of Concepts From Anthropology for Nursing (3) A
    Aikins
Examination of selected core concepts from anthropology and an assessment of the implications of these concepts for nursing research. Prerequisite, permission. (Limit: twenty students.)

NURS 553 Implications of Sociology for Research in Nursing (3) W
    Emergo
Examination of principles and concepts from sociology and their implications for nursing research. Prerequisite, permission.

NURS 554 Implications From Physiology for Nursing (3) A
    Brengelmann
One field from following studied intensively: body temperature regulation, respiration, cardiovascular system, renal system, acid-base balance. Remaining areas considered more briefly. Emphasis on unifying aspects, modern research techniques, implications for nursing care. Prerequisite, permission.

NURS 555 Implications From Microbiology for Nursing (2) W
    Hellingstrom
Examination of selected major fields from microbiology. Exploration of particular aspects of those fields and of current research progress in microbiology. Prerequisite, permission.

NURS 570 Seminar in Clinical Research in Nursing (3) Sp
    Crowley
Philosophy, problems of design; use of criterion measures in terms of patient care. Prerequisite, permission.

NURS 571 Seminar in Nursing and the Social Order (3, max. 9) W
    Byerly
Changing patterns of nursing service and education in contemporary society. Implications of personal value systems. Prerequisite, permission.

NURS 572 Theory Building in Nursing (3) S
    Ditbrow
Designed to help graduate students in nursing gain an increased understanding of the technique of theory construction, problems involved in theory testing, interdependence of theory and research, and implications of these for building a science of nursing. Prerequisite, permission.

NURS 574 Selected Topics in Comparative Nursing Care Systems (2 or 3, max. 10) SpS
    In-depth examination of the literature pertinent to major theoretical issues in cross-cultural nursing and health care systems. Course conducted as a seminar with analysis and discussion of selected topics and readings. Derivation of implications for research and health care is stressed. (First time offered: Spring Quarter 1975.)

NURS 575 Death Influence in Clinical Practice (4) W
    Benoliel
Analysis and study of social, cultural, and psychological conditions that influence human death in modern society. Research findings, selected readings, and direct experience provide direction for examination of philosophic, theoretic, and pragmatic issues underlying choices and decisions in clinical practice. Open to graduate students with permission. (Limit: sixteen students.)

NURS 576 Operant Techniques in Modification of Behavior (3) Sp
    O'Neil
Critical review of research related to the development of motor skills, language, and imitative behavior in the young child in order to facilitate the development of these skills in the child with handicaps. A minimum of four hours field study weekly. Prerequisites, 536 and permission.

NURS 578 Seminar in Cross-Cultural Nursing (3) Sp
    Byerly, Christman
Analysis, synthesis, and evaluation of selected theories from nursing and anthropology in application to the delivery of health care cross-culturally. Includes a consideration of community study methods as they relate to the assessment of health needs, cultural beliefs about health, illness, and health-seeking behaviors. Prerequisite for 579, the seminar provides the student with the opportunity to articulate theory and method in planning the subsequent field experience in cross-cultural nursing. (First time offered: Spring Quarter 1975.)
NURS
579 Field Course in Cross-Cultural Nursing (6) SA
Byerly, Chrisman
Guided field practicum in application of concepts from cross-cultural nursing to health care delivery. Includes assessment of health needs and analysis of their relationships with cultural beliefs, collaboration with other health personnel in designing plans for care and evaluation of results. A minimum of eighteen hours field experience is required. Prerequisites, 578, which may be taken concurrently, 583, and permission. (First time offered: Summer Quarter 1975.)

NURS
583 Transcultural Nursing Practices (3) WS
Byerly
Study of nursing practices in different cultures. Seminar focus is on theoretical formulations and comparative analysis of values, patterns, techniques, and practices of nursing care in many societies. Rituals, myths, taboos, and beliefs are studied in relation to the subculture(s) of caring and nursing practices.

NURS
600 Independent Study or Research (*)

NURS
700 Master's Thesis (*)

SCHOOL OF PHARMACY

PHARMACEUTICAL SCIENCES

PHSCI 320, 321 Pharmaceutical Sciences Laboratory (3,3) A,W
Elmer, McCarthy
Laboratory demonstrates by experimentation basic analytical procedures and the properties of drugs in different physical and biological systems. Prerequisites, Chemistry 236; 320 for 321.

PHSCI 332 General and Physical Principles (3) W
Lecture and laboratory present those physical-chemical properties of drug systems that have a significant effect on the therapeutic efficacy of drugs. Prerequisite, Pharmacy Practice 331.

PHSCI 350 Psychotrophic 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, Chemistry 236 and Biology 212, or equivalents.

PHSCI 400 Biophysical Medicinal Chemistry (4) Sp
Hultric, Trager
Principles of physical organic chemistry relevant to processes of drug distribution, transport, binding, elimination, specificity, and mechanism of action in general, and their relationships to these processes. Prerequisite, Chemistry 236 or 337 or equivalent.

PHSCI 405 Biopharmaceutics and Pharmacokinetics (5) Sp
Levy
Lectures, conferences, and laboratory experiments on drug release from dosage forms, absorption from different routes of administration, and the resulting concentration time curves in blood and urine. Prerequisites, 332 and Pharmacology 402.

PHSCI 412, 413, 414 Pharmacognosy (3,3,3) A,W,Sp
Brady, Elmer
Medicinal plants and pharmaceutically useful products of plant, microbial, and animal origin. Biologic and chemical properties are emphasized. Prerequisites, Biochemistry 405, Biology 212, Chemistry 236, Microbiology 301 or 351, and 302.

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, Physiology and Biophysics 360.

PHSCI 432 Bionucleonics Laboratory (3) Sp
Spitznagle
Lectures, experiments, and demonstrations of radionuclide detection equipment and techniques and selected radiotracers techniques. Experiments illustrate applications of bionucleonics to problems in the pharmaceutical sciences. Prerequisite, permission.

PHSCI 435 Diagnostic Medicinal Chemistry (3) A
Spitznagle
Presentation of factors considered in clinical diagnostic tests in respect to: biosynthesis, transport, distribution, catabolism, and excretion. The etiology associated with the test and the role of medication upon the clinical test value. Prerequisites, Physiology and Biophysics 360, and Biochemistry 405.

PHSCI 440, 441, 442 Medicinal Chemistry (4,4,3) A,W,Sp
Hultric, McCarthy, Nelson, Trager
Study of the various classes of medicinal compounds with particular emphasis on biochemical, mechanism of action, biotransformation, and the structural and physical properties governing absorption, distribution, and excretion. Prerequisites, Chemistry 236 and Physiology and Biophysics 360.

PHSCI 445 Radiopharmaceutics (3) W
Spitznagle
Fundamentals of radioactivity; properties of radiation; instrumentation used in nuclear medicine; problems associated with the formulation, production, and use of radiopharmaceuticals; and a discussion of radiopharmaceuticals currently used for diagnosis and therapy. Prerequisite, 321.

PHSCI 460 Mechanism of Drug Action (3) A
Nelson
Consideration of factors concerning availability of drugs at active sites (e.g., transport, sites of loss, and drug intoxication); molecular mechanism of drug action; topics in drug design. Prerequisites, 442, Biochemistry 442 or 405, Pharmacology 443 or 402 or permission.

PHSCI 480 Advanced Medicinal Chemistry Laboratory (3) A
Hultric
Synthesis of important medicinal products. Prerequisite, permission. (Offered alternate years; offered 1975-76.)

PHSCI 490 Metabolism of Drugs (3) W
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, Pharmacology 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 in insecticides, rodenticides, and fungicides. Includes symptoms, treatment, antidotes, and possible use in various classes of poisons, and also a study of environmental pollutants and their effect on biological systems. Prerequisite, Pharmacology 402.

PHSCI 499 Undergraduate Research (*, max. 6) A,W,Sp
Research problems in bionucleonics, biopharmaceutics, medicinal chemistry, pharmaceutical chemistry, and pharmacognosy. Prerequisites, cumulative grade-point average of 2.50 and permission.

Courses for Graduates Only

PHSCI 510 Topics in Pharmaceutics (3, max. 6) Sp
Hall, Hammarlund, Levy, E. Plein
Reading, conference, and laboratory work in physical pharmacy and biopharmaceutics. Prerequisite, permission.

PHSCI 511, 512 Advanced Pharmaceutical Chemistry (3,3) A,W
Krupski
Chromatography, gas chromatography, ion exchange, and the use of various instruments for scientific investigations and determination of medicinal agents. (Offered every third year; offered 1974-75.)

PHSCI 520 Seminar (1, max. 5) A,W,Sp
Graduate students attend seminars and make one formal presentation per year while in residence; 1 credit per year is allowed. Offered on credit/no credit basis only.

PHSCI 521, 522 Advanced Medicinal Chemistry (3,3) W,Sp
Hultric, McCarthy, Nelson, Trager
Application of integrated data from the physical and biological sciences to problems of chemo therapy, including transport of drugs to sites of action, biotransformation of drugs, interaction of drugs with enzyme systems, and recent advances in drug design. Prerequisites, Chemistry 457, 531, and Biochemistry 442, or permission. (Offered alternate years; offered 1974-75.)
PHARMACY

Courses for Undergraduates

PHARM 204 Orientation (2) A
Study of the profession of pharmacy, its development, and its literature.

PHARM 310 Drugs in Our Society (3) Sp
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) Sp
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.

PHARM 315 Introduction to Pharmacotherapeutics (3) A Sp
J. Plein
Introductory course in drug therapy. Includes drug information resources; principles of pharmacology; pharmacologic and therapeutic classes of drugs with emphasis on characteristics of the classes and on clinically important prototype drugs. Required for nursing students. Prerequisites, Microbiology 301, 302; Conjoint -318, which may be taken concurrently, or permission.

PHARM 351 Fundamentals of Pharmacotherapeutics (3) Sp
J. Plein
Drug information resources; principles of pharmacology; pharmacologic and therapeutic classes of drugs with emphasis on characteristics of the classes and on clinically important prototype drugs. For nursing students. Prerequisites, Microbiology 301, 302; Conjoint -318, which may be taken concurrently, or permission.

PHARM 405 Prescription Practice (4) A
Hall
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, Pharmaceutical Sciences 405, and Pharmacology 402.

PHARM 406 Evaluation of Drug Products (3) W
Hall
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
Gallenberger
Compounding and dispensing of prescriptions originating in the Hall Health Center pharmacy (Student Health Services) and University Hospital pharmacy. Laboratory work is under direct supervision of the Student Health Services pharmacist and the University Hospital pharmacists. Prerequisites, fifth-year standing and permission.

PHARM 412 Drug Products for Autotherapy (3) Sp
Hall
Self-medication as a public health problem. An analytical study of the use and abuse of nonprescription remedies by the general public. Prerequisite, 406.

PHARM 420 Manufacturing Pharmacy (3) AW
E. Plein
Technology of various dosage forms and the manufacture of pharmaceuticals on a small-plant scale. Prerequisite, Pharmaceutical Sciences 332.

PHARM 450 Pharmacy Laws (3) Sp
Pitla
Study of the laws regulating the practice of pharmacy. These include federal, state, and municipal laws, and professional ethics. Prerequisite, fourth-year standing.

PHARM 451 Pharmacy Administration (3) W
The business and management aspects of pharmacy. Economic considerations in independent and chain operations. A study of third-party payment plans for financing pharmaceutical service, government programs, public relations, professional promotion, and advertising. Sick room supplies, surgical and orthopaedic appliances are discussed. Prerequisite, 407.

PHARM 452 Contemporary Problems (1) Sp
Orr
Discussion of current trends affecting the role of pharmacy in health care delivery. Prerequisite, fifth-year standing. Offered on credit/no credit basis only.

PHARM 465 The General Practice of Pharmacy (2, max. 4) AWSpS
Study of pharmacy in the community and urban setting. Students spend variable periods under the tutelage of a pharmacist in his day-to-day practice and meet for weekly discussions of their experiences. Offered on credit/no credit basis only. Prerequisites, Pharmaceutical Sciences 332 and permission.

PHARM 470 Externship In Pharmacy (15) Sp
Hall
Closely supervised study-experience period during which the student spends four weeks in each of three areas of pharmacy practice: a hospital pharmacy, a community pharmacy, and an acute care (clinical) pharmacy service. In hospital and community pharmacies the student participates fully with a preceptor in active pharmacy practice. In the acute care service, the student participates in drug monitoring, patient instruction, consultation, and other applications of his knowledge to a clinical pharmacy service. The hospital and community segments may involve pharmacies anywhere in the state as instructional sites, while the acute care segment ordinarily makes use of the University-affiliated hospitals. Conferences on specific topics supplement work experience to blend academic knowledge into professional activity. Students in the externship are exempted from Pharmacy 452 as a graduation requirement. Offered on credit/no credit basis only. Prerequisite, permission.

PHARM 483 Hospital Pharmacy (3-5) AWSpS
E. Plein
Introduction to hospital pharmacy. Principles and techniques of hospital pharmacy operation. Laboratory work is conducted in pharmacies of University Hospital and affiliated hospitals. Prerequisite, permission.

PHARM 484 The Introduction to Clinical Pharmacy (5) A
Ivey, Kradjan, E. Plein, Smith, Sorby
Orientation to the clinical roles of the pharmacist and other health professionals and study of the more common diseases and their drug therapy, considered as content relevant to drug histories, laboratory tests, drug administration, and case method studies of complex drug therapy. The pharmacist's professional responsibilities for inpatient and outpatient care are also emphasized. Four lectures, one conference, and the equivalent of one laboratory per week. Prerequisites, 407, which may be taken concurrently. Pharmaceutical Sciences 405, 414, and 442.
PHARM
485 Clinical Pharmacy (7) W
Ivey, Kradjan, E. Plein, Smith, Sorby
Continuation of 484 with increased emphasis on the study of disease states and their drug therapy. Lectures and conferences stress application of basic pharmaceutical sciences to selection of drugs in patient care. Laboratory experiences are conducted in various clinical areas of the hospital where students associate observed symptomatology in patients with textbook descriptions of disease states, gain insight into problems of diagnosis and treatment planning, and relate disease states with drug therapy for specific patients. Two lectures, one conference, and three laboratory sessions per week. Prerequisites, 484 and permission.

