

A high-contrast, black and white photograph of a modern building. The image shows a series of tall, vertical columns or pillars that create a rhythmic pattern. A walkway or ramp leads from the foreground towards the building. The lighting is dramatic, with strong shadows and highlights.

GENERAL CATALOG 1976-78

UNIVERSITY OF WASHINGTON BULLETIN

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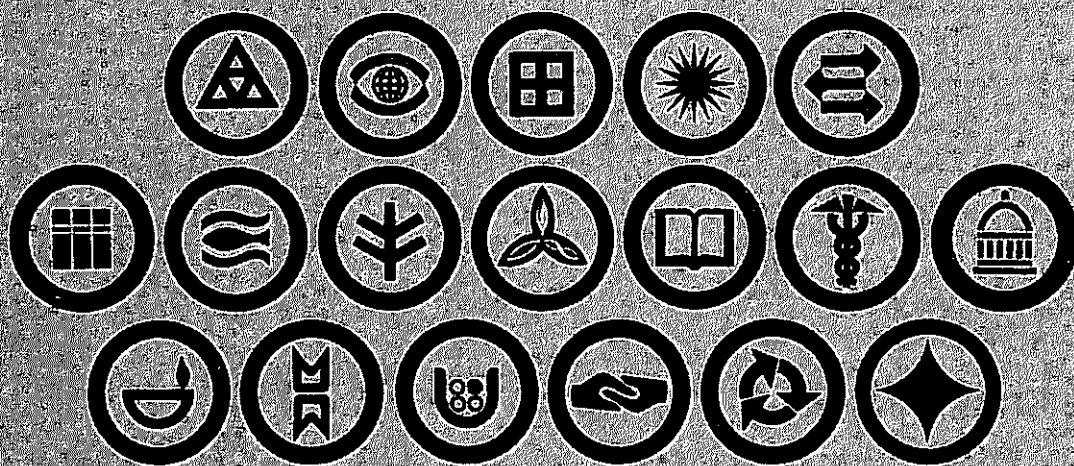
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UNIVERSITY OF WASHINGTON



OTHER UNIVERSITY OF WASHINGTON PUBLICATIONS

Undergraduate Study at the University of Washington

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

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

Information for Prospective Graduate Students

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

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

Graduate Study and Research Bulletin

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

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

Time Schedule

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

Not distributed outside the campus.

Summer Quarter Bulletin

Published annually in mid-March. Provides information on admission, registration, and fees, and lists all undergraduate and graduate courses offered for academic credit during day and evening.

University of Washington; Summer Quarter Office;
103 Lewis, DW-40; Seattle, Washington 98195

Student Guide

A booklet prepared to inform students of the various services and opportunities available on campus, as well as to provide names and telephone numbers of people and offices to contact when students need assistance.

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

Evening and Extension Credit Programs

An annual bulletin listing University of Washington courses available through: Evening Residence Credit Classes, Extension Credit Classes, and Independent Study by Correspondence.

University of Washington; Division of Evening and
Extension Credit Programs; 222 Lewis, DW-20;
Seattle, Washington 98195

Independent Study Bulletin

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

University of Washington; Division of Evening and
Extension Credit Programs; 222 Lewis, DW-20;
Seattle, Washington 98195

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

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ACADEMIC CALENDAR 1976-77

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

SUMMER QUARTER 1976

Application closing date for all new and former students	May 15
Preregistration for all students registered Spring Quarter 1976	May 6-12
In-Person Registration for new and former students	June 11-16
School of Law classes begin	June 14
Regular quarter and Term <i>a</i> classes begin	June 21
School of Dentistry classes begin	June 28
Independence Day holiday	July 5
Term <i>a</i> classes end	July 21
Term <i>b</i> classes begin	July 22
School of Dentistry classes end	July 30
Regular quarter and Term <i>b</i> classes end	August 20
School of Law classes end	August 27

AUTUMN QUARTER 1976

Application closing date for new students entering from high school	May 1*
Application closing date for all other new and former students	July 1*
Preregistration for matriculated students registered Spring Quarter 1976	May 21-28
In-Person Registration for new and former matriculated students	July 6-August 25 and September 16-21
In-Person Registration for all nonmatriculated students	September 22
School of Law classes begin	September 22
All other classes begin	September 27
Veterans Day holiday	October 25
Thanksgiving recess	November 25, 26
Last day of instruction	December 8
Final examinations	December 9-16

WINTER QUARTER 1977

Application closing date for all new and former students	November 1*
Classes begin	January 3
Washington's Birthday holiday	February 21
Last day of instruction	March 11
Final examinations	March 14-18

SPRING QUARTER 1977

Application closing date for all new and former students	February 1*
Classes begin	March 28
Memorial Day holiday	May 30
Last day of instruction	June 3
Final examinations	June 6-10
Commencement	June 11

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

1977-78

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

SUMMER QUARTER 1977

Application closing date for all new and former students	May 15
School of Law classes begin	June 13
Regular quarter and Term <i>a</i> classes begin	June 20
School of Dentistry classes begin	June 27
Independence Day holiday	July 4
Term <i>a</i> classes end	July 20
Term <i>b</i> classes begin	July 21
School of Dentistry classes end	July 29
Regular quarter and Term <i>b</i> classes end	August 19
School of Law classes end	August 26

AUTUMN QUARTER 1977

Application closing date for new students entering from high school	May 1*
Application closing date for all other new and former students	July 1*
School of Law classes begin	September 21
All other classes begin	September 26
Veterans Day holiday	November 11
Thanksgiving recess	November 24, 25
Last day of instruction	December 7
Final examinations	December 8-15

WINTER QUARTER 1978

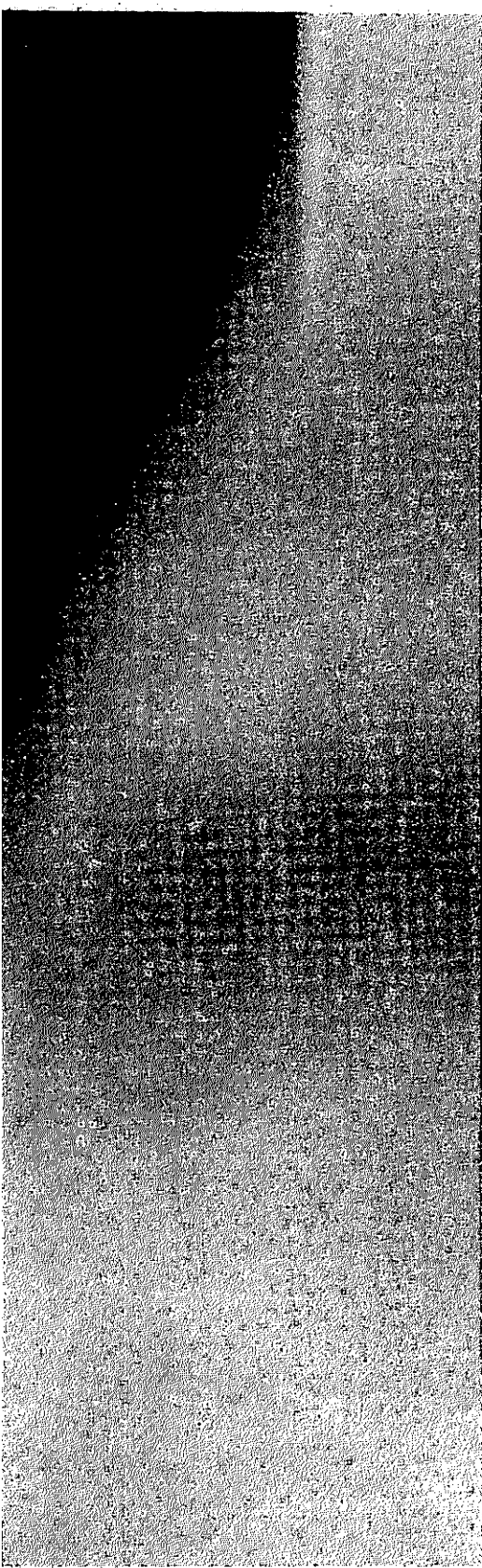
Application closing date for all new and former students	November 1*
Classes begin	January 3
Washington's Birthday holiday	February 20
Last day of instruction	March 10
Final examinations	March 13-17

SPRING QUARTER 1978

Application closing date for all new and former students	February 1*
Classes begin	March 28
Memorial Day holiday	May 30
Last day of instruction	June 2
Final examinations	June 5-9
Commencement	June 10

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

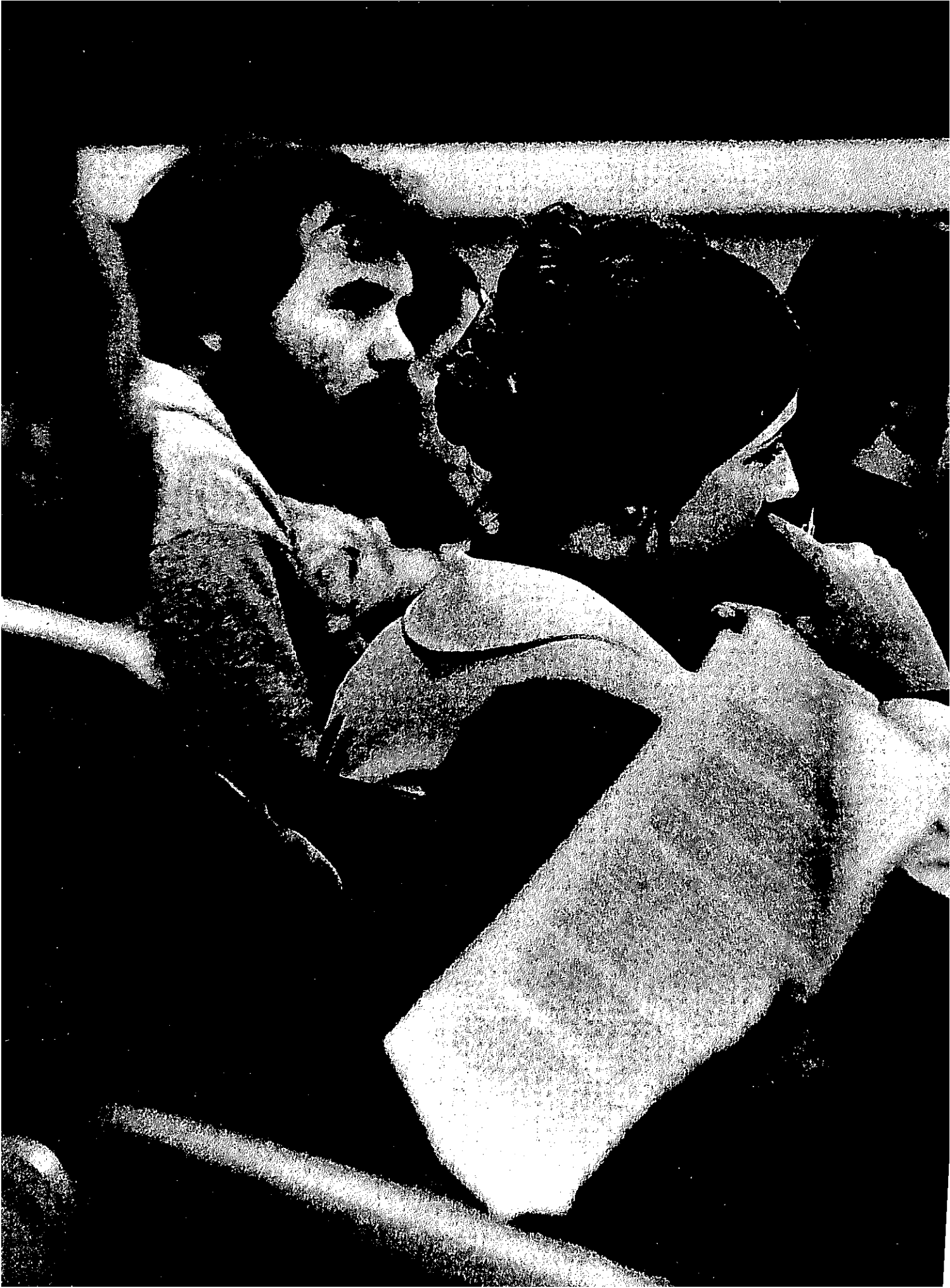




The University, through its teaching and research programs and through its faculty, students, and staff, is a major force for change.

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





GENERAL INFORMATION

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

The University of Washington's enrollment, which ordinarily is limited to about thirty-four thousand students, was 35,434 in Autumn Quarter 1975. Of the total, 24,362 were undergraduates and the remainder were in professional and graduate programs. More than three-fourths of the undergraduates enter as freshmen from Washington high schools or as transfer students from Washington community colleges or other colleges and universities in the state. The majority of students who enter the University as freshmen are from the top one-third to one-fifth of their high school graduating class. The grade-point average for the regularly admitted freshman class entering in Autumn Quarter 1975 was 3.47. In 1974-75 the full-time teaching faculty of the University numbered 2,400.

The University of Washington recognizes as one of its highest educational priorities the need to increase the number of qualified minorities and women in certain of the academic fields and professions in which they have been historically denied access or traditionally under-represented in higher education. Through its admission policies, the University attempts to bring in more minorities and women at all levels of its educational programs. In addition, special educational support services are provided through the Office of Minority Affairs and the Office for Recruitment of Minority Graduate and Professional Students to facilitate the entry of persons from under-repre-

sented minorities and to enhance their likelihood of success while attending the University.

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.

Academic 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. Day and evening credit classes are integrated so that students may attend the University either during the day or at night or in a combination of the two.

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

Summer Quarter

The opportunities for study during Summer Quarter are comparable to those of the regular school year, except that the number of courses offered is not as large. A wide selection of courses in most major fields is available to graduate

and undergraduate students pursuing degree programs on a year-around basis, as well as to teachers and other summer-only students seeking to broaden, intensify, or refresh their subject matter competence. Freshman students entering from high school are encouraged to begin their college work in the summer. Through the Office of Admissions, enrollment in summer courses may be arranged under certain circumstances for specially qualified students who have not yet completed high school.

Admission requirements for Summer Quarter are the same as for any other quarter; credits earned are evaluated as residence credits; and—with the exception of separate fee schedules for medical and dental students—Summer Quarter fees closely parallel those of a regular quarter. There is no additional fee for nonresidents during the summer.

Students may register for either day or evening credit courses, or for a combination of day and evening credit courses, on the basis of a single fee schedule. Part-time fees are charged in accordance with the number of credits for which the student is registered. A complete listing of undergraduate and graduate courses offered during Summer Quarter is published in the *Summer Quarter Bulletin*.

PROGRAMS OF STUDY

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

The programs of study in a variety of fields not only train students for the professions and occupations but also prepare them to contribute to the culture and progress of society. The colleges and schools and the principal fields of study at the University 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
- Art History
- Asian American Studies*
- Asian Languages and Literature

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

- Astronomy
- Atmospheric Sciences
- Biology
- Black Studies
- Botany
- Chemistry
- Chicano Studies*
- Cinema Studies*
- Classics (Latin, Greek, Classical Studies)
- Communications (Advertising, Journalism, Radio-TV)
- Comparative and Foreign Area Studies (Comparative Religion, East Asia, Inner Asia, Russia and East Europe, South Asia)
- Comparative Literature
- Computer Science
- Dance (School of Music)
- Drama
- Economics
- English
- Environmental Studies*
- Ethnomusicology*
- General Studies
- Genetics†
- Geography
- Geological Sciences
- Geophysics†
- Germanics
- History
- Home Economics
- Humanistic Studies*
- Jewish Studies*
- Latin American Studies*
- Linguistics
- Mathematics
- Microbiology and Immunology
- Music
- Near Eastern Languages and Literature
- Oceanography
- Philosophy
- Physical and Health Education
- Physics
- Political Science
- Psychology
- Religious Studies/Comparative Religion
- Romance Languages and Literature
- Scandinavian Languages and Literature
- Slavic Languages and Literature
- Society and Justice
- Sociology
- Speech and Hearing Sciences
- Speech Communication
- Women Studies*
- Zoology

School and Graduate School of Business Administration

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

School of Dentistry

- Community Dentistry
- Continuing Dental Education

* Program that may be taken for a degree under General Studies.
† Graduate program. Certain courses open to undergraduates.



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

College of Education

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

College of Engineering

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

College of Fisheries

Fisheries Science
Food Science
Quantitative Science
Wildlife Science

College of Forest Resources

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

Interschool or Intercollege Programs

Bioengineering
Computer Science
Marine Studies
Quantitative Science
Social Management of Technology
University Conjoint Courses
Wildlife Science

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 and Immunology
Neurological Surgery
Obstetrics and Gynecology
Occupational Therapy
Ophthalmology
Orthopaedics
Otolaryngology
Pathology
Pediatrics
Pharmacology
Physical Therapy
Physiology and Biophysics
Prosthetics and Orthotics
Psychiatry and Behavioral Sciences
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

School of Public Health and Community Medicine

Biostatistics
Environmental Health
Epidemiology and International Health
Health Services
Pathobiology

† Graduate program. Certain courses open to undergraduates.

† Graduate program. Certain courses open to undergraduates.

Reserve Officer Training Programs

Aerospace Studies
Military Science
Naval Science

School of Social Work

Social Welfare

Other Programs

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

DEGREES

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

Undergraduate Degrees

Bachelor of Arts	B.A.
Bachelor of Arts in Business Administration . . .	B.A.B.A.
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

Dental, Law, and Medical Degrees

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

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

CAMPUS FACILITIES

University Libraries

The University Library system, consisting of the Suzzallo Library, the Charles E. Odegaard Undergraduate Library, and eighteen branch libraries, contains 2,187,917 volumes; 400,000 research reports; 46,996 current serial subscriptions; computerized bibliographic data bases in the social sciences, business, sciences, and health sciences; as well as numerous maps, newspapers, microforms, 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 130,889 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, undergraduates in any academic field can find in the undergraduate library nearly every book they are likely to need.

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 four and one-half million author entries from forty-eight 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.

Henry Art Gallery

The Henry Gallery, the art museum of the University of Washington, brings to the campus and the community exhibitions of contemporary and historical work in all media. The offerings also include films, lectures, demonstrations, symposia, and an active publishing program. The small, but distinguished, collection includes European and American paintings and prints and contemporary American and Japanese ceramics. The Henry Gallery Association offers membership to students, faculty, and the community for the purpose of supporting the multifaceted program. The gallery is open without charge to the public every day except University holidays.



Museum

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

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

University Theatres

The School of Drama operates three theatres: the Glenn Hughes Playhouse, with a thrust stage; the Penthouse Theatre, the first theatre-in-the-round built in America; and the Showboat Theatre, fashioned after a turn-of-the-century floating showboat with a proscenium stage. Faculty- and student-directed plays are presented during the academic year and range in type from classics to musicals.

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.

University Research Facilities and Services

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

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 Mc-

Mahon Hall is given to students who have at least junior standing and are at least twenty years old.

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

Fraternities and Sororities

Twenty-seven fraternities and seventeen 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 organiza-

tions 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, and Spanish are conducted in coeducational residence halls by students. Members are grouped according to language interests and eat meals together. Additional information may be obtained from the departments concerned.

Student Union Building

The Student Union Building, commonly known as the HUB, is a social, cultural, recreational, and service center for students and the University community. HUB activities are planned and coordinated by student committees, assisted by trained advisers. In addition to dining facilities, the HUB has a ticket office, an auditorium, a bookstore branch, meeting rooms, lounges, a ballroom, and several game rooms. The South Campus Center, which is located between the Health Sciences Building and the Showboat Theatre, provides services and activities similar to the Student Union Building.

STUDENT SERVICES OFFICES

Office of Student Affairs

The Office of Student Affairs is concerned with the general welfare of students and provides various nonacademic services to assist them. The office works 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 encouraged to contact the Office of Student Affairs, 459 Schmitz, for information or assistance concerning life at the University. The Office of Student Affairs also provides special programs, services,

and information for veterans, physically handicapped students, international students, and student-parents needing child care.

Office of Minority Affairs

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

The program operates the Study Skills Center, which provides assistance in reading, composition, computational, and basic study skills. The Tutorial Office provides individual and small-group tutorial support for any course offered at the University. Summer workshops are offered through the Study Skills Center and the Tutorial Office. These programs are open to nonminority students and those outside the EOP program on a space-available basis.

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

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

Educational Assessment Center

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

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.

Many financial aid programs have application deadlines as early as February 1 of each year for consideration the following academic year. To be assured of consideration, students must make application for financial aid on or before the appropriate deadline.

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.

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

Counseling Center

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

Other services of the center include an Effective Study Program to assist students in improving their study patterns and to equip them with effective study techniques, Assertiveness Training Programs, and Exploration-Encounter group sessions. The center is located on the fourth floor of Schmitz Hall.

Hall Health Center

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

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

An infirmary 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 for outpatient prescriptions. Major surgery and the occasional illness of exceptional severity require treatment elsewhere, and the student should protect himself or herself against the expenses of these by supplementary medical insurance. A low-cost group medical-surgical-hospital policy designed to meet these specific needs may be purchased at time of registration.

Placement Center

The University's Placement Center, which includes a Minority Placement Program, offers career information and

assists undergraduates, graduate students and degree or certificate holding alumni (a) to make a viable connection between their academic backgrounds and their career or long-range employment objectives, (b) to develop effective job-seeking campaigns, and (c) to find suitable employment upon leaving the University or to change employment thereafter.

TUITION AND FEES

The University's tuition and fee rates effective at the time of publication are indicated below. Fee schedules for resident and nonresident students apply to the academic year (Autumn, Winter, and Spring quarters) only. Summer fees are listed in the *Summer Quarter Bulletin*. The resident fee is charged nonresident students during Summer Quarter, except for students in the schools of Dentistry or Medicine. Quarterly tuition and fee amounts are shown below.

	Resident	Non-resident
Undergraduates (including nonmatriculated and fifth-year students)		
Full time (more than 6 credits)	\$188	\$527
Part time (6 credits or less)		
Minimum (first 2 credits)	53	147
Each additional credit	27	76
Graduate and Law		
Full time (more than 6 credits)	208	547
Part time (6 credits or less)		
Minimum (first 2 credits)	73	167
Each additional credit	27	76
Dentistry and Medicine		
Full time (more than 6 credits)	280	613
Part time (6 credits or less)		
Minimum (first 2 credits)	148	250
Each additional credit	12	33

Other fees, special charges and refund policies are explained in the Rules and Procedures section of this catalog.

CAMPUS ACTIVITIES

Associated Students, University of Washington (ASUW)

The Associated Students of the University of Washington (ASUW) is a nonprofit corporation that provides a variety of services and programs for students. Every full-time student is automatically a member of the ASUW, which has an annual budget of approximately \$250,000, allocated from the services and activities fee paid as part of tuition. The government of the ASUW is headed by a president, and three other officers, and a seven-member board of control, all elected by the student body each year. The ASUW maintains agencies, commissions, and service groups to provide students with a varied program of activities during the school year. Other ASUW services include Lecture Notes, CAGE Poster Printing Service, Legal Aid Service, the Experimental College, and a Bike Repair Shop.

Graduate and Professional Student Senate (GPSS)

The GPSS is a representative body of graduate and professional students 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.

Student Organizations

Students at the University are encouraged to become active in at least one of the campus's approximately three hundred fifty voluntary student organizations, which include honorary, professional, and social organizations, 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*, the *Student Directory*, and the *Student Guide*. 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.

Department of Intercollegiate Athletics

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. The intercollegiate athletic program for men offers competition in twelve varsity sports for undergraduate students: 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 facilities that support the intercollegiate athletic program include the pavilion and the stadium.

Department of Recreational Sports Programs

The Department of Recreational Sports Programs provides a comprehensive, quality program of sports activities designed to meet the diverse needs and interests of students and faculty and staff members of the University of Washington. In this endeavor, a wide spectrum of structured and unstructured activities is available, including: intramural sports (women's, men's and co-recreational), special events, sports clubs, class instruction in sports skills, and informal free-play recreation. To provide this service, the Department of Recreational Sports Programs is responsible for operation of the Intramural Activities Building, Golf Range, and Canoe House.



RULES AND PROCEDURES

The University and its colleges and schools reserve the right to change the fees, the rules, and the calendar regulating admission and registration, the instruction in, and the graduation from, the University and its various divisions, and 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 procedures as they are stated in the *General Catalog*. In instances in which no appeal procedure is outlined and the student is persuaded that a special set of circumstances makes appeal reasonable, he or she may appeal the application of specific rules or regulations to the Office of the Dean of the school or college in which he or she is enrolled in the case of an academic matter or to the Office of Student Affairs in the case of a nonacademic matter. These offices will render a decision on the appeal, 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, divisions, and institutes. For example, the College of Arts and Sciences includes six schools, twenty departments, one division, and two institutes.

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

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 catalog may be consulted about specific limitations and guidelines.

Curriculum

The pattern or sequence of courses a student takes in earning a 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.

Courses numbered 500 and above but followed by a "P" are for professional students in the School of Medicine.

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 adviser, a program of studies that meets the broad general requirements of the college and at the same time provides for experimentation and exploration in the subject areas of the college. Each program is planned according to the individual student's 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.

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 or she has earned. Credits earned in lower-division ROTC courses are not counted.

Freshman: 1-44 quarter credits.

Sophomore: 45-89 quarter credits.

Junior: 90-134 quarter credits.

Senior: 135 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 permitted to register for courses on a space-available basis only and 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 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.

ENROLLMENT ELIGIBILITY AND REGISTRATION AUTHORIZATION

Continuing Students

Registered students continuing at the University of Washington in the same category (i.e., undergraduate, graduate, fifth-year, etc.) from Autumn Quarter to Winter Quarter, Winter Quarter to Spring Quarter, and Spring Quarter to Autumn Quarter are guaranteed enrollment space in the University if they register by the seventh calendar day of the quarter. Graduate students returning from on-leave status are not considered continuing students and must comply with former student readmission requirements indicated below.

New Students

Students new to the University or new to a classification are accommodated on a space-available basis. Once offered admission, a student is requested to pay a \$50 nonrefundable enrollment service fee to reserve a place in the University. If space is available when the payment is received, a registration authorization and appointment is sent to the student. If space is no longer available, the \$50 is returned. The \$50 applies only to tuition and fees assessed for the quarter for which the student is determined admissible and subsequently enrolls. Payment of the \$50 fee is not required for Summer Quarter.