PHARM
486 Clinical Pharmacy (4-10) Sp
Ivey, Kradjan, E. Plein, Smith, Sorby
Continuation of 485 including lectures, conferences, and laboratories in various clinical areas of the hospital and outpatient clinics. Prerequisites, 484 and permission.

PHARM
487 Clinical Clerkship: Inpatient Care (*, max. 15) AWPSp
Supervised experience in the clinical roles of pharmacy practice in selected inpatient care facilities. Under the supervision of a faculty member, students participate in medicine 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 and drug utilization reviews through various 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.

PHARM
488 Clinical Clerkship: Outpatient Care (*, max. 15) AWPSp
Supervised experience in performing clinical roles of pharmacy practice in selected ambulatory patient care facilities. Under supervision of a faculty member, students engage in such activities as maintaining and using individual medication records and profiles, taking drug-use histories, consulting with physicians about drug therapy problems, counseling patients, etc. Interdisciplinary in nature, these experiences are designed to provide patient care are emphasized. Daily conferences with the faculty supervisor are usually included. Offered on credit/no credit basis only. Prerequisite, permission.

PHARM
489 Clinical Clerkship: Drug Information Services (*, max. 15) AWPSp
Supervised experience in performing the clinical roles of the pharmacist relating to the retrieval, analysis of drug information from various library resources. Students work under direct supervision of a faculty member in preparing answers to actual consultation requests presented to the Drug Information Service. Techniques of preparing suitable written and verbal drug information reports are also stressed. Offered on credit/no credit basis only. Prerequisites, Pharmaceutical Sciences 405 and permission.

PHARM
495 Special Studies In Pharmacy (*, max. 6) AWPSp
Special studies of professional topics in pharmacy. An opportunity to expand the breadth and depth of understanding in specific pharmaceutical areas. Students usually undertake independent study under the individual direction of a faculty member. Prerequisite, permission.

PHARM
499 Undergraduate Research (*, max. 6) AWPSp
Pharmacological research problems. Prerequisites, cumulative grade-point average of 2.50 and permission.

Courses for Graduates Only

PHARM
515 Topics in Nursing and Pharmacy (2) Sp
E. Plein, Regan
Reading and discussion of assigned topics of current interdisciplinary interest in the fields of nursing and pharmacy. Subject matter changes from year to year. Offered jointly with the School of Nursing as Nursing 515. Prerequisite, permission.

PHARM
520 Seminar (1, max. 5) AWPsp
Graduate students must attend seminars and make one formal presentation per year while in residence; 1 credit per year is allowed. Offered on credit/no credit basis only. Prerequisites, permission.

PHARM
560 Manufacture of Sterile Pharmaceuticals (4) W
E. Plein
The technology of parenteral preparations, ophthalmic solutions and ointments, and specific problems in formulation of sterile pharmaceuticals. Prerequisite, permission. (Offered alternate years; offered 1975-76.)

PHARM
570 Hospital Pharmacy Administration (5) Sp
E. Plein
Organization and administration of the hospital pharmacy and the responsibility of the director of pharmacy services in a hospital. Prerequisite, permission. (Offered alternate years; offered 1975-76.)

PHARM
580 Advanced Manufacturing Pharmacy (5) Sp
E. Plein
Study of the methods of manufacture of pharmaceutical preparations on a commercial scale. Prerequisites, Chemistry 457, which may be taken concurrently, and permission. (Offered alternate years; offered 1974-75.)

PHARM
600 Independent Study or Research (*) AWPsp

PHARM
700 Master's Thesis (*) AWPsp

GRADUATE SCHOOL OF PUBLIC AFFAIRS

PUBLIC ADMINISTRATION

Courses for Graduates Only

PB AD
500 General Seminar (1, max. 9) AWPsp
(Formerly Public Policy 500.)

PB AD
501 The Administrator and the Policy Process (3) A
Miller
Context of public administration from the perspective of the administrator. Through case and research materials, field inquiries and interviews, the manifold roles and functions of the administrator are examined, particularly as he relates himself and his work to the process of implementing, making, and changing public policy. Offered jointly with the Department of Political Science as Political Science 570.

PB AD
502 Public Policy and Administration (3) W
Miller
Interaction 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 the Department of Political Science as Political Science 571.

PB AD
503 Administrative and Executive Leadership (3) Sp
Nature of executive life in the public sector, the function of leadership in implementing, maintaining, and changing policy. Leadership styles, the relation of leadership to its constituencies and communities. Offered jointly with the Department of Political Science as Political Science 572.

PB AD
505 The Law of Public Administration (3) Sp
Miller
Legal framework of public administrative action in the United States, emphasizing constitutional requirements; operation of the administrative process; management of personnel, funds, and contracts; and judicial review of administrative activity. Primarily for students in the Graduate School of Public Affairs; others by permission.

PB AD
510 Governmental Organizations (3) W
Sp
Survey of the theory, the current practice, and experience relating to governmental organizations and their program objectives. Comprises a synopsis of subject matter covered in 511, 512, and 521. No credit allowed if 511 and 512 are taken for credit.

PB AD
511 Administrative Problems: Micro-Organization (3) A
Miller
Analysis and solution of 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 governmental organization, the motivation of the persons involved in the decision to produce, the nature of the decision to participate, the nature of conflict and innovation, and the limits of rationality.

PB AD
512 Administrative Problems: Macro-Organization (3) W
Analysis and solution of problems inherent in the characteristics and behavior of large-scale organization and multiagency complexes. Systems approaches are interrelated with social systems theory; functional problems are interrelated 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 
513 Administrative Problems: Program Analysis (3) Sp
Applicability of systems approaches and systems modeling to various types of program problems. Emphasis is upon comprehensive program planning, approaches to factoring of alternatives, evaluation of cost-utilty relationships, and assessment of alternative options or "trade-offs" in activity components of large-scale action programs.

PB AD 
521 Public Management: Program Planning and Design (3) A
Topics include the policy context of planning and programming, the institutionalization of purpose, the planning process, activity design, work scheduling and measurement, and program evaluation.

PB AD 
522 Public Management: Budgeting (3) W
Lyden, Peat
Budgeting as a management process. Study of formulation and administration of government budget, including the role of budgeting in the policy process, the approaches to budget formulation and analysis, the development of the PB approach, and the aspects of budget administration, such as revenue estimating, allotment control, and cost accounting.

PB AD 
523 Public Management: Personnel (3) ASp
Lyden
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 and placement, performance appraisal, incentive management, and training.

PB AD 
524 Organization Development in Public Agencies (3) Sp
Miller
Examination of the philosophies, theories, and models of behavioral science interventions in organizational diagnosis and development (OD). In addition to a review of the basic literature dealing with the OD approach, emphasis is placed on examination of case studies and classroom experience in OD applications, including organizational diagnosis, problem confrontation, and team building. Prerequisite, permission.

PB AD 
527 Quantitative Analysis (3)
Introduction to elementary research methodology and statistical analysis utilizing large and small-scale computers; covering classical statistical topics such as correlation, regression, statistical estimation, sampling, probability, and data analysis. Emphasis is placed on using the computer for data analysis and statistical computation.

PB AD 
530 Advanced Quantitative Methods in Public Administration (3) Sp
Calhoun
Discussion of several important and current topics in operations research: optimization theory, simulation, time-series analysis, Monte Carlo methods, queuing theory, decision models, Markov processes, mathematical programming, and multiple regression analysis. The computer is used in an interactive classroom environment. Prerequisite, 527 or permission.

PB AD 
541 Social Theory and the Public Policy Process (3) A
Lyden
Approaches to the study of organizational behavior in a changing society, including consideration of formal and informal organization, personalities, role playing, client relations, and sociopolitical and technological environment.

PB AD 
542 Social Research and the Public Policy Process (3) W
Lyden
Survey of research evidence 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 
543 Systems Theory and the Public Policy Process (3) Sp
Lyden
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
Kroll
Methodological problems of research in comparative administration. Theoretical and substantive aspects of administrative systems in urban-industrial and developing nations. Offered jointly with the Department of Political Science as Political Science 579.

PB AD 
552 Administrative Problems of Development (3) Sp
Kroll
Problems of administering developing nations and regions, including theoretical aspects of development administration, bureaucratic change, administrative-political interaction in policy making, organizational development, and political impact of administering major programs. Prerequisites, Political Science 473, 474, or permission.

PB AD 
559 Special Topics (2-6, max. 6) A WSp
Systematic study and analysis of special subject matter in public administration and policy. Topic for each quarter varies. Prerequisite, permission.

PB AD 
600 Independent Study or Research (*)

PUBLIC POLICY
Courses for Graduates Only

PB PL 
505 Health Policy and Medical Care (2) Sp
Bergman
Interdisciplinary seminar designed to survey factors affecting health policy and programs. The subject is viewed by representatives of medicine, sociology, economics, political science, and others. Offered jointly with the School of Public Health and Community Medicine as Health Services 505. Prerequisite, permission.

PB PL 
514 Program Evaluation (3) W
Day, Williams
Examines the theory, practice, and politics of evaluation. All types of evaluative activities are considered, from simple feedback mechanisms to the evaluation of large-scale ongoing programs and social experiments, such as the New Jersey negative income tax experiment. Students are expected to gain familiarity with the basic principles of experimental design and the variations necessitated by their application in practice settings. Case studies are used to illustrate the various types of evaluation. Offered jointly with the School of Public Health and Community Medicine as Health Services 514. Prerequisites, adequate background in quantitative methods (e.g., Biostatistics, Health Services 512 or 513) and permission.

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, financial block grants, revenue sharing, and tax deduction and credit systems. Selected programs are examined to determine probable impact on beneficiaries, intergovernmental relations, and program accountability. Political and constitutional limitations are also discussed. Prerequisite, permission.

PB PL 
534 American Foreign Policy Formation (3) Sp
Denny
American foreign policy viewed whole, including defense policy, the relationships of foreign policy to domestic policies and priorities, and the full range of historical, constitutional, institutional, political, and theoretical questions related to the formation and the execution of foreign policy in this broad sense. Offered jointly with the Department of Political Science as Political Science 534.

PB PL 
535-536 Seminar in American Foreign Policy (3-3) W Sp
Denny
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
Wenk
Analysis of the interaction of technology and society through general principles and case studies of contemporary issues and public policy: the nature of the technological enterprise, its scientific base, ingredients of capital, specialized manpower, organizational structure and management; employment of public and private institutions; policy planning to generate, utilize, and manage technology so as to maximize opportunities and to minimize unwanted consequences; institutional conflicts; development of goals, strategies, program priorities, and policies; legal and economic considerations; processes of public decision making. Offered jointly with the Department of Civil Engineering as CIVE 540, 541, 542. Prerequisites, permission for 540; 540 for 541; 541 for 542.
PUBLIC HEALTH AND COMMUNITY MEDICINE

PB PL
556 Public Policy, Administration, and Democratic Theory (3) Sp
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 organizations, the functions of the public servant in the making of policy decisions, and the realities of policy formulation in relation to democratic values. Objectives of the course is to enable the student professionally committed to public activity to reflect in a discussion setting upon his or her position as a participant in the society in which he or she works. Students and faculty determine the specific topics to be covered. Prerequisite, permission.

PB PL
561, 562 Policy Development and Administration: Urban Affairs (3,3) A,W
A two-quarter graduate course in the structures, functions, and processes of government in cities, with special emphasis on the origin, content, and implementation of public policies. Major focus is on the political processes at the municipal 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 relationship between research and public policy. Prerequisite, Economics 416.

PB PL
571, 572, 573 Public and Educational Policy Issues in the Development of Human Talent (3,3,3) A,W,Sp
Wolfe
Higher education and the nation's human resources, including education, future projections, policy issues, and national and personal goals in the relations between education and the utilization of professional and specialized personnel. Students will do research work on topics of special interest. Offered jointly with the College of Education as EDEPS 571, 572, 573. Prerequisite, permission.

PB PL
583, 584, 585 Seminar in Science and Public Policy (3,3,3) A,W,Sp
Wolfe
Issues and problems relating to the interaction of science and scientists with the public policymaking process. Science versus the nature and values of political processes, and the continuing tensions between the two. The evolving interaction between scientific and technical knowledge and political power, scientific versus ethical judgments. Role of science in the establishment of national goals. Plans and proposals for increasing governmental competence to deal with public policy issues involving science and technology.

PB PL
590, 591, 592 Midcareer Seminar (3,3,3) A,W,Sp
Miller
Interdisciplinary seminar in public policy for midcareer executives. Open to participants in the Education For the Public Management Program; others by permission.

PB PL
593, 594, 595 Policy Development and Administration: Natural Resources (3,3,3) A,W,Sp
Crutchfield, Marts, Pealy
Interdisciplinary research seminar in natural resources policy development and administration. Major concern is with the processes of natural resources policy formulation and analysis, and the role of various sectors in influencing policy development and administration. Open to graduate and professional students in varied disciplines who are emphasizing preparation in natural resources fields. Prerequisite, permission.

PB PL
596 Social Policy Analysis (3) Sp
Williams
Examines the techniques and methods required in social policy analysis, including the technical issues in developing, using, and interpreting research relevant for social policy and bureaucratic problems in using research and analysis in the policy process. Designed to aid future administrators and analysts in performing policy analysis and in working with researchers to develop relevant studies and with the agency bureaucracy to integrate research and analysis. Prerequisite, permission.

PB PL
600 Independent Study or Research (*) A,W,Sp

PB PL
604, 605, 606, 607 Degree Project (2-6,2-6, 2-6-2-6)
The following economics courses serve as an integral part of the Graduate School of Public Affairs curriculum.

ECON
392 American Indian Economic Development Problems (5) W
Troper
Study of the economic problems faced by native Americans. Primary emphasis on the management of reservation resources, particularly those resources important on reservations in the northwestern United States. Secondary emphasis is on the study of the integration of Indian workers into the general labor force of the United States. Prerequisite, 200 or equivalent or permission.

ECON
400 Fundamentals of Micro-Theory (3) A
Hashimoto
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 Micro-Theory (3) W
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 301 has been taken for credit.

ECON
416 Urban Economics (5) A Sp
Open Theatre
Examines what is happening in urban areas. Use of economic analysis to explain urban trends; urban government organization; and problems of housing and renewal, transportation, poverty and race, and the environment.

Offered jointly with the Department of Geography as Geography 416. Prerequisite, 300 or 400, or equivalent.

ECON
Special emphasis on elements of economic theory relating to resource-oriented industries. Case studies in the theory and practice of resource management dealing with both stock and flow resources. Benefit-cost analysis and the evaluation of multipurpose projects.

ECON
445 Income Distribution and Public Policy (5) W
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.

ECON
446 Economics of Labor and Human Resources (5) Hashimoto
Economic analyses of policy related topics in human resources. Topics include labor demand and supply, education and occupation, wage structures, and income inequality, discrimination, and poverty. Prerequisite, equivalent of 400 or permission.

ECON
451 State and Local Public Finance (3) W or Sp
Analysis of state and local government revenue sources and consequences of their use. Includes taxation, user charges, debt finance, and intergovernmental fiscal relations. Emphasis on metropolitan finance problems. Prerequisite, 201, 400 or equivalent.

ECON
452 Economic Approaches to Political Analysis (5) W
Application of economic theory and methodology to political phenomena. Emphasis on the construction with application in American context. Offered jointly with the Department of Political Science as Political Science 416. Prerequisites, 201, 400, or equivalent.

ECON
553 Economics Analysis and Government Programs (3) Sp
McCaffree
Application of economic analysis to public enterprises and programs. Prerequisites, 400, 401, or equivalent.

SCHOOL OF PUBLIC HEALTH AND COMMUNITY MEDICINE

BIOSTATISTICS

Courses for Undergraduates

PC BS
410 Principles of Communicable Disease Control and Biostatistics (2) A,W,Sp
Vital statistics, measure of central tendency and dispersion, introduction to interpreting statis-
## Courses for Graduates Only

### PC BS

- **511, 512, 513 Medical Biometry I, II, III**
  - (3,3,3) A,W,S
  - Feigl, Kanarek, Krommal, Martin, Thompson

  Application of mathematical and statistical techniques to the problems of advanced medical and epidemiological research.

- **562 Operations Research for Health Services**
  - (3) W
  - Dickson

  Survey introducing operations research techniques (linear, nonlinear, integer, dynamic, stochastic programming), with specific applications to health services research. Solution techniques are not emphasized; rather, consideration of problem formulation, problem type recognition, availability of solution algorithms, and critique of present research in terms of operations research and health services criteria. No previous knowledge of mathematical programming is assumed. Prerequisites, 511 or equivalent, and graduate standing.

### PC BS

- **571, 572, 573 Special Topics in Advanced Biostatistics**
  - (3, max. 6) A,W,S
  - Feigl, Fisher, Martin, Wahl

  Covered are multivariate analysis, clinical trials, health-survey design and analysis, Bayesian decision procedures, regression and classification techniques, stochastic models in biology and medicine, and other advanced statistical methods.

### PC BS

- **580 Seminar in Biostatistics**
  - (*, max. 5) A,W,S
  - Feigl

  Presentation and discussion of special topics and research results in biostatistics. Speakers include resident faculty, visiting scientists, and advanced graduate students. Required for students in the Department of Biostatistics training program.

- **582 Seminar in Biostatistics Applied to Health Services Research**
  - (1, max. 5) A,W,S
  - Diehr

  Presentation and discussion of special topics and research results in health services that have a strong methodological and/or statistical component. Participants include visiting scientists, resident faculty, and graduate students. Required of students in the biostatistics-health services graduate training program. Offered jointly with the Department of Health Services as Health Services 582.

### PC BS

- **583 Epidemiology and Biostatistics Research Seminar**
  - (1) A,W,S
  - Fox, Thompson

  Promotes critical reading of scientific papers and increases knowledge and understanding of principles and methods in epidemiology. Offered jointly with the Department of Epidemiology and International Health 583.

### PC BS

- **590 Biostatistical Consulting**
  - (max. 9) A,W,S
  - Feigl, Kanarek, Wahl

  Training in consulting on the biostatistical aspect of research problems arising in the biomedical field. Students, initially under the close supervision of a faculty member, participate in discussions with investigators leading to the design and/or the analysis of a quantitative investigation of a problem. With experience, independent associations of student and research worker are encouraged, with subsequent review by faculty of resulting design and analysis. Required for students in biostatistics graduate program.

### ENVIRONMENTAL HEALTH Courses for Undergraduates

### PC EH

- **411 Introduction to Environmental Health**
  - (3) W
  - Hatlen

  Relationship of man to his environment, how it affects his physical well-being and what he can do to influence the quality of the environment and to enhance the protection of his health. Emphasis on environmental factors involved in transmission of communicable diseases and hazards due to exposure to chemical and physical materials in our environment.

### PC EH

- **440 Water and Waste Sanitation**
  - (4) A
  - Van Duren

  Advanced study of the pollution factors, the sanitary control of water supplies, and sewage and refuse disposal, with emphasis on the knowledge and skills utilized by the sanitary engineer. Prerequisites, environmental health major and 411, or permission.

### PC EH

- **441 Food and Milk Sanitation**
  - (4) W
  - Jackson

  Advanced study of the sanitary control of the production, processing, and distribution of food, products, emphasizing control of foodborne diseases. Prerequisite, microbiology course or permission.

### PC EH

- **442 Vector Control and Solid Waste Sanitation**
  - (3) Sp
  - Hatlen

  Advanced study of the impact and control of rodents and arthropod vectors of disease; and programs and problems associated with solid waste disposal and control. Prerequisites, 411 and environmental health major, or permission.

### PC EH

- **443 Human Habitat and Health**
  - (3) Sp
  - Van Duren

  Examination of the impact of housing on man's total health and well-being; the environmental health problems associated with inadequate housing; the environmental specialist's responsibility in promoting health in both private and public accommodations including schools, migrant housing, jails, and institutions; and the interrelationships of health with existing housing programs. Prerequisites, 411 and environmental health major, or permission.

### PC EH

- **444 Institutional Environmental Health**
  - (3) Sp
  - Fish

  Examination of the environmental health and safety hazards that can adversely affect hospital and nursing home patients, staff, and surrounding community; the means by which hazards can be prevented and controlled; and the interrelationships with administrative and regulatory activities. Prerequisites, 411 and environmental health major, or permission.

### PC EH

- **449 Health Effects of Air Pollution**
  - (2) Frank

  Structure and function of the respiratory and cardiovascular systems and the changes that may be produced by specific air pollutants, such as ozone, carbon monoxide, SO₂, etc. Air quality criteria and the economic costs of disease are discussed. Several classroom demonstrations. Prerequisites, sophomore standing, and 450, CEWA 461, or permission.

### PC EH

- **450 Measurement and Control of Air Pollution**
  - (2) A
  - Brysbaert

  Description of methods for air pollution research and control, including field-survey techniques, stack sampling, analytical monitoring, and use of control equipment. Administrative problems are also discussed.
Courses for Graduates Only

PC EH 511 Environmental Health (3) A Milner
General survey of all physical environmental factors affecting human health and functioning, including general community, special occupational, and exotic environments. Considered are effects of heat, cold, light, circadian rhythms, ionizing and nonionizing radiation, air pollution, water resources, pesticides, food additives, solid-waste disposal, accidents, hyperbaric environments, and specific industrial hazards. Prerequisite, M.D., Ph.D., medical student, or permission.

PC EH 521 Environmental Cotnponents (3) A Haten
Examination of the physical components that influence man’s health and his efficiency of performance. Major components are defined, then examined individually in concert with the total environment. Interrelationships of the physical environment and social, cultural, and economic influences are considered. Prerequisite, environmental health graduate student or permission.

PC EH 522 Environmental Programs (3) W Fish
Environmental programs are examined with regard to determination of needs, establishment of controls, and the legal and organizational framework within which they exist. The operational aspects of programs are explored, considering organization, planning, staffing, financing, and evaluation. Agencies are visited and studied, and a report is presented. Prerequisites, 521, environmental health graduate student, or permission.

PC EH 523 Environmental Management (3) Sp Haten, Reed
Examination and discussion of human resources as a critical component in environmental programs: Emphasis on the importance of instruction, communication, and involvement in the achievement of environmental control goals and on the maximizing of human resources through the application of progressive principles in the recruitment, training, and utilization of personnel in environmental control programs. Prerequisites, 521, 522, environmental health graduate student, or permission.

PC EH 581 Environmental Reading (1, max. 6) A WSpS
Critical reading of selected basic and applied research publications on environmental health problems and programs.

PC EH 590 Selected Topics (1-6) A WSpS
In-depth study of a current environmental health topic and/or special summer format presenting introductory material. May be taken with Health Services 590 and Epidemiology and International Health 590. For more information and permission, consult department program adviser.

PC EH 599 Field Studies (2-6, max. 6) A WSpS
Assignment to an environmental research or service program for application of evaluating techniques.

EPIDEMIOLoGY AND INTERNATIONAL HEALTH

PC EP 410 Principles of Communicable Disease Control and Biostatistics (2) A WSp Vital statistics, measures of central tendency and dispersion, introduction to interpreting statistical data, and control of communicable dis-
PC EP 420 Principles of Epidemiology (3) A Hall, Staff
Descriptive, analytic, and experimental epidemiology, as presented in examples from infectious and chronic noninfectious disease. Includes descriptive statistics as applicable in epidemiology. Prerequisite, Health Services 332, Microbiology 301 or permission, or graduate standing.

PC EP 478 Application of Vital and Health Statistics (2) Sp Lee, Weiss
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 development and the evaluation of programs and the recognition of new hazards. Offered jointly with the Department of Biostatistics as Biostatistics 478. Prerequisite, Biostatistics 472 or equivalent or permission.

PC EP 497 Epidemiology and International Health Special Electives (*) AWSpS
Off-campus course for medical students. Prerequisite, permission.

PC EP 499 Undergraduate Research (*) AWSpS
Prerequisite, permission.

Courses for Graduates Only

PC EP 510 Applications of Epidemiology (4) Sp Gale
Introduction of epidemiologic principles and examples of the application of these principles to the monitoring of disease occurrence, epidemiologic investigation, disease control, and health program evaluation. Examples from acute and chronic diseases, environmental health, and health care delivery are used. Recommended for graduate students whose primary interests lie in areas other than epidemiology. Prerequisites, graduate standing and permission.

PC EP 511 Principles of Epidemiology (3) A Fox
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.

PC EP 512 Epidemiology of Chronic Diseases (3) W Lee, Weiss
Study of the principles and practices of epidemiology as applied to the noncommunicable diseases. Prerequisite, 511 or permission.

PC EP 513 Epidemiology of Acute Diseases (3) Sp Alexander
Study of the principles and practices of epidemiology, as derived from a study of communicable diseases. Prerequisite, 511 or permission.

PC EP 521 Epidemiology of Perinatal Problems (3) Sp Emanuel
Consideration of the contribution of epidemiology 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 maternal retardation, in relation to the evaluation of control problems. Prerequisites, graduate, medical, or dental school standing and 510 or 511, or permission.

PC EP 531 Problems in International Health (3) W Emanuel
Survey of the relationships of the sociocultural, political, economic, and demographic characteristics of developing countries to disease occurrence and to the solution of health problems. Prerequisite, graduate or medical student or permission.

PC EP 540 Anthropology and Health (3) Kunstadter
Seminar on the history, development, and future of anthropological contributions to problems of health and illness. Offered jointly with the Department of Anthropology as ANTH 540. Prerequisite, permission.

PC EP 572 Epidemiology of Neoplastic Diseases in Man (2) A Lee
Human cancer and its etiology; the techniques involved and the results, so far, are examined in the light of future prospects. Offered jointly with the Department of Environmental Health as Environmental Health 572. Prerequisite, 511 or permission.

PC EP 583 Epidemiology and Biostatistics Research Seminar (1) AWSpS Fox, Thompson
Promotes critical reading of scientific papers and increases knowledge and understanding of principles and methods in epidemiology. Offered jointly with the Department of Biostatistics as Biostatistics 583.

PC EP 590 Selected Topics in Epidemiology or International Health (2-6, max. 6) AWSpS
Tutorials are arranged for a small number of students for in-depth examination of an area of epidemiology or international health, usually of current nature. Seminar format. Prerequisite, 511. Also a special summer format presenting introductory material. May be taken with Environmental Health 590 and/or Health Services 590. For more information and permission, consult the department program adviser.

PC EP 598 Teaching Methods in Epidemiology and/or Preventive Medicine (1-3) AWSpS Fox
Supervised teaching experience in public health and in epidemiology. Student formulates an outline for a course in epidemiology or related subject. He makes one or more formal presentations to class and is encouraged to use modern educational methods and teaching media. He constructs test questions on lecture subjects. Prerequisite, EDPSY 449 or equivalent.