Returning Former Students

All returning former students, including on-leave graduate students, must pay a \$50 nonrefundable enrollment service fee at the time of readmission. Graduate students who have on-leave status with the Graduate School or undergraduates who have been absent from the University for one quarter, with the exception of Summer Quarter, are guaranteed space in the University if they file a Former Student Enrollment Application by the closing date and pay the \$50 enrollment service fee by the date requested in the offer of readmission. All other returning students are accommodated on a first-paid-first-served space-available basis. If space is not available when the \$50 enrollment service fee is received, the money is returned. If space is available, a registration authorization and appointment is sent to the student. The \$50 payment applies to tuition and fees assessed for the quarter the student is readmitted and subsequently enrolls. Payment of the \$50 fee is not required for Summer Quarter.

REGISTRATION

No person, other than a faculty member attending informally with the approval of the instructor, may attend a University course in which that person has not been registered.

An instructor may allow a student to attend his or her class only if the student's name is on the class list or on an official class card from the Registrar's Office.

Preregistration

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

In-person Registration

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

Fee Payment

A tuition and fee obligation is incurred when a student registers. 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 address on file in the Registrar's Office. Nonpayment of tuition and fees by the 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. *The mailing of notices to the last address on record constitutes official notification.*

Change of Program to Drop or Add Classes

1. Preregistered students may add and drop classes during an early change period before the quarter begins. Appointments are necessary. Information on dates and procedures

appears on posters placed throughout the campus and in the quarterly *Time Schedule*.

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

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 Fees and Charges section for refund information).

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

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

3. Refer to the Grades and Grading Systems section for information on grades and withdrawal.

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

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

Military Withdrawal

If a student is conscripted into 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.

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 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, 207 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.

GRADES AND GRADING SYSTEMS

Beginning Summer Quarter 1976, the following grading system will be in effect at the University, subject to certain exceptions in the Graduate School and in the schools of Dentistry, Law, and Medicine:

Grades are entered as numbers, the possible values being 4.0, 3.9, . . . and decreasing by 1/10 until 0.7 is reached. The number 0.0 is assigned as a failing grade. Correspondence between numerical grades and letter grades is as follows:

Letter Grade	Numeric Grade-Point Equivalent	Explanation
A	4.0	Honor
A-	3.7	
B+	3.3	
B	3.0	Good
B-	2.7	
C+	2.3	
C	2.0	Medium
C-	1.7	
D+	1.3	
D	1.0	Poor (low pass)
D-	0.7	
E	0.0	Failure or other than official withdrawal

The following letter grades also may be used:

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

I Incomplete. An incomplete is given only in case the student has been in attendance and has done satisfactory work until within two weeks of the end of the quarter and has furnished proof satisfactory to the instructor that the work cannot be completed because of illness or other circumstances beyond the student's control. To obtain credit for the course, an undergraduate student must convert an incomplete into a passing grade no later than the last day of the next quarter. An Incomplete grade not made up by the end of the next quarter will be converted to the grade of 0.0 by the Registrar unless the instructor has indicated, when assigning the Incomplete grade, that a grade other than 0.0 should be recorded if the incomplete work is not completed.

A student may petition the Registrar to retain the Incomplete grade on his or her record for a maximum of three additional quarters. Petitions will be granted by the Registrar if approved by the instructor of the course involved. Petitions must be received before the Incomplete is converted to a failing grade.

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

S Satisfactory grade for courses taken on a satisfactory/not satisfactory basis. An *S* grade is automatically converted from a numerical grade of 1.7 or above for undergraduates and a numerical grade of 2.7 or above for graduates. The grade *S* may not be assigned directly by the instructor, but is a grade conversion by the Registrar's Office.

NS Not-satisfactory grade for courses taken on a satisfactory/not satisfactory basis. A grade less than 1.7 for undergraduates, or less than 2.7 for graduates, will be converted to *NS*. *NS* is not included in the grade-point-average calculation.

CR Credit awarded in a course offered on a credit/no credit basis only. The grade is awarded directly by the instructor. (*CR* may be a grade conversion from a numeric grade if an undergraduate student is in the credit/no credit program. A grade of 1.7 or better is converted to *CR*.)

NC Credit not awarded in a course offered on a credit/no credit basis only. The grade is awarded directly by the instructor and is not included in a grade-point-average calculation.

W Official withdrawal or drop during the third and fourth weeks of the quarter for undergraduates and through the seventh week for graduates.

Withdrawing From a Course

Undergraduates withdrawing officially from a course during the first two weeks of a quarter shall have no entry on their permanent academic record. During the third and fourth weeks, an official withdrawal is recorded as *W*. Withdrawals require that a student process a Change of Program card through the Registrar's Office, but do not require an instructor's signature.

For undergraduates, during the fifth through tenth weeks of the quarter, no drops are permitted, with the following exceptions:

(a) A student may drop all courses by withdrawing from the University.

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

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

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

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

(c) A student who has used his or her uncontested drops may petition the Registrar in writing to drop a course. Such a petition will be granted if, in the Registrar's judgment, (1) the student is unable to complete the course in ques-

tion due to a severe mental or physical disability, or (2) unusual and extenuating circumstances beyond the student's control have arisen that prevented him or her from dropping by the end of the fourth week. Petitions must be filed promptly after the occurrence of the event that gave rise to the need for dropping.

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

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

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

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

Students withdrawing unofficially from or dropping a course shall be given a grade of 0.0.

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

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

Grade-Point Average

The cumulative grade-point average is based solely on courses taken in residence at the University of Washington and specifically excludes transfer and extension credits and credits earned by examination.

Computation of Grade-Point Average

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

A graduate student's grade-point average will be calculated entirely on the basis of number grades in 300-, 400-, and



500-level courses. The grades of *S*, *NS*, *CR*, *NC*, and *N* will be excluded, as will all grades in courses numbered 600, 700, and 800, and at the 100 and 200 level.

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.

EXAMPLE 1

Course	Credits	Grade	Grade Points
ENGL 171	3	CR	
OCEAN 101	5	2.7	13.5
HST 111	5	4.0	20.0
GEOG 258	2	3.3	6.6
Total credits earned toward graduation	15		
Total graded credits attempted (TCA)	12		40.1

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

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

EXAMPLE 2

Course	Credits	Grade	Grade Points
ENGL 121	5	2.3	11.5
OCEAN 101	5	0.0	0.0
SPCH 100	3	2.7	8.1
H ED 250	3	I	
Total credits earned toward graduation	8		19.6
Total graded credits attempted (TCA)	13		

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

The student attempted 16 credits, but only 13 are graded, because the *I* is not computed in the grade-point average. The 0.0 for OCEAN 101 is computed in the grade-point average, but no credit is awarded toward graduation. If the work in H ED 250 is not made up by the end of the next quarter, the *I* will convert to a numeric grade (see explanation under Grades and Grading Systems on page 21), and the grade-point average will be recomputed.

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 School of Medicine, at the close of the quarter. The grade reports are sent to the mailing address supplied by the student at the time of registration. To ensure delivery of grades, any changes in this permanent mailing address should be reported to the 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 numerical system. 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. Entrance forms and additional information may be obtained from the Registration Office, Schmitz Hall.

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. Thus, the credit/no credit program is not appropriate for part-time students. For terms and conditions relating to academic probation, the student should see his or her academic adviser.

Granting of Degrees: A student may earn a baccalaureate degree under the credit/no credit system only with the approval of the major department.

Credit/No Credit-Only as a Course Option

With appropriate departmental review and approval, the University may offer a course or courses on a credit/no credit basis. The standard for granting credit is

credit-only courses under this option is the demonstration of competence in the material of the course to the instructor's satisfaction.

A student on the numerical grading system has *CR* entered on his or her transcript if the student passes, 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. Registration in credit/no credit-only courses under the course option does not affect a graded student's right to take other courses for conventional grades concurrently.

Satisfactory/Not Satisfactory Grading Option

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

Scholarship and Grades in the School of Dentistry

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

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

A student who has less than a 2.00 grade-point average in the courses for 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

Grades are awarded in 1/10 increments from 4.0 to 0.7 and 0.0. Credit is awarded for grades of 1.3 or better. 4.0 is the highest grade and 0.0 is the lowest grade. A 2.00 cumulative grade-point average is required for graduation.

Scholarship and Grades in the School of Medicine

The School of Medicine maintains a record of each student's performance and reports to the Registrar's Of-

fice 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 scholarship can be readmitted only by action of the executive committee, and one who is readmitted is on probation and must maintain a quality of work consistently above the minimum requirements. 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.

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 *W*, *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 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 earned by the repetition may be awarded. The fact that the student originally earned an *E* is to be apparent on the record.

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

Academic Warning

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

Probation and Dismissal for Low Scholarship

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

Reinstatement

Only under exceptional circumstances is a student who has been dropped under low-scholarship rules readmitted to the University. Such a student is readmitted only at the discretion of the Dean of the school or college to which 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 2.50 grade-point average for the following quarter's work. 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 independent study.
2. For work completed with private teachers.
3. For work completed in unaccredited institutions if a formal examination is deemed necessary by the Chairman of the concerned department(s). (In some cases, credit may be validated without an examination. Students who wish to validate credit must make arrangements with the Office of Admissions.) The following restrictions apply:
 - a. No one may take a credit examination for a course in which he or she has received prior credit.
 - b. All credits earned by examination are counted as extension credit and are included in the 90-extension-credit maximum that may be applied toward the baccalaureate degree. No credit is allowed by examination if the grade earned is less than 2.0. Grades earned are not included in the grade-point average.
 - c. No student shall receive credit by examination for a course for which the student would not be eligible to receive credit if the course were taken in residence.
 - d. No student is permitted to repeat any examination for credit.
 - e. No student receives credit by examination for lower-division courses in the student's native language.
 - f. Credit by examination is not acceptable for application toward an advanced degree in the Graduate School.

A student who wishes to qualify for credit by examination must apply to the Graduation 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's Office, 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 no later than the fourth week of the quarter.

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

CLEP Credit

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

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 may be changed only by written notification to the Graduation Office by the student's departmental adviser.

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 resubmitted.

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

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

Degrees With Two Majors

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

Two Baccalaureate Degrees Concurrently

Two baccalaureate degrees, associated with different majors, may be granted at the same time, but the total number of academic credits earned must reach a minimum of 45 credits in excess of the number 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 community 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, the Graduate School, and Research section of this catalog.

REQUIREMENTS FOR TEACHING CERTIFICATION

The College of Education offers professional programs approved by the State Board of Education leading to teaching and other certificates. For additional information, refer to the College of Education section of this catalog or write to the College of Education advisory office, 207 Miller.

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 de-



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.

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.

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

2. A new or returning matriculated student who, after meeting with an appropriate academic adviser or receiving a University *General Catalog*, determines that the program for which admission was granted differs substantially from what the student was led to expect based upon earlier avail-

able information, will be refunded the \$50 enrollment service fee upon written request to the Registrar. Such a request for refund must be submitted before the student registers for courses and in no case later than the first day of the quarter for which admission has been granted.

3. A new or returning student who applies by the prescribed deadline for financial aid administered by the University's Office of Financial Aids, and who cannot be awarded financial aid adequate to his or her needs as determined by that office, and who is therefore unable to attend the University, will be refunded the \$50 enrollment service fee upon application to the Registrar no later than two weeks after receipt of notice of the financial aid award.

4. A new or returning student who is unable to attend the University because of pregnancy, disability, or death, or because of being called involuntarily into the military service of the United States or into civil duty, will be refunded the amount, if any, by which the enrollment service fee exceeds the amount of tuition and fees assessed at the time of withdrawal. Requests for refund must be submitted in writing to the 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 1976

	Resident	Non-resident
Undergraduate		
Full fee (more than 6 credits)	\$188	\$527
6 or fewer credits:		
Minimum (first 2 credits)	53	147
Each additional credit	27	76
Graduate and Law		
Full fee (more than 6 credits)	208	547
6 or fewer credits:		
Minimum (first 2 credits)	73	167
Each additional credit	27	76
Dentistry and Medicine		
Full fee (more than 12 credits)	280	613
12 or fewer credits:		
Minimum (first 2 credits)	148	250
Each additional credit	12	33

Fee schedules for resident and nonresident students apply to the academic year (Autumn, Winter, and Spring quarters). Summer Quarter fees are listed in the *Summer Quarter Bulletin*. The resident fee is charged nonresident students during 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 registration period.

Athletic Admission Fee: A ticket that admits its owner to all athletic events during the quarter or quarters covered: Autumn Quarter, \$15; Winter and/or Spring quarters, \$10.

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.

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

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

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

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 computed on the total credits remaining plus one-half the difference between the old fee and the new fee. There is no cancellation or reduction in fees for courses dropped after the thirtieth calendar day of the quarter. The fees of a new or returning student cannot be reduced below the \$50 minimum paid as an enrollment service fee.

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.

RESIDENCE REQUIREMENTS

For tuition purposes, a resident student is one who has been domiciled in the state of Washington for the period of one year immediately before the beginning 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. A change in residence status may not become retroactive to a preceding quarter, nor is a change in residence status automatic after a student has lived in the state of Washington for one year.

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 or legally separated, the minor is entitled to classification as a resident student if one of the parents has established a domicile in the state of Washington.

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 domiciled 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 not filed or post-marked prior to the first day of the quarter cannot become effective, if granted, until the following quarter.

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.

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.

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

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.

Category	Office to Contact	Form to Use
Academic personnel.	Scholarship and Loan Fiscal Office, 170 Schmitz; questions regarding eligibility may be directed to the Academic Personnel Records Office, 316 Administration.	"Faculty/Staff Tuition Exemption Request," UW 100SLF; resident and nonresident portions of tuition and fees are exempted when this form is filed <i>each quarter</i> .
Spouses and children of academic personnel.	Academic Personnel Records Office, 316 Administration.	"Scholarship, Grant, or Exemption Authorization."
Staff personnel eligible for tuition-free course of 6 credits or less.	Scholarship and Loan Fiscal Office, 170 Schmitz; an information sheet explaining eligibility may be obtained from the Staff Personnel Office, 3903 Brooklyn Avenue Northeast.	"Faculty/Staff Tuition Exemption Request," UW 100SLF; resident and nonresident portions of tuition and fees are exempted when this form is filed <i>each quarter</i> .
Staff personnel (1) not eligible for tuition-free course or (2) taking more than 6 credits.	Office of Residence Classification, 320 Schmitz; information sheet explaining eligibility may be obtained from the Staff Personnel Office, 3903 Brooklyn Avenue Northeast.	"Washington Institutions of Higher Education, Application for Change in Residence Status."
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.	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.	"Application for Refund of the Nonresident Portion of Tuition and Fees by Virtue of University of Washington Employment," revised 7/71.
Spouses and children of staff personnel working at least twenty hours per week.	Staff Personnel Office, 3903 Brooklyn Avenue Northeast.	"Scholarship, Grant, or Exemption Authorization."
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.	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.	"Application for Refund of the Nonresident Portion of Tuition and Fees by Virtue of University of Washington Employment," revised 7/71.
Graduate students with graduate service appointments.	Payroll Office, 3903 Brooklyn Avenue Northeast, during the first week of the quarter; Scholarship and Loan Fiscal Office, 170 Schmitz, thereafter.	"Scholarship, Grant, or Exemption Authorization."
Employees, and their spouses and children, of another state of Washington institution of higher education, working at least twenty hours per week.	Office of Residence Classification, 320 Schmitz.	"Washington Institutions of Higher Education, Application for Change in Residence Status."
Military employees and their spouses and children.		
Federal employees and their spouses and children.		
Veterans whose final permanent duty station was		



Category

Office to Contact

Form to Use

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 and children of graduate students with graduate service appointments.

Office of Veteran Affairs, 180 Schmitz.
(This exemption is for half the nonresident portion of tuition.)

Graduate School,
1 Administration Building.

Upon presentation of discharge papers, "Veterans Tuition Exemption Card," UW 502.

"Scholarship, Grant, or Exemption Authorization."

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 is issued an 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 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 identification-cards may be replaced by the student's making a request for replacement at the University Cashier's Office and paying a 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 EDUCATION RECORDS

The following section details the student's rights to inspect his or her records at the University, as outlined under Washington Administrative Code Nos. WAC 478-140-010, -020, -021, -022, -030, -040, and -050. Copies of the WAC numbers dealing with the disclosure of, and access to, student education records are available for examination at the Registrar's Office, Schmitz Hall.

University Policy on Student Education Records

Public Law 93-380, The Family Educational Rights and Privacy Act of 1974, requires that the University adopt

guidelines concerning the right of a student to inspect his or her education records, and guidelines concerning the release of personally identifiable information to third parties. The act further provides that a student has the right to a hearing in order to provide for the correction or deletion of inaccurate, misleading or otherwise inappropriate data. The act also provides that students be informed annually of the types of education records maintained by the University that are directly related to students.

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

Definition of a Student

A student is defined as any person who is or has been officially registered at the University of Washington and with respect to whom the University maintains education records or personally identifiable information.

Education Records: Student's Right to Inspect

A. A student has the right to inspect and review his or her education records. A list of the types of education records maintained by the University and the record locations may be obtained by the student at the University Visitors Information Center, 4014 University Way Northeast, or at the Transcript Department of the Registrar's Office, 260 Schmitz, 1400 Northeast Campus Parkway.

1. For purposes of this section the term "education records" means those records, files, documents and other materials that contain information directly related to a student.

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

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

(1) A person who is providing instruction in place of the regularly assigned faculty member in a course in which

knowledge of the performance of individual students is essential to the provision of instruction, or

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

b) If the personnel of the University Police Department do not have access to education records under WAC 478-140-030(1), the records and documents of the Police Department that (1) are kept apart from records described in WAC 478-140-021(1)(a), (2) are maintained solely for law-enforcement purposes, and (3) are not made available to persons other than law-enforcement officials of the same jurisdiction.

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

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

B. 1. Recommendations, evaluations or comments concerning a student that are provided in confidence, either expressed or implied, as between the author and the recipient, shall be made available to the student, except as provided in paragraphs (2.), (3.) and (4.) of this section.

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

a) Admission to any educational institution, or

b) An application for employment, or

c) Receipt of an honor or honorary recognition.

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

a) The student is, upon request, notified of the names of all persons making confidential statements concerning him or her, the dates of such confidential statements, and the purpose for which the statements were provided, and

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

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

4. Recommendations, evaluations, or comments concerning a student that have been provided in confidence, either expressed or implied, as between the author and the recipient, prior to January 1, 1975, shall not be subject to release under WAC 478-140-021(2)(a); provided, however, that upon request the student is notified of the names of the authors of all such confidential records, the dates appearing on such confidential records and the purpose for which each such confidential record was provided. Such records shall remain confidential and shall be released only with the consent of the author. Such records shall be used by the institution only for the purposes for which they were originally intended.

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

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

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

F. Student education records may be destroyed in accordance with a department's routine retention schedule. In no case will any record that is requested by a student for review in accordance with WAC 478-140-021 and WAC 478-140-022 be removed or destroyed prior to providing the student access.

Requests and Appeal Procedures

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

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

C. 1. After reviewing his or her record, a student may challenge the content of the records if they are felt to be inaccurate, misleading, or otherwise in violation of the privacy or other rights of the student. In such cases the student should contact the appropriate Dean or director responsible for custody of the record.

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



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

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

Release of Personally Identifiable Records

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

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

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

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

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

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

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

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

1. A specification of the records to be released.

2. The reasons for such release.

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

C. In cases where records are made available without student release as permitted by WAC 478-140-030(1)(b), (c), (d), (e) and (f), the University shall maintain a record kept with the education record released, which will indicate the parties that have requested or obtained access to a student's records maintained by the University and which will indicate the legitimate interest of the investigating party. Releases in accordance with WAC 478-140-030(1)(a) need not be recorded.

D. Personally identifiable education records released to third parties, with or without student consent, shall be accompanied by a written statement indicating that the information cannot be subsequently released in a personally identifiable form to any other parties without obtaining consent of the student.

E. The term "directory information" used in WAC 478-140-030(1) is defined as student's name, address, telephone number, date and place of birth, major field of studies, participation in officially recognized sports activities, weight and height of members of athletic teams, dates of attendance, degrees and awards received, and the most recent previous educational agency or institution attended by the student. Students may request that the University not release directory information by so indicating on their registration form or through written notice to the Registration Department of the Registrar's Office, 225 Schmitz, Window 3, 1400 Northeast Campus Parkway.

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

University Records

All University individual(s) or office(s) that have custody of education records will develop procedures in accord with WAC 478-140-010 through 050. Any supplementary regulations found necessary by departments will be filed with the Student Records Committee, which will be responsible for periodic review of policy and procedures.

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

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

Student Records Committee

The Student Records Committee shall be responsible for reviewing unusual requests for information and for assisting in the interpretation of these rules. The committee also shall be responsible for hearing appeals as defined in WAC 478-

140-022. The committee shall consist of the Registrar, a graduate student, an undergraduate student, and two faculty and two University staff members. The committee will be advised by a representative of the Attorney General's Division at the University.



UNDERGRADUATE ADMISSION

The University of Washington maintains a policy of equal educational opportunity for applicants, regardless of race, sex, creed, or ethnic origin.

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

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.

For the 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. 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 nontraditional grading systems may be required to take examinations or to provide other supplementary information for the determination of admissibility. Transfer students must present the minimum 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.

Initial Assignment to a College, School, and Major

An admitted student is assigned to one of the University's colleges or schools, even though he or she may not yet be prepared to choose an academic major. Students who are undecided begin their study as premajors in the College of Arts and Sciences. If a student wishes to pursue a professional program in architecture, business administration, dental hygiene, dentistry, education, landscape architecture, law, medical technology, medicine, occupational therapy, pharmacy, physical therapy, prosthetics and orthotics, social welfare, or urban planning, he or she usually begins study as a premajor to complete preliminary work in one of the preprofessional programs offered within the College of Arts and Sciences. Students who have a specific major in mind may declare the major directly upon entering the University, unless the department they wish to enter requires that certain admission criteria be met. If such is the

case, the student enters as a premajor. There is no commitment on the part of the University to accommodate students into a specific academic program after accepting them as premajors into the College of Arts and Sciences. Transfer from premajor status to a specific degree program is not automatic. 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.

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 requirement 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. Deficiencies in foreign language and laboratory science may be removed by completion of 10 quarter credits in one foreign language and 5 quarter credits in a natural science with credit at the collegiate level. All deficiencies must be removed prior to the applicant's enrollment in the University. Moreover, the academic record must show an overall college grade-point average of at least 2.00 for residents. Nonresidents are normally required to present records of significantly higher quality. Transfer applicants with fewer than 45 quarter credits must meet freshman admission requirements in order to qualify for admission to the University.

In certain colleges, preference is given to academically qualified transfer applicants who have achieved certain credit levels before transferring to the University. Such

practices are described in the Programs of Study section of this catalog. 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.

Applicants should be aware that the University's transfer admission policies are under review and some changes may be introduced in 1976. It is advisable for those who are seriously considering transferring to the University to consult the Office of Admissions regarding possible changes in transfer admission policies, or the advising office of the school or college concerned for possible changes in credit-level requirements.

Allowance of Transfer Credits

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.

Credits earned at institutions accredited only for two-year programs may be applied to the first 90 credits accumulated. Once an accumulated total of 90 credits (acceptable to the University of Washington) has been reached at two-year and/or four-year institutions, then no further credits earned at a two-year institution and transferred to the University may be counted toward the 180 credits required for a baccalaureate degree. However, all appropriate courses completed may be used to satisfy prerequisite and distribution requirements.

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

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

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



Credit acquired through procedures described in the preceding two paragraphs is included in the 90 maximum extension credits allowed toward the baccalaureate degree.

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

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

Appeal of Admission Decisions

Applicants who are dissatisfied with the original admission 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

Applications must be received by the following closing dates:

Autumn Quarter	
Freshmen (from high school)	May 1
Transfers, fifth-year, and nonmatriculated	July 1
Winter Quarter	November 1
Spring Quarter	February 1
Summer Quarter	May 15

Application forms, obtained from the Office of Admissions, should be returned as soon as possible, because quarterly quotas may be filled prior to closing dates.

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

Admission of Nonresident Students

Because the University of Washington is a state institution, students who are not residents of the state of Washington are normally expected to present better academic credentials than those required of residents. Nonresident students also pay higher tuition and fees than residents. Refer to the Rules and Procedures section of this catalog for specific information on tuition and fees.

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

Admission of Undergraduate Students From Abroad

The University of Washington believes 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.

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 Admissions and must be accepted by one of the undergraduate colleges. A resident of Washington is 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 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 graduate students and, therefore, are not 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.

Admission to Nonmatriculated Standing

The nonmatriculated status is a special classification that accommodates students who do not wish to pursue a program leading toward a degree or teaching credential at the University. It includes: students currently enrolled in another university or college who wish to have undergraduate course credits transferred to the school from which they expect to receive a degree; currently employed teachers and school administrators who wish to enroll in undergraduate courses with no degree or certificate as an objective; and postbaccalaureate students who may not desire formal admission to the Graduate School. Nonmatriculated students are permitted to enroll for credit to the extent space and facilities are available.

If the nonmatriculated student is later admitted as a matriculated undergraduate, the scholastic standing achieved and appropriate credits earned in the nonmatriculated status will apply toward the requirements for the baccalaureate degree. However, the student must subsequently complete at least 45 credits in matriculated status to qualify for a degree.

Admission of Auditors

An individual who wishes only to audit courses should apply through the Office of 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. No record of audited courses is kept.

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

Admission Procedure

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 Admissions, 320 Schmitz, PC-30, 1400 Northeast Campus Parkway, Seattle, Washington 98195.

High School Applicants

Tentative admission decisions are 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 for their high school record. 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.

Transfer Applicants

Applicants for transfer from other colleges should file an application, high school transcripts, and preliminary college transcripts no later than the beginning of their final term in the school in which they are currently enrolled. Complete credentials must be filed prior to the application closing dates indicated earlier in this section.

Notification of Admission Status

Each applicant is notified officially of his or her admission status after credentials have been reviewed. A student accepts the offer of admission by returning a confirmation card and paying an enrollment service fee of \$50 (applicable toward tuition). Upon receipt of the \$50, the University sends instructions regarding registration and a registration appointment date.

The University assumes no responsibility for a student who comes to the campus before he or she has received an official appointment for registration.

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.

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.

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 Admissions of a continued interest in attending the University or of enrollment in independent study programs.

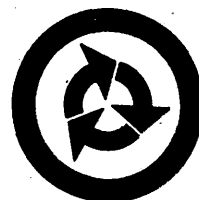
Credentials submitted to the Office of Admissions become the property of the University and may not be returned to the student or duplicated for any purpose.

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 Admissions, 320 Schmitz, PC-30, 1400 Northeast Campus Parkway, Seattle, Washington 98195.

Placement Tests

Information about mathematics, chemistry, or foreign-language placement tests for students who wish to continue their study of these subjects in college is mailed with registration information.



GRADUATE STUDY THE GRADUATE SCHOOL AND RESEARCH

Officers of the Graduate School

Morgan D. Thomas, Ph.D.
Acting Dean

Patricia Keller, Ph.D.
Associate Dean

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

Herman McKinney, M.S.W.
Assistant Dean

Marcella D. Woods, Ph.D.
Assistant Dean

James D. Linse, B.A.
Administrator

Executive Committee of the Graduate School

Morgan D. Thomas, *Chairman*

N. Heer, *Group I*

R. Lorenzen, *Group II*

N. Andersen, *Group III*

A. Bestor, *Group IV*

C. Burgess, *Group V*

A. Kobayashi, *Group VI*

D. Lagunoff, *Group VII*

L. Mansfield, *Group VIII*

Graduate Faculty Council and Group Operating Committees

(The combined membership of the eight Group Operating Committees comprises the Graduate Faculty Council—Morgan D. Thomas, Chairman.)

Group I

H. Ammerlahn, J. Augerot, C. Edmonson, N. Heer
(Chairman), J. D. McCracken

Group II

B. Baskerville, W. Bergsma, J. Erickson, R. Lorenzen
(Chairman)

Group III

N. H. Andersen (Chairman), D. Bevan, E. Fortson, P. Hodge, J. Rothberg

Group IV

W. Ames, A. Bestor (Chairman), W. Fowler, M. Kroll, J. Watson

Group V

C. Burgess (Chairman), W. T. Burke, R. H. Scott, G. Sundem, J. F. Truitt

Group VI

R. I. Gara, B. Hartz, A. Kobayashi (Chairman), D. A. Russell, W. Scott

Group VII

C. Evans, P. Fiegl, D. R. Morris, D. Lagunoff (Chairman), E. Smuckler

Group VIII

K. Fox, N. Gottlieb, L. Mansfield (Chairwoman), W. L. Nelson, M. Robinovitch

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 eighty-four 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 fifteen hundred senior professors. About seven thousand graduate students are now in residence, seeking their master's or doctoral degrees in the Graduate School. 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 tutorial-type 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 research paper, master's thesis, or a doctoral dissertation. A master's thesis is a modest contribution to knowledge, or a review or a report on 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 eighty-four 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, certain graduate degree programs. The statements are simply illustrative of arrangements relating to admission into, and completion of, graduate degree programs; they must be verified by the graduate program adviser and the 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 graduate 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. Courses numbered 498 and/or entitled Special Topics or Special Projects normally are not applicable to graduate programs if these are addressed primarily to introductory content and undergraduate students. Undergraduate research (499) is not accepted as part of the graduate program.

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

Courses numbered 500 and above that are followed by a "P" are not graduate courses, but are for professional students in the School of Medicine.

Grading Practices for Graduate Students

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

for consistency in reporting of grades for graduate students the following procedures should be used:

1. Grades shall be entered as numbers only, the possible values being 4.0, 3.9 . . . and so on, decreasing by one-tenth until 0.7 is reached. Numbers below 0.7 shall not be assigned as grades, except the number 0.0.

Correspondence between number grades and letter grades is as follows:

Letter Grade	Numeric Grade-Point Equivalent
A	4.0
A-	3.7
B+	3.3
B	3.0
B-	2.7
C+	2.3
C	2.0
C-	1.7
D+	1.3
D	1.0
D-	0.7
E	0.0

2. The following letter grades also may be used in accordance with the policies listed herein: *I*, incomplete; *N*, satisfactory without grade; *W*, official withdrawal; *S/NS*, satisfactory/not satisfactory; *CR/NC*, credit/no credit.

a. An instructor may assign the grades of *I*, *N*, *CR*, or *NC* when consistent with the policies of the faculty in the instructor's academic unit. b. The grades of *S*, *NS*, and *W* will be assigned only by the Registrar's Office.

3. a. The grade *I* may be given only in case the student has been in attendance and has done satisfactory work to within two weeks of the end of the quarter and has furnished proof satisfactory to the instructor that he or she cannot complete the work because of illness or other circumstances beyond his or her control. A written statement of the reason for the giving of the Incomplete, listing the work which the student will need to do to remove it, must be filed by the instructor with the head of the department or the Dean of the college in which the course is given.

b. In order to obtain credit for the course, a student must convert an Incomplete into a passing grade by the last day of the next quarter in residence, except that this time limit may be extended by filing with the Registrar a petition, approved by the instructor or the Dean of the college in which the course is offered, indicating that removal cannot be achieved without the extension. In no case can an Incomplete be converted into a passing grade after a lapse of two years or more.

4. The grade *N* may be given for students enrolled from quarter to quarter in hyphenated courses and courses numbered 600 (Independent Study and Research), 700 (Thesis), and 800 (Dissertation). An *N* grade indicates that satisfactory progress is being made, but evaluation depends on completion of the research, thesis, or dissertation, at which time the instructor or Supervisory Committee chairperson should change the *N* grade or grades to one or more appropriate to the final evaluation (normally *CR/NC*).

5. The grade *W*. a. Students withdrawing officially from a course during the first two weeks of a quarter shall have no entry on their permanent academic record. The grade *W* shall be recorded by the Registrar's Office after the first two weeks of a quarter in accordance with withdrawal policy for graduate students (see Withdrawal Policy).

b. Students unofficially withdrawing from a course shall be given a grade of 0.0:

c. The grade *W* shall count neither as completed credits nor in computation of grade-point averages.

6. The grade *S/NS*. A graduate student, with the approval of the graduate program adviser or supervisory committee chairperson, may elect to be graded *S/NS* in any numerically graded courses for which he or she is eligible. If a student does not so elect, then he or she will be graded on a numerical 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 be later converted to number grades (or *vice versa*). The instructor will submit a conventional numerical grade to the Registrar, who will convert grades of 2.7 and above to *S* and numbers lower than 2.7 to *NS* for graduate students in graduate or undergraduate courses.

7. The grade *CR/NC*. With the approval of the faculty in the academic unit, any course may be designated for grading on the *CR/NC* basis by notice in the appropriate *Time Schedule*. For such courses, the instructor will submit a grade of *CR* or *NC* to be recorded by the Registrar for each student in the class at the end of the quarter.

8. Of the minimum credits required for a graduate degree, a graduate student must show numerical grades in at least 18 quarter hours of course work taken at the University of Washington. These numerical grades may be earned in 300-400-, and 500-level courses.

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

10. 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 chairperson.

Withdrawal Policy

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

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

3. No official withdrawal will be permitted after the seventh week of the quarter except as follows: A student may petition the Registrar in writing to drop a course. The Registrar shall grant such a petition if in his or her judgment (a) the student is unable to complete the course in question due to a severe mental or physical disability, or (b) unusual and extenuating circumstances beyond the student's control have arisen that prevented him or her from dropping by the end of the seventh week. Petitions must be filed promptly after the occurrence of the event that gave rise to the need for dropping.

4. The drop dates listed above apply to quarters of the regular academic year. Comparable dates for Summer Quarter will be established by the Dean of Summer Quarter.

5. Drops from a course accomplished by another method are not official and will result in the grade of 0.0 for the course.

Scholarship

To be eligible for a degree in the Graduate School, a student must have an average of 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 800, with the grades earned, are listed. However, *grade points* are *not* extended for 100- and 200-level courses or for 600-, 700-, and 800-level courses. Such courses are *not* included in quarter or cumulative grade-point averages. In computing a student's grade-point average, numerical system grades are considered for 300-, 400-, and 500-level courses only.

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, for graduate programs in that unit have identified certain 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 these languages is to be required. Thus, the additional language competence requirement for graduate students at the University of Washington is that established by the Graduate Faculty in the unit offering the graduate program. The details of this requirement are transmitted to the Dean of the Graduate School.



Graduate Degree Programs Offered and Names of Graduate Program Advisers

Field	Graduate Degrees	Graduate Program Adviser	Alternate Graduate Program Adviser
Aeronautics and Astronautics	M.S.A.&A., M.A.&A., Ph.D.	D. Russell	R. Bolland
Anthropology	M.A., Ph.D.	C. Eastman	R. Dunnell
Architecture	M.Arch.	W. Wherette	C. Kelley
Art	M.F.A., M.A.T.	C. Hafermehl	F. Anderson
Art History	M.A., Ph.D.	M. Rogers	H. Opperman
Asian Languages and Literature	M.A., Ph.D.	J. Norman	R. Miller
Astronomy	M.S., Ph.D.	K. Bohm	G. Wallerstein
Atmospheric Sciences	M.S., Ph.D.	R. Fleagle	J. Holton
Biochemistry	M.S., Ph.D.	E. Young	K. Walsh
Biological Structure	M.S., Ph.D.	M. Nameroff	P. Coates
Biology	M.A.T.	I. Olsen	R. Olstad
Biostatistics	M.S., Ph.D.	R. Kronmal	B. Jayne
Biomedical History	M.A.	C. Bodemer	J. Whorton
Botany	M.S., Ph.D.	E. Haskins	W. Halperin
Business Administration	M.A., M.B.A., Ph.D.	W. French	R. May
Ceramic Engineering	M.S.Cer.E., Ph.D.	R. Campbell	W. Scott
Chemical Engineering	M.S.Ch.E., Ph.D.	R. Moulton	C. Seicher
Chemistry	M.S., M.A.T., Ph.D., D.A.	D. Eggers	A. Fairhall
Civil Engineering	M.S., M.S.C.E., M.S.E., Ph.D.	H. Mittet	R. Sylvester
Classics	M.A., Ph.D.	W. Grummel	C. Edmonson
Communications	M.A., M.C., Ph.D.	K. Stamm	J. Bowes
Comparative Literature	M.A., Ph.D.	C. Christofides	W. Konick
Computer Science	M.S., Ph.D.	D. Dekker	H. Golde
Dentistry	M.S.Den.	S. Schluger	A. Moore
Drama	M.A.	R. Lorenzen	J. Crider
Drama Arts	Ph.D.	R. Lorenzen	J. Wolcott
East Asian Studies	M.A.	H. Chan	K. Yamamura
Economics	M.A., Ph.D.	G. Brown	E. Silberberg
Education	M.Ed., Ed.D., Ph.D.	R. Olstad	F. Gilles
Electrical Engineering	M.S.E.E., Ph.D.	E. Noges	D. Dow
English	M.A., M.A.T., Ph.D.	T. Lockwood	D. McCracken
Epidemiology and International Health	Ph.D.	J. Fox	H. Foy
Fisheries	M.S., Ph.D.	G. Pigott	D. McCaughan
Forest Resources	M.S., M.F.R., Ph.D.	S. Gessel	D. Thomas
Genetics	M.S., Ph.D.	A. Doermann	H. Roman
Geography	M.A., Ph.D.	J. Velikonja	R. Morrill
Geological Sciences	M.S., Ph.D.	R. Gresens	J. Rensberger
Geophysics	M.S., Ph.D.	C. Raymond	J. Booker
Germanics	M.A., Ph.D., D.A.	S. McLean	H. Rabura
Health Services Administration and Planning	M. Health Admin.	W. Dowling	A. Blackman
History	M.A., Ph.D.	D. Pinkney	L. Saum
Home Economics	M.A., M.S.	M. Johnson	B. Worthington
Inter-Engineering	M.S.E.	K. Garlid	R. Clark
Law	LL.M., Ph.D.	J. Huston	W. Burke
Librarianship	M.Lib., M.LawLibr.	P. Hiatt	M. Benne
Linguistics	M.A., Ph.D.	S. Saporta	M. Brame
Mathematics	M.A., M.S., M.S.Math.Stat., M.A.T., Ph.D.	C. Cujel	T. Hungerford
Mechanical Engineering	M.S.M.E., M.S.E., Ph.D.	A. Kobayashi	D. McFeron
Metallurgical Engineering	M.S.Met.E., Ph.D.	R. Campbell	T. Archbold
Microbiology and Immunology	M.S., Ph.D.	H. Douglas	E. Nester
Mining, Metallurgical, and Ceramic Engineering	M.S.	R. Campbell	T. Archbold
Music	M.A., M.A.T., M.M., D.M.A., Ph.D.	J. Beale	J. Moore
Near Eastern Languages and Literature	M.A.	N. Heer	F. Ziaeh
Nuclear Engineering	M.S.N.E., Ph.D.	A. Babb	K. Garlid
Nursing	M.A., M.N.	E. Brandt	D. Crowley
Oceanography	M.S., Ph.D.	R. Carpenter	W. Crimiale
Oral Biology	M.S., Ph.D.	I. Siegel	M. Rabinovitch
Pathology	M.S., Ph.D.	E. Benditt	D. Lagunoff
Pharmaceutical Sciences	M.S., Ph.D.	J. Orr	L. Brady
Pharmacology	M.S., Ph.D.	M. Juchau	A. Horita
Pharmacy Practice	M.S.	J. Orr	W. Campbell
Philosophy	M.A., Ph.D.	K. Clatterbaugh	D. Keyt
Physical and Health Education	M.S., M.S.Phys.Ed.	T. Doolittle	B. Mathews
Physics	M.S., Ph.D., D.A.	E. Fortson	I. Halpern
Physiology and Biophysics	M.S., Ph.D.	T. Kennedy	H. Patton
Physiology Psychology	Ph.D.	M. Smith	D. Hitchner
Political Science	M.A., Ph.D.	S. Scheingold	
Psychology	M.S., Ph.D.	M. Perry	
Public Affairs	M.P.A.	M. Wolters	B. Denny
Public Health and Community Medicine	M.S.P.H., M.P.H.	J. Gale	B. Gilson
Radiological Sciences	M.S.Rad.Sci.	K. Jackson	G. Christensen
Rehabilitation Medicine	M.S., M.O.T., M.P.T.	J. Lehmann	W. Stolov
Romance Languages and Literature	M.A., Ph.D.	A. Pace	M. Predmore
Russian and East European Studies	M.A.	P. Sugar	J. Augerot
Scandinavian Languages and Literature	M.A., Ph.D.	B. Steene	H. Sehmsdorf
Slavic Languages and Literature	Ph.D.	W. Konick	J. Augerot
Social Welfare	Ph.D.	S. Briar	N. Gottlieb
Social Work	M.S.W.	C. Takagi	C. Macdonald
Sociology	M.A., Ph.D.	D. Schmitt	R. Emerson
South Asian Studies	M.A.	K. Potter	F. Conlon
Special Individual Ph.D. Program	Ph.D.	M. Thomas	
Speech and Hearing Sciences	M.S., M.Sp.Path.&Aud., Ph.D.	D. Bennett	P. Yantis
Speech Communication	M.A., Ph.D.	B. Baskerville	T. Nilsen
Urban Planning	M.U.P., Ph.D.	D. Miller	R. Shinn
Zoology	M.S., Ph.D.	R. Snyder	D. Farner

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 standardized examinations in French, German, and Spanish. Students are urged to acquire and use foreign-language competence as undergraduates or as early as possible in their graduate careers. *The examination may be written and passed by undergraduates who are urged to establish foreign-language competence before entering the Graduate School.*

Examinations in languages other than French, German, and Spanish are given at the University of Washington.

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

Final Quarter Registration

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

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 by completing a petition for on-leave status, which must be 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. On-leave quarters are counted in the accumulation toward degree time limits.

Registration in Absentia

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

Readmission

A student previously registered in the Graduate School who has failed to maintain continuous enrollment but who wishes later to resume his or her studies must file an application for admission to the Graduate School by the regularly published closing dates in person or by mail. If the student is admitted, 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 admission carries no preference and is treated in the same manner as an application for initial admission, including the requirement of payment of the application fee of \$10.

Graduate Student Level Classifications

The following system classifies graduate students and post-doctoral appointees by levels relative to their advancement toward, or completion of, graduate degrees:

Category Number	Title	Description
1	Premaster	Admitted to the Graduate School, but not yet having completed course and research work required for a master's degree in the subject field, or the equivalent of such work.
2	Post-master	Completed the master's degree or the equivalent, but not yet having had a doctoral Supervisory Committee appointed. When a 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.
3	Precandidate	Having had a doctoral Supervisory Committee appointed and thus having been admitted into the doctoral program but not yet having completed the Graduate School General Examination.
4	Candidate	Completed the Graduate School General Examination, and thereby admitted as a Candidate but not yet having completed work for a doctoral degree.
5	Postdoctoral Appointee	Having completed a doctoral degree and being now engaged in research or scholarly work in residence at the University, but being neither an enrolled student nor a member of the faculty.

When a graduate student is first admitted to the Graduate School, he or she is placed by actions in the Graduate

Admissions Office, in the classification appropriate in recognition of the highest academic degree which the admittee then holds in the field in which he or she proposes to do graduate work at the University of Washington. When a graduate student officially completes the master's degree, or has a doctoral Supervisory Committee appointed, or completes the General Examinations, his or her classification is changed appropriately by actions in the offices of the Graduate School and the Registrar.

Master's Degree

Summary of Graduate School Requirements

Each aspirant of the master's degree must meet the following Graduate School requirements:

1. Under a thesis program, a minimum of 36 or more quarter credits (27 course credits and ordinarily at least 9 credits of thesis) must be presented. Under a nonthesis program a minimum of 36 or more quarter credits of course work are required.
2. At least 18 of the minimum 36 quarter credits for the master's degree must be for work numbered 500 or above. (In a thesis program, 9 of the 18 must be course credits and 9 may be for 700, Master's Thesis.)
3. Numerical grades must be received in at least 18 quarter credits of course work taken at the University of Washington. Numerical grades may be earned in 300-, 400-, and 500-level courses only. A minimum grade-point average of 3.00 is required.
4. A minimum of three full-time quarters of residence credit must be earned. Part-time quarters may be accumulated to meet this requirement (see detailed information under Residence).
5. A certificate or, where applicable, departmental verification of proficiency in a foreign language, if one is required for a particular degree.
6. In a thesis degree program, a thesis, approved by the Supervisory Committee, must be prepared, unless specifically excepted in a particular program. A student must register for thesis (700).
7. A final master's examination, either oral or written, as determined by the student's supervisory committee, must be passed.
8. Any additional requirements imposed by the graduate program adviser in the student's major department or by the student's supervisory committee must be satisfied.

A master's 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 field.

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 tenure 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 graduate quarter credits taken while a graduate student in another recognized Graduate School to be applied toward the master's degree here. Normally, twenty-five percent of the minimum degree requirements may be transferred. The petition must be accompanied by a written recommendation from the graduate program adviser.

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

If approved, 6 quarter credits of University of Washington extension credit or a combination of transfer and extension credits not exceeding twenty-five percent of the minimum degree quarter credit requirements may be applied to the master's degree. Neither the minimum residence requirement of three quarters at the University of Washington nor the 18 quarter credits of numerically graded course work may be reduced by transfer or extension credit.

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

Thesis

The master's thesis should be evidence of the graduate student's ability to carry out independent investigation and to present the results in clear and systematic form. Two copies of the thesis, normally written in the English language, along with forms signed by the members of the supervisory committee from the major department, must be deposited in the Graduate School 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.

Final Examination for Master's Degree

As soon as is appropriate, but not later than the time that the student's application for the degree has been approved, the faculty in the student's major department appoints a supervisory committee, ordinarily consisting of two or three members but not more than four. The committee 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.

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 Degree 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 (for information see College of Education, Graduate Programs).

Candidate's Certificate

The candidate's certificate gives formal recognition of the successful completion of a very significant step toward the doctoral degrees awarded through the Graduate School: Doctor of Philosophy, Doctor of Arts, Doctor of Education, and Doctor of Musical Arts.

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

When an aspirant for the doctoral degree has been admitted officially to candidacy as described in a later section under the heading Admission to Candidacy for the 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 present capacities and future promise for scholarly work.

Summary of Requirements

In order to qualify for the doctoral degree, the student must meet the following Graduate School *minimum* requirements:

1. Completion of a program of study and research as planned by the graduate program adviser in the student's major department or college and the Supervisory Committee. Half of the total program, including the dissertation, must be credits in courses numbered 500 and above.

Every student is expected to take some work outside the major field, and the Supervisory Committee determines the requirements for 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 is completed prior to the General Examination.* Residence requirement for the doctoral degree cannot be met solely by part-time study.

3. Numerical grades averaging not less than 3.00 must be received in at least 18 credits of course work *taken at the University of Washington.* Numerical grades may be earned in 300-, 400-, and 500-level courses only. Satisfactory progress in courses in the major field requires that a grade of 2.7 or above be achieved.

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 chairperson for information and advice about the foreign-language competence required for his or her program.

5. Creditable passage of the General Examination.

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 a defense of the dissertation and the field with which it is concerned.

8. Completion of all work for the doctoral degree within ten years. This includes applicable work from the master's degree 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.

er'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, provides 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 completed the master's degree or identifiable equivalent work, or who already has been admitted to the Graduate School at the University of Washington and has completed at least three quarters of full-time work at the University and who takes the initiative carefully to 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.

Appointment of Doctoral Supervisory Committee

Appointment of the *Supervisory Committee* signifies that it is the conclusion of the faculty in the graduate student's field of study that the student's academic background, in terms of preparation and achievement, is such as to suggest

a reasonable expectation that the student will complete successfully the requirements for the chosen doctoral program. "Preliminary" examinations required by departments and other graduate units authorized to award doctorates should then be completed prior to the request for appointment of the Supervisory Committee. If "preliminary" examinations are not a department or graduate unit's requirement, it is appropriate for the graduate program adviser to request appointment of the Supervisory Committee during the student's first year of study (see revised Graduate School Memorandum No. 13 for appointment procedures).

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 chairperson of the Supervisory Committee may present to the Dean of the Graduate School, for approval, a warrant permitting the student to take the General Examination for admission to candidacy for the doctoral degree. This means that, in the opinion of the committee, the student's background of study and preparation is sufficient to justify the undertaking of the examination. The warrant 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. During the oral examination, a majority of the examining committee in the precandidate's discipline, as well as a Graduate Faculty representative, must be present.

If the student's performance in the General Examination is judged by the Supervisory Committee to be satisfactory, a warrant certifying the successful completion of the General Examination is filed in the Graduate School office by the chairperson 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 engages in completion of research, writing the dissertation, and preparation for the Final Examination.

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

Dissertation and Final Examination

The Candidate must present a dissertation demonstrating original and independent investigation and achievement. The dissertation, 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 warrant and returns it to the Graduate School at least two weeks before the end of the quarter in which the degree is to be conferred. If the examination is unsatisfactory, the Supervisory Committee may recommend that the Dean of the Graduate School permit a second examination after a period of additional study.

Publication of Doctoral Dissertations

Doctoral dissertations are published in full on microfilm and/or the abstract may be published in "Dissertation Abstracts." Two weeks before the end of the quarter in which the degree is to be conferred, the Candidate must present two copies of his or her dissertation at the Graduate School 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 \$30 publication charge must be shown when the dissertation is presented.

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

ADMISSION POLICIES

Regular Graduate Student Status

In general, properly qualified students who are graduates of the University of Washington or of other colleges 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 managed enrollment, and registration is contingent on available space and facilities.

Recognizing its special role in the training of teachers and professors for the future as well as professional practitioners, the Graduate School is committed to increasing the enrollment and retention of increased numbers of members of ethnic minority groups and women as graduate students. Some funds are being advanced to carry forward this significant activity in the form of recruiting efforts and financial aid to enrolled graduate students. The Graduate

School maintains an Office for the Recruitment of Minority Graduate and Professional Students, which provides special educational support services for minority students. An associate dean of the Graduate School is involved in the special problems of recruiting and retention of women graduate students.

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 the 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 was less than *B* or 3.00 or undergraduate preparation was 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 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. Only the Dean of the Graduate School may alter the academic 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 the 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. The student 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 the applicant's status on a special form entitled Visiting Graduate Student—Certificate of Status, which may be obtained by writing to the University of Washington; 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 registration will terminate at the end of the single quarter or the single summer session for which the student 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 begins work toward a degree at the University of Washington, he or she may petition the Dean of the Graduate School for allowance of credit for courses taken as a Visiting Graduate Student to be applicable toward the graduate program.

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

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

Regular Graduate 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: July 1 for Au-

turn Quarter, November 1 for Winter Quarter, February 1 for Spring Quarter, May 15 for Summer Quarter (these dates are subject to change by the University). Early application is advised, because some departmental targets are filled well in advance of these dates.

The foregoing dates apply to new students as well as to former students of the University who have not attended since receiving their baccalaureate degrees. A former student must apply as a new student for admission to the Graduate School or for admission to an undergraduate college as a 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 offi-



cial 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.

International 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: July 1 for Autumn Quarter, November 1 for Winter Quarter, February 1 for Spring Quarter, May 15 for Summer Quarter.

Second Bachelor's Degree or Standard Teaching Certificate

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

REGISTRATION PROCEDURES

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).

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

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

Advising

After notification of admission and before registration, the student should confer with the departmental graduate program adviser about the program for 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 chairperson 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 without special permission from the Dean of the Graduate School.

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.

International student scholarships are awarded by the University of Washington each academic year to seventy-five 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 and the need for such assistance. These scholarships cover tuition only and are administered by the Foreign Exchange Tuition Scholarship Committee, International Services Office, University of Washington.

Graduate Student Service Appointment

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. Succeeding 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 on page 55 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 some carry such fringe benefits as vacations, sick leave, and opportunities to enroll in University courses. In addition, nonresident graduate students may receive waiver of the nonresident portion of fees if their spouses are full-time employees of the University. Inquiries may be directed to the Staff Employment Office, 1415 Northeast Forty-fifth Street, Seattle.

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

Two special categories for teaching appointments and one for research appointments are provided above the predoctoral associate level: predoctoral instructor, for the graduate student who has achieved Candidate status and is ready for increased teaching responsibility; predoctoral lecturer, for a mature and competent graduate student who, though he or she need not be a Candidate, has had exceptional previous teaching or other professional experience; and predoctoral researcher, for the student who has special skills or qualities obtained outside of his or her experience as a graduate student or who carries major responsibilities in relation to research activities. For the 1975-76 academic year these appointments carry a minimum stipend of \$502 per month (half time) with no designated maximum so that the stipend may be adjusted to a level appropriate to the appointee's experience and his or her teaching and research responsibilities.

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

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

Spouses of graduate students who hold assistantship or associateship appointments as herein described, and 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 except Summer Quarter, a minimum of 9 credits in formal courses or in research, thesis, or dissertation work. These credits must be in courses that are applicable toward an advanced degree.

Under 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, 1976, for the 1976-77 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, or other Spanish 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. Each application must be accompanied by a letter of support from the department Chairperson or the graduate program adviser.

Direct financial assistance from individual departments also may be available, and the prospective student should apply directly to the Chairperson 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.