PC EP 599 Practice of Epidemiology (*) AWSpS
Participation in the field investigations of acute or chronic disease occurrence. Prerequisite, permission.

PC EP 600 Independent Study or Research (*) AWSpS
Prerequisite, permission.

PC EP 700 Master's Thesis (*) AWSpS
Prerequisite, permission.

PC EP 800 Doctoral Dissertation (*) AWSpS
Prerequisite, permission.

HEALTH SERVICES

PC HS 323 Introduction to Public Health Principles and Practices (3) AWSpS Wilkey
Survey of principles, practices, and agencies concerned.

PC HS 424 Public Health Programs (3) Sp Hall
Current problems and programs of major concern in health care delivery, mental health, chronic diseases, and medical economics.

PC HS 497 Health Services Special Electives (*) AWSpS
Off-campus course for medical students.

PC HS 498 Undergraduate Thesis (*) AWSpS

PC HS 499 Undergraduate Research (*) AWSpS

Courses for Graduates Only

PC HS 505 Health Policy and Medical Care (2) Sp Bergman
Interdisciplinary seminar designed to survey factors affecting health policy and programs. The subject is viewed by representatives of medicine, sociology, economics, political science, and others. Offered jointly with the Graduate School of Public Affairs as Public Policy 505. Prerequisite, permission.

PC HS 511 Health Services and Medical Care (4) W Day
Intensive introduction to the subject, including measurement of need and demand, the resources for health care, private and public efforts to provide health services, elements of medical care, program planning and evaluation, the biological basis of organized public health activities, public health programming, health behavior and its modification, social science applications in health services and medical care, and related topics. Prerequisite, graduate standing or permission.

PC HS 512 Medical Care (3) Sp Richardson
Intensive treatment of aspects of medical care, including access, quality, financing and supply,
Institutional and provider arrangements, private and public programs to supply care, and related issues. Prerequisite, 511 or equivalent, or permission.

PC HS
513 Health Planning: Implementation and Goals (3) A
Blackman
Study and discussion of the methods of comprehensive health planning and resource allocation in the planning services area. Cost benefit and cost effectiveness, program budgeting, and other techniques are explored in relationship to the methodology for measuring health benefits and planning health services. The evaluation of programs, methods for such investigation and analysis, and related topics are included. Prerequisite, 511 or equivalent, or permission.

PC HS
514 Program Evaluation (3) W
Richardson
Examination of theory, practice, and politics of evaluation. All types of evaluative activities are considered, from simple feedback mechanisms to the evaluation of large-scale ongoing programs and social experiments. Students are expected to gain familiarity with the basic principles of experimental design and the variations necessitated by their application in practical settings. Case studies are used to illustrate the various types of evaluation. Offered jointly with the Graduate School of Public Affairs as Public Policy 514. Prerequisites, adequate background in quantitative methods (e.g., Biostatistics 512 or 513) and permission.

PC HS
519 Health Services Seminar (*, max. 4) A
Presentations predominantly by students, primarily health services majors, emphasizing detailed examination of aspects of medical care, medical administration, public health programs, and allied topics. Prerequisites, 511, 512, and 513 or concurrent registration, and permission.

PC HS
521 Community Health Education (3) A
Basic concepts related to community health education with emphasis on the psychosocial and cultural factors related to health and health education. Emphasis is on the determinants of health behavior at the individual, group, and community levels, and on the role of health education as an instrument of planned change. Prerequisite, health education concentration or permission.

PC HS
522 Community Organization for Health (4) W
Anderson
Emphasis on the diagnosis of community health problems and various organizational practices utilized for effective solution. Review and analysis of the community organization process; resources; role of the community health workers, relationship to the practice of community health education. One-half day of field work required. Prerequisites, health education concentration and permission.

PC HS
530 Community Medicine (3) AW
Browder, Gilson
One-half day field and two hours seminar experiences weekly in community agencies delivering and planning health services. Visits may be made to neighborhood clinics, comprehensive health planning bodies, group medical practices, public health agencies, special problem (drug, alcohol, sexuality) clinics, mental health facilities, environmental services, and others. Related subjects are discussed in weekly seminars by students, faculty, and guests. Prerequisite, medical student standing; others by permission.

PC HS
531 Independent Field Studies in Community Medicine (2-15) AWSpS
Gilson
In-depth experience in variable time blocks in one or more community health activities in agencies delivering and planning health services. Topics may include neighborhood clinics, comprehensive health planning bodies, medical practice settings, public health agencies, special problem clinics and facilities, environmental programs and services. Prerequisite, medical student or permission.

PC HS
546 Economic Studies of Health Care (3)
Lagace
Examination of topics related to the economics of health care, including supply and demand factors, financing of care, efficiency and cost of delivery, and allied areas. Offered jointly with the Department of Economics as Economics 546. Prerequisite, graduate standing in the School of Public Health and Community Medicine; others by permission.

PC HS
551 Health Services Management I (3) A
Dowling
The first of a three-course sequence dealing with the management of health institutions and programs, with special emphasis on the general hospital. Included are a review of hospital ownership, organization, and control; health services law, manpower management; and positive and special professional elements of patient care. Prerequisites, 511, 512, and permission.

PC HS
552 Health Services Management II (3) W
Dowling
Second course in a three-course sequence dealing with the management of health services institutions and programs. Topics covered include: health facilities logistics, financial management, and application of quantitative methods in health services administration. Prerequisite, 551.

PC HS
553 Health Services Management III (3) Sp
Lagace, Seifert
Third course in a three-course sequence dealing with the management of health services institutions and programs. Topics covered include: health services law, hospital and program policy decisions, financial planning, and hospital design and architecture; and the presentation of hospital survery and health services research project reports. Prerequisites, 551 and permission.

PC HS
561 Seminar on Sociological Aspects of Health and Housing (3) W
Shortell
Critical examination and discussion of sociological approaches—methodological, theoretical, and empirical—in the health care field. Particular attention is paid to applied studies in the field and, more broadly, to the implications for decision-making from the sociological perspective. Prerequisite, 511 or undergraduate major in sociology or permission.

PC HS
567 Politics of Health Care (3) Sp
Gilson
Provides analytical skills for viewing health care delivery within the context of the American political system. Distinctive characteristics of the health field are examined as these relate to the formulation and implementation of health policy, as well as the areas that health shares in common with other policy areas. Emphasis in the course is on the political processes underlying the ever-expanding role of government in health care. Prerequisite, 511 or permission.

PC HS
580 Health Services Research Seminar (1) W
Preparations of current research programs of faculty, students, and selected guest investigators. Topics include quality evaluation, measurement of health benefits, program design and evaluation, and related issues. Prerequisite, graduate standing in the School of Public Health and Community Medicine; others by permission.

PC HS
581 Health Services Reading Seminar (1) Sp
Review of current literature in health services, introduced topically, covering major areas of health policy, health services research, medical care and public health programs, and related areas. Prerequisite, graduate standing in the School of Public Health and Community Medicine; others by permission.

PC HS
582 Seminar in Biostatistics Applied to Health Services Research (1, max. 5) AWSpS
Presentation and discussion of special topics and research results in health services that have a strong methodological and/or statistical component. Participants include visiting scientists, resident faculty, and graduate students. Required of students in the biostatistics-health services graduate training program. Offered jointly with the Department of Biostatistics as Biostatistics 582. Prerequisite, permission.

PC HS
590 Selected Topics in Health Services (*)
By individual arrangement, the student and faculty member(s) develop a program of reading and conference appropriate to the topic selected by the student. The topic chosen will be within the special competence of the faculty participating in the course, in the areas of health care delivery and health care administration. Also special summer format presenting introductory material may be taken with Environmental Health 590 and/or Epidemiology and International Health 590. For more information and permission, consult departmental program advisor.

PC HS
595, 596, 597 Field Analysis Project/Research Project (3, 3, 3) A, W, Sp
Blackman, Dowling, Lagace, Seifert
Supervised research in a selected topic related to student's concentration in graduate study. Includes survey of literature, development of approach, and written paper on conclusions. Prerequisite, successful completion of first-year curriculum and internship in graduate program in health services administration and planning.

536
and pathobiological phenomena (differentiation, organization, infection, cancer, etc.) are covered. Prerequisites, Biochemistry 440, 441, 442 and Microbiology 447, and permission. Offered jointly with the Department of Microbiology 525.

PC PB 580 Pathobiology Seminar (1, max. 9) A,W,Sp,)
Research reports from both students and faculties are presented and discussed. Topics include immunohematology, viruses, membranes, infectious diseases, immune response. Prerequisite, permission.

PC PB 581 Current Literature in Pathobiology (1, max. 12) A,W,Sp
Critical evaluation of recent articles on infectious agents. Emphasis on literature dealing with immunological, biochemical, and molecular studies of selected pathogenic microorganisms and viruses. Prerequisite, graduate student standing in pathobiology; others by permission.

PC PB 582 Seminar on Molecular Biology of Animal Viruses (1, max. 12) A, W, Wise
In-depth study of one or more animal virus types of current interest. Topics include cell-virus interactions, control of viral replication and protein synthesis, assembly of mature virus, relationship between structure and antigenicity, and recombination and genetic analysis in DNA and RNA viruses. Direct participation of students in the presentation of topics is required. Prerequisite, permission.

PC PB 598 Didactic Pathobiology (*, max. 12) A,W,Sp, Kenny
Supervised lecture and laboratory teaching experience for Ph.D. candidates. Teaching is in pathobiology laboratory courses, depending on interests of the student. Prerequisite, permission.

PUBLIC HEALTH AND COMMUNITY MEDICINE

PC 600 Independent Study or Research (*)

PC 700 Master's Thesis (*)
RESERVE OFFICER PROGRAMS

cal leadership techniques demonstrated
strated in the most significant American cam-
paigns and engagements; fundamentals of
military justice; the law of armed conflict;
interpretation and field navigation with map
and compass; fundamentals and techniques of
small-unit tactics, emphasizing the
importance of teamwork, movement, and
communications; the duties, responsibilities,
and methods of employment of basic military units. One hour
of leadership laboratory per week and one
weekend field exercise are required during the
year.

M SCI
301, 302, 303 Military Science III: Advanced
A W S p, A W S p , A W S p
Develops the student's proficiency in delivering
and evaluating oral presentations; identifies and
illustrates effective leadership traits; provides
the student with an understanding of the fac-
tors affecting human behavior; affords oppor-
tunities to apply leadership and management
techniques; explains the roles of the
branches in the overall mission of the Army
and their functions in support of field forces;
the role of the leader in directing and coordi-
nating ground and military units in the
accomplishment of missions from squad to
battalion level; the principles of command con-
trol, leadership techniques, and communication
systems used in the Army. Three classroom
hours and one hour of leadership laboratory
per week, two weekend field exercises, and 3
quarter credits of academic enrichment sub-
jects are required during the year. A tax-free
stipend of $100 per month is paid to contract
students enrolled in the advanced program.

M SCI

304 Military Science III: Advanced Generalship
and the art of warfare as they are
exemplified by two leaders from the time of Frederick the
Great to the present; technological and tactical
innovations during, and the background to, the
major conflicts of this period. Required
for students entering the two-year program
who did not take 301. Concurrent with 301.

M SCI
401, 402, 403 Military Science IV: Advanced
A W S p, A W S p , A W S p
Examination of the factors influencing world
culture, to allow a more informed analysis of
the relations between the United States and
other nations; analysis of the position of the
United States in the contemporary world scene and
its impact on leadership and management
problems of the military services; use of a
developmental study designed to provide an
awareness of the personal responsibilities and
official relationships of an Army officer; a
comprehensive study of the organization and
functions of command and staff relationships;
the processes which shape strategy, opera-
tives, and planning are coordinated into success-
ful military operations; an introduction to the
basic concepts of the legislative and executive
authorities represented by the Uniform Code of
Military Justice; comprehensive study of the
problem-solving techniques used by the small-
unit leader, with emphasis on coordination and
detailed planning by the junior officer; analysis
and discussion of the process of planning suc-
cessful military operations. Two classroom
hours and one hour of leadership laboratory
per week are required of students enrolled.
During the Autumn Quarter and Winter Quarter, a
course in military law is offered by the Division of
General and Interdisciplinary Studies (General
and Interdisciplinary Studies 448) for all
advanced course cadets. This course replaces
402; however, one hour of leadership labora-
tory per week is still required. 6 quarter

credit's of academic enrichment subjects are
required during the year. A tax-free
stipend of $100 per month is paid to contract
students enrolled in the advanced program.

NAVAL SCIENCE

Courses for Undergraduates
N SCI
111 The Naval Service (3) A
General introduction to the Navy, its organiza-
tion, missions, roles, tasks, and operating
methods. The relationship to the other services
within the Department of Defense is empha-
sized.

N SCI
112 Naval Ship Systems I (3) W
Study of the varied ship systems operational in
the Navy today, including the principles of char-
nacteristic propulsion systems and auxiliary
machinery and the elements of ship stability
and damage control. An introduction to nu-
clear propulsion.

N SCI
113 Naval Ship Systems II (3) Sp
Continuation of 112.

N SCI
211 Naval Weapon Systems (3) A
Concept of weapon systems and the
systems approach, the techniques of
engineering, and the development and implemen-
tation of new weapon 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 cen-
ters on the role of sea power in the history of
the United States, the current status of the vari-
ous elements of the nation's sea power as they
influence the development and implementation of
national security policy, and the economic
potent. 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
Comprehensive study of the science of ter-
restrial navigation, including dead reckoning,
piloting, and electronic means. The laws for
prevention of collision at sea (rules of the nautical
road) are covered.

N SCI
312 Celestial Navigation (3) W
Theory and practice of celestial navigation.
The student performs the complete "day's work" of
the ship's navigator.

N SCI
313 Naval Operations (3) Sp
Introduction to naval operations, the employ-
ment of naval forces, naval tactics, formulation
of operations plans and orders, employment of
detection equipment, and meteorology. The
subfield of operations analysis as a tool for deci-

dion making is introduced.

N SCI
410 Naval Operations Analysis (3)
Provides the student background to understand
operations analysis projects and his role in
data gathering for useful quantitative infor-
mation in the solution of analytical problems.

N SCI
411 Psychology of Leadership (3) A
Introduction of the theory and techniques of
behavioral science that are pertinent to under-
standing individual and group behavior of
adults. It introduces midshipmen to the
management process and the relationship of man-
agement functions to leadership. Acceptance of
a traditional deep sense of moral responsi-
bility on the part of the aspiring leader is
stressed.

N SCI
413 Naval Organization and Management II
(3) Sp
Continuation of 412.

MARINE CORPS OPTION COURSES
N SCI
321 Evolution of Warfare I (3) A
Introduction to the art of war, the evolution of
warfare from the earliest recorded battles to the
present day.

N SCI
322 Evolution of Warfare II (3) W
Continuation of 321.

N SCI
323 Marine Corps Operations (3) Sp
Introduction to the basic tactics employed by the
Marine Corps: Coverage of the roles and the
missions of the Marine Corps, its relationship
to the other services; and its employment in the
implementation of national policy. Familiarizes
the student with Marine Corps organization.

N SCI
421 Amphibious Warfare I (3) A
Historic review of the great amphibious opera-
tions conducted in the Pacific theater of opera-
tions 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 opera-
tions 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
423 USMC Leadership and Administration
(3) Sp
Concepts, objectives, characteristic qualities,
and practical techniques of leadership as inex-
ercised by the Marine Corps officer are studied.
Emphasis is placed on the leadership and man-
agement role of the junior officer in the fleet
marine forces.
SCHOOL OF SOCIAL WORK

Courses for Undergraduates

SOC W 300 Field of Social Welfare (5) AWSp
Berleman, Brink, Dear, Duplica, Meld, Parsons
Origin, development, and present status of social service programs, with particular emphasis on the relationship of program resources, human needs, and the methods through which services are provided. Prerequisite, upper-division standing.

SOC W 310-311-312 Social Welfare Practice (2-2-2)
A, W, Sp
Berleman, Whitaker
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 professional 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 390 Introduction to Social Welfare Research (3) AWSp
Gatski, Hutchins
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.

SOC W 401 Interviewing and Counseling Skills (3) Sp
Margolin
Ten sessions focused on experiential learning of skills in interviewing and counseling persons with problems in their social functioning. Focus also on identifying and practicing skills in communications, including listening, observing, interviewing, discussing, confronting, and reviewing.

SOC W 409 Readings in Social Welfare (1-4, max. 12)
AWSp
Prerequisite, permission.

SOC W 410 Beginning Social Work Practice (2) A Duplica, Resnick, Whitaker
Introduction to social work practice that develops a conceptual framework for the responsible delivery of a social service, provides an overview of traditional social work methods (casework, group work, and community organization), and explores an array of techniques, skills, and methods for use in beginning practice. Prerequisites, social welfare major, 300 and upper-division standing. To be taken concurrently with 415.

SOC W 411 Beginning Social Work Practice (2-2) W Duplica, Ochoa, Teacher, Whitaker
Continuation of methods initiated in 410, with emphasis on service methods. Prerequisites, 410- and 415-. To be taken concurrently with 415.

SOC W 412 Beginning Social Work Practice (-2) Sp
Bryant, Duplica, Ochoa
Elaboration of concepts and methods developed in 410- and 411-. Prerequisites, 410-411- and 415-416-. To be taken concurrently with 417.

SOC W 415 Beginning Field Instruction (3) A
Students are placed in selected social service agencies and accept beginning social service assignments under the supervision of competent agency personnel. Prerequisites, social welfare major, and 300. To be taken concurrently with 410-. Offered on credit/no credit basis only.

SOC W 416 Beginning Field Instruction (3) W
Continuation of student placements in assigned social service agencies. Students assume increasing responsibility for particular service assignments. Prerequisites, 410- and 415-. To be taken concurrently with 411-. Offered on credit/no credit basis only.

SOC W 417 Beginning Field Instruction (3-3) Sp
Continuation of student placements in social service agencies. Students complete service assignments and work through termination process. Prerequisites, 410-411- and 415-416-. To be taken concurrently with 412. Offered on credit/no credit basis only.

Note: Social Work 410-411-412 and 415-416-417 must be taken during the student's senior year. The sequences must be completed in order for the student to receive credit for any one of the courses.

SOC W 420 Social Gerontology (4)
Beatty
Generational component in social work practice. Discussion of value differences across generations, life stage development into the later years, social role loss and acquisition 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 430 Methods of Child Care and Treatment (3) Whitaker
Major foci include 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 447 Physical Structure and Human Interaction (2) W Resnick, Sanoff
For social work and architectural students. Examines the effect of physical structure on human interaction. Offered jointly with the College of Architecture and Urban Planning as Architecture 447. Prerequisite, permission.

SOC W 470 Crisis Intervention in Social Welfare (3)
Lewin
Introduction to: interactive 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 didactic presentation of materials by instructor, use of role play, films and tapes, discussions led by social workers from centers for persons in acute personal circumstances. Open to majors and nonmajors.

Courses for Graduates Only

SOC W 500 Social Welfare Lecture Series (2)
Introduction to fundamental issues confronting social work and social welfare. This is a series of ten lectures delivered by knowledgeable persons on current concern. The presentations are intended to provide the student with a broad perspective on the major trends and developments in the field.

SOC W 501 Problems of Social Welfare in Ethnic Minority Communities (2)
Benz, Chamblis, Shisaka, Kritologo, Northwood, Ochoa
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 effective delivery of social work and social welfare services in those communities. May be repeated for credit.

SOC W 502 Social Welfare Policy (2)
Brink, Dear, Duplica, Lewin, Parsons
Introduction to major institutions responsible for implementing social welfare programs. Analysis and examination of the processes through which social welfare policies are developed; the interactive relationships of social welfare policies among various programs; and emergent issues and new policy developments in the field.

SOC W 504 Social Problems and Social Welfare (3, max. 9)
Beatty, Bracht, Dear, Herrick, 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 in the provision of services related to such problems, selected social problems such as poverty and ill health, juvenile delinquency, drug and alcohol addiction, and neglect of the aging are studied and related to the student's field experiences. Community and organizational development students should register concurrently for basic interactive skill course (Social Work 560) concerned with ameliorating or alleviating the social problem under study.

SOC W 507 Seminar (2) AWSp
Bryant, Duplica, Roffman
May be repeated for credit. Prerequisite, permission.

SOC W 509 Readings in Social Work (*) AWSp
May be repeated for credit. Prerequisite, permission.
SOC W 510 Social and Behavioral Foundations of Social Work Practice (5)
Introduction to selected theoretical orientations upon which various current modalities of social work practice are based. The implications of each of these orientations for work with large and small client systems are discussed. The course consists of self-contained units of study.

SOC W 515 Field Instruction (2-8) AWSp
Social work majors only. Prerequisite, permission.

SOC W 529 Introduction to Human Services Practice (2, max. 12)
Farber, Hanneman, Hutchins, Ishisaka, R. Macdonald, Maier, F. Miller, S. Miller, Mundt, Norton, Resnick, Riechey, Teather, Whittaker
Topics covering various helping methods used in practice with individuals, families, and small groups. (Formerly 511.)

SOC W 533 Advanced Human Services Practice (2)
Advanced human services practice in special areas. Intensive study of practice materials with emphasis upon development of appropriate interventive and methodological skills. May be repeated for credit.

SOC W 535 Advanced Field Instruction (2-10, max. 20) AWSp
Prerequisite, 515.

SOC W 540 Human Behavior and Social Environment (3)
Farber
Overview of the developmental continuum. Exploration of biological, psychological, and sociocultural factors in the life cycle and their effects on the development of personality.

SOC W 541 Special Topics in Human Development (3, max. 9)
Allen, Anderson, Beatty, Farber, Ishisaka, R. Macdonald, Maier, Mundt, Riechey, Teather
Specific aspects of biopsychosociocultural development.

SOC W 560 Basic COD Interventive Skills (2) WSp
Bracht, Bryant, Meld, Resnick
Methodologically based course providing for the acquisition of professional analytic and interventive skills associated with social work practice in community organization, planning, administration, and policy analysis. Content draws upon research from social work and related social science disciplines. May be repeated for credit. Prerequisite for COD students, concurrent registration in 569.

SOC W 569 Social Work Practice Skills Laboratory (1)
Gottlieb
Laboratory component of practice and skill courses to assist students in applying skills to specific tasks or practice experiences. Instructors provide existing or simulated opportunities for achievement of more specific behavioral (skill) objectives. May be repeated for credit.

SOC W 570 Specialized COD Interventive Skills (2)
Methodologically based course related to specialized aspects of COD practice. Includes such areas as grant writing, budget preparation, and interdisciplinary methods. May be repeated for credit. (Formerly 534.)

SOC W 575 Special Topics in Social Welfare Policy (4, max. 6)
Anderson, Dear, Duplaca, Farber, Gottlieb, Gronewold, Herrick, Meld, Patti, Roffman
Analyzes new or expanding areas of social welfare policies and services. Emphasis on developing the 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. (Formerly 505.)

SOC W 585 Systematic Theory Building (2)
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 (2)
Solem

SOC W 588 Research in Community and Organizational Settings (2)
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. May be repeated for credit.

SOC W 590 Social Welfare Research (3)
Beatty, Griswold, Herrick, Hutchins, Jaffee, Northwood, Strechinsky
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 Individual or Group Research Project (2, max. 6) 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 (2-2)
Gottlieb, Griswold, Herrick, Hutchins, Jaffee, Northwood, Strechinsky
Study of the logic and principles underlying the collection and analysis of data and the presentation of findings in social research. Evaluation of published reports of empirical research with emphasis on relevance of such research to social work practice.

SOC W 600 Independent Study or Research (*)

SOC W 700 Master's Thesis (*) AWSp
The first date following a name indicates the beginning of 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 Autumn Quarter 1973.

A

AAGAARD, GEORGE N., 1954 (1967), Professor of Medicine and Pharmacology; B.S., 1934, M.B., 1936, M.D., 1937, Minnesota


AASHIM, GEORDIS M., 1960 (1965), Assistant Professor of Anesthesiology; Chief of Anesthesiology, Veterans Administration Hospital; B.S., 1953, Saskatchewan; M.D., 1955, Toronto


ABB, JAMES H.* 1970, Assistant Professor of Speech; B.S., 1967, Wisconsin State; M.S., 1968, Ph.D., 1970, Wisconsin

ABERNATHY, RUTH, 1967, 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


ADAMS, ROBERT PARDEE,* 1947 (1966), Professor of English; B.A., 1931, Oberlin; Ph.D., 1937, Chicago

ADAMSON, JOHN W., 1962 (1973), Associate Professor of Medicine; A.A., 1956, Stockton; B.A., 1958, California; M.D., 1962, California (Los Angeles)

ADEE, BRUCE H., 1970, Assistant Professor of Mechanical Engineering; B.S.E. in A.M.S., 1966, Princeton; M.S. in N.A., 1968, Ph.D., 1972, California (Berkeley)

ADELBELGER, ERIC G.* 1970 (1972), Associate Professor of Physics; B.S., 1960, Ph.D., 1967, California Institute of Technology


ADOLPHSON, DONALD L., 1970, Assistant Professor of Quantitative Methods; B.A., 1966, California (Berkeley); M.S., 1968, Ph.D., 1973, Wisconsin


AGABIAN, NINA, 1973, Assistant Professor of Biochemistry; B.A., 1966, M.S., 1968, Adelphi; Ph.D., 1971, Albert Einstein College of Medicine


AKAGANE, KATSUO, 1972, Research Associate in Forest Resources; B.S., 1964, Konan; M.S., 1969, Ph.D., 1972, Washington

AKAMATSU, TOSHIO, 1963 (1971), Associate Professor of Anesthesiology; Chief, Division of Obstetric Anesthesia; B.A., 1955, M.D., 1959, Minnesota


ALBRECHT, ROBERT G.* 1960 (1967), Associate Professor of Architecture; B.S. in C.E., 1956, Washington; M.S. in C.E., 1960, Massachusetts Institute of Technology

ALBRECHT, ROBERT WILLIAM,* 1961 (1971), Professor of Nuclear Engineering; B.S. in E.E., 1957, Purdue; M.S. in N.E., 1958, Ph.D., 1961, Michigan

ALDEN, DAURIL,* 1959 (1969), Professor of History and Latin American Studies; Chairman of Latin American Studies; A.B., 1930, M.A., 1932, Ph.D., 1959, California (Berkeley)

ALDEN, RICHARD,* 1961 (1969), Associate Professor of Architecture; B.A., 1957, Washington; M.S., 1960, Yale; Ph.D., 1971, Pennsylvania
CRIDER, JAMES R.,* 1932 (1972), Professor of Drama; Acting Executive Director, School of Drama; B.A., 1945; Cornell; M.A., 1950, Washington
CRILL, WAYNE E.,* 1967 (1972), Associate Professor of Physiology and Biophysics and Medicine; B.S., 1956, College of Idaho; M.D., 1962, Washington
CRIMINALE, WILLIAM O.,* 1968 (1973), Professor of Oceanography and Geophysics; B.S., 1955, Alabama; Ph.D., 1960, Johns Hopkins
CRITTENDEN, ALDEN L.,* 1947 (1960), Associate Professor of Chemistry; B.S., 1942, Ph.D., 1947, Illinois
CROCKER, CHARLES,* 1966 (1972), Associate Professor of Psychology; Adjunct Assistant Professor of Linguistics; B.S., 1963, Chicago; M.S., 1964, Ph.D., 1968, Michigan
DAMBOURG, MARK J.,* 1969, Assistant Professor of Electrical Engineering; B.S., 1962, Iowa State; M.S.E., 1963, Ph.D., 1969, Michigan
D'AMBROSIO, CHARLES A.,* 1960 (1970), Professor of Finance; B.S.C., 1955, Loyola; M.S., 1958, Ph.D., 1962, Illinois
DANIELS, MARIE C., 1973, Acting Assistant Professor of Spanish Language and Literature; B.A., 1967, Wisconsin
DAVIS, PAUL W.,* 1967, Associate Professor of Pediatrics; B.S., 1967, Rochester; M.D., 1970, Johns Hopkins
FACULTV INDEX