1975-76 GRADUATE STUDENT SERVICE APPOINTMENTS (Students holding these appointments pay resident tuition and fees.)

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

<i>Title of Appointment</i>	<i>One Month</i>	<i>Academic Year</i>	
Teaching Assistant	\$ 491	4,419	Premaster*
Research Assistant	445	4,005	Post-master*
Graduate Staff Assistant	491	4,419	Precandidate* or Candidate*
Predoctoral Teaching Associate I	522	4,698	Post-master Precandidate or Candidate
Predoctoral Research Associate I	471	4,239	
Predoctoral Staff Associate I	522	4,698	
Predoctoral Teaching Associate II	553	4,977	Candidate
Predoctoral Research Associate II	502	4,518	
Predoctoral Staff Associate II	553	4,977	

**Premaster:* Admitted to the Graduate School, but not yet having completed course and research work required for a master's degree in the subject field, or the equivalent of such work. *Post-master:* Completed the master's degree or equivalent, but not yet having a doctoral Supervisory Committee appointed. *Precandidate:* Having had a doctoral Supervisory Committee appointed and thus having been admitted into the doctoral program but not yet having completed the General Examination and thereby being identified as a Candidate for the doctoral degree. *Candidate:* Admitted as a Candidate, but not yet having completed a 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 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 1960* 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 Policy† 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." These statements withstand the passage of time.

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 fields of learning uniformly, the emphases 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 Jessie and 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 Jessie and John Danz Fund should be addressed to the

**Scientific Progress, the Universities and the Federal Government*, statement by the President's Science Advisory Committee, November 15, 1960, U.S. Government Printing Office, Washington, D.C.

† *Federal Support of Basic Research in Institutions of Higher Learning*, NAS Study, March, 1964, Printing and Publishing Office, National Academy of Sciences, Washington, D.C.



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 throughout the University. These are listed below, with some of them being described in greater detail.

Alcoholism and Drug Abuse Institute

3937 Fifteenth Avenue Northeast

The institute's main functions are to carry out original research in the alcoholism and drug-abuse areas, 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, proximity to the city and the University, and varied microenvironments make it an ideal tool for research in many disciplines, including urban forestry, ornamental horticulture, environmental studies, plant genetics, and systematics.

Center for Research in Oral Biology

B530 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 interdisciplinary 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. Research and training programs are closely related to the programs of the state departments of Public Instruc-

tion 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.

Office of Academic Computing Services

Robert G. Gillespie, B.A., Director

The Office of Academic Computing Services is responsible for the overall direction of computing services on campus. The campus computing resources include many specialized computers used in research projects as well as the facilities for remote job entry and the Academic Computer Center.

Academic Computer Center

Wayne O'Brien, 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 73. 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 via 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.

Computer Science Laboratory

Jean-Loup Baer, Ph.D., Director

127 Sieg

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

The operation of the laboratory is integrated with the graduate training program of the Department of Computer Science 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, several graphics terminals, and a writable control-store minicomputer (see the Interschool or Intercollege Programs section of this catalog for descriptions of undergraduate and graduate programs).

Developmental Psychology Laboratory

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

Graduate training in general developmental psychology is provided by this laboratory. A primary emphasis is research concerned with the identification and nurturance of exceptionally gifted children.

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 exploration, development, and use of the resources of the seas and oceans. Interdisciplinary in nature, the division is concerned with the development and use of physical, chemical, geological, and biological resources of the marine environment. It coordinates and supplements the research and development efforts and provides the advisory service programs in marine science and engineering. It cooperates in similar activities with outside agencies and institutions, coordinating the University's response to problems in marine commerce and engineering and the economic, legal, biomedical and sociological problems that arise out of the management and utilization of marine resources.

The University is a Sea Grant College. The division is responsible for the coordination and administration of the interdisciplinary Sea Grant Program, which includes research, education, and advisory services. It also administers interdisciplinary research efforts in the Arctic, including the interinstitutional Arctic Ice Dynamics Joint Experiment.

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.

Fisheries Research Institute

Robert L. Burgner, Ph.D., Director
Roy E. Nakatani, Ph.D., Associate 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, administered by the Vice President for Research, is the principal marine science field station of the University of Washington. The faculty 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 seawaters 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 tideways. The waters about the San Juan Archipelago abound in varied marine flora and fauna.

During spring, summer, and autumn, 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

Richard Grove, Director
Julie Anderson, Publicity Director
Fred Dunagan, 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 Registry of Northwest Artists, the Index of Art in the Pacific Northwest, and other research programs.

Institute for Environmental Studies

Robert O. Sylvester, S.M., Director
201 Engineering Annex

The institute is a University-wide educational unit for inter-college-interdisciplinary program development in teaching in environmental studies at the undergraduate and grad-



uate 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 interdisciplinary research teams for specific projects.

To facilitate interdisciplinary research and the development of proposals on a particular topic, the institute appoints faculty groups called "Interdisciplinary Academic and Research Specialty Groups in Environmental Studies," for which logistic support is provided. Mechanisms have been developed to simplify proposal review and to allocate grant funding credit to participating academic units.

Institute for Marine Studies

Donald L. McKernan, B.S., Director
3731 University Way Northeast

The institute is an academic and research unit for multidisciplinary studies of contemporary problems and conflicts arising from increased ocean uses and exploitation of marine resources. Emphasis is on the development and evaluation of alternative solutions to policy and management issues at the international, national and local levels.

The objective of the institute is to provide students from a variety of educational backgrounds, in one or more of the disciplines in the social, technological, and social sciences, with a broad and comprehensive understanding of the field of marine affairs so that they can perform effectively as professionals and as scholars.

The faculty of the institute offers a number of graduate courses. Plans are being developed to grant degrees of Master of Science in Marine Affairs and Doctor of Philosophy.

Institute for Sociological Research

David R. Schmitt, Ph.D., Director
110 Savery

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

Institute of Forest Products

James S. Bethel, D.F., Director
Ian G. Morison, Ph.D., Assistant Director
102 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 state and local 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

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 Energy Research and Development Administration (ERDA), 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, and radiological sciences, and in chemical, ceramic, electrical, mechanical, metallurgical, and nuclear engineering. ERDA-owned laboratory facilities, operated by its various prime contractors, 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. Some 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 ERDA or its contractors and have access to their laboratories. Employment with contractors of ERDA 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 federal and local government agencies and private industry provide student research positions and specialized equipment and facilities for the analyses of radionuclides in biological and environmental samples.

Nuclear Engineering Laboratories

William S. Chalk, M.S., Director
Nuclear Reactor Building

The Nuclear Engineering Laboratories provide facilities for research in nuclear engineering and a variety of other fields, especially those making use of neutron activation analysis. A variety of equipment is available, including a 100kw thermal nuclear reactor, two neutron generators, and extensive nuclear radiation counting and computing apparatus.

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.

Oceanographic Research Vessels

Maurice Rattray, Jr., Ph.D., Chairman
123 Oceanographic Teaching

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

Office of Scholarly Journals

Dolores Field, Director
4045 Brooklyn Avenue Northeast

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; 4045 Brooklyn Avenue Northeast; Seattle, Washington 98195.

Organization for Tropical Studies

Kenneth J. Turnbull, Ph.D., Executive Director
College of Forest Resources
107 Anderson

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 Bibliographic 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

Estella B. Leopold, Ph.D., 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 members 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, General Manager, KUOW
325 Communications

Dr. Richard J. Meyer, General Manager
KCTS/9 Television
4045 Brooklyn Avenue Northeast

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

Regional Primate Research Center

Orville A. Smith, Ph.D., Director
I-421 Health Sciences Center

The Regional Primate Research Center, located in 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 research on nonhuman primates. At the center, one of seven throughout the nation, the emphasis is on neurological sciences, developmental biology, cardiovascular function and disease, endocrinology and metabolism, disease models, and craniofacial structure and function. The center maintains a large breeding facility at Medical Lake, near Spokane. A field research station is located in Kalimantan, Indonesia.

A worldwide bibliographic and information service, the Primate Information Center provides literature-based information on nonhuman primates to scientists throughout the world. It publishes and circulates a weekly list of current primate literature, prepares retrospective bibliographies on request, and compiles normative data on primates.

The research staff at the center includes faculty members from many different disciplines within the University, as well as visiting scientists from other institutions. The center provides research training to graduate students and to post-doctoral fellows.

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

Speech and Hearing Clinic

David Prins, 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, and it provides services to the public.

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 322-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
4045 Brooklyn Avenue Northeast

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 and an import program, the purpose of which is to make known important books in English published abroad. The press also distributes a variety of audiovisual educational materials, most of which grew out of original research on campus. These materials include motion-picture films, film strips, disk recordings, language tapes and videotapes.

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: Director, University of Washington Press; 4045 Brooklyn Avenue Northeast; 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.



CONTINUING EDUCATION

Acting Director

Robert G. Waldo
201 Smith

Because learning is a lifelong activity rather than a terminal process, the University of Washington carries on a 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 Committee on Continuing Education, appointed by the President, and the Health Sciences Center 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.

Continuing Education offers programs that include undergraduate credit and noncredit classes and other educational services of direct interest to students and out-of-school adults.

Division of Community and Organization Development

Director

Daniel W. Shannon
316 Lewis

This division seeks to extend and to apply 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 various community development projects, is to encourage a fuller utilization of citizen resources in the solution of local problems. The division assists citizen groups, local governmental units, and nonprofit organizations in such areas as citizen participation, planning, and leadership development. The division also assists civic bodies or other nonprofit 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. It also works closely with the



office of the State Superintendent of Public Instruction and school districts to coordinate arts in education conferences involving school personnel and community residents.

Title I, Higher Education Act of 1965

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

Additional information concerning the above division may be obtained by telephoning (206) 543-0980.

Division of Evening and Extension Credit Programs

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.

The College of Arts and Sciences, through Continuing Education, offers an opportunity to earn a traditional University baccalaureate degree in the evening in five fields of study. A student may complete a degree program 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 with short-range educational or vocational goals, as well as those who must 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 the equivalent. 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, or by a combination of correspondence and television or other types of media. Anyone of legal age who has a high school diploma or the equivalent is eligible to enroll. Independent study offers the individual an opportunity to obtain education at his or her convenience, with no requirements for classroom attendance. Most courses are prepared by members of the faculty and parallel similarly numbered courses taught in the resi-

dence 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.

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-30; Seattle, Washington 98195, or by telephoning (206) 543-2350.

Lectures and Concerts

Manager

Guy Tucker
M102 Meany

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.

Additional information may be obtained by telephoning (206) 543-4880.

Lake Wilderness Continuing Education Center

Manager

Mildred E. Hammergren
204 Lewis

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

Additional information may be obtained by telephoning (206) 543-5380.

Division of Noncredit Programs

Director

Constance R. Wells
320 Lewis

The division serves adults throughout the state for whom traditional, credit-related programs are either not available or inappropriate. The needs of professionals and the interests of lay persons are addressed through the division's

programs, which are also attended by students, faculty, and staff of the University. All programs are sponsored by academic departments of the University.

Noncredit Studies

Through this office, a quarterly program of lecture series and day and evening noncredit classes is planned and administered. More than five thousand persons are served annually. Lecture-discussion series are designed to survey a topic from a broad, often interdisciplinary, perspective, enlisting the capabilities of University faculty members, visiting scholars, and authorities from related fields. The day and evening classes for adults present University-level material specially adapted to the interests and capabilities of the adult learner, and particularly to his or her greater wealth of experience, regardless of educational background. A limited number of programs also are available for children.

The campus noncredit program is announced each quarter in *Spectrum*, which is available without charge by telephoning (206) 543-2590. Additional information may be obtained by telephoning Noncredit Studies, (206) 543-2140.

Residential Seminars

This office brings the University's resources to alumni, civic leaders, and citizens through weekend seminars held at locations around the state. The purpose is to bring the scholarship of the University to bear on issues of social and cultural importance. Programs are often interdisciplinary and are attended by adults from varying occupations and professions and from varied educational backgrounds.

Additional information may be obtained by telephoning Residential Seminars, (206) 543-5280.

Short Courses and Conferences

Through this office, educational programs are administered for the colleges, schools, departments, and administrative units of the University and for public and private agencies when a University-related program is proposed. The staff provides such assistance as financial planning and management; marketing—including locating client groups, tailoring programs to the needs of clients, and publicizing; on-site arrangements; and program evaluation. The staff handles programs of varying formats and lengths and of a recurring or nonrecurring nature, including professional meetings ranging from those involving local members to full-scale international conferences. Consultative services are also available. Short Courses and Conferences is a self-sustaining unit, dependent on recovery of costs through fees and underwriting from sponsoring departments and agencies.

Additional information may be obtained by telephoning (206) 543-5280 or writing to: University of Washington; Office of Short Courses and Conferences; 327 Lewis, DW-50; Seattle, Washington 98195.

Radio Broadcast Services and KUOW

General Manager

Kenneth K. Kager
325 Communications

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 may be obtained by telephoning (206) 543-2710.

Telecourses

Manager

Betty A. Oldham
326 Lewis

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. Presenting a wide range of topics, a number of televised series are prepared each year by members of the University faculty and are broadcast on the educational station, KCTS-TV, and on commercial stations in Seattle. Videotapes are also released to stations throughout Washington, for broadcast, as well as to stations in other parts of the country. Most series are on video-cassette and are available at the Undergraduate Library media center. Study guides, prepared by the instructors, may be purchased.

Additional information may be obtained by telephoning (206) 543-5381.

Women's Programs

Director

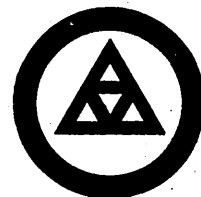
Jeanne C. Rehwinkel
1209 Northeast Forty-first Street

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 telephoning (206) 543-4262 or writing to: University of Washington; Women's Programs; 1209 Northeast Forty-first Street, JB-15; Seattle, Washington 98195.

PROGRAMS OF STUDY





ARCHITECTURE AND URBAN PLANNING

Dean

Lee G. Copeland

Associate Deans

Claudio Arenas

Norman J. Johnston

The College of Architecture and Urban Planning brings together in one unit four departments charged with the education of professionals in the planning, design, and building of the physical environment: Architecture, Building Construction, Landscape Architecture, and Urban Planning. Their programs encompass a wide range of responsibilities that together constitute this complex matter of dealing with contemporary environmental issues. Thus, to the traditional design and technical considerations, our curriculums today add greater dimensions of social, economic, and psychological concerns, which in their own ways influence or provide greater insight toward understanding, preserving, developing, and enriching both our built and 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 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 chapters representing 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 and some fellowship and scholarship support are available for graduate students in architecture and in urban planning. Inquiries should be directed to the respective departments.

Undergraduate Programs

Besides satisfying the usual requirements at the high school level for admission to the University, students who plan to enter the College of Architecture and Urban Planning should have taken a semester of trigonometry. Courses in the humanities, the social sciences, and freehand drawing are strongly recommended as electives.

On entering the University, students enroll in one of its several colleges or schools, whether or not an academic major has been chosen. Students majoring in building construction may 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 43.

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; Albrecht, Alden, Bonsteel, Bosworth, Copeland, Curtis, Dietz (emeritus), Donnette, Heerwagen, Herrman (emeritus), Hildebrand, Jacobson, Jensen (emeritus), Johnston, Kelley, Kolb, Latourell, Lebert, Lewis, Lovett, Minah, Mithun, Nyberg, Onouye, Pundt, Radcliffe, Rohrer, Rosner, Sanders, Sasanoff, Schneider, Seligmann, Skirvin, Small, Sproule, Staub, Steinbrueck, Streissguth, Thiel, Wherrette, Wise, Zarina, Zuberbuhler. R. C. Schneider, 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, 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.

An emerging undergraduate study program will offer concentrations in Theories of Architecture; Behavior and Experience; Values, Behavior and the Built Environment; and Performance Research and Evaluation.

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.

Basic degree requirements include 45 approved professional elective credits, 36 studio credits, and 9 thesis credits, for a total of 90 credits (for holders of a five-year professional degree in architecture the basic requirements are 36 approved professional elective credits and 9 thesis credits, for a total of 45 credits). In addition, entering students must expect to supplement their backgrounds in those pre-professional areas found wanting in the judgment of the graduate program adviser.

Students holding four-year baccalaureate degrees in architecture or environmental design should anticipate a minimum of seven academic quarters for completion of the degree requirements. Those holding five-year professional degrees in architecture should expect to spend about four quarters. Students entering with degrees in fields other than architecture or environmental design, without a professional preparatory background, will generally need at least ten quarters to complete the program.

Students are normally admitted to the graduate program in architecture only in Autumn Quarter, and all application materials should be received by the department no later than the preceding February 15. Notices of admission are given about April 1. The prospective applicant should note that the Graduate Record Examination aptitude scores will

be required as part of his or her application and should plan accordingly.

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 building construction program is concerned with providing education and training that will attract and prepare individuals for senior levels of management or technical positions in the building industry or related businesses or to establish their own business operations. Many areas of activity—development, design, construction, government, and supporting industries—need individuals with technical competence and management skills who have a basic knowledge of, and concern for, architecture and building. To satisfy these diverse educational requirements for the building and associated industries, the building construction curriculum must, in addition to providing for the broader perspectives gained from the humanities and social and natural sciences, offer core courses in three major areas: engineering, technology, and management. The engineering courses are concerned with the theory and utilization of inorganic properties of matter and physical forces for supplying human needs in the form of structures, machines, and manufactured products. Technology deals primarily with the application of scientific knowledge and methods to the fields of construction and building. Developing a perspective for the efficient coordination, utilization, and control of the elements of production in the building process, (i.e., men, materials, methods, machines, and money) is the concern of the management courses.

This unique interdisciplinary combination of engineering, technology, and management is now acknowledged as an essential quality of managers in the complex building industry.

Faculty

Marvin J. Flaherty, Chairman; Bayley, Eberharter, Hopkins, Rivet, Short, Siqueland, Torrence, Varey.

Undergraduate Program

Bachelor of Science in Building Construction Degree

Students admitted to the University may enter the Department of Building Construction directly, to the extent of its enrollment quota, either as freshmen or as transfer students from another unit on campus or from a community or four-year college. Students already at the University who wish to transfer to the department may contact it regarding admission procedures. A Bachelor of Science in Building Construction degree is granted to those students who successfully complete the four-year curriculum of 192 credits. A student must maintain a yearly 2.30 grade-point average in the third and fourth years of the curriculum and a 2.50 grade-point average in all departmental courses.

Core Courses: B CON 301, 310, 330, 331, 332, 401, 402, 410, 420; ARCH 310, 312, 320, 321, 322, 420, 421, 422.

Required Courses: In addition to core courses listed above: MATH 104, 105, 157; PHIL 100; PSYCH 100, CHEM 100 or 101; SOC 110, ACCTG 210, 220, 230; PHYS 114, 115, 116, 117, 118, 119; BG&S 200 or CETC 407; CETC 405; ECON 211 or 200, and 340; Q METH 200, 201; CIVE 366; OPSYS 301; ENGR 161; URB P 400.

Electives: 24 credits in the first two years may be selected with the help of the student's adviser to broaden the student's knowledge and appreciation of our society. 27 credits may be selected in the third and fourth years to complement and strengthen the student's specific area of interest within the field of the major.

LANDSCAPE ARCHITECTURE

348 Gould

The expanded role and opportunities for the landscape architect are directly related to the increasing public concern for 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 analyses, 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, Dawson, Furtado, Gutter, Haag, Jongejan, Lane, Mauck, Nakano, Scheele, Small, Streatfield, Untermann.

Undergraduate Program

Bachelor of Landscape Architecture Degree

The five-year curriculum leading to the Bachelor of Landscape Architecture degree is 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.

For students without sufficient proficiency as exhibited by their portfolio material, a special proficiency course offered by the department in Summer Quarter may be required prior to admission as a major. For these students final selection will be based on performance in this course and only to the extent that the department enrollment quota permits.

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, 460; FOR B 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, 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 built environments and is based on an under-



standing of institutions, technology, and human aspirations and opportunities. It makes its contribution in the integrated application of knowledge from diverse fields. Planners conduct research on the nature of our environment and its 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, Arenas, Bell, Carter, Grey, Hancock, Horwood, Johnston, Ludwig, Miller, Norton, Rabinowitz, Ryan, Schneider, Seyfried, Tufts, Wolfe. H. L. Amoss, undergraduate program adviser; D. H. Miller, 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 an urban studies emphasis for the student contemplating a career in urban planning or further study in a variety of disciplines including 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. Application to the Bachelor of Arts in Urban Planning program may be made upon completion of 75 quarter credits. Applicants are expected to have a minimum 2.00 grade-point average in each of the distribution areas and a minimum 2.50 overall grade-point average.

Admission to the department is 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, 479, 498 (Regional and Environmental Planning), 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 16 credits of urban planning electives. Total: 90 credits.

Required for graduation is satisfactory completion of the 180 credits with maintenance of a cumulative 2.50 grade-point average.

Graduate Programs

Master of Urban Planning Degree

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

Preparation for master's study may be in urban planning or other appropriate fields, such as economics, geography, and other social sciences; civil engineering and environmental science and studies; or landscape architecture and architecture. Selective urban study and technique courses are taken to provide a basis for professional courses.

It is the primary objective of the curriculum to educate professional planners with a broad range of competence; a secondary objective is to provide opportunities for specialization.

Course requirements specify a core of knowledge embodied in required courses. Drawing on the electives in the Master of Urban Planning curriculum and with the advice of faculty members with similar interests, the student may put together an area of specialization. Current organized program opportunities include Urban Design, Urban Transportation, Urban Development, and Comparative Urban Development. Other opportunities that may be developed by the student involve the cooperation of other University units, in consultation with the graduate program adviser and other faculty.

Doctor of Philosophy Degree

The Doctor of Philosophy degree in the urban planning field indicates scholarly abilities, long-term intellectual interests, and substantial achievements related to the discipline of planning. The requirements leading to this degree are devices through which students may demonstrate that they have these qualities and are capable of independent work worthy of the attention of their peers in the academic and professional planning communities. This doctoral program is not viewed as an additional level of training for professional practice.

Admission to the doctoral program is similar to admission to the Master of Urban Planning program with the added understanding that the student is essentially interested in an academic or research career in a specialty within the planning field and has demonstrated a high degree of intelligence and academic competence.

For graduation, the program has a minimum of fixed requirements in the Department of Urban Planning in addition to those of the Graduate School. A preliminary examination 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.



ARTS AND SCIENCES

Dean

George M. Beckmann
B110 Padelford

Associate Deans

Joe S. Creager
Ronald Geballe
Donna Gerstenberger
Hubert G. Locke
S. Frank Miyamoto
William L. Phillips

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, Pharmacy, 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 Admission section of this catalog.

Recommended High School Preparation

Students who include four years of English, at least three years of a single foreign language, and at least three years of college preparatory mathematics in their high school programs meet the basic proficiency requirement of the college degree program upon entrance to the University and are thus exempt from the 15 credits of courses in these areas normally required of students 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. In addition, the student must present at least 90 credits outside the major department and must meet minimum grade-point average requirements as mentioned below.

Basic Proficiency Requirement

Students of the college are expected to have developed, either in their high school study or early in their college study, fundamental verbal and quantitative skills. These skills 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. 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 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 at least 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 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 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 50 or more prescribed credits in a department of the college or a closely related group of departments. Descriptions of major programs are printed below.

Credits Required Outside Major Department

So that the student will not be tempted to specialize prematurely, the college limits to 90 the number of credits from a single department that the student may elect to count in the 180 credits required for the degree. A department itself may require no more than 70 credits from courses within the department, and no more than 90 credits from within the department and related fields combined, as constituting its major program for the Bachelor of Arts or Bachelor of Science degree. These limits may be exceeded only by the amount that a department elects to require credits in addition to the 180 minimum for graduation, as in the case of certain curricula in art and music.

Grade-Point Average Required for Graduation

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

Applying for Graduation

Students should apply for the baccalaureate degree no later than the first quarter of their final year. They may choose to graduate under the graduation requirements of the *General Catalog* published most recently before the date of entry into the college, provided that no more than ten years have elapsed since that date and provided that approval of the major department has been obtained. As an alternative, a student may choose to fulfill the graduation requirements as outlined in the catalog published most recently before the anticipated date of graduation. All responsibility for fulfilling graduation requirements rests with the student concerned.

DISTRIBUTION LIST

HUMANITIES

Minimum of 20 credits required, all outside the major

Anthropology: ANTH 333, 334, 335, 403, 429, 431, 450, 455, 456, 457, 458, 459, 466, 467, 468, 486, 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 American Studies: AAS 400

Asian Languages and Literature: All undergraduate courses

Biomedical History: BI HS 401, 403, 419, 430

Cinema Studies: CINE 201, 202, 203

Classics: All undergraduate courses *except* LAT 475

Communications: CMU 321, 324, 326, 373

Comparative Literature: All undergraduate courses

Dance: DANCE 101, 102, 103, 201, 202, 203, 301, 302, 303, 401, 402, 403

Drama: All undergraduate courses

East Asia: EASIA 240

English: All undergraduate courses

General and Interdisciplinary Studies: GIS courses as designated each quarter

Germanics: All undergraduate courses

History: HST 205, 307, 308, 311, 312, 411, 412; HSTAA 402, 454; HSTAM 334, 335, 336, 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, 450, 451, 461, 471, 472, 480

Humanities: HUM 103, 201

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* as noted below*

Near Eastern Languages and Literature: All undergraduate courses

Philosophy: All undergraduate courses *except* as noted below*

Physical and Health Education: PE 220

Religious Studies: RELIG 201, 202, 210, 220, 311, 380

Romance Languages and Literature: All undergraduate courses

Russia and Eastern Europe: REEU 243, 403

Scandinavian Languages and Literature: All undergraduate courses *except* as noted below.*

Slavic Languages and Literature: All undergraduate courses

South Asia: SASIA 472, 491

Speech and Hearing Sciences: SPHSC 100, 101

Speech Communication: SPCH 102, 103, 140, 203, 220, 222, 240, 305, 320, 345, 347, 349, 421, 424, 440, 442, 444

Women Studies: WOMEN 206

SOCIAL SCIENCES

Minimum of 20 credits required, all outside the major

Anthropology: All undergraduate Archaeology courses and all undergraduate Anthropology courses *except* as noted below†

Architecture and Urban Planning: URB P 450, 451

Asian American Studies: AAS 205, 350, 360, 490, 499

Biomedical History: BI HS 101, 413, 414, 416, 417, 418, 422, 426, 432, 433, 434

Black Studies: BLK S 250

Business Administration: A ORG 440, 460; BG&S 101, 200, 333; I BUS 310

Communications: CMU 150, 200, 201, 202, 203, 220, 314, 320, 338, 400, 402, 406, 411, 414, 443, 470, 480

East Asia: All undergraduate courses *except* EASIA 240

Economics: All undergraduate courses

Education: EDEPS 479

General and Interdisciplinary Studies: GIS courses as designated each quarter

Geography: All undergraduate courses

History: All undergraduate courses *except* as noted below†

Home Economics: H EC 350, 354, 356, 409, 454, 457

Humanistic-Social Studies: HSS 310, 320, 410, 419, 420, 421, 422, 425, 431, 435

Inner Asia: All undergraduate courses

Linguistics: LING 333, 451, 452, 453, 461, 462, 463

Philosophy: PHIL 110, 113, 230, 260, 332, 334, 338, 363, 410, 414, 460, 463, 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* as noted below†

Religious Studies: RELIG 380, 410

Russia and Eastern Europe: All undergraduate courses *except* REEU 243, 403

Scandinavian Languages and Literature: SCAND 370, 380, 381, 382

Social Science: SOC S 150

Sociology: All undergraduate courses *except* SOC 223

South Asia: All undergraduate courses *except* SASIA 472, 491

Speech Communication: SPCH 235, 270, 329, 334, 335, 339, 373, 425, 426, 428, 471, 472, 473

Women Studies: WOMEN 257, 310, 353, 357

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

Biomedical History: BI HS 415, 421, 425, 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* as noted below†

Microbiology: MICRO 101, 301, 302, 400

Oceanography: All undergraduate courses *except* as noted below†

Pharmacology: PHCOL 300

Philosophy: PHIL 120, 370, 372, 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, 419, 421, 422, 423, 425, 475

Quantitative Science: Q SCI 281, 291, 292, 381

Speech and Hearing Sciences: SPHSC 300, 301

Wildlife Science: WLF S 350

Zoology: All undergraduate courses

* The following courses from the departments listed may *not* be counted toward Humanities: MUSIC 136, 137, 138, 139, 220, 221, 222, 223, 224, 225, 226, 227, 228, 229, 230, 231, 232, 233, 236, 237, 240, 241, 250, 323, 324, 325, 326, 327, 328, 340, 431, 432, 434, 435, 436, 440, 441, 443, PHIL 110, 113, 120, 230, 260, 332, 334, 338, 363, 370, 372, 410, 414, 460, 463, 464, 465, 466, 470, 472, 473, 474, SCAND 370, 380, 381, 382.

† The following courses from the departments listed may *not* be counted toward Social Sciences: ANTH 333, 334, 335, 403, 429, 431, 450, 455, 456, 457, 458, 459, 466, 467, 468, 486, 487, 488, 493, and all Physical Anthropology courses. HST 311, 312, 411, 412, HSTAA 402, 454, HSTAM 334, 452, 453, HSTAS 401, 402, HSTEU 401, 405, 406, 407, 421, PSYCH 102, 200, 213, 217, 218, 222, 231, 232, 233, 406, 409, 416, 417, 419, 421, 422, 423, 425, 475.

‡ The following courses from the departments listed may *not* be counted toward Natural Sciences: MATH 101, 104, 497, OCEAN 110, 111, 112.



Limits on Physical Education and ROTC Courses Allowed Toward Graduation

A student graduating from the College of Arts and Sciences may count a maximum of three 1-credit 100-level physical education courses taken at the University of Washington, or their equivalents at other collegiate institutions, as elective credits toward graduation. Such credits may be counted, however, only if earned in Autumn Quarter 1970 or thereafter. At the present time, 1-credit physical education courses are not being offered at the University of Washington. 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

Donna Gerstenberger, 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.

Premajor 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 sometimes requires completion of prerequisite courses, attainment of a minimum specified grade-point average, or selection by the department from among a group of prospective majors.

For those students who would like to follow a basic course of study in preparation for training in professional schools, the college provides advising service in the following preprofessional programs: architecture, business, dental hygiene, dentistry, education, landscape architecture, medical technology, medicine, occupational therapy, pharmacy, 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 on the General Studies major ap-

pears under Interdepartmental Programs in this section of the catalog.

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 340 through 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. The program is designed to make available expanded opportunities for undergraduate education to those students best prepared to utilize the University's intellectual resources.

To be considered for admission at entrance, students must apply during their final high school semester to the director of honors. Selection is based on high school records and scores on such examinations as those administered by the College Entrance Examination Board, National Merit, and the Washington Pre-College Testing Program. 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, the students 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 Departmental 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.

Certification for Teaching

Students following programs that lead to a baccalaureate 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 are enrolled initially in the College of Arts and Sciences. Upon the completion of 90 credits and prerequisites, they may apply for admission to the Teacher Certification Program. If accepted, they may then transfer to the College of Education.

Students preparing for certification 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 43.

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 below and in the University of Washington *Graduate Study and Research* bulletin.

Interdepartmental Programs

AFRICAN STUDIES

For African Studies, see Comparative and Foreign Area Studies in this section.

AMERICAN INDIAN STUDIES

C130 Padelford

The goals of the American Indian Studies Program are to increase the relevance of academic education for American Indian students; to promote an interest in American Indian communities and Indian cultures; and to increase the awareness and education of non-Indians about these communities and cultures. The program offers a series of courses on American Indian culture, history, and contemporary issues, with emphasis on developing knowledge and understanding of American Indian traditional, sociological, philosophical, and esthetic perspectives. An undergraduate degree in American Indian Studies is not offered. However, a General Studies degree is available to students

interested in following a program in this area. Consult a General Studies adviser in B10 Padelford.

Carolyn L. Attneave, 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. An undergraduate degree in American Studies is not offered. However, a General Studies degree is available to students interested in following a program in this area. Consult a General Studies adviser in B10 Padelford.

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 Asian American Studies, as well as in other departments such as 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. An undergraduate degree in Asian American Studies is not offered. However, a General Studies degree is available to students interested in following a program in this area. Consult a General Studies adviser in B10 Padelford.

ASIAN REGIONAL STUDIES

For regional studies programs concerning China, Japan, Korea, South Asia, and Inner Asia, see Comparative and Foreign Area Studies in this section.

BLACK STUDIES

C122 Padelford

Black Studies is an interdisciplinary program drawing together courses in a variety of academic disciplines designed to broaden the student's knowledge about the Black experience. Students are offered the opportunity to understand and appreciate the social, economic, historical, and esthetic aspects of Afro-American culture.

Affiliate Faculty

Banks, Barth, Black, Bodden, Bravmann, Brazil, Carty, Chandler, Eastman, Flint, Griffith, Jones, McElroy, Spain, 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; ARTH 230, 331, 432, 436, 437, 438, 439; BLK S 250, 490; CMU 328, 329; CLIT 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;



PHY A 381; 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: 70 credits distributed as follows—20 credits in core courses at the 100 and 200 levels; 15 credits in courses at the 300 and 400 levels; 5 credits in ethnic studies other than Black Studies; 30 credits in a single department relevant to Black Studies curriculum. Academic units relevant to Black Studies include Anthropology, Art, Communications, Comparative Literature, Drama, English, Geography, History, Music, Philosophy, Political Science, Psychology, Romance Languages and Literature, Sociology, and Speech Communication.

Teaching Program: Teaching major or minor in Black Studies. Information on requirements appears in the College of Education section of this catalog.

CHICANO STUDIES

B503 Padelford

El Centro de Estudios Chicanos was developed to create an academic atmosphere on campus that is familiar to the Chicano student and to provide academic support and instructional resources to 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. An undergraduate degree in Chicano Studies is not offered. However, a General Studies degree is available to students interested in following a program in this area. Consult a General Studies adviser in B10 Padelford.

CINEMA STUDIES

C8G Padelford

Cinema Studies is designed around a cluster of basic film courses that serve both as an introduction to cinematic art, its conventions and historical development, and as an opportunity to pursue in depth some particular aspects of American cinema and of *auteur* films. In addition to this cluster of courses, students may pursue courses in national cinemas, offered in the departments of Comparative Literature, Romance Languages and Literature, and Scandinavian Languages and Literature, and related film courses, including film production in the schools of Communications and Art and College of Education. An undergraduate degree in Cinema Studies is not offered. However, a General Studies degree is available to students interested in following a program in this area. Consult a General Studies adviser in B10 Padelford.

Birgitta Steene, Director

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 and Inner Asia, Russia and Eastern Europe, South Asia, Africa, Latin America, and the Near East. The Institute also sponsors programs in Comparative Religion and Comparative Studies in Ethnicity and Nationality, and topical seminars and courses in other fields that are especially suited to comparative international study.

Faculty

Herbert J. Ellison, Director.

East Asian Studies Group: China and Inner Asia—Jack L. Dull, Associate Director; Brandauer, Chan, Chang, Cirtautas, Harrell, Hsiao (emeritus), Kapp, Knechtges, Mah, Norman, Palais, Poppe (emeritus), Robinson, Ruegg, Seruys, Taylor (emeritus), Townsend, Treadgold, Wang, Wilhelm (emeritus), Williston (emeritus), Wylie, Yen. **East Asian Studies Group: Japan and Korea**—Kenneth B. Pyle, Associate Director; Beckmann, Butow, Haley, Hanley, Hellmann, Henderson, Hiraga, Kakiuchi, Lukoff, Lyons, McKinnon, Miller, Niwa, Palais, Rubin, Suh, Tatsumi (emeritus), G. Webb, Yamamura. **Russia and East European Studies Group**—Peter F. Sugar, Associate Director; Augerot, Boba, Carpenter, Chirot, Cirtautas, Coats, Ellison, Gershevsky (emeritus), Gribanovsky, Haney, Jackson, Kapetanick, Konick, Kramer, Legters, Micklesen, Paul, Reshetar, Romanowski, Sokol, Spector (emeritus), Swayze, Szeftel (emeritus), Thornton, Treadgold, Velikonja, Waugh, West. **South Asian Studies Group**—Karl H. Potter, Associate Director; Brass, Conlon, Curtis, Haynes, Hiebert, Morris, Rogers, Ruegg, Schiffman, Shapiro, Thrasher. **African Studies Group**—Rene Bravmann, Chairman; Crutchfield, Eastman, Griffeth, Hechter, Hill, Kauffman, Leiner, Morell, Osborne, Ottenberg, Spain, van den Berghe, Williams, Winans. **Near Eastern Studies Group**—Farhat J. Ziadeh, Chairman; Andrews, Bacharach, Brame, Clear, Heer, Lorraine, MacKay, Sugar. **Latin American Studies Group**—Dauril Alden, Chairman; Algeo, Bodden, Garfias, Greengo, Hunn, Krieger, Myhr, Solberg, Ullmann, Vargas-Baron (emeritus), Ybarra-Frausto. **Comparative Religion/Religious Studies**—Eugene Webb, Chairman; P. Amoss, Conlon, Cox, Fowler, Harrell, Keyes, Kilcup, Lipstadt, Potter, Roth, Treadgold, Webb, Ziadeh. **Comparative Studies in Ethnicity and Nationality**—Paul R. Brass, Chairman; Chandler, Ellison, Hechter, Keyes, Ottenberg, Paul Schiffman, van den Berghe.

Undergraduate Programs

Bachelor of Arts Degree

COMPARATIVE RELIGION/RELIGIOUS STUDIES

Programs are offered in History of Religions, Western Emphasis; History of Religions, Eastern Emphasis; Religion and Society; and Religion in Symbolic Expression.

Major Requirements: History of Religions, Western Emphasis: RELIG 201, 202, 380; ENGL 241 or HST 307 or N E 210; N E 220 or CLAS 445; ANTH 321 or PHIL 267 or RELIG 410 or SOC 457; one course in an eastern religious tradition; five courses in Christianity, Islam, or Judaism (three of these must be courses in which religion is a central topic, as marked with an asterisk in the list below; none of them may duplicate courses used to fulfill the pre-

ceding requirements). Courses in Christianity: RELIG 220, 320; HST 307*, 308*, ENGL 241*, 261*, ART H 202, 453, GERM 347*, HSTAM 441*, HSTEU 401*, 402*, PHIL 321, 434, 469, RUSS 321, SCAND 390. Courses in Judaism: RELIG 210*, 311*, ENGL 372, HSTEU 464, HEBR 411*, 412*, 413*, 421*, 422, 431, 441*, 442*, 443*, 451*, 452*, 453*, ARAM 401. Courses in Islam: N E 210, 420*, 422, 430*, 432*, 434, HST 261*, 461, 462, 463, ARAB 404*, 405*, 406*, 414*, 415*, PRSAN 401, 402, 412*, 413*.

History of Religions, Eastern Emphasis: RELIG 201, 202, 380; SASIA 472 or PHIL 418; SASIA 491; SOC 457 or ANTH 321 or RELIG 410; one course in Christianity, Judaism, or Islam; five courses from offerings in South Asia, East Asia, and Inner Asia listed below (three of these must be courses marked with asterisks; none of them may duplicate courses used to fulfill the preceding requirements). South Asia: ANTH 412, ART H 421, PHIL 286*, 412*, 417*, 418*, SASIA 472*, SNKRT 493*, 494*, 495*. East Asia: EASIA 240, 443, 445*, ANTH 404, ART H 417, 418, PHIL 415*, 416*. Inner Asia: IASIA 431, 464*.

Religion and Society: RELIG 201, 202, 380; ANTH 321; SOC 457; two of the following, consisting of one course each in a western and an eastern religious tradition: RELIG 320, 321, HST 307, N E 210, SASIA 472, 491, EASIA 445; four courses from the following: ANTH 421, 422, HSTAM 441, HSTEU 401, 402, HST 261, 461, 462, 463, ANTH 404, 412, ENGL 372, N E 430, 432, POL S 430, EASIA 240, 443, ARAB 405, 406.

Religion in Symbolic Expression: RELIG 201, 202, 380; ENGL 241; PHIL 267 or ANTH 421; two of the following, consisting of one course each in a western and an eastern tradition: HST 307, N E 210, SASIA 472, 491; four courses from the following: RELIG 220, 410, ART H 202, 417, 418, 421, 453, CLAS 430, 445, ENGL 261, 372, GERM 343, 370, HSTEU 464, ITAL 481, N E 434, 450, 451, RUSS 321, SCAND 330, 332, 390, GIS 325, PRSAN 401, 402, 412, 413.

REGIONAL STUDIES PROGRAMS

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, 481, 482; 25 credits in 300- and 400-level courses on East Asia.

Russian Regional Studies: REEU 243, 343, 457; 15 credits in a selected discipline; 15 credits in 300- and 400-level courses on Russia.

East European Regional Studies: REEU 220 (or its equivalent), 344, 458; 15 credits in a selected discipline; 15 credits in 300- and 400-level courses on Eastern Europe.

South Asia Regional Studies: Language requirement: 30 credits of Hindi, Tamil, Sanskrit, or other South Asian languages as offered; HSTAS 201, 202; 30 credits in one discipline (anthropology, economics, history, linguistics, political science, or religion); 15 credits oriented to South Asia in social science 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 General Studies.

African Studies: 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; CLIT 261, 262, 263, 450; HUM 103; MUSIC 205, 206, 317, 427, 512; MUSAP 159, 459; PHY A 381; POL S 439, 539; ROM 590; SOC 459, 569; and other courses offered on a periodic basis through the Office for Undergraduate Studies. An undergraduate degree in African Studies is not offered. However, a General Studies degree is available to students interested in following a program in this area. Consult a General Studies adviser in B10 Padelford.

Latin American Studies: Latin American Studies is an interdisciplinary program intended to provide students with a broad understanding of the history, politics, socioeconomic structures, and cultures of Latin America, from pre-Columbian and peninsular origins to the present. Requirements are one year of Portuguese and two of Spanish, or two years of Portuguese and one of Spanish; 48 to 50 credits, including the following: ANTH 322 or 418 plus one elective; HSTAA 381, 382, 383 (two of three); 9 credits in Spanish-American or Luso-Brazilian literature; GST 492 (senior seminar) and 493 (senior thesis); and 13 to 15 credits in elective courses. An undergraduate degree in Latin American Studies is not offered. However, a General Studies degree is available to students interested in following the above program. Consult a General Studies adviser in B10 Padelford.

COMPARATIVE STUDIES IN ETHNICITY AND NATIONALITY

The program in Comparative Studies in Ethnicity and Nationality is designed to foster comparative social scientific inquiry and teaching concerning the formation, transformation, and persistence of ethnic identities over time among diverse ethnic groups in different parts of the world. Although the program does not offer its own degree, opportunities for study are available in several departments. Faculty is drawn principally from Anthropology, Economics,



Political Science, and Sociology, and from the African Studies, South Asian Studies, and Southeast Asian Studies programs in the Institute for Comparative and Foreign Area Studies.

Honors Program: Baccalaureate degree "With College Honors in (area)" or "With Distinction in (area)." Consult honors adviser 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

Master of Arts Degree

Programs on East Asia (China, Japan, Korea), Russia and Eastern Europe, and South Asia, which are offered in cooperation with these areas, are described in the Interdisciplinary Graduate Degree Programs section of this catalog.

COMPARATIVE HISTORY OF IDEAS

C248 Padelford

Comparative History of Ideas is an interdisciplinary program intended to open a broad view onto man's intellectual accomplishments by revealing the interaction of the arts, the sciences, literature, religion, and philosophy. The program is structured in three sections: (1) the core program; (2) the symbolic realm of man (as manifest in myth, mythology, religion, the arts, and literature); (3) the intellectual and sociopolitical realm of man (as manifest in philosophy, scientific thought, social and political thought). Whereas the core program equips the student with basic notions relevant to the study of the history of ideas and methodological problems, the second and third sections present courses in the history of ideas offered by various disciplines of this university. An undergraduate degree in Comparative History of Ideas is not offered. However, a General Studies degree is available to students interested in following a program in this area. Consult a General Studies adviser in B10 Padelford.

Ernst Behler, Director

COMPARATIVE LITERATURE

B434 Padelford

Comparative Literature is the comparative study of various national literatures, stressing their mutual influences and their use of similar forms and themes, along with the study of literature theories that have a bearing on these relations. 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

Ammerlahn, Andrews, D. Behler, E. Behler, Carpenter, Christofides, Ellrich, Grummel, Hrubby, F. Jones, L. Jones,

Konick, Kramer, J. Leiner, W. Leiner, Loraine, MacKay, McKinnon, McLean, Rabago, Reinert, Sehmsdorf, Vaughan, Wang, Warnke, Willeford.

Undergraduate Programs

Bachelor of Arts Degree

Major Requirements: 50 credits, including the following courses: CLAS 210 or any upper-division course in Classics; CLIT 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, Germanics, Romance Languages and Literature, Scandinavian Languages and Literature, Slavic Languages and Literature, and Near Eastern 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 appears in the College of Education section of this catalog.

Graduate Programs

Master of Arts Degree

Information on this degree appears in the Interdisciplinary Graduate Degree Programs section of this catalog.

Doctor of Philosophy Degree

Information on this degree appears in the Interdisciplinary Graduate Degree Programs section of this catalog.

COMPUTER SCIENCE

112 Sieg

Computer Science is devoted to the representation, storage, manipulation, and presentation of information, in both theory and practice. Computer scientists are interested in representations of information, algorithms to transform information, languages to express algorithms, hardware and software processors to execute algorithms, and ways to accomplish all of these economically.

Computer Science, an intercollege department affiliated with both the College of Arts and Sciences and the College of Engineering, offers both undergraduate and graduate programs. Faculty is drawn from the College of Arts and Sciences and the College of Engineering. For description of this program see the Interschool or Intercollege Programs section of this catalog.

ENVIRONMENTAL STUDIES

201 Engineering Annex

The Institute for Environmental Studies is an interdisciplinary educational unit, established to develop environmentally related programs in teaching, research, and public service. The institute offers courses of interest to students who wish to increase their knowledge of the environment

and of environmentally related issues. An undergraduate degree in Environmental Studies is not offered. Students may design an individual degree program through General Studies in the College of Arts and Sciences or through the nondepartmental or nonprofessional programs in the College of Engineering. An Environmental Studies adviser is available in 230 Engineering Annex.

A graduate degree in Environmental Studies is not offered. Qualified students may pursue an individually designed interdisciplinary graduate program in Environmental Studies. Graduate School admission is through a specific academic unit with an appropriate faculty group serving as the advisory or supervisory committee in administering the study and research program.

Robert O. Sylvester, Director

ETHNOMUSICOLOGY

64 Music

Ethnomusicology involves the study of all the world's music, with special attention given to music outside the Western art-music tradition. It places emphasis upon the cultural structures in which all music exists. Courses in ethnomusicology offer descriptive studies of music related to specific areas of the world, music performance taught by visiting artists, and the study of multidisciplinary methodological procedures.

The undergraduate program includes courses in Western music, ethnomusicology, anthropology, and linguistics. An undergraduate degree in ethnomusicology is not offered. However, a General Studies degree is available to students interested in following a program in this area. Students may also obtain a degree with an emphasis on ethnomusicology through the music theory-history option in the School of Music.

Graduate programs leading to a Master of Arts degree and a Doctor of Philosophy degree are available through the School of Music.

GENERAL STUDIES

C14 Padelford

The General Studies major provides students an opportunity to design an interdisciplinary degree program suited to their individual academic goals. Certain other interdisciplinary programs (e.g., Comparative Literature, Society and Justice) lead to a degree in the specific area studied, but many existing interdisciplinary programs lead to a degree in General Studies. Among the latter are African Studies, American Indian Studies, American Studies, Asian American Studies, Chicano Studies, Cinema Studies, Comparative History of Ideas, English as a Second Language, Environmental Studies, Ethnomusicology, French Language and Area Study, Jewish Studies, Latin American Studies, Medieval and Renaissance Studies, Scientific and Technical Communication, Social Theory, and Women Studies, many of which are described elsewhere in this section of the catalog.

Undergraduate Programs

Bachelor of Arts and Bachelor of Science Degrees

Admission Requirements: An interdisciplinary program planned with several faculty members and a General Studies adviser, and agreed-upon faculty sponsorship for the senior thesis.

Major Requirements: From 50 to 70 credits in courses related to the major. Ordinarily, no fewer than three quarters in the program. Completion of required senior thesis. Precise curriculum to be determined in consultation with General Studies adviser and faculty sponsors. Awarding of the Bachelor of Arts or Bachelor of Science degree depends on each student's degree program.

Honors Program: Baccalaureate degree "With College Honors in General Studies." Consult honors adviser about requirements.

JEWISH STUDIES

118 Smith

Jewish Studies is an interdepartmental program covering related disciplines from ancient to modern times. Areas of study include history, religion, literature, philosophy, and language (Hebrew, Aramaic, and Yiddish). Requirements are 50 credits within the field, with no more than 25 credits in any one department; RELIG 210 and 311; senior thesis; language competence at the level of two years of Hebrew or Yiddish (to count toward the major, work in the other language must include at least 15 credits). An undergraduate degree in Jewish Studies is not offered. However, a General Studies degree is available to students interested in following a program in this area. Consult a General Studies adviser in B10 Padelford.

Edward Alexander, Chairperson
Deborah E. Lipstadt, Assistant Chairperson

LATIN AMERICAN STUDIES

For Latin American Studies, see Comparative and Foreign Area Studies in this section.

MEDIEVAL AND RENAISSANCE STUDIES

A203 Padelford

Medieval and Renaissance Studies is an interdisciplinary program designed to offer the student a broad and coherent exposure to the Western cultural tradition through the study of the art, history, literature, philosophy, and religion of the Middle Ages and the Renaissance. Individualized programs of study, drawing on the course offerings of more than twenty departments and schools, are developed by the student with a committee of three faculty members, chosen by the student. An undergraduate degree in Medieval and Renaissance Studies is not offered. However, a General Studies degree is available to students interested in following a program in this area. Consult a General Studies adviser in B10 Padelford.

M. F. Vaughan, Director



RELIGIOUS STUDIES

For program in Comparative Religion/Religious Studies, see Comparative and Foreign Area Studies in this section.

RUSSIAN AND EAST EUROPEAN REGIONAL STUDIES

For regional studies programs covering Russia and East Europe, see Comparative and Foreign Area Studies in this section.

SCIENTIFIC AND TECHNICAL COMMUNICATION

B10 Padelford

The program in Scientific and Technical Communication prepares the student to convey information clearly and accurately through various media to a wide spectrum of readers, ranging from the general public to experts in such fields as the sciences, engineering, medicine, and social sciences. The program combines a solid grounding in science and mathematics with preparation for serving as a writer or editor in technically oriented organizations. It provides the student an opportunity for exposure to the media available to the communicator—including publications, graphics, oral presentations, and audiovisual arts. An undergraduate degree in Scientific and Technical Communication is not offered. However, a General Studies degree is available to students interested in following a program in this area. Consult a General Studies adviser in B10 Padelford.

SOCIETY AND JUSTICE

C115 Padelford

The criminal justice system in our society is studied from a multidisciplinary, liberal arts, research-oriented point of view.

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 in the following categories: 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 either a quantitative or a nonquantitative 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.

Ezra Stotland, Director

WOMEN STUDIES

C19 Padelford

Women Studies is an interdisciplinary program offering students the opportunity to select courses from a variety of academic disciplines while pursuing concentrated study in a particular department. 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 for those interested in studying women. Requirements: WOMEN 400; one core course in Women Studies that presents an overall view of the field; 35 credits in a single department outside of Women Studies (but offering courses relevant to the theme of study); at least four upper-division Women Studies courses of 3 or 5 credits each; a senior thesis on some aspect of the study of women. An undergraduate degree in Women Studies is not offered. However, a General Studies degree is available to students interested in following the above program.

Departmental Programs

ANTHROPOLOGY

M32 Denny

Anthropology involves the analysis of the physical and cultural development, comparative biology, and social customs and beliefs of human beings. Primary fields include archaeology, physical anthropology, linguistics, and socio-cultural anthropology.

Faculty

Robert C. Dunnell, Chairman; Amoss, Atkins, Dumont, Dunnell, Eastman, Eck, Garfield (emeritus), Grayson, Greengo, Harrell, Hiebert, Hunn, Jacobs, Keyes, Krieger, Miller, Nason, Newell, Newman, Nute, Osborne, Ottenberg, Quimby, Read, Spain, Swindler, Ward, Watson, Wenke, 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 85 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 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: Baccalaureate degree "With College Honors in Anthropology" or "With Distinction in Anthropology." Consult honors adviser about requirements.

Teaching Program: Teaching major or minor in anthropology. Information on requirements appears in the College of Education section of this catalog.