FIGLEY, MELVIN M.,· 1958, Professor and
Chairman of Radiology; B.S., 1941, Dartmouth,'
M.D., 1944, Harvard
FINCH, CLEMENT A., 1949 (1955), ProfesSor
of Medicine; B.S., 1936, Union; M.D., 1941,
Rochester
FINE, RUTH B., 1960 (1968),· Associate Professor 0/ Comparative Nursing Care Systems;
Director, Nursing Services, and Associate Hos- .
pital Administrator, University Hospital: DIploma, 1939, Garfield Memorial Hospital; B.S;,
FINK, B. RAYMOND, 1964, Professor of Anesthesiology; Assistant Chairman for 'Research in
Anesthesiology; M.B., B.S., 1933, B.Sc., 1935,
University College (London); M.R.C.S., 1938,
England
FINLAYSON, BRUCE A.,· 1967 (1972), Associate Professor of Chemical Engineering;
B.S.Ch.E., 1961, M.S.Ch.E., 1963, Rice; PhD.,
1965, Minnesota
FINNE. GUNNAR, 1973, Lecturer In Fisheries;
B.S. In Chemistry, 1962, M.s. In Chemistry,
Education, and Food Science, 1963, Queens University, Bel/ast, Ireland; Diploma Ed., 1967,
Bergen University, Norway; M.S• .in Food Science,1971, Washington
.'
FIRBY, JOSEPH CARL.· 1954 (1961), Professor of Mechanical Engineering;. B.S. in M.E.,
1940, Washington; M.S. in M.E., 1941~ Wisconsin
FISCHBACH, DAVID B., 1969. Research Asso-I
. ciate Professor of Ceramic Engineering; B.A ••
1950. Denison; M.S., 1951, PhD., 1955, Yale
FISCHER, EDMOND H.,· 1953 (1961), Professor of Biochemistry; B.S;, 1943. Ph.D., 1947,
Geneva
FISCHER, LOUIS,· 1926 (1945). Professor of
Pharmaceutical Chemistry; Director of Student
A/fairs: B.S.. 1926, Ph.c.. 1926, M.S., 1928,
PhD., 1933, Washington
FISH, JOHN ORTON,· 1962 (1971), Assistant
Professor of Environmental Health; Deputy
Director, Environmental Health and Sqfety;
B.S., 1949, WaShington; M.P.H•• 1959, Michigan
FiSHER, ALAN SIMONTON,· 1968 (1969),
Assistant Professor of English; B.A.; 1962, M.A ••
1964, PhD., 1969. California (Berkeley)
FISHER, CATHERINE I., 1973, Ins.tructor in
Famllyand Community Nursing; B.S., 1947,
M.N., 1952, Washington
FISHER, LLOYD D., JR.,· 1966 (1970), Associate Professor of Biostatistics; S.B., 1961, Massachusetts Institute of Technology, M.A., 1965,
PhD., 1966, Dartmouth
FITCHEN, RICHARD B., 1972. Assistant Professor of Communications; B.A .• 1964. M.A.,
1966. San Jose State; PhD., 1971, Ca«fornla
(Santa Barbara)
FITZGERALD, PA'FRICIA A., 1966 (1971),
Assistant Professor of Comparative Nursing Care
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<table>
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<tr>
<th>Name</th>
<th>Title, Year</th>
<th>Institution</th>
<th>Field</th>
</tr>
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<tr>
<td>HATFIELD, GLENN WILSON, JR.</td>
<td>1961, Associate Professor</td>
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<td>HEIDEGER, WILLIAM J.*</td>
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Morison, Ian George, 1972, Research Associate Professor; B.Sc., 1950, Western Australia; Dip. For., 1932, Australian Forestry School; Ph.D., 1970, Washington
Moriyasu, Kehiachiro, 1971 (1973), Assistant Professor of Physics; B.S., 1962, Massachusetts Institute of Technology; Ph.D., 1967, California (Berkeley)
Morrill, Richard L., 1961 (1969), Professor and Chairman of Geography; Professor of Environmental Studies; B.A., 1935, Dartmouth; M.A., 1957, Ph.D., 1959, Washington
Morris, David R., 1966 (1970), Assistant Professor of Biochemistry; A.B., 1961, California (Los Angeles); Ph.D., 1964, Illinois
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Morrison, Kenneth N., 1948 (1965), Professor and Chairman of Restorative Dentistry; D.D.S., 1943, Toronto; M.S.D., 1952, Washington
Morrison, Winsor V., 1966 (1967), Lecturer in Otolaryngology; Deputy Chief, Department of Otolaryngology, United States Public Health Service Hospital; A.B., 1953, B.S., 1955, Missour; M.D., 1957, Tennessee
Morrow, James Allen, Jr.*, 1969 (1973), Associate Professor of Mathematics; B.S., 1963, California Institute of Technology; Ph.D., 1967, Stanford
Moseley, Spencer*, 1948 (1965) Professor of Art: Director, School of Art; B.A., 1948, M.F.A., 1951, Washington
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Moss, Ned S., 1969 (1973), Research Assistant Professor of Pathology; B.S., 1951, City College, New York; M.D., 1955, New York
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Moulton, Arno G., 1953 (1961), Professor of Medicine and Genetics; B.S., 1945, M.D., 1947, Illinois
Moulton, R. Wells*, 1941 (1950), Professor and Chairman of Chemical Engineering; Dean, Joint Center for Graduate Study; Associate Dean, Graduate School; B.S.C.H.E., 1932, M.S.C.H.E., 1934, Ph.D., 1938, Washington
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RICHARDSON, JAMES CAMPBELL HAY, 1945 (1969), Professor Emeritus of Forest Resources; B.S.F., 1927, Washington; M.S.F., 1933, California; D.F., 1947, Duke.

ROBERTSON, R. PAUL, 1971 (1973), Assistant Professor of History; B.A., 1968, San Diego State; M.D., 1964, Creighton.

ROBERTSON, WILLIAM O., 1963 (1972), Professor of Pediatrics; Director, Medical Education; Director, Poison Control Center, Children's Orthopedic Hospital and Medical Center; B.A., 1946, M.R.C.P., 1956, Washington.

ROBINOVITCH, MURRAY R.*, 1968, Associate Professor of Mechanical Engineering; B.S., 1947, Ph.D., 1958, Washington.


ROBINSON, HALBERT B.*, 1968, Professor of Psychology; Director, Developmental Psychology Laboratory; A.B., 1951, M.A., 1953, Ph.D., 1957, Stanford.

ROBINSON, REX JULIAN, 1929 (1945), Professor Emeritus of Chemistry; B.A., 1925, Harvey; D. P. M., 1939, Washington; D. P. M., 1942, New York.

ROBB, MAURICE A.*, 1967 (1968), Associate Professor of Nuclear Engineering; B.S., 1953, California Institute of Technology; Ph.D., 1961, Massachusetts Institute of Technology.


ROCKEFELLAR, RALPH TYRRELL*, 1966 (1972), Professor of Mathematics; Adjunct Professor of Computer Science; A.B., 1957, Harvard; M.S., 1959, Marquette; Ph.D., 1963, Harvard.

RODDIS, RICHARD S. L.*, 1968, Professor of Law; Dean, School of Law; B.A., 1951, San Diego State; J.D., 1954, California (Berkeley).

ROFFMAN, ROGER A., 1972, Assistant Professor of Social Work; B.A., 1963, Boston University; M.S.W., 1965, Michigan.


ROGERS, MILLARD*, 1952 (1967), Associate Professor of History and South Asian Studies; Director, Center for Asian Art; Adjunct Curator, Burke Memorial—Washington State Museum; B.A., 1937, Art Institute of Chicago; M.A., 1940, University of Chicago; M.F.A., 1940, Art Institute of Chicago; Ph.D., 1952, Chicago.


ROHME, JOHN*, 1948 (1959), Associate Professor of Architecture; B.Arch., 1937, Washington.


ROICK, FRED H., JR., 1927, Lecturer in Drama.


ROLLE, J. REID*, 1970, Associate Professor of Communications; B.S., 1938, M.A.B.A., 1940, Ohio State.


ROMAN, HERSHEL L.*, 1942 (1952), Professor and Chairman of Genetics; B.A., 1936, Ph.D., 1942, Missouri (Columbia).


ROOSSEN-RUNGE, EDWARD C.*, 1952 (1959), Professor of Biological Structure; M.D., 1963, Hamburg.

ROSE, NORMAN JENISCH*, 1966 (1968), Associate Professor of Chemistry; B.A., 1957, Knox; Ph.D., 1960, Illinois.

ROSE, PATRICIA A.*, 1952 (1967), Associate Professor and Chairman of Maternal and Child Nursing; Diploma, 1946, St. Joseph's Hospital School of Nursing, Tacoma; B.S., 1949, M.N., 1958, Washington.


ROSS, W. DUNCAN*, 1961 (1968), Professor of Drama.


ROSELL, SVEN HAKON, 1974, Associate Professor of Scandinavian Languages and Literature; Magister, 1968, Copenhagen.


ROTH, GUENTHER, *1970, Professor of Sociology; Ph.D., 1960, California (Berkeley).


ROTHCHILD, JOEL, 1973, Research Assistant Professor of Pathology; A.B., 1948, Harvard; Ph.D., 1958, Columbia.


ROWELL, LORING B., *1962 (1972), Professor of Physiology and Biophysics; Adjunct Professor of Medicine; B.S., 1953, Springfield; Ph.D., 1962, Minnesota.

ROWNTREE, JENNIE L., 1925 (1955), Professor Emeritus of Home Economics; B.S., 1918, Wisconsin; M.S., 1925, Chicago; Ph.D., 1929, Iowa.


RUCH, THEODORE C., *1946, Professor of Physiology and Biophysics; B.A., 1927, Oregon; M.A., 1928, Stanford; B.S.C., 1930, Oregon; Ph.D., 1932; Ph.D., 1933, Yale.


RUGG, DAVID SEYFORT, *1972, Professor of Buddhist Studies and South Asian Studies; Cert. in Religious Studies; B.S., 1957, Bordeaux; D.Litt., 1969, University of Paris.


RUSHER, ROBERT F., 1947 (1967), Professor of Bioengineering; Head, Division of Bioengineering; School of Medicine; Director, Center for Bioengineering; B.S., 1933, Chicago; M.D., 1939, Rush Medical College, Chicago.


RUSTAGI, KRISHNA P., 1973, Assistant Professor of Forest Resources; B.Sc., 1951, M.Sc., 1953, Agra University (India); M.F., 1971, Ph.D., 1973, Yale.

RUVACABA, ROGELIO H. A., 1965 (1971), Associate Professor of Pediatrics; Director, Endocrinology Clinic, Rainier School; M.D., 1957, De La Universidad de Guadalajara.


SABO, JESSE J., JR., 1969 (1972), Assistant Professor of Physics; B.S., 1964, Maryland; Ph.D., 1968, California (Berkeley).

SACKETT, GEORGE F., *1970, Professor of Psychology; B.A., 1939, California (Riverstone); M.A., 1941, Ph.D., 1963, Claremont.


SALINERO, FERNANDO GARCIA, *1965, Associate Professor of Spanish Language and Literature; Ph.D., 1963, Madrid (Spain).

SALO, ERNEST OLAVI, *1965 (1968), Assistant Professor of Fisheries; B.S., 1947, Ph.D., 1955, Washington.


SAMUELSON, MERRILL, *1962, Associate Professor of Communications; B.S., 1948, Oklahoma City; M.S., 1955, Oregon; Ph.D., 1960, Stanford.


SANDERS, JAMES, 1968 (1972), Assistant Professor of Architecture; B.Arch., 1969, Washington; M.Arch., 1969, Columbia.


SAPORTA, SOL, *1960 (1964), Professor of Linguistics and Romance Languages and Literature; Chairman, Department of Linguistics; B.A., 1944, Brooklyn; M.A., 1952, Ph.D., 1955, Illinois.

SARASON, IRWIN G., *1963 (1965), Professor of Psychology; B.A., 1951, Rutgers; M.A., 1953, Iowa; Ph.D., 1955, Indiana.

SARASON, LEONARD, *1965 (1966), Associate Professor of Mathematics; B.S., 1945, Yale; M.A., 1948, M.S., 1949, Yale; Ph.D., 1961, New York University.