Graduate Programs

Master of Arts Degree

Admission Requirements: The Master of Arts degree is a preparatory stage for the doctoral program. Except in museology, students pursuing graduate work are admitted only to the Doctor of Philosophy degree program. An undergraduate major in anthropology is not required. Applicants are judged on overall undergraduate performance and by the recommendations of professors who have supervised them.

Graduation Requirements: *With Thesis*—Requirements vary according to specialization in archaeology, physical anthropology, or sociocultural anthropology. Students must demonstrate proficiency in one foreign language and complete a thesis embodying independent research, followed by oral examination. Requirements for specialization in museology are two years of course work, an acceptable thesis, and demonstration of proficiency in one foreign language. Museology specialization leads to a terminal master's degree and does not confer acceptance to the Doctor of Philosophy degree program in anthropology. Separate application for such admission is required. *Without Thesis*—Substitution of written examinations for thesis is permitted, except for the Master of Arts degree with specialization in museology.

Doctor of Philosophy Degree

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

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

ART 104 Art

The School of Art, which includes the Division of Art History, is concerned with the practice, history, and teaching of the graphic and plastic arts. It offers undergraduate and graduate instructional and research programs in art education, art history, ceramics, graphic design, industrial design, interior design, metal design, painting, printmaking, sculpture, and general art.

Spencer A. Moseley, Director.

Art Faculty

Alps, Anderson, Bauer, Carraher, Celentano, Dahn, Dailey, DuPen, Dunthorne, Erickson, Foppe (emeritus), Fuller,

Gonzales, Hafermehl, R. Hill (emeritus), W. Hill, Hixson, Lawrence, Lew, Lundin, Marshall, Mason, Miller, Moseley, Patterson (emeritus), Pawula, Penington (emeritus), Pizzuto, Praczukowski, Proctor, Raven, Reed, Ritchie, Smith, Solberg, Spafford, Sperry, Stoops, Taylor, Tsutakawa, Wadden, Welman, Whitehill-Ward. C. L. Hafermehl, graduate program adviser.

Art History Faculty

Millard B. Rogers, Head; Bliquez, Bravmann, Christofides, Edmonson, Grossmann (emeritus), Holm, Kingsbury, Opperman, Pascal, Pundt, Reed, Silbergeld, Webb, Weston, Wilson. Millard B. Rogers, graduate program adviser.

Undergraduate Programs

UNDERGRADUATE ACCEPTANCE POLICY

For Studio Majors: Freshmen entering the University directly from high school may be admitted as art majors. Other initial-degree-seeking undergraduates with no previous college-level studio art experience may apply for art major status without submitting work for acceptance review. Such students entering the University of Washington directly from high school or as transfer students will be classified as premajors, but may transfer to art when interviewed by a School of Art adviser. Transfer and other students with college-level studio art experience must submit work for a School of Art acceptance review and placement in the program. Work must be submitted in slide and/or photograph form to the School of Art advisory office by the following dates: Autumn Quarter: July 1; Winter Quarter: October 15; Spring Quarter: January 15; Summer Quarter: May 1.

Currently enrolled students attending the University of Washington or returning students must submit up-to-date transcripts with slides of work. The applicant should indicate the major within art that he or she wishes to follow. Following the acceptance review, the applicant will be notified by mail regarding his or her status.

For Art History Majors: Initial-degree-seeking undergraduates may apply for art history major status at any time. Applicants must present an up-to-date transcript or adviser's file when interviewed by a School of Art adviser.

Satisfactory progress must be maintained by all art and art history majors to ensure continuation in art.

ACCEPTANCE POLICY FOR FIFTH-YEAR APPLICANTS

All fifth-year applicants must file an application through the Undergraduate Admissions Office. A Supplementary Information Form and slides of studio work must be submitted to the School of Art advisory office for an acceptance review. The quarterly review dates listed above are *not* applicable to fifth-year applicants. The applicant will be notified by the admission office regarding his or her admission status.

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 op-



tional fields so that one option includes no more than 15 credits and the others no more than 9 credits each: all undergraduate art history courses except ART H 201, 202, 203; ART 301, 302, 303, 304; 201, 202, 203, 353; 250, 253, 255, 340; 265, 325; 357, 358, 359, 457, 458, 459; 339; 256, 257, 259, 307, 360; 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; 201; 3 credits from 300, 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 H 201; 47 additional art history credits, including at least five upper-division credits in each of the following areas: Asian, Primitive and Tribal, Classical, Medieval, Renaissance, Baroque-Rococo, and Nineteenth-Twentieth Centuries; plus *one* of the following three options: (1) ART 105, 106, 107, 109, 110; (2) ART 129 plus 12 upper-division credits in history, from *one* of the following: History of the Americas, Ancient and Medieval History, History of Asia, or Modern European History; or (3) ART 129 plus 12 upper-division credits selected from the offerings of *one* of the following departments, exclusive of courses offered jointly with Art History: Anthropology, Asian Languages and Literature, Classics, Comparative Literature, English (literature courses only), Germanics, Near Eastern Languages and Literature, Romance Languages and Literature, Scandinavian Languages and Literature, or Slavic Languages and Literature.

Bachelor of Fine Arts Degree

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

Major Requirements

Ceramic Art: ART 105, 106, 107, 109, 110, 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 205, 206, 207, 208, 366, 367, 368, 376, 377, 378, 466, 467, 468, 478, 479, 480; 24 elective art credits.

Industrial Design: ART 105, 106, 107, 109, 110, 129; ART H 201, 202, 203; ARCH 300, 301, 302, 310, 311, 312, 313, 314; ART 316, 317, 318, 445, 446, 447; 253, 272, 321; ME 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, 262; ART H 201, 202, 203, 478, 479; ARCH 150, 151, 300, 301, 310, 311; ART 259, 263, 265, 310, 311, 312, 319, 320, 321, 472, 473, 474; 16 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 up to 9 credits of 325 may substitute for up to 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), 41 elective art credits.

Sculpture: ART 105, 106, 107, 109, 110, 129; ART H 201, 202, 203, 3 elective art history credits; ART 272 (6 credits), 274, 332 (15 credits), 335, 337, 436 (15 credits); 253, 256, 257, 265 (6 credits), 33 elective art credits.

Graduate Programs

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; 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 (Art Education Theory)

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. The student must pass a written comprehensive examination following the completion of core courses. Undergraduate work beyond the basic minimum may be required to make up deficiencies. There is no foreign-language requirement.

Master of Arts Degree (Art History)

Admission Requirements: (1) Bachelor of Arts degree with major in the history of art, or equivalent; (2) three letters of recommendation; (3) a statement of professional objectives in the field, and (4) samples of the applicant's written work.

Graduation Requirements: 36 credits in art history courses numbered 400 or above, of which 27 are course credits and nine are thesis credits (half of the 36 credits must be in courses numbered 500 or above); reading knowledge of

French or German as tested by the Graduate School Foreign Language Test; passing of a comprehensive examination in art history at the level of a sound general survey; presentation and defense of a thesis, which may be an extension of a seminar paper, that demonstrates familiarity with sources and a capacity for synthesis and critical evaluation.

Doctor of Philosophy Degree (Art History)

Admission Requirements: (1) Prior sound preparation at a general level, which usually means having acquired the Master of Arts degree in the history of art; students whose backgrounds are judged insufficient may be required to satisfy deficiencies before undertaking a full-scale graduate program; (2) three letters of recommendation; (3) a statement of professional objectives in the discipline; and (4) samples of written research work in art history.

Graduation Requirements: (1) 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 18 must be graded acceptable graduate-level courses, and at least 36 must be in courses numbered 500 and above, of which a maximum of 15 may be in fields related to art history; (2) reading knowledge of French or German as tested by the Graduate School Foreign Language Test, plus reading knowledge of one or more additional languages as determined by the student's Supervisory Committee; (3) a General Examination, written and oral, taken prior to enrollment for dissertation credits; this examination covers three fields of art history chosen from the following general areas: (a) East Asian, (b) South and Southeast Asian, (c) Primitive and Tribal, (d) Ancient, (e) Medieval, (f) Renaissance, (g) Baroque, (h) Modern (no more than two fields may be selected from the same area); (4) preparation and defense of a dissertation requiring a minimum of 27 additional credits at the 800 level. In most cases, the student must expect to work and travel abroad in order to acquire firsthand knowledge of the works of art involved in the dissertation research.

Financial Assistance

The art history division offers the Samuel H. Kress Foundation Fellowship of \$3,000 each year to a student who is pursuing a graduate degree in the history of art. Limited Kress funds are also available for the assistance of art history graduate students. Also available are teaching assistantships for which graduate students may apply. It is a policy to award financial aid and assistantships only to students who have been in residence at the University of Washington for at least one year.

ASIAN LANGUAGES AND LITERATURE

225 Gowen

The Department of Asian Languages and Literature offers instruction in the principal languages and literatures of Asia, including the Far East, Southeast Asia, and the Indian subcontinent. Emphasis is placed on the roles of these languages within the cultures they serve and on linguistic analysis, particularly historic. Some courses on important Asian literary works in English translation, especially for nonmajors, are available. Languages include Chinese (Mandarin and Cantonese), Hindi-Urdu, Indian, Japanese, Ko-

rean, Manchu, Mongolian, Pali, Sanskrit, Tagalog, Tamil, Thai, Tibetan, and Uzbek (Turkic).

Faculty

Roy Andrew Miller, Chairman; Brandauer, Cirtautas, Cooke, Hiraga, Knechtges, Lukoff, Lyons, McKinnon, Miller, Niwa, Norman, Nornang, Poppe (emeritus), Rubin, Ruegg, Schiffman, Serruys, Shapiro, Shih (emeritus), Suh, 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)—60 credits in the language, which includes 45 credits in the major language, 15 credits in the minor language, 18 area credits in HSTAS 201, 202, INDN 420 or 421 and senior seminar; 12 credits in humanistic and social science discipline, with South Asian focus (to be chosen in consultation with adviser) from current elective courses (e.g., PHIL 286, ARTH 421, MUSIC 428). Majors in Tamil and Hindi-Urdu ordinarily use Sanskrit as a minor language, but may substitute a second Dravidian language or Persian, respectively, if relevant to their proposed course of studies and if they have the approval of their adviser.

Teaching Programs: Minor academic fields in Chinese and Japanese are available for those preparing to teach in secondary schools. Information on requirements appears in the College of Education section of this catalog.

Graduate Programs

Master of Arts Degree

The Master of Arts degree is offered with specialization in Buddhist studies, Chinese, Japanese, Korean, South Asian, Tibetan, and Turkic languages and literature.

Admission Requirements: Bachelor of Arts degree in relevant Asian language or equivalent background, three letters of recommendation, and a statement of purpose.

Graduation Requirements: Proficiency examination in major language; graduate reading examination in one language other than major language. *With Thesis*—A minimum of 36 credits, of which 18 must be taken for a grade in courses numbered 500 or above, and a minimum of 9 thesis credits; successful completion and defense of thesis. *Without Thesis*—A minimum of 45 credits, of which 18 must be taken for a grade in courses numbered 500 or above; two papers, in the field of language and/or literature, approved by supervisory committee.

Doctor of Philosophy Degree

The Doctor of Philosophy degree is offered with specialization in Buddhist studies, Chinese, Japanese, Korean, Tibetan, and Turkic languages and 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 program adviser must be consulted about specific course requirements in the various language areas.

ASTRONOMY

241 Physics

Astronomy deals with the science of the objects making up the physical universe and with the study of their physical characteristics, compositions, motions, histories, and interrelationships and of the physical laws governing them. The principal disciplines include such specialties as celestial mechanics, solar system and planetary astronomy, stellar spectroscopy and spectrophotometry, stellar structure and evolution, interstellar matter, galactic structure, nucleosynthesis of the elements, extragalactic astronomy, and cosmology.

Faculty

George Wallerstein, Chairman; Balick, K. Bohm, E. Bohm-Vitense, Boynton, Hodge, Jacobsen (emeritus), Sullivan, Wallerstein. K. H. Bohm, graduate program adviser.

Undergraduate Program

Bachelor of Science Degree

Major Requirements: ASTR 321, 322, 323; 431, 432, 433 or 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, 238; 327, 328; and MATH 205 or 302; 12 additional credits in courses at the 300 level or above in astronomy, physics, or related fields, approved by adviser (PHYS 323, 324, 325; 421, 424, 425, 426 recommended for students planning to do graduate work in astronomy); junior year (survey) and senior year (research) papers recommended as ASTR 499 projects, with emphasis on the senior paper for students planning graduate work. 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

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.

Graduation Requirements: Master's degree in astronomy or equivalent knowledge; 24 credits of physics courses at the 400 level or above or equivalent knowledge; at least one quarter of teaching experience in astronomy; dissertation and Final Examination. Proficiency in one foreign language in which there is a substantial body of astronomical literature. Students interested in work in theoretical astrophysics may be required to take additional courses in physics and mathematics. Students working on other topics may take certain courses in related fields, such as astronautics, atmospheric sciences, geophysics, or electrical engineering. A knowledge of computer programming is useful.

ATMOSPHERIC SCIENCES

408 Atmospheric Sciences/Geophysics

Atmospheric Sciences is concerned with the physical state of the atmosphere, with processes and changes occurring in the atmosphere, and especially with application of the fundamental principles of physics to atmospheric phenomena.

Faculty

Robert G. Fleagle, Chairman; Arya, Badgley, Businger, Church (emeritus), Fleagle, Harrison, Hobbs, Holton, Houze, Katsaros, LaChapelle, Leovy, Radke, Reed, Untersteiner, Wallace, Webster. 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: Baccalaureate degree "With College Honors in Atmospheric Sciences" or "With Distinction in Atmospheric Sciences." Consult honors adviser about requirements.

Graduate Programs

Master of Science Degree

Admission Requirements: Baccalaureate 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.

BIOLOGY

220 Johnson

Undergraduate programs leading to a baccalaureate degree are offered by the departments of Botany, Microbiology and Immunology, and Zoology. An interdisciplinary program leading to a baccalaureate degree in biology is described below. Baccalaureate degree programs with a strong biological orientation are also offered by the departments of Psychology and Oceanography, and by the colleges of Fisheries and Forest Resources. In addition to the departments and colleges already noted, undergraduate and graduate courses in the biological sciences are offered by departments in the College of Arts and Sciences (e.g., Anthropology and Genetics) and in the schools of the health sciences (Dentistry, Medicine, Nursing, Pharmacy, and Public Health and Community Medicine). The departments of Botany and Zoology jointly offer a major in biology for students in the College of Education (additional information appears in the College of Education section of this catalog). Interdisciplinary study of biology is supervised by the Biology Instructional Program Committee, of which Richard B. Walker is 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.

BOTANY

240 Johnson

Botany is concerned with the structure, physiology, evolution, and classification of plants, with emphasis on both

organismal and cellular biology. Special courses and programs in botany of the Pacific Northwest are shared with related departments.

Faculty

A. R. Kruckeberg, Chairman; Bendich, Blaser (emeritus), Cattolico, Cleland, del Moral, Denton, Halperin, Haskins, Hitchcock (emeritus), Kruckeberg, Meeuse, Muhlick (emeritus), Norris, Stuntz, Tsukada, S. D. Waaland, J. R. Waaland, Walker, Whisler. E. H. Haskins, graduate program adviser.

Undergraduate Program

Bachelor of Science Degree

Major Requirements: Minimum requirements that provide a survey of botanical investigations, but when taken alone do not ordinarily qualify a student for advanced studies, include at least 59 credits as follows: CHEM 140, 150, and 231 or 101, 102; BIOL 101-102 and GENET 451 or BIOL 210, 211, 212; BOT 113, 320, 490; 371 or 472; 360 or 446; 444 or 450 or 480; a minimum of 10 credits of upper-division courses (excluding courses without prerequisites) in botany, zoology, microbiology and immunology, and genetics.

A more rigorous program designed for students with professional aspirations includes the following: at least CHEM 140, 150, 151 and 231 and 232 or 235, 236; BIOL 210, 211, 212; GENET 451; BOT 113, 320, 490; 371 or preferably 472; 360 or 446; 444, or 450 and 451, or 480 and 481, and a minimum of 10 credits of botany courses chosen to provide some depth in one field (e.g., BOT 433, 434, 445, 478, 498, 569).

The following are strongly recommended for all students, but do not count toward the 59 credits: reading knowledge of a foreign language (German, Russian, French); one year of physics; one year of calculus; Q SCI 281 or 381 (statistical methods) and Q SCI 340 (applications using computer).

Graduate Programs

Master of Science Degree

Admission Requirements: Equivalent of a baccalaureate degree in biological sciences; organic chemistry; some preparation in a foreign language (French, German, or Russian); Graduate Record Examination scores (verbal, mathematical, and either chemistry or biology); three letters of recommendation.

Graduation Requirements: Individualized programs, with or without thesis, are planned with a committee of three members. Reading knowledge of one foreign language in major area 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

Arthur Fairhall, Acting Chairman; N. Andersen, A. Anderson, Borden, Cady (emeritus); Chilton, Christian, Crittenden, Davidson, Eggers, Eichinger, Epitotis, Fairhall, Gouterman, Gregory, Halsey, Kowalski, Kwiram, Lingafelter, Macklin, Meyer, Norman, Pocker, Rabinovitch, Raucher, Ritter, Robinson (emeritus), Rose, Schomaker, Schubert, Schurr, Shain, Sivertz (emeritus), Slutsky, Stout, Vandembosch, Weinstein, Woodman.

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 $1\frac{1}{2}$ units of algebra and $\frac{1}{2}$ unit of trigonometry; one unit of physics; and one unit of chemistry.

Major Requirements: CHEM 145 (or 140), 155 (or 150), and 160 (students with inadequate backgrounds in laboratory work should include CHEM 151 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 in the standard American Chemical Society examination in organic chemistry); CHEM 455, 456, 457; 10 credits from CHEM 460, 461, 462, 463; 414 (or 416); 5 credits in English composition; one year of physics, including one credit of laboratory (PHYS 121, 122, 123, 132 recommended); MATH 124, 125, 126, and two additional courses numbered 200 or above (MATH 238 and 302 recommended); one year of German, French, or Russian or placement into second year on the language examination; 17 credits of upper-division science electives. Grade-point average of 2.80 in chemistry courses, with C or better in all required chemistry courses 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; 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; 414 (or 416) recommended; 5 credits in English composition; one year of physics, including one credit of laboratory; MATH 124, 125, 126. Grade-point average of 2.00 in chemistry courses, with C or better in all required chemistry courses and a total grade-point average of 2.00 or better.

Honors Program: Bachelor of Science degree or Bachelor of Arts degree "With College Honors in Chemistry" or "With Distinction in Chemistry." Consult honors adviser about requirements.

Teaching Program: Teaching major or minor in chemistry. Information on requirements appears in the College of Education section of this catalog.

Graduate Programs

Master of Science Degree

Admission Requirements: Baccalaureate degree with major in chemistry. Placement (qualifying) examinations.

Graduation Requirements: *With Thesis*—36 approved credits with 18 in courses at the 500 level or above; 18 in courses at the 400 level or above (or at the 300 level in outside departments) taken for 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 or 500 level, 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 Requirement: 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.

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: Baccalaureate degree "With College Honors" or "With Distinction" in Latin, in Greek, or in classics. Consult honors adviser about requirements.

Teaching Programs: Teaching major or minor in Latin and in Classical Studies. Information on requirements appears in the College of Education section of this catalog.

Graduate Programs

Master of Arts Degree

Admission 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 practical experience in their fields. The undergraduate program is interdisciplinary with emphasis on the social sciences and humanities.

Faculty

Alex S. Edelstein, Director; Ames, Bowen, Bowes, Carter, Christian (emeritus), Cranston, Dervin, Edelstein, France, Frazer, Godfrey, Heller, Jackson, Johnston, Pember, Roller, Ryan (emeritus), Samuelson, Shadel (emeritus), Simpson, Slater, Smith (emeritus), Stamm, Warner (emeritus), Wike, Yerxa. K. R. Stamm, graduate program adviser.

Undergraduate Programs

Bachelor of Arts Degree

Admission Requirements: 75 credits completed with no more than 20 credits in School of Communications courses; two of CMU 150, 200, or 214 (or equivalents) with grades (currently C or better) acceptable to school faculty; a grade-point average in the past three quarters (or 45 credits), either at the University of Washington or any other collegiate institution, at least equal to the all-University cumulative average of the Spring Quarter preceding the quarter during which admission is sought; letters as required by faculty. Satisfaction of these minimum requirements ensures consideration; it does not guarantee acceptance.

Major Requirements: 10 credits from courses in literature; 35 credits in related social science courses as specified by school faculty, to include at least 20 credits in upper-division courses and 20 credits in one department; core requirements of at least 50 credits within the school, to include 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, 342, 344, and 345. 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: Baccalaureate degree "With College Honors in Communications" or "With Distinction in Communications." Consult honors adviser about requirements.

Teaching Program: Teaching major or minor in editorial journalism. Information on requirements appears in the College of Education section of this catalog.

Graduate Programs

Master of Communications Degree

Admission Requirements: Above-average undergraduate record, Graduate Record Examination, and letter of intent.



Graduation Requirements: Option A—15 credits (including 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.

DANCE

254 Meany

Dance, a division of the School of Music, offers dance instruction in ballet and contemporary dance leading to the degree of Bachelor of Arts.

Faculty

Boris, Green, Skinner.

Undergraduate Program

Bachelor of Arts Degree

Admission Requirements: Audition and interview when ready to begin a 200-level techniques sequence.

Major Requirements: Grade-point average of 2.50 in dance and music courses. *Option 1*—36 credits in ballet techniques and modern dance techniques, including 18 credits at the 300 level or above; DANCE 145, 240; 3 credits from 220, 223, 324; 3 credits in folk/ethnic dance courses; 470 (6 credits); and 20 credits in approved music electives. *Option 2*—36 credits in modern dance techniques and ballet techniques, including 18 credits at the 300 level or above; DANCE 282, 355 (6 credits), 364, 464 (3 credits); and 20 credits in approved music electives. Music courses designated as primarily for nonmajors are acceptable toward the music requirement. Students with previous musical training may, with permission, be admitted to courses designated as primarily for music majors.

DRAMA

113 Drama-TV

The School of Drama is concerned with the whole continuum of acting, directing, designing, theatre history, and dramatic forms through which the human, dramatic imagi-

nation finds expression, from the spontaneous, imaginative play of children to the theatre arts of criticism.

Faculty

Paul S. Hostetler, Executive Director; Carr (emeritus), Conway (emeritus), Crider, Dahlstrom, Davis (emeritus), Devin, Falls, Forrester, Galstaun, Gray, Haaga, Harrington (emeritus), Hobbs, Hostetler, Loper, Lorenzen, Lounsbury (emeritus), McCoy, Martin, Roberts, Ross, Siks, Sydow, Turner, Valentinetti, Winchell, Wolcott, York. R. L. Lorenzen, graduate program adviser.

Undergraduate Programs

Bachelor of Arts Degree

Major Requirements: A minimum of 55 credits in drama courses. Three quarters of acting: DRAMA 151, 152, 153 or 251, 252, 253 or 351, 352, 353 (with 250 and 350 series, 3 credits of DRAMA 298 or 498 also required). Three quarters of technical practice: DRAMA 210, 211, 212, 290, 291, 292. 17 credits in Theatre History, Dramatic Literature, and Criticism: DRAMA 102, 274, 476, plus two courses from DRAMA 374, 376, 377, 378, 379, 472, 473, 475, 477, 478, 479. Electives at the 300-400 level to complete the balance. Drama majors are encouraged to elect a movement class.

Bachelor of Fine Arts Degree

Admission Requirements: Complete, or be in the process of final completion of, two years of general college study (90 credits). Entrance determined solely by audition with previous grade-point average of only incidental concern. Students may enter only in Autumn Quarter. Application deadline is February 1 for auditions that are held in the spring. The student should contact the school for additional material required for application.

Major Requirements: In addition to the 90 credits required for admission, 45 credits in elective courses, plus DRAMA 121, 122, 123, 141, 142, 143, 155, 156, 157, 181, 182, 183, 221, 222, 223, 241, 242, 243, 255, 256, 257, 271, 272, 273, 371, 372, 373, and three quarters of 459.

Teaching Program: Teaching major or minor in drama. Information on requirements appears in the College of Education section of this catalog.

Graduate Programs

Master of 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); credits from 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

Information on this degree appears 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

Douglass C. North, Chairman; Appelbaum, Barzel, Bassett, Benjamin, Brown, Cartwright, Cheung, Cox, Crutchfield, Gillingham, Hadjimichalakis, Halvorsen, Hartman, Hashimoto, Higgs, Hopkins (emeritus), Huber, Kochin, Mah, McCaffree, McGee, Morris, Mund (emeritus), Nelson, North, Ozenne, Parks, Pollakowski, Rao, Silberberg, Thomas, Thornton, Trosper, Worcester. G. M. Brown, Jr., graduate program adviser.

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: Baccalaureate degree "With Collège Honors in Economics" or "With Distinction in Economics." Consult honors adviser about requirements.

Teaching Program: Teaching major or minor in economics. Information on requirements appears in the College of Education section of this catalog.

Graduate Programs

Master of Arts Degree

Admission Requirements: Undergraduate major in economics is not required. Admission applicants are judged on

performance in courses in which analytical skills are required such as intermediate microeconomic and macroeconomic theory 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 410, 480, 482, 500, 501, 502, 503; or the equivalent. Three additional courses in economics at the 500 level, not more than one of which can be in a "tool" area, such as mathematical economics, econometrics, price theory, and macroeconomics. 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); statistics and econometrics (ECON 480, 482). Three field examinations, at least one of which must come from an applied or nontool area. General Examination, 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, Altieri, Banta, Bentley, Blake, Blessing, Bowie, Brenner, Brown (emeritus), H. Burns (emeritus), W. Burns, Butwin, Carty, Clemens, Coldewey, Cox, Culbert, Duckett (emeritus), Dunlop, Dunn, Eby (emeritus), Emery (emeritus), Ethel (emeritus), Fisher, Fowler, Frank, Frey, Gere, Gerstenberger, Gould (emeritus), J. Griffith, M. Griffith, Guberlet (emeritus), Harris, Hatfield, Heilman (emeritus), Hilen (emeritus), Hudson, Irmscher, Jones, Kaplan, Kartiganer, Kaufman (emeritus), Kolpacoff, Korg, LaGuardia, Lockwood, Longyear, Magie, Matchett, McCracken, McElroy, Modiano, Oberg, Palomo, Pellegrini (emeritus), Person (emeritus), Phillips, Reinert, Requa, Rivenburgh (emeritus), Sale, Shulman, Simonson, Smith, Stanton, Stevick, Stewart, Stirling (emeritus), Streitberger, Vaughan, Wagoner, Walters (emeritus), Webb, Webber, Webster, Willeford, Willis (emeritus), Winther (emeritus), Yaggy, Zillman (emeritus). T. Lockwood, graduate program adviser.



Undergraduate Programs

Bachelor of Arts Degree

MAJOR REQUIREMENTS

Language and Literature: At least 50 credits in English at the 200 level and above, including at least 30 credits in 300- and 400-level courses. These 50 credits must include 5 credits within the period Beowulf to 1600, through Shakespeare, 5 credits in English literature within the period 1600-1780, 5 credits in English literature within the period 1780 to the present, and 5 credits in American literature. Recommended are ENGL 391, 393, one advanced writing course.

Composition and Advanced Writing: At least 50 credits in English at the 200 level and above, including at least 30 credits in 300- and 400-level courses. These 50 credits must include the courses required for the curriculum in language and literature, 10 elective credits in literature courses, and 20 credits in advanced writing courses (15 credits in upper-division courses in at least two forms [e.g., short story, novel, drama, poetry, expository writing]).

Honors Program: Baccalaureate degree "With College Honors in English" or "With Distinction in English." Consult honors adviser about requirements.

Teaching Program: Teaching major or minor in English. Information on requirements appears in the College of Education section of this catalog.

Graduate Programs

Master of Arts Degree

Admission Requirements: Bachelor of Arts degree 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 approved foreign languages (usually Latin, Greek, French, German, Spanish, Italian, or Russian).

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 major literary fields, satisfactory completion of broad 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.

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, Doermann, 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

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 in which environmental, economic, social, political, and other phenomena are structured spatially or regionally.

Faculty

Richard Morrill, Chairman; Beyers, Boyce, Chang, Fleming, Heath (emeritus), Hodge, Hudson (emeritus), Jackson, Kakiuchi, Krumme, Marts, Morrill, Romanowski, Sharp, 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, 226, 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 social 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

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; normally, reading knowledge of one foreign language. Programs are as outlined under Master of Arts degree. Interdisciplinary studies are encouraged or required as appropriate to these specializations (e.g., a working knowledge of a language for Eurasian studies; economic theory for regional analysis; data processing for spatial analysis).

GEOLOGICAL SCIENCES

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

Bernard W. Evans, Chairman; Adams, Barksdale (emeritus), Blacic, Bostrom, Cheney, Christensen, Coombs, Cowan, Dunne, Evans, Ghose, Gresens, Hanson, Mallory, McCallum, Misch, Porter, Rensberger, Stewart, Stuver, Vance, Washburn, Wheeler (emeritus), Whetten, Whitney. J. M. Rensberger, graduate program adviser.

Undergraduate Program

Bachelor of Science Degree

Admission: 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

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, Cros-son, Fairhall, Helms, Hodge, LaChapelle, Leovy, Lewis, Lister, Merrill, Parks, Raymond, J. D. Smith, S. W. Smith, Swarm, Untersteiner. C. F. Raymond, graduate program adviser.

Undergraduate Programs

An undergraduate degree is not offered.

Graduate Programs

Master of Science Degree

Area of Specialization: Solid Earth Geophysics—The earth's internal composition, structure, and dynamics, including seismology, tectonophysics, geothermal studies, and high-pressure properties of materials. **Geomagnetism and Aeronomy**—Origin and behavior of the earth's magnetic field, rock magnetism, investigations of the upper atmosphere, the ionosphere, and the magnetosphere. **Geophysical Fluid Mechanics**—Large-scale fluid motion in the atmosphere, ocean, and earth's interior.

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: 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.

GERMANICS

340 Denny

The Department of Germanics is concerned with the German language, literature, and civilization, with emphasis on present-day Germany, its history, literature, and philosophy and their role in Western civilization; and linguistic analysis, especially historic, of the Germanic languages. The department offers in English some courses on well-known authors, designed especially for the nonmajor.

Faculty

George Buck, Chairman; Ammerlahn, Ankele (emeritus), Barrack, D. Behler, E. Behler, Buck, Dunnhaupt, Garrin, Hertling, Hill, Hruby, McLean, Meyer (emeritus), Rabura, Rey, Sauerlander (emeritus), Sherwin (emeritus), South, Voyles, Wesner (emeritus), Wilkie (emeritus), Ziemann. S. McLean, graduate program adviser.

Undergraduate Programs

Bachelor of Arts Degree

Major Requirements: Traditional major—34 credits in core courses: GERM 301, 302, 303; 310, 311, 312, 401, 402; 413, 414; 18 credits of electives in upper-division German courses. German Area Studies—25 credits of lower-division college German or equivalent; 25 credits of upper-division German courses including courses offered in English; 20 credits chosen from one of five interdepartmental areas of specialization; a senior thesis. At least a C must be earned in every upper-division German course; a 2.50 grade-point average must be maintained in these courses.

Honors Program: Baccalaureate degree "With College Honors in German" or "With Distinction in German." Consult honors adviser about requirements.

Teaching Program: Teaching major or minor in German. Information on requirements appears in the College of Education section of this catalog.

Graduate Programs

Master of Arts Degree

Admission Requirements: Bachelor of Arts degree with major in German or equivalent background.

Graduation Requirements: A minimum of 36 credits, plus either a final comprehensive examination or a master's thesis. Concentration on German literature, civilization, and philosophical traditions, with supplementary course work in at least one of the following three areas: philology and linguistics; stylistics, methodology, and pedagogy; related courses outside the Department of Germanics. Reading knowledge of one foreign language (usually German).

Doctor of Philosophy and Doctor of Arts Degrees

The Doctor of Philosophy curriculum serves the needs of the future professor at universities and colleges, stressing scholarship and research; the Doctor of Arts curriculum is designed to prepare future teachers at community and four-year colleges, with a primary stress on pedagogy.

Admission Requirements: 36 credits of graduate studies in Germanics plus research thesis or equivalent of master's degree in Germanics.

Graduation Requirements: Study period of two years following the attainment of the master's degree (for a total of 90 credits), followed by general written and oral examinations. Reading knowledge of a second language subject to approval by the department. A fourth year is reserved for the writing of the dissertation and, in the Doctor of Arts curriculum, for an internship of at least two quarters.

During the final two years of course work for the Doctor of Philosophy degree, concentration on either "Literature and Civilization" and "German Philosophical Traditions," or "Philology and Linguistics" and "Literature and Civilization," plus supplementary course work in other areas (philology and linguistics; German philosophical traditions; stylistics, methodology, and pedagogy; related courses outside the department). During the final two years of course work for the Doctor of Arts degree, concentration on "Methodology and Pedagogy" and "Literature and Civilization," plus supplementary course work in other areas (philology and linguistics; German philosophical traditions; related courses outside the department). The doctoral dissertation for both degrees must be an original contribution to scholarship and must demonstrate mastery of the pertinent methods of investigation.

HISTORY

315 Smith

History undertakes the study of human affairs in a manner that seeks to understand change and development rather than the state of things at a given moment, taking into account societies in diverse parts of the world from the earliest times for which written records exist to the present.

Faculty

Donald W. Treadgold, Chairman; Alden, Bacharach, Bell, Bestor, Boba, Bridgman, Burke, Butow, Carstensen (emeritus), Conlon, Costigan (emeritus), Dull, Ellison, Emerson, Ferrill, Flint, Fowler, Gil, Griffith, Griffiths, Hankins, Holl, Holt (emeritus), Johnson, Kapp, Katz, Kilcup, Levy, Lipstadt, Lytle, Palais, Pease, Pinkney, Pressly, Pyle, Saum, Savelle (emeritus), Solberg, Sugar, Szeftel (emeritus), Temmel, 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 2.00 or higher. At least 5 credits each of ancient, medieval, modern European, and American history (e.g., HST 111, 112, 113 and HSTAA 201 or 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 un-

dergraduate advisers. Transfer students are required to complete a minimum of 15 upper-division credits in history at the University of Washington.

Honors Program: Baccalaureate degree "With College Honors in History" or "With Distinction in History." Consult honors adviser about requirements.

Teaching Program: Teaching major or minor in history. Information on requirements appears in the College of Education section of this catalog.

Graduate Programs

Master of Arts Degree

Admission Requirements: Strong undergraduate program in history; grade-point average above 3.00, especially in history and related subjects and particularly in the final two years of work; Graduate Record Examination verbal aptitude score in the 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 from the arts, and applies this knowledge to improve the lives of families and individuals.

Faculty

Mary Louise Johnson, Director; Brockway (emeritus), Buerger, Childs, Fontana, Granberg, Hall, Johnson, King, Martinsen, McAdams (emeritus), Monsen, Ostrander, Pipes, Terrell (emeritus), Worthington, Yamanaka. M. L. Johnson, graduate program adviser.

Undergraduate Programs

Bachelor of Science Degree

CLINICAL DIETETICS

Admission Requirements: Candidates compete for admission after completing the prerequisite course work with a minimum grade-point average of 2.50. Required for admis-



sion: 90 credits, including CHEM 140, 150, 151, 231, 232; H EC 307, 314; MATH 105 (or a score of 55 on the mathematics achievement portion of the Washington Pre-college Test); MICRO 301, 302; ZOOL 118, 119.

Major Requirements: The last two years of the curriculum coordinate didactic learning with clinical experiences in area health-care facilities and community programs. Graduates of the program meet the academic and clinical requirements for membership in the American Dietetic Association, and they are prepared to assume entry-level positions in clinical dietetics. For courses required in the last two years, see the Home Economics adviser. A student who fails to achieve a grade of C or above in a required course must repeat the course. A student may not register for a subsequent clinical course without first having completed the prerequisite clinical course with a grade of C or above. A student whose overall University grade-point average falls below 2.50 will be placed on probation in the program and, upon failing to raise the grade-point average to 2.50 in the two subsequent academic quarters, will be dismissed from the program.

NUTRITIONAL SCIENCE AND FOODS

Admission Requirement: Minimum 2.50 college grade-point average.

Major Requirements: H EC 307, 314, 317, 405, 407, 409, 410, 411, 415, 457; BIOC 405; CHEM 140, 150, 151, 231, 232 (or 235, 236), 241, 242; MATH 105; MICRO 301, 302; BIOST 472 or EDPSY 490 or Q SCI 281; ZOOL 208 or P BIO 360; 11 credits of anthropology, economics, psychology, sociology.

Bachelor of Arts Degree

TEXTILES AND CLOTHING

Admission: No students will be admitted until the curriculum is revised.

Major Requirements: Program now under revision. For information, see Home Economics adviser.

Graduate Programs

Master of Science Degree

Graduation Requirements: 45 credits combining work in dietetics, food, and/or nutrition, or textiles, with 12 credits in natural science. Thesis required.

Master of Arts Degree

Graduation Requirements: 45 credits combining work in textiles and clothing, or dietetics, with 12 credits of a minor other than natural science in any field relative to home economics. Thesis required.

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, Ioup, Newmeyer, Saporta, Williams. S. Saporta, graduate program adviser.

Undergraduate Program

Bachelor of Arts Degree

Major Requirements: LING 200 or 400; 451, 452, 453; 461, 462, 463; at least one year of a non-Indo-European language; at least one year of an Indo-European language; 20 credits of specified courses in other departments or courses in linguistics.

Graduate Programs

Master of Arts Degree

Admission Requirements: Completion of 45 credits of undergraduate language study, implying attainment of proficiency in one language other than the student's native language, is recommended.

Graduation Requirements: Familiarity with several languages is desirable; 36 credits, of which at least 18 credits must be in courses at the 500 level or above, including 9 credits in LING 700; comprehensive examination; thesis. Attendance at the Linguistic Society of America Summer Institute is strongly recommended.

Doctor of Philosophy Degree

Admission Requirements: The department may grant a student permission to proceed directly to work on the doctoral degree without having acquired the Master of Arts degree, or may first require an individual to satisfy the requirements for the Master of Arts degree.

Graduation Requirements: Completion of the Master of Arts degree program or 36 credits in linguistics and related areas; 54 additional credits, including 3 credits in LING 599 and 27 credits in LING 800; supervised teaching in phonology, syntax, historical linguistics; General Examination; dissertation; Final Examination.

MATHEMATICS

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

Jack Segal, Chairman; Arsove, Avann, Baxter, Beaumont, Benda, Bendersky, Birnbaum (emeritus), Blumenthal, Brownell, Bungart, Chan, Chapman, Corson, Curjel, Curtis, Dekker, Dubisch, Durfee, Erickson, Folland, Gangolli, Glickfeld, Glicksberg, Goldstein, Grunbaum, Halsey, Haris, Hewitt, Hungerford, Jans, Johnson, King, Kingston, Klee, Lind, McFarlan (emeritus), Michael, Minbashian,

Monk, Moore, Morel, Morrow, Namioka, Ness, Nunke, Osborne, Ozols, Pearson, Phelps, Pincus, Pyke, Ragozin, Rockafellar, Sarason, Scholz, Segal, Shorack, Smythe, Stout, Sullivan, Warfield, Warner, Westwater, Zuckerman (emeritus). C. Curjel, graduate program adviser.

Undergraduate Programs

Bachelor of Arts Degree

Admission: Four years of high school mathematics recommended.

LIBERAL ARTS OPTION

Major Requirements: 50 approved credits in mathematics, including MATH 124, 125, 126, 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 a major or minor in mathematics.

In both options above, 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, 302, 324 or 327, and 9 credits in courses numbered 400 or above in each of two of the following categories: algebra, analysis (not numerical), geometry, and statistics; one year of freshman physics (preferably PHYS 121, 122, 123).

MATHEMATICAL STATISTICS OPTION

Major Requirements: 54 approved credits in mathematics, including MATH 124, 125, 126, 302, 303, 327, 328 (or equivalent), 394, 395, 482, 483, and two of the following three courses: MATH 396, 484, 485; one year of freshman physics (preferably PHYS 121, 122, 123).

NUMERICAL ANALYSIS OPTION

Major Requirements: 54 approved credits in mathematics, including MATH 114, 124, 125, 126, 238, 302, 303, 324 or 327, 374, 438, 464, 465, 466 (upon request 407 may be substituted for 466); one year of freshman physics (preferably PHYS 121, 122, 123).

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." Consult honors adviser about requirements.

Graduate Programs

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. The 18 credits in courses numbered 500 or above should be distributed over no more than three sequences.

Master of Arts for Teachers Degree

Admission Requirement: Baccalaureate degree with background in mathematics.

Graduation Requirements: 36 credits; 33 at the 400 level or above, remaining 3 at the 400 level or above in mathematics or at the 300 level or above in another field; 18 credits must be at the 500 level or above, and at least 15 of these credits must be in mathematics courses; 9 credits must be thesis. There is no foreign-language requirement.

Master of Science Degree

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

Graduation Requirements: With Thesis—36 credits, including 9 credits of thesis; a minimum of 27 approved credits in courses numbered 400 or above, with at least 18 credits in courses numbered 500 or above. The courses must include at least 6 credits each in analysis, algebra, and one other field. Demonstration of proficiency in French, German, or Russian. Thesis should contain original research. **Without Thesis**—Formal admission to candidacy for the Doctor of Philosophy 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 the following: French, German, Russian; dissertation; and Final Examination.

MICROBIOLOGY AND IMMUNOLOGY

G305 Health Sciences

The Department of Microbiology and Immunology is a basic biological science department concerned with microbiology and immunology. Microbiology is a branch of nat-



pral science that deals with microscopic organisms, including bacteria, viruses, fungi, protozoa, and algae. It is concerned with the nature and properties of these organisms and their effects on man and the environment.

Immunology is a branch of natural science that deals with specific and nonspecific resistance to tissue injury by both foreign and autochthonous substances. The mechanisms of resistance involve primarily the activities of leukocytes and antibodies, including those concerned with the specific immune response.

Faculty

John C. Sherris, Chairman; Barnes, Champoux, Chilton, Claggett, Clausen, Coyle, Cramer, Douglas, Evans, Falkow, Gilliland, Groman, Hakomori, Hellstrom, Holmes, Kenny, Kiehn, Klebanoff, Lara, Laxson, Mannik, Memmer, Minshew, Nester, Nowinski, Ordal, Parkhurst, Pearsall, Pollack, Pollock, Portman, Ray, Schoenkecht, Sherris, Staley, Storb, Weiser, Whiteley, Wright.

Undergraduate Programs

Bachelor of Science Degree

Admission Requirements: A minimum of 75 credits with overall grade-point average of 2.00 and, unless specifically waived, a grade-point average of 2.50 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; a minimum of 30 credits in microbiology courses and approved electives, including MICRO 400, 401, 430, 431, 441, 442, 443, and 496 (MICRO 101, 301, 302, 319, 351 cannot be used); a minimum grade-point average of 2.00 in the required microbiology courses as well as in the entire 30 credits of microbiology and approved electives; PHYS 114, 115, 116 or 121, 122, 123; CHEM 140, 150, 151, 160; CHEM 231, 232 or 231, 235, 236 or 335, 336, 337 (three-quarter sequence preferred); CHEM 221; MATH 124 or 157 or Q SCI 281 or 291.

Double Degree Program in Medical Technology: A five-year program is offered by the Department of Microbiology and Immunology and the Department of Laboratory Medicine to a limited number of students. Consult the Microbiology and Immunology academic affairs office, G303 Health Sciences, for information on admission requirements.

Honors Program: Baccalaureate degree "With College Honors in Microbiology and Immunology" or "With Distinction in Microbiology and Immunology." Consult honors adviser about requirements.

Graduate Programs

Students who plan to pursue a graduate degree program in microbiology and immunology should consult the School of Medicine, Microbiology and Immunology, section of this catalog.

MUSIC

106 Music

Music is studied as a creative art, viewed through its literature and compositional techniques and in the laboratory of performance.

Instruction in dance is also administered by the School of Music (see Dance in this section of the catalog).

Faculty

John T. Moore, Director; Babb, Beale, Benshoof, Bergsma, Bissell, Brazil, Carlsen, Chapple (emeritus), Clarke, Cooper, Curtis-Verna, Dempster, Dorsey, Eichenberger, Eichinger, Garfias, Geissmar, Grossman, Harman, Harris (emeritus), Heinitz, Hokanson, Irvine, Jussila, Kauffman, Kechley, Kind, Krachmalnick, Leuba, Lishner, Lundquist, McColl, McInnes, Moore, Munro (emeritus), O'Doan, Rahn, Rosinbum, Siki, Skowronek, Smith, Sokol, Stern, Storch, Terry (emeritus), Troy, Tufts, Verrall (emeritus), Weltman, Werner (emeritus), Woodcock (emeritus), Zetlin (emeritus), Zsigmondy. J. M. Beale, graduate program adviser.

Undergraduate Programs

Admission Requirements: All students must audition to the level of private instruction in their principal performance areas to qualify as music majors and receive private instruction, and must pass an examination in basic piano. Students proficient in another instrument or voice, but deficient in basic piano, may begin their musical studies, but must enroll in MUSIC 136 until proficiency is established.

Core Requirements: The music theory-history core, required in each of the undergraduate curricula, is as follows:

Courses	Credits
MUSIC 110, 111, 112 First-Year Theory (3,3,3)	9
MUSIC 113, 114, 115 Ear Training (1,1,1)	3
MUSIC 210, 211, 212 Second-Year Theory (3,3,3)	9
MUSIC 213, 214, 215 Music After 1750 (3,3,3)	9
MUSIC 310 Modal Counterpoint (3)	3
MUSIC 311 Tonal Counterpoint (2)	2
MUSIC 312 Contemporary Idioms (3)	3
MUSIC 313, 314 Music Before 1750 (3,3)	6
MUSIC Upper-division theory or history electives	10

54

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; 2.50 grade-point average in music courses.

VOCAL OR INSTRUMENTAL OPTION

Major Requirements: Music theory-history core, excluding the 10 credits in theory or history electives, plus 9 credits in lower-division vocal or instrumental instruction, 9 credits in upper-division vocal or instrumental instruction, and 8 credits in ensembles, for a total of 70 credits; 2.50 grade-point average in music courses.

Bachelor of Arts and Bachelor of Music Degree (Concurrent)

General Requirements: A minimum of 225 credits, of which 90 must be in areas other than music; all College of Arts and Sciences graduation requirements must be met.

Major Requirements: 2.50 grade-point average in music courses.

COMPOSITION MAJOR

Courses	Credits
Music theory-history core	54
MUSIC 191, 291, 391, 491 Composition (6,6,6,6)	24
MUSIC 487 Tonal Counterpoint (3)	3
MUSIC 280, 380, 381, 382 Conducting (1,1,1,1)	4
Vocal or instrumental instruction	24
Ensembles	12
Music electives	6
	<hr/> 127

MUSIC HISTORY MAJOR

Courses	Credits
Music theory-history core	54
5 credits from MUSIC 316, 317, 318	5
3 credits from MUSIC 400, 401, 402, 403	3
3 credits from MUSIC 404, 407, 410, 413, 416, 417, 420	3
3 credits from MUSIC 405, 408, 411, 414, 418, 421	3
3 credits from MUSIC 406, 409, 412, 415, 419, 422, 423	3
Music history-literature electives	9
Music electives	9
Vocal or instrumental instruction	24
Ensembles	12
	<hr/> 125

Students who intend to pursue graduate studies are strongly advised to establish proficiency in German or French and to acquire some acquaintance with one or two additional foreign languages. For emphasis in ethnomusicology, consult the music adviser regarding suitable area studies other than music.

PIANO MAJOR

Courses	Credits
Music theory-history core	54
MUSAP 160, 260, 360 Private Instruction: Piano	27
MUSAP 460 (two years) Private Instruction: Piano	18
MUSIC 323, 324, 325 Accompanying (2,2,2)	6
MUSIC 326, 327, 328 Repertoire (2,2,2)	3
MUSIC 434, 435, 436 Pedagogy (2,2,2)	6
MUSIC 479 Senior Recital	1
Ensembles	15
	<hr/> 133

STRING INSTRUMENT MAJOR

Courses	Credits
Music theory-history core, to include	54
MUSIC 487 Tonal Counterpoint	3
MUSAP 161, 163, 164, 178, 261, 263, 264, 278, 361, 363, 364, 378 Private Instruction: Violin-Viola, Violoncello, Viola da Gamba, Contrabass	27
MUSAP 461, 463, 464, 478 (two years) Private Instruction: Violin-Viola, Violoncello, Viola da Gamba, Contrabass	8
MUSIC 479 Senior Recital	1
MUSIC 434, 435, 436 Pedagogy (2,2,2)	6
MUSAP 140 Private Instruction: Piano or MUSIC 236 Secondary Piano	6
MUSIC 280 Basic Principles of Conducting	1
Ensembles	21
	<hr/> 134

Violinists should complete one quarter of viola.

VOICE MAJOR

Courses	Credits
Music theory-history core	54
MUSAP 162, 262, 362 Private Instruction: Voice	27
MUSAP 462 (two years) Private Instruction: Voice	18
MUSAP 140 Private Instruction: Piano or MUSIC 236 Secondary Piano	6
MUSIC 233 Music Theatre Technique	1
MUSIC 280, 380, 381, 382 Conducting (1,1,1,1)	4
MUSIC 309 Advanced Music Theatre Technique	1
MUSIC 323 Accompanying	2
MUSIC 326, 327, 328 Repertoire (2,2,2)	3
MUSIC 434, 435, 436 Pedagogy (2,2,2)	6
MUSIC 479 Senior Recital	1
Ensembles	12
	<hr/> 138

Voice majors should establish proficiency in French, German, or Italian and complete an additional 15 credits in a second language from this group as well as 5 credits in SPHSC 300 (Speech Science).

ORGAN MAJOR

Courses	Credits
Music theory-history core, to include MUSIC 487 Tonal Counterpoint	54
MUSAP 165, 265, 365 Private Instruction: Organ	27
MUSAP 465 (two years) Private Instruction: Organ	18
MUSIC 479 Senior Recital	1
MUSIC 323, 324 Accompanying (2,2)	4
MUSIC 326, 327, 328 Repertoire (2,2,2)	3
MUSIC 280, 380, 381, 382 Conducting (1,1,1,1)	4
Ensembles	12
	<hr/> 126

ORCHESTRAL INSTRUMENT MAJOR

Courses	Credits
Music theory-history core	54
MUSAP 166 through 176, 266 through 276, 366 through 376 Private Instruction	27
MUSAP 466 through 476 (two years) Private Instruction	18
MUSIC 479 Senior Recital	1
MUSAP 140 Private Instruction: Piano or MUSIC 236 Secondary Piano	6
MUSIC 280, 380, 381, 382 Conducting (1,1,1,1)	4
Ensembles	21
	<hr/> 131

General requirements for each Music Education option:

MUSIC EDUCATION MAJOR

Courses	Credits
Music theory-history core (see special inclusions below)	54
MUSIC 340 Music in General Education	3
Two courses from the following:	6
MUSIC 432 The General Music Class (3) MUSIC 440 Music in Early Childhood (3) MUSIC 441 Music in Later Childhood (3) MUSIC 443 Choral Curriculum: Methods and Materials (3) MUSIC 280, 380, 381, 382 Conducting (1,1,1,1)	4
Major performance medium	18-24
Secondary performance medium	12-18
(Major and secondary performance media to total 36)	
Performance electives	6
Ensembles (minimum of one year of choral ensemble required)	12
	<hr/> 115-127

Information concerning special procedures for students pursuing teacher certification should be obtained from the Music Education office, 331 Music.



Requirements for specific options:

GENERAL MUSIC (ELEMENTARY AND SECONDARY)

Music theory-history core to include: 5 credits from MUSIC 316, 317, 318 (Music Cultures of the World). Music education methods to include: MUSIC 440 (Music in Early Childhood); MUSIC 441 (Music in Later Childhood), for persons pursuing the elementary emphasis; MUSIC 432 (The General Music Class), 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

Music theory-history core to include: MUSIC 334 (Band Arranging) or 490 (Orchestration). 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 136 (Basic Keyboard); 137, 138, 139 (Class Instruction: Voice); and 16 credits from the following: MUSIC 220, 221, 222 (String Techniques and Pedagogy), MUSIC 226, 227, 228 (Woodwind Techniques and Pedagogy), MUSIC 229, 230, 231 (Brass Techniques and Pedagogy), and MUSIC 232 (Percussion Techniques and Pedagogy). Major performance medium must total 24 credits.

CHORAL

Music education methods to include MUSIC 443 (Choral Curriculum: Methods and Materials). Major and secondary performance media must be piano and voice, or voice and piano. Major performance medium must total 24 credits.

Bachelor of Music Degree

Intended for a limited number of specially qualified students who wish to emphasize professional training in performance within a four-year program.