SASANOFF, ROBERT, 1963, Assistant Professor of Architecture; B.Arch., 1963, M.C.P., 1968, California (Berkeley).
Tabei, Toru, 1971, Research Assistant Professor of Obstetrics and Gynecology; B.S., 1957, M.D., 1965, Stanford, Calif.; M.S., 1961, Osaka, Japan

Taber, Richard Douglas,* 1968, Professor of Forest Zoology; B.A., 1942, California (Berkeley); Ph.D., 1951, California

Taft, Bruce, 1973, Research Associate Professor of Oceanography; B.S., 1951, Stanford; M.S., 1956, Ph.D., 1965, Calif., Santa Cruz (San Diego)

Taggart, Raymond,* 1962 (1968), Professor of Mechanical Engineering; B.S., 1948, London; Ph.D., 1956, Queen (Belfast)

Takagi, Calvin Y.,* 1961 (1969), Professor of Social Work; Associate Dean, School of Social Work; B.A., 1930, M.S.W., 1933, Ph.D., 1938, Minnesota


Taub, Frieda Blou,* 1962 (1972), Professor of Fisheries; B.A., 1955, M.S., 1957, Ph.D., 1959, Rutgers


Taylor, Eugene Mark, 1972, Research Assistant Professor of Rehabilitation Medicine; B.S., 1958, Idaho State; M.S., 1959, Ph.D., 1964, Washington

Taylor, George Edward,* 1939 (1940), Professor of East Asian Studies, Institute for Comparative and Foreign Area Studies; A.B., 1927, M.A., 1928, D.Lit., 1957, Birmingham (England)

Taylor, Muriel K., 1968 (1970), Assistant Professor of Psychology and Behavioral Sciences; A.B., 1958, M.D., 1963, Cornell


Taylor, Robert L., 1941 (1969), Professor Emeritus of Law; B.A., 1927, Yale; J.D., 1930, Northwestern


Teller, David C.,* 1965 (1969), Associate Professor of Biochemistry; B.A., 1960, Swarthmore; Ph.D., 1964, California (Berkeley)

Teller, Davida Y.,* 1965 (1971), Associate Professor of Psychology and Physiology; B.A., 1960, Swarthmore; Ph.D., 1965, California (Berkeley)

Templeton, Frederic E.,* 1966 (1968), Professor of Radiology; B.S., 1927, Washington; M.D., 1931, Oregon

Tenckhoff, Henrich, 1964 (1972), Associate Professor of Medicine; M.D., 1955, Köln

Terrel, Ronald Lee,* 1967 (1970), Associate Professor of Civil Engineering; B.S. in C.E., 1966, M.S. in C.E., 1968, Purdue; Ph.D., 1967, California (Berkeley)

Terrell, Margaret E.,* 1928 (1971), Professor Emeritus of Home Economics; A.B., 1923, Penn (Iowa); M.A., 1927, Chicago

Terry, Miriam,* 1930 (1930), Associate Professor of Music; B.M., 1926, M.A., 1948, Washington

Thalberg, Stanton Philip,* 1965 (1970), Associate Professor of Education; B.A., 1957, M.A., 1959, Ph.D., 1964, Iowa

Theil, Philip,* 1961 (1966), Professor of Architecture; B.S., 1943, Webb Institute of Naval Architecture; M.S., 1948, Michigan; B.Arch., 1952, Massachusetts Institute of Technology

Thomas, Carol G.,* 1964 (1971), Associate Professor of History; A.B., 1960, Carleton; A.M., 1961, Ph.D., 1964, Northwestern

Thomas, David Philip,* 1959 (1966), Professor of Wood Science and Technology; Associate Dean, College of Forest Resources; B.S.F., 1941, M.F., 1948, Washington

Thomas, E. Donald,* 1963, Professor of Medicine; M.D., 1946, Harvard

Thomas, Gomer C.,* 1969, Assistant Professor of Mathematics; B.A., 1962, Pomona; B.A., 1964, Trinity College, Cambridge (England); Ph.D., 1968, Illinois

Thomas, Morgan D.,* 1959 (1966), Professor of Geography; Associate Dean, Graduate School; B.A., 1951, Ph.D., 1954, Queen's (Belfast)

Thomas, Robert P.,* 1963 (1969), Associate Professor of Economics; Adjunct Associate Professor of Environmental Studies; A.B., 1960, Carleton; Ph.D., 1965, Northwestern

Thomas, Stephen N.,* 1969, Assistant Professor of Philosophy; A.B., 1964, Harvard; Ph.D., 1968, Massachusetts Institute of Technology

Thomas, Terry M., 1972 (1973), Instructor in Hospital Dentistry; D.D.S., 1971, Loyola


Thompson, Donován J.,* 1970, Professor and Chairman of Bacteriologists; B.A., 1941, St. Olaf; M.A., 1947, Minnesota; Ph.D., 1951, State

Thompson, Gary,* 1966 (1972), Associate Professor of Speech; B.A., 1952, M.A., 1955, State University of Iowa; Ph.D., 1966, Minnesota


Thornton, Judith A.,* 1961 (1972), Professor of Economics and Russian and East European Studies; B.A., 1936, Vassar; M.A., 1938, Ph.D., 1960, Radiation

Thrasher, Allen W., 1973, Assistant Professor of Sanskrit and South Asian Studies; A.B., 1967, Ph.D., 1972, Harvard


Tippit, Doris F., 1960, Research Associate in Pediatrics; B.S., 1944, Utah

Tittini, Koiti, 1969, Research Associate Professor of Biochemistry; B.S., 1953, M.S., 1957, Ph.D., 1960, Tokyo


Topping, John W., 1972, Assistant Professor of Oratory; B.S., 1956, Fairfield; D.D.S., 1960, Iowa; M.S., 1972, New York

Torkelson, Gerald Melvin,* 1965, Professor of Education; B.S., 1941, Central State College, Wisconsin; Ph.M., 1945, Wisconsin; Ed.D., 1953, Pennsylvania State
TSUTAKAWA, GEORGE.* 1946 (1963), Professor of Art; B.A., 1937, M.F.A., 1950, Washington

TUFIFS, PAUL DEWITT, 1958 (1967), Associate Professor of Music; B.A., 1949, M.A., 1951, Washington

TUNKS, LEHAN K.*, 1963, Professor of Law; B.B., 1935, New Mexico; J.D., 1938, Northwestern; J.S.D., 1947, Yale

TURCK, MARVIN, 1964 (1971), Professor of Medicine; B.S., 1955, M.D., 1959, Illinois

TURNBULL, KENNETH JAMES,* 1958 (1966), Associate Professor of Forest Biometry; Director, International Forest Resources Laboratories; B.Sc., 1951, Edinburgh; M.F., 1958, Ph.D., 1963, Washington

TURNER, MABEL A., 1941 (1968), Associate Professor Emeritus of Librarianship; A.B., 1926, Oregon; B.S.L.S., 1931, M.S.L.S., 1939, Columbia

TYLER, NANCY B., 1970 (1973), Assistant Professor of Rehabilitation Medicine; B.S., 1964, Fuget Sound; M.O.T., 1971, Washington

U

UHRLING, EDWIN ALBRECHT, 1936 (1947), Professor Emeritus of Physics; B.A., 1925, Wisconsin; M.A., 1943, Oxford; Ph.D., 1949, Oxford

UERING, G. H., 1967, Professor of Psychology; Ph.D., 1967, New York

ULLMAN, EDWARD L.* 1951, Professor of Geography; S.B., 1934, Chicago; A.M., 1933, Harvard; Ph.D., 1941, Chicago

ULLMAN, JOAN CONNELLY,* 1966 (1968), Associate Professor of History; B.A., 1953, Caltech; B.S., 1963, Bryn Mawr


UNTERSTEINER, NOBERT,* 1957 (1967), Professor of Atmospheric Sciences and Geophysics; AIDEX Coordinator, Division of Marine Resources; Ph.D., 1950, Innsbruck; Dozent, 1961, Vienna

V

VAGNERS, JURIS,* 1967 (1973), Associate Professor of Aeronautics and Astronautics; B.S., 1961, Washington; M.S.A.A., 1965, Ph.D., 1967, Stanford

VALENTINETTI, AURORA,* 1961 (1973), Associate Professor of Drama; B.A., 1943, M.A., 1949, Washington

VAN ARSDEL, PAUL P., JR., 1959 (1969), Professor of Medicine; B.S., 1948, Yale; M.D., 1951, Columbia

VANCE, JOSEPH A.*, 1957 (1968), Associate Professor of Geological Sciences; B.S., 1931, M.S., 1931, Stanford

VAN CITTERS, ROBERT L.*, 1962 (1970), Professor of Physiology and Biophysics and Medicine; Dean, School of Medicine; A.B., 1949, M.D., 1953, Kansas

VAN CLEVE, RICHARD.*, 1948 (1971), Professor of Fisheries; B.A., 1927, Ph.D., 1936, Washington


VANDENBOOSCH, ROBERT,* 1963 (1967), Professor of Chemistry; B.A., 1954, Calvin; Ph.D., 1957, California (Berkeley)

VAN DER MARK, JAN,* 1972, Associate Professor of Art History; Curator, Henry Art Museum; B.A., 1952, M.F.A., 1954, Ph.D., 1956, Nijmegen


VANDUSEN, KAREN ANN, 1971, Instructor in Environmental Health; B.S., 1965, Washington

VAN HANSEL, HENRY J., 1967 (1972), Associate Professor of Physiology and Biophysics and Endodontology; B.A., 1954, Maryville; D.D.S., 1963, Maryland; M.S.D., 1967, Washington


VAREY, GORDON B.*, 1962 (1973), Professor of Architecture and Building Construction; Chairman, Department of Architecture; B.Arch., 1954, Washington; M.Arch., 1966, California (Berkeley)


VARSHELYI, DESI D.*, 1949 (1961), Professor of Civil Engineering; B.A., 1928, Ref. College Kolozsvár (Rumania); Dipl. Ing., 1932, Dr. Ing., 1944, Technical University (Budapest)

VAUGHAN, MICEAL FRANCIS, 1973, Assistant Professor of English; B.A., 1968, St. Thomas; M.A., 1972, Ph.D., 1973, Cornell

VELIKNIA, JOSEPH,* 1964, Associate Professor of Geography and Russian and East European Studies; Undergr., 1944, Ljubljana (Yugoslavia); Ph.D., 1948, Rome

VERESS, SANDOR A.*, 1963 (1972), Professor of Civil Engineering; B.S. in Forest Engineering, 1911, József Nádor Technical and Economic University of Hungary (Budapest); M.S., 1956, Hungarian Technical University of Sorosón; Ph.D., 1968, Université de Laval (Québec)

VERRALL, JOHN WEEDEON, 1945 (1959), Professor Emeritus of Music; B.Mus., 1929, Minneapolis College of Music; Cert. of Mus., 1932, Liszt Conservatory (Budapest); B.A., 1934, Minnesota

VESPER, KARL HAMPTON, 1963 (1975), Professor of Psychology and Biophysics; Ph.D., 1963, Harvard

VIGNOLI, LOUIS J.*, 1966 (1968), Assistant Professor of Classics; B.A., 1962, St. Mary’s (California); Ph.D., 1968, Hebrew Univer.

VILCHES, OSCAR E.*, 1968 (1972), Associate Professor of Physiology; Licenciado en Física, 1959, Instituto de Física "Dr. J. A. Balseiro"; Doctor en Física, 1966, Universidad Nacional de Cuyo (Argentina)

ZIMMERMANN, TIMM A., 1964 (1972), Assistant Professor of Medicine; B.S., 1957, Ferris State; M.D., 1963, Wisconsin

ZINSER, ELISABETH A., 1972, Research Instructor in Medicine and Office of Research in Medical Education; B.S., 1964, Stanford; M.S., 1966, PhD., 1972, California


ZSIGMONDY-LIEDEMANN, DENES, 1972 (1973), Professor of Music; Baccalaureate, 1940, Gymnasium, Budapest; Liszt-Academy, Budapest; Masterclass, 1943, Budapest


ZUCKERMAN, HELEN C., 1952 (1973), Lecturer Emeritus in Mathematics; B.S., 1930, M.S., 1935, Washington
## 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>
</tr>
</thead>
<tbody>
<tr>
<td>A A:</td>
<td>Aeronautics and Astronautics (Engineering)</td>
</tr>
<tr>
<td>ACCTG:</td>
<td>Accounting (Business Administration)</td>
</tr>
<tr>
<td>ADMIN:</td>
<td>Administration (Business Administration)</td>
</tr>
<tr>
<td>AKKAD:</td>
<td>Akkad, Ancient Eastern Languages and Literature (Arts and Sciences)</td>
</tr>
<tr>
<td>ANEST:</td>
<td>Anesthesiology (Medicine)</td>
</tr>
<tr>
<td>ARTH:</td>
<td>Administrative Theory and Organizational Behavior (Business Administration)</td>
</tr>
<tr>
<td>ARAB:</td>
<td>Arabic, Near Eastern Languages and Literature (Arts and Sciences)</td>
</tr>
<tr>
<td>ARCH:</td>
<td>Architecture (Architecture and Urban Planning)</td>
</tr>
<tr>
<td>ARCHY:</td>
<td>Archaeology, Anthropology (Arts and Sciences)</td>
</tr>
<tr>
<td>ART:</td>
<td>Art (Arts and Sciences)</td>
</tr>
<tr>
<td>ART H:</td>
<td>Art History, Art (Arts and Sciences)</td>
</tr>
<tr>
<td>AS:</td>
<td>Aerospace Studies (Reserve Officer Training Programs)</td>
</tr>
<tr>
<td>ASIAN:</td>
<td>Asian Languages and Literature, Asian Languages and Literature (Arts and Sciences)</td>
</tr>
<tr>
<td>ASTR:</td>
<td>Astronomy, Astronomy (Arts and Sciences)</td>
</tr>
<tr>
<td>ATM S:</td>
<td>Atmospheric Sciences, Atmospheric Sciences (Arts and Sciences)</td>
</tr>
<tr>
<td>B A:</td>
<td>Business Administration (Business Administration)</td>
</tr>
<tr>
<td>BA RM:</td>
<td>Research Methods (Business Administration)</td>
</tr>
<tr>
<td>B CMU:</td>
<td>Business Communications (Business Administration)</td>
</tr>
<tr>
<td>B CON:</td>
<td>Building Construction (Architecture and Urban Planning)</td>
</tr>
<tr>
<td>B ECN:</td>
<td>Business Economics (Business Administration)</td>
</tr>
<tr>
<td>BGAS:</td>
<td>Business, Government, and Society (Business Administration)</td>
</tr>
<tr>
<td>BIOC:</td>
<td>Biochemistry (Medicine)</td>
</tr>
<tr>
<td>BIOGEN:</td>
<td>Biogenetics (Interschool or Intercollge Programs)</td>
</tr>
<tr>
<td>BI HS:</td>
<td>Biomedical History (Medicine)</td>
</tr>
<tr>
<td>BIOL:</td>
<td>Biology, Biology (Arts and Sciences)</td>
</tr>
<tr>
<td>BLK S:</td>
<td>Black Studies (Arts and Sciences)</td>
</tr>
<tr>
<td>BMATH:</td>
<td>Biomathematics (Interdisciplinary Graduate Programs)</td>
</tr>
<tr>
<td>BOT:</td>
<td>Botany, Botany (Arts and Sciences)</td>
</tr>
<tr>
<td>B POL:</td>
<td>Business Policy (Business Administration)</td>
</tr>
<tr>
<td>B STR:</td>
<td>Biological Structure (Medicine)</td>
</tr>
<tr>
<td>BULGR:</td>
<td>Bulgarian, Slavic Languages and Literature (Arts and Sciences)</td>
</tr>
<tr>
<td>CATA:</td>
<td>Catalan, Romance Languages and Literature (Arts and Sciences)</td>
</tr>
<tr>
<td>CER E:</td>
<td>Ceramic Engineering (Engineering)</td>
</tr>
<tr>
<td>CESM:</td>
<td>Structural Engineering and Engineering Mechanics, Civil Engineering (Engineering)</td>
</tr>
<tr>
<td>CETC:</td>
<td>Transportation, Construction, and Geotechnical Engineering; Civil Engineering (Engineering)</td>
</tr>
<tr>
<td>CEWA:</td>
<td>Water and Air Resources, Civil Engineering (Engineering)</td>
</tr>
<tr>
<td>CHEM:</td>
<td>Chemistry, Chemistry (Arts and Sciences)</td>
</tr>
<tr>
<td>CIV:</td>
<td>Civil Engineering Core Courses (Engineering)</td>
</tr>
<tr>
<td>CL AR:</td>
<td>Classical Archaeology, Classics (Arts and Sciences)</td>
</tr>
<tr>
<td>CLAS:</td>
<td>Classical, Classics (Arts and Sciences)</td>
</tr>
<tr>
<td>C LIT:</td>
<td>Comparative Literature, Comparative Literature (Arts and Sciences)</td>
</tr>
<tr>
<td>CL LI:</td>
<td>Classical, Linguistics, Classics (Arts and Sciences)</td>
</tr>
<tr>
<td>CMU:</td>
<td>Communications, Communications (Arts and Sciences)</td>
</tr>
<tr>
<td>COM D:</td>
<td>Community Dentistry (Dentistry)</td>
</tr>
<tr>
<td>CONJ:</td>
<td>Conjunct (Medicine)</td>
</tr>
<tr>
<td>C PHY:</td>
<td>Comparative Physiology (Interdisciplinary Graduate Programs)</td>
</tr>
<tr>
<td>CSAA:</td>
<td>Continuing Studies—Aeronautics and Astronautics (Continuing Studies)</td>
</tr>
<tr>
<td>CSCE:</td>
<td>Continuing Studies—Civil Engineering (Continuing Studies)</td>
</tr>
<tr>
<td>CSCR:</td>
<td>Continuing Studies— Ceramic Engineering (Continuing Studies)</td>
</tr>
<tr>
<td>CSCHB:</td>
<td>Continuing Studies—Chemical Engineering (Continuing Studies)</td>
</tr>
<tr>
<td>C SCI:</td>
<td>Computer Science (Interdisciplinary Graduate Programs)</td>
</tr>
<tr>
<td>CSEE:</td>
<td>Continuing Studies— Electrical Engineering (Continuing Studies)</td>
</tr>
<tr>
<td>CSENG:</td>
<td>Continuing Studies—Engineering (Continuing Studies)</td>
</tr>
<tr>
<td>CSHSS:</td>
<td>Continuing Studies—Humanities-Social Studies (Continuing Studies)</td>
</tr>
<tr>
<td>CSI:</td>
<td>Continuing Studies—Industrial Engineering (Continuing Studies)</td>
</tr>
<tr>
<td>CSME:</td>
<td>Continuing Studies—Mechanical Engineering (Continuing Studies)</td>
</tr>
<tr>
<td>CMS:</td>
<td>Continuing Studies—Metallurgical Engineering (Continuing Studies)</td>
</tr>
<tr>
<td>CSMIN:</td>
<td>Continuing Studies—Mining Engineering (Continuing Studies)</td>
</tr>
<tr>
<td>CSNE:</td>
<td>Continuing Studies—Nuclear Engineering (Continuing Studies)</td>
</tr>
<tr>
<td>CSREH:</td>
<td>Continuing Studies—Rehabilitation Medicine (Continuing Studies)</td>
</tr>
<tr>
<td>CZEC:</td>
<td>Czech, Slavic Languages and Literature (Arts and Sciences)</td>
</tr>
<tr>
<td>DAN:</td>
<td>Danish, Scandinavian Languages and Literature (Arts and Sciences)</td>
</tr>
<tr>
<td>D ART:</td>
<td>Drama Arts (Interdisciplinary Graduate Programs)</td>
</tr>
<tr>
<td>DENT:</td>
<td>Dentistry (Dentistry)</td>
</tr>
<tr>
<td>D HYG:</td>
<td>Dental Hygiene (Dentistry)</td>
</tr>
<tr>
<td>DRAMA:</td>
<td>Drama, Drama (Arts and Sciences)</td>
</tr>
<tr>
<td>DRDNC:</td>
<td>Drama Dance, Dance (Arts and Sciences)</td>
</tr>
<tr>
<td>EASIA:</td>
<td>East Asia, Institute for Comparative and Foreign Area Studies (Arts and Sciences)</td>
</tr>
<tr>
<td>ECON:</td>
<td>Economics, Economics (Arts and Sciences)</td>
</tr>
<tr>
<td>EDADM:</td>
<td>Educational Administration (Education)</td>
</tr>
<tr>
<td>EDCAI:</td>
<td>Educational Curriculum and Instruction (Education)</td>
</tr>
<tr>
<td>EDEPS:</td>
<td>Educational Policy Studies (Education)</td>
</tr>
<tr>
<td>EDHED:</td>
<td>Higher Education (Education)</td>
</tr>
<tr>
<td>EDPSY:</td>
<td>Educational Psychology (Education)</td>
</tr>
<tr>
<td>EDSP:</td>
<td>Special Education (Education)</td>
</tr>
<tr>
<td>EDUC:</td>
<td>Independent Study, Research, and Field Experience (Teaching Practice)</td>
</tr>
<tr>
<td>E E:</td>
<td>Electrical Engineering (Engineering)</td>
</tr>
<tr>
<td>ENDO:</td>
<td>Endodontics (Dentistry)</td>
</tr>
<tr>
<td>ENGL:</td>
<td>English (Arts and Sciences)</td>
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<tr>
<td>ENGR:</td>
<td>Engineering, College Courses (Engineering)</td>
</tr>
<tr>
<td>ENV S:</td>
<td>Institute for Environmental Studies</td>
</tr>
<tr>
<td>FAMED:</td>
<td>Family Medicine (Medicine)</td>
</tr>
<tr>
<td>FD SC:</td>
<td>Food Science (Fisheries)</td>
</tr>
<tr>
<td>FIN:</td>
<td>Finance (Business Administration)</td>
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<td>FINN:</td>
<td>Finnish, Scandinavian Languages and Literature (Arts and Sciences)</td>
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<td>FISH:</td>
<td>Fisheries (Fisheries)</td>
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<td>FOR R:</td>
<td>Forest Resources (Forest Resources)</td>
</tr>
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<td>FREN:</td>
<td>French, Romance Languages and Literature (Arts and Sciences)</td>
</tr>
<tr>
<td>GENET:</td>
<td>Genetics, Genetics (Arts and Sciences)</td>
</tr>
<tr>
<td>GEOG:</td>
<td>Geography, Geography (Arts and Sciences)</td>
</tr>
<tr>
<td>GEOI:</td>
<td>Geophysical Sciences, Geological Sciences (Arts and Sciences)</td>
</tr>
<tr>
<td>GERQ:</td>
<td>German Languages and Literature, Germanic Languages (Arts and Sciences)</td>
</tr>
<tr>
<td>GIS:</td>
<td>General and Interdisciplinary Studies, General and Interdisciplinary Studies (Arts and Sciences)</td>
</tr>
<tr>
<td>GPHYS:</td>
<td>Geophysics, Geophysics (Arts and Sciences)</td>
</tr>
<tr>
<td>ORK:</td>
<td>Greek, Classics (Arts and Sciences)</td>
</tr>
<tr>
<td>GST:</td>
<td>General Studies, General and Interdisciplinary Studies (Arts and Sciences)</td>
</tr>
<tr>
<td>HD UR:</td>
<td>Hindi-Urda, Asian Languages and Literature (Arts and Sciences)</td>
</tr>
<tr>
<td>HEBR:</td>
<td>Hebrew, Near Eastern Languages and Literature (Arts and Sciences)</td>
</tr>
<tr>
<td>H EC:</td>
<td>Home Economics, Home Economics (Arts and Sciences)</td>
</tr>
<tr>
<td>HD ED:</td>
<td>Health Education, Physical and Health Education (Arts and Sciences)</td>
</tr>
<tr>
<td>HRSYS:</td>
<td>Human Resource Systems (Business Administration)</td>
</tr>
<tr>
<td>HIST:</td>
<td>History, General, History (Arts and Sciences)</td>
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</tbody>
</table>
HSS: Humanistic-Social Studies (Engineering)
HSUAA: Hispanic-American, History (Arts and Sciences)
HSTAM: Ancient and Medieval History, History (Arts and Sciences)
HSTAS: History of Asia, History (Arts and Sciences)
HSTEU: Modern European History, History (Arts and Sciences)
HUBIO: Human Biology (Medicine)
HUM: Humanities, Humanities (Arts and Sciences)
HUNGR: Hungarian, Slavic Languages and Literature (Arts and Sciences)
IASIA: Inner Asia, Institute for Comparative and Foreign Area Studies (Arts and Sciences)
I BUS: International Business (Business Administration)
ICEL: Icelandic, Scandinavian Languages and Literature (Arts and Sciences)
INDN: Indian, Asian Languages and Literature (Arts and Sciences)
IMS: Institute for Marine Studies (InterSchool or Intercollegiate Programs)
IPHD: Individual Doctor of Philosophy Degree Program (Interdisciplinary Graduate Programs)
ITAL: Italian, Romance Languages and Literature (Arts and Sciences)
JAPAN: Japan, Asian Languages and Literature (Arts and Sciences)
KOR: Korean, Asian Languages and Literature (Arts and Sciences)
L A: Liberal Arts
LAB M: Laboratory Medicine (Medicine)
LAB R: Language, Architecture (Architecture and Urban Planning)
LAT: Latin, Classics (Arts and Sciences)
LAW: Law (Law)
LIB: Librarianship (Librarianship)
LING: Linguistics (Arts and Sciences)
MATH: Mathematics, Mathematics (Arts and Sciences)
ME: Mechanical Engineering (Engineering)
MED: Medicine (Medicine)
MED P: Medical Practice (Medicine)
MED T: Medical Technology (Medicine)
MET E: Metallurgical Engineering (Engineering)
MICRO: Microbiology, Microbiology (Arts and Sciences)
MISC: Music Applied, Music (Arts and Sciences)
MUSIC: Music, Music (Arts and Sciences)
N E: Near Eastern Languages and Literature (Arts and Sciences)
NORW: Norwegian, Scandinavian Languages and Literature (Arts and Sciences)
NR: Neurological Surgery (Medicine)
N SCI: Naval Science (Reserve Officer Training Programs)
NUC E: Nuclear Engineering (Engineering)
NURS: Nursing (Nursing)
OB GY: Obstetrics and Gynecology (Medicine)
OCEAN: Oceanography, Oceanography (Arts and Sciences)
ODPT: Oral Diagnosis and Treatment Planning (Dentistry)
ENG: Ocean Engineering (Engineering)
OPHTH: Ophthalmology (Medicine)
OPSYS: Operations and Systems Analysis (Business Administration)
ORAL: Oral Biology (Dentistry)
ORALM: Oral Medicine (Dentistry)
ORTH: Orthodontics (Dentistry)
ORTHOP: Orthopaedics (Medicine)
OST: Oral Surgery (Dentistry)
OT: Occupational Therapy (Medicine)
OTOL: Otolaryngology (Medicine)
P AFR: Public Affairs (Public Affairs)
PATH: Pathology (Medicine)
PB AD: Public Administration (Public Affairs)
P BIO: Physiology and Biophysics (Medicine)
P PL: Public Policy (Public Affairs)
PBCS: Psychiatry and Behavioral Sciences
PC: Public Health and Community Medicine (Public Health and Community Medicine)
PC BS: Biostatistics (Public Health and Community Medicine)
PC EH: Environmental Health (Public Health and Community Medicine)
PC EP: Epidemiology and International Health (Public Health and Community Medicine)
PC HS: Health Services (Public Health and Community Medicine)
PC PB: Pathobiology (Public Health and Community Medicine)
PE: Physical Education, Physical and Health Education (Arts and Sciences)
PEDC: Dance, Physical and Health Education (Arts and Sciences)
PEDO: Pedodontics (Dentistry)
FEDS: Pediatrics (Medicine)
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