General Requirements: A minimum of 180 credits of which 60 must be taken in departments other than the School of Music. The 60 credits must include the basic proficiency requirement of the College of Arts and Sciences and no fewer than 20 credits in each of two fields (humanities, social sciences, or natural sciences).

Major Requirements: Grade-point average of 3.20 in music courses; 54 credits in a theory-history sequence to include MUSIC 110, 111, 112, 113, 114, 115, 210, 211, 212, 213, 214, 215, 310, 311, 312, 313, 314, and 10 credits to complete the total.

PIANO MAJOR

Music theory-history core; 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

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.

STRING INSTRUMENT MAJOR

Music theory-history core; 50 credits in MUSAP 161, 163, 164, 178, 261, 263, 264, 278, 361, 363, 364, 378, 461, 463, 464, 478; MUSIC 379, 479; 12 credits in ensembles; 8 credits in approved music electives. Total music credits: 124.

VOICE MAJOR

Music theory-history core; 50 credits in MUSAP 162, 262, 362, 462; MUSIC 379, 479; 12 credits in ensembles; 12 credits in approved music electives. Total music credits: 128.

ORCHESTRAL INSTRUMENT MAJOR

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

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 baccalaureate degree and teacher certification at the secondary or elementary level appears in the College of Education section of this catalog.

HONORS PROGRAM

Baccalaureate degree "With College Honors in Music" or "With Distinction in Music." Consult honors adviser about requirements.

Graduate Programs

Master of Arts for Teachers Degree

Admission Requirements: At least one year of teaching experience and permission.

Graduation Requirements: 36 credits, of which 18 must be in courses at the 500 level or above and 30 must be in approved music courses. Final written and oral examination.

Master of Music Degree

Areas of Specialization: Performance (piano, organ, voice, strings, other orchestral instruments), instrumental conducting, choral conducting, composition, opera production.

Admission Requirements: Audition required for entrance to performance, 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 pro-

iciency 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 theory, historical musicology, ethnomusicology, systematic musicology, music education.

Admission Requirements: Examination for entrance to music history or music theory. Graduate Record Examination for entrance to systematic musicology. Entrance to other areas by permission.

Graduation Requirements: 36 credits, of which 18 must be in courses at the 500 level or above and 9 in thesis. Demonstration of proficiency in one language from among French, German, Italian, 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 for performance, instrumental conducting, and composition. Entrance to other areas by permission. Demonstration of proficiency in one language from among 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 musicology; systematic musicology; ethnomusicology; music theory.

Admission Requirements: Examination for entrance to historical musicology or music theory. Graduate Record Examination for entrance to systematic musicology. Entrance to other areas by permission. Demonstration of proficiency in German and a second language from among French, Italian, 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, literature and civilization, with some attention being paid to more recent cultural developments.

Faculty

Farhat J. Ziadeh, Chairman; Andrews, Clear, Heer, Jacobi, Loraine, MacKay, Ziadeh. N. L. Heer, graduate program adviser.

Undergraduate Program

Bachelor of Arts Degree

Major Requirements: An approved program of 30 credits (excluding language courses) in courses offered by the department or courses on the Near East offered by other departments, or both, plus at least 9 credits in literature courses at the 400 level in the major language for which courses numbered 101-102, 103 and 201, 202, and 203 are usually prerequisites. Summer study opportunities in Tunisia and Egypt are available for a limited number of students on competitive basis.

Graduate Programs

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.

Doctor of Philosophy Degree

The Doctor of Philosophy degree is offered only in Arabic or Turkish.

Admission Requirements: Same as for the Master of Arts degree, except that the sample of written work should represent the student's most advanced work on a Near Eastern subject; master's degree in some aspect of Near Eastern studies.

Graduation Requirements: Fulfillment of University requirements; course work after the master's degree as planned by the student's Supervisory Committee; qualifying examination consisting of two major parts (part I, which is the examination described for the master's degree, is not required for students who have already passed it; part II is a written examination on three specific fields in the student's major language area, followed by a single oral examination covering all three fields); demonstration of a reading knowledge of both French and German, dissertation, and Final Examination.



OCEANOGRAPHY

108 Oceanography Teaching

Oceanography is the environmental science that examines processes in the ocean and the interrelation of the ocean with the earth and the universe. Study includes chemical composition of seawater; seawater in motion; interactions between sea and atmosphere, sea and land, sediments and rocks beneath the sea; physics of the sea and sea floor; and life in the sea.

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

Maurice Rattray, Jr., Chairman; Richard W. Sternberg, Associate Chairman for Instruction; Francis A. Richards, Associate Chairman for Research; Aagaard, Anderson, Baker, Banse, Barnes (emeritus), Burns, Carpenter, Cline, Coachman, Creager, Criminale, Damkaer, Desaubies, Duxbury, Emerson, English, Ewart, Feely, Fleming, Frost, Galt, Glassley, Gregg, Halpern, Hayes, Henry, Hickey, Irish, Jumars, Lam, Larsen, Lewin, Lewis, Ling, Lister, Lorenzen, Martin, McCulloh, McManus, Merrill, Murphy, Murray, Pavlou, Perry, Rattray, Richards, Roden, Schoener, Smith, Sternberg, Taft, Wearn, Welander, Winter, Worsley.

Undergraduate Programs

Bachelor of Arts Degree

Admission: Suggested high school curriculum to include physics, chemistry, biology, four years of mathematics.

Major Requirements: MATH 124, 125, 126; CHEM 140, 150, 151, 160; PHYS 121, 122, 123, with laboratory if in physical option; principal option and two supporting options in oceanography, of which one must be physical oceanography.

Bachelor of Science Degree

Admission: Same as for the Bachelor of Arts degree.

Major Requirements: MATH 124, 125, 126; CHEM 140, 150, 151, 160; PHYS 121, 122, 123, with laboratory if in physical option; one principal option and three supporting options, which must include physical oceanography, and 10 or more credits in upper-division science or mathematics courses.

PRINCIPAL OPTIONS

Biological

BIOL 210, 211, 212, 472; CHEM 231, 232, or 231, 235, 236; GENET 451; OCEAN 434, 435 and 15 credits of biologically related courses approved by an adviser.

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, 427; OCEAN 450, 451, 452 or 457, and 453; PHYS 221, 222, 223, 321, 322, 323.

Physical

ATM S 301 (not required if atmospheric sciences sequence that follows is chosen); ATM S 340, 441, 442, or PHYS 321, 322, 323, or OCEAN 511, 512, 513; MATH 328, 427; MATH 238 or OCEAN 341; MATH 327 or OCEAN 342; A A 470; PHYS 131, 221, 222, 223; OCEAN 417, 418, 419.

SUPPORTING OPTIONS

Biological

BIOL 101-102; OCEAN 433.

Chemical

CHEM 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." Consult honors adviser about requirements.

Graduate Programs

Master of Science Degree

Admission Requirements: Grade records, letters of recommendation, and the results of the Graduate Record Examination. Students should acquire a broad background in science and mathematics and are encouraged to have knowledge of a foreign language. The student specializes in biological, chemical, geological, geophysical, or physical oceanography.

Graduation Requirements: Program of study approved by the student's supervisory committee, including one principal option, three supporting options, and other courses in science and mathematics. Departmental comprehensive written examination. The supervisory committee must be consulted about language requirements. *With Thesis*—Thesis approved by the supervisory committee must be presented at a seminar. *Without Thesis*—Requires an approved research activity; written or oral reports are decided upon by the supervisory committee.

Doctor of Philosophy Degree

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

Graduation Requirements: Program planned by the student and his Supervisory Committee includes one principal option and three supporting options in oceanography and

courses in science and mathematics. General Examination in oceanography and supporting fields. Dissertation. Final Examination.

PHILOSOPHY

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, esthetics, political philosophy, the philosophy of religion, and the history of philosophy.

Faculty

David Keyt, Chairman; Boler, Burke, Clatterbaugh, Coburn, Cohen, Crocker, Dietrichson, Keyt, Kirk, Lucian, Marks, Mish'alani, Potter, Rader (emeritus), Richman, Small, Thomas. C. Marks, K. Clatterbaugh, graduate program advisers.

Undergraduate Programs

Bachelor of Arts Degree

Major Requirements: 50 credits in philosophy, of which at least 25 must be earned at the University of Washington; at least four courses, selected by the student, at the 400 level or above, excluding transfer credits and reading courses (PHIL 484 and 584), which normally cannot be used to satisfy this requirement.

Honors Program: Baccalaureate degree "With College Honors in Philosophy" or "With Distinction in Philosophy." Consult honors adviser about requirements.

Graduate Programs

Master of Arts Degree

Admission Requirements: An undergraduate major in 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.

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 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. Health education involves the study of human behavior in terms of its health consequences for man and his environment and the educational processes of change in health-related behavior as these effect the promotion of health and prevention of disease among individuals, groups, and communities.

Faculty

W. R. Morford, Director; Abernathy (emeritus), Berryman, Broer (emeritus), Buckley (emeritus), Doolittle, Fox, Horne (emeritus), Hughes, Hutton, Ingham, Kerr, Kidwell (emeritus), Kunde (emeritus), Lawson, MacLean (emeritus), Mast, Mathews, Miller, Mills (emeritus), Morford, Peek (emeritus), Purdy, Reeves (emeritus), Renick, Smoll, Torney (emeritus), Wilson (emeritus), 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: 3.00 grade-point average at time of entry or after one year in residence after having completed a minimum of three required courses in the major; interview by an appropriate committee; written recommendation by a faculty member associated with the human movement studies program stating the academic qualifications and potential of the applicant.

Major Requirements: PE 301, 302, 325, 331, 332, and 350; ZOOL 118 and 119 or 208; B STR 301; PSYCH 101; SOC 110; area of specialization—18 approved credits beyond the courses listed above, including at least five departmental courses at the 400 level or above.

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 included in these credits).

HEALTH EDUCATION

Admission Requirements: 90 credits, including 45 credits of the College of Arts and Sciences distribution requirement; ZOOL 118 or 208, PSYCH 101, H ED 250; a cumulative grade-point average of 2.00 and a grade-point av-



erage of 2.50 in the biological and social sciences. Admission limited to Autumn Quarter only; application must be made no later than the first day of the preceding Spring Quarter.

Major Requirements: Core courses: H ED 251, 321, 322, 421, 422. Related-fields courses: G ST 350, HSERV 411. **Options**—liberal arts emphasis: 21 additional credits; professional emphasis: 21 additional credits.

Teaching Programs: Teaching major or minor in physical education and teaching major in health education. Information on requirements appears in the College of Education section of this catalog.

Nondegree Program

Athletic Training: Athletic trainers are concerned primarily with the prevention and amelioration of athletic injuries. They ensure that treatment prescribed by a licensed physician is appropriately executed, and are responsible for the administration of an injury-reporting and record-keeping system. They also cooperate with the coaching staff in designing conditioning programs. The athletic training program, approved by the National Athletic Trainers Association (NATA), is offered with the cooperation of the Division of Sports Medicine in the Department of Orthopaedics as a service to students wishing to take the NATA certification examination. It may be taken in conjunction with any major, but in order to be eligible for the NATA certification examination the major must lead to teacher certification.

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, Blair, Bodansky, Boulware, Brown, Burnett, Cahn, Clark,

Cook, Cramer, Dash, Davisson, Dehmelt, Ellis, Fain, Farwell, Fortson, Geballe, Gerhart, Halpern, Henderson (emeritus), Henley, Higgs (emeritus), Ingalls, Kenworthy (emeritus), Lord, Lubatti, L. McDermott, M. McDermott, Miller, Mockett, Moriyasu, Neddermeyer (emeritus), Parks, Peierls, Peters, Puff, Rehr, Riedel, Rothberg, Sanderman (emeritus), Schick, Schmidt, Stern, Streib, Uehling (emeritus), Vilches, Vlases, Weis, Weitkamp, Wilets, Williams, Young. E. N. Fortson, 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, 133, 221, 222, 223, 231, 232, 321, 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 approved 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) basic computer programming skill (ENGR 141 or equivalent); (8) 9 credits selected from physical or biological sciences other than physics and mathematics, or from history or philosophy of science, in addition to any courses in these fields taken to fulfill requirement 4. Courses taken on a credit/no credit or satisfactory/not satisfactory 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: Baccalaureate degree "With College Honors in Physics" or "With Distinction in Physics." Consult honors adviser about requirements.

Teaching Program: Teaching major and minor in physics. Information on requirements appears in the College of Education section of this catalog.

Graduate Programs

Master of Science, Doctor of Philosophy, and Doctor of Arts in Teaching Degrees

Admission Requirements: Undergraduate preparation to include upper-division courses in mechanics; electricity and magnetism; statistical physics and thermodynamics; modern physics, including an introduction to quantum mechanics; and advanced laboratory work. Preparation in mathematics to include vector analysis, complex variables, ordinary differential equations, Fourier analysis, boundary value problems, and special functions. Admission is based on the undergraduate academic record, letters of recommendation, and the aptitude and advanced physics parts of the Graduate Record Examination. In exceptional cases, admission is granted without strong GRE scores when there

is other evidence of ability in physics. 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 strong Graduate Record Examination scores 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 may repeat the preliminary examination 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. Final examination, usually oral. No thesis is required. There is no foreign-language requirement.

Doctor of Philosophy Degree

Graduation Requirements: The student is expected to obtain (here or elsewhere) a background in physics equivalent to that contained in the following sequences of basic graduate courses: PHYS 505, 506; 513, 514, 515; 517, 518, 519; 524, 525; 527, 528, 529; and 566; and in specialized courses appropriate to each student's interests. A record of satisfactory performance is expected in all courses attempted in the physics department. The student is required to pass, successively, a written qualifying examination (in the second year), an oral General Examination for admission to candidacy (usually in the third year), and an oral Final Examination. In order to take the General Examination, the student must have been accepted by a graduate faculty member as a research student. This examination covers the area in which the dissertation research is planned. Teaching experience is required of all candidates. There is no foreign-language requirement.

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 and its applications, 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. The student must pass the same examinations as required for the Doctor of Philosophy degree. In the General Examination, a student presents a talk on an elementary physics topic at a level suitable for an undergraduate audience and is examined on knowledge of the basic physics of the topic. The teaching requirements for this degree are participation (usually in the second year) in the teaching and organization of an upper-division undergraduate laboratory course; and at least two quarters of teaching internship, involving participation in organizing a course and in giving a substantial number of lectures. The dissertation 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. There is no foreign-language requirement.

POLITICAL SCIENCE

101 Gowen

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

Donald Matthews, Chairman; Bennett, Bone, Brass, Cassinelli, Chandler, Cole (emeritus), Gore, Gottfried, Hart-Nibbrig, Hitchner, Horowitz, Kroll, Lee, Lev, Levi, Martin (emeritus), Matthews, Meranto, Modelski, Mosher, Paul, Pealy, Reshetar, Riley, Robinson, Rohn, Rosenberg, Scheingold, Shepro, Shipman (emeritus), Teuber, Townsend, Webster (emeritus), Warwick. D. Hitchner and S. Scheingold, graduate program advisers.

Undergraduate Programs

Bachelor of Arts Degree

Major Requirements: 50 credits in political science, including any three of the following: 101, 201, 202, 203, 204. At least 10 credits in upper-division courses in each of the following three groups: Group I, Political Theory and Public Law; Group II, American Government, Politics, and Public Administration; Group III, Comparative Government and International Relations; 2.25 grade-point average in political science courses. Knowledge of one modern foreign language or of statistics recommended.

Honors Program: Baccalaureate degree "With College Honors in Political Science" or "With Distinction in Political Science." Consult honors adviser about requirements.

Teaching Program: Teaching major or minor in political science. Information on requirements appears in the College of Education section of this catalog.

Graduate Programs

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 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, or engineering psychology.

Faculty

Earl Hunt, Chairman; Attneave, Barash, L. Beach, Becker, Bolles, Broedel, Carr, Culbert, Dale, Doerr, Donaldson, Douglas, Edwards, Feldman-Summers, Fenner, Fiedler, Fields (emeritus), Genter, Horst (emeritus), Horton (emeritus), Hunt, Johnson, Keating, Kohlenberg, J. Lockard, R. Lockard, E. Loftus, G. Loftus, Loucks (emeritus), Lumsdaine, C. Lunneborg, P. Lunneborg, Makous, Marlatt, McKeever, H. Mitchell, Nelson, Pagano, Perry, Reitan, H. Robinson, Rose, Sackett, Sarason, Sax, Scontrino, Simpson, Slaby, M. Smith, R. Smith, W. Smith, Steele, Stotland, Strother (emeritus), Sue, Teller, Wagner, Woodburne (emeritus), Woods, Zaro. M. Perry, graduate program adviser.

Undergraduate Programs

Bachelor of Science Degree

Intended primarily to prepare students for graduate study.

Major Requirements: 50 credits in psychology courses—PSYCH 102 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 Univer-

sity 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, 257, 260, 305, 306, 320, 345, 361, 405, 410, 414, 415, 439, 440, 442, 443, 444, 445, 446, 447, 449, 457, 488, and 489. Natural science psychology courses—PSYCH 105, 200, 222, 355, 357, 400, 403, 406, 407, 409, 416, 417, 418, 419, 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 College of Arts and Sciences distribution list.

Bachelor of Arts Degree

Major Requirements: 50 credits in psychology courses—PSYCH 101 or 102, 231 (or 232 or 233), 213 (or 217, 218), and electives to total 50 credits (497 recommended); MATH 101 or equivalent is a prerequisite to PSYCH 213 but is not a required course; 2.00 grade-point average in all psychology courses. Transfer students must meet all above requirements but need complete only 15 credits in psychology at the University of Washington.

A student may earn either a Bachelor of Science or a Bachelor of Arts degree in psychology, but not both.

Honors Program: Bachelor of Science or Bachelor of Arts degree "With College Honors in Psychology" or "With Distinction in Psychology." Consult honors adviser about requirements.

Teaching Program: Teaching major or minor in psychology. Information on requirements appears in the College of Education section of this catalog.

Graduate Programs

Master of Science Degree

Optional degree choice for doctoral students.

Admission Requirements: Same as for the Doctor of Philosophy degree. Department does not admit to its graduate program those students whose sole intention is to obtain a master's degree.

Graduation Requirements: Completion of first-year graduate programs and an appropriate research program, including a research thesis. There is no foreign-language requirement.

Doctor of Philosophy Degree

Admission Requirements: Undergraduate degree in psychology is not required; some preparation in biological or social sciences is strongly advised. Applicants are judged on their academic and research backgrounds, on Graduate Record Examination aptitude scores, and on written evaluations submitted by former professors or supervisors. Students with little training in psychology may be required to complete preliminary work in undergraduate courses.

Admission of new students usually occurs in Autumn Quarter only.

Graduation Requirements: For graduate instruction, department is organized into several content areas—animal behavior; physiological, human experimental, quantitative, developmental, social, and clinical (general and child) psychology; and personality. Essential requirements include minimal competencies in four of the content areas mentioned above, experimental design, minor and major area requirements, independent research, General Examination, dissertation, and Final Examination. 3.00 grade-point average overall must be maintained; 3.00 grade-point average required for all courses used to satisfy minimal competency and minor requirements. There is no foreign-language requirement. First-year requirements—demonstrate competence in statistics and experimental design; complete two of the area minimal competency requirements; complete at least 3 credits in independent predoctoral research.

ROMANCE LANGUAGES AND LITERATURE

C104 Padelford

In Romance languages and literature, students study French, Spanish, Italian, Portuguese, Catalan, Provencal, or Romanian.

Faculty

Marcelino C. Penuelas, Chairman; Anderson, Bodden, Christofides, Concha, Contreras, Creore, Dale, Daniels, David (emeritus), Ellrich; Field, Friedman, Friedrich, Hanzeli, Jones, Keller, Klausenburger, J. Leiner, W. Leiner, Nostrand, Pace, Penuelas, Petersen, Predmore, Rabago, Salinero, Saporta, Shipley, Vargas-Baron (emeritus), C. Wilson, W. Wilson (emeritus), Wortley, Yarbrow, Ybarra. 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 of Arts degree "With College Honors in French/(Spanish)," or "With Distinction in French/(Spanish)." Consult honors adviser for French or Spanish about requirements.

Teaching Programs: Teaching major or minor in French or Spanish. Information on requirements appears in the College of Education section of this catalog.

Graduate Programs

Master of Arts Degree

Programs: French language and literature, Spanish language and literature, Italian language and literature, Romance linguistics. French includes a special option for practicing teachers.

Graduation Requirements: 36 credits, of which at least 18 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 9 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 Board of Graduate Advising and Admissions.

Graduation Requirements: 90 applicable course credits, of which at least 32 must be in courses numbered 500 or above; evidence of basic competence in bibliography and research methods, Romance linguistics, and history of one Romance language; reading knowledge of two languages other than the major one.

Detailed descriptions of individual master's and doctoral programs may be obtained from the departmental graduate advisory office, C109 Padelford.

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), Conroy, Flatin, Jarvi, Johnson (emeritus), Rossel, Sehmsdorf, Warme. B. Steene, graduate program adviser.

Undergraduate Programs

Bachelor of Arts Degree

Major Requirements: At least 50 credits, of which 25 must be upper-division. Danish major: SCAND 380 or 381 or 382; 455 or 460 or 461; DAN 101-102, 103, 217, 218, 222, 300, 301, 302, 450, and 490. Norwegian major: SCAND 380 or 381 or 382; 455 or 460 or 461; NORW 101-102, 103, 220, 221, 222, 300, 301, 302, 450, and 490. Swedish major: SCAND 380 or 381 or 382; 455 or 460 or 461; SWED 101-102, 103, 220, 221, 222, 300, 301, 302, 450, and 490. Other courses will be substituted with the approval of the adviser.

Honors Program: Bachelor of Arts degree "With College Honors in Danish/(Norwegian, Swedish)" or "With Distinction in Danish/(Norwegian, Swedish)." Consult honors adviser about requirements.

Teaching Programs: Teaching major or minor in Norwegian or Swedish. Information on requirements appears in the College of Education section of this catalog.

Graduate Programs

Master of Arts Degree

Admission Requirement: Bachelor of Arts degree with major in Danish/(Norwegian, Swedish) or equivalent background.

Graduation Requirements: A minimum of 36 credits in courses or seminars in Scandinavian and related subjects approved by the department, of which at least 20 credits must be in courses numbered 500 and above; reading knowledge of French or German (another non-Scandinavian language may be substituted with faculty approval); written and oral examination; option between thesis and nonthesis program.

Doctor of Philosophy Degree

Admission Requirement: Master of Arts degree with major in Scandinavian languages and literature or equivalent background.

Graduation Requirements: 72 credits in courses or seminars in Scandinavian languages and literature and related subjects approved by the department; a reading knowledge of French and German (other non-Scandinavian languages may be substituted with faculty approval); General Examination for admission to candidacy; an acceptable dissertation; a Final Examination on the dissertation.

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, Serbo-Croatian, and Ukrainian.

Faculty

Jack V. Haney, Chairman; Augerot, Carpenter, Coats, Gribanovsky, Gross, Holdsworth, Kapetanac, Konick, Kramer, Micklesen, Pahn, Sokol, Swayze, 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 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: Baccalaureate degree "With College Honors in Slavic Languages and Literature" or "With Distinction in Slavic Languages and Literature." Consult honors adviser about requirements.

Teaching Program: Teaching major or minor in Russian. Information on requirements appears in the College of Education section of this catalog.

Graduate Programs

Master of Arts Degree

Admission Requirement: Bachelor of Arts degree with major in Russian or 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.

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

Richard M. Emerson, Chairman; Bainbridge, Barth, Black, Blalock, Blumstein, Bose, Campbell, Chirot, Cohen (emeritus), Cook, Costner, Dodd (emeritus), Emerson, Faris (emeritus), Gross, Guest, Hayner (emeritus), Hechter, Hill, Larsen, Lee, McCann, Miyamoto, Preston, Roberts, Roth, Schmitt, Schrag, Schwartz, Stark, van den Berghe, Wager, Weis. R. Emerson, graduate program adviser.

Undergraduate Programs

Bachelor of Arts Degree

Admission Requirement: Junior standing (at least 90 credits but not more than 135), including 10 graded credits in sociology courses, 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. A minimum of 25 credits of sociology must be completed at the University.

Teaching Program: Teaching major or minor in sociology. Information on requirements appears in the College of Education section of this catalog.

Graduate Programs

Master of Arts Degree

Admission Requirements: Undergraduate major in sociology not required, but preferred. Applicants judged on performance in relevant courses and overall undergraduate grade record; Graduate Record Examination scores; applicant's statement of educational goals and plans; letters of recommendation.

Graduation Requirements: SOC 428-429, an advanced two-quarter statistics course, one theory course, any four of six area courses designed for first- and second-year graduate students (SOC 513, 514, 516, 517, 518, 519), 9 credits of SOC 700 (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: Minimum of 9 credits in approved courses in a related or supporting field. Certification, by examination or other means, in research methodology. A major and a minor substantive area. Successful completion of a dissertation and Final Examination.

SPEECH AND HEARING SCIENCES

21 Speech and Hearing Clinic

The speech and hearing sciences concern the processes and disorders of human symbolization and verbal communication. The areas of scholarly interest include: normal language acquisition; phonetics; speech production and transmission; hearing; speech perception; computer recognition and generation of meaningful speech; the nature of human communication disorders related to language, speech, and hearing; and the clinical processes involved in identification, prevention, and remediation of these disorders.

Faculty

David Prins, Chairman; Abbs, Bennett, Carpenter, Carrell (emeritus), Coggins, Flowers, Miner (emeritus), Minifie, Palmer, Prather, Prins, Sparks, Thompson, Tiffany, Till, Watkin, Weber, Willett, Wilson, Yantis. D. M. Bennett, graduate program adviser.

Undergraduate Programs

Bachelor of Science Degree

Admission Requirements: 2.50 overall grade-point average. Recommended educational preparation includes high school physics or equivalent; introductory exposure to human learning, sensory, perceptual, and cognitive processes, general physiology and the physiology of behavior, and algebra.

Core Requirements for All Options: 26 credits in the following courses—SPHSC 250, 301, 302, 303, 307, 310, 311. Students following Options II, III, or IV below must have a 3.00 grade-point average in courses that make up the common core.

OPTION I, GENERAL ACADEMIC

Intended to provide broad perspectives of the field, but not to prepare students for professional careers in the speech and hearing sciences.

Major Requirements: Core requirements listed above; 25 credits in courses dealing with normal and abnormal language, speech, and hearing taken from the following: SPHSC 315, 330, 380, 401, 402, 410, 420, 430, 431, 450, 454, 484, 499.

OPTION II, BASIC SCIENCES

Intended for students who wish to continue graduate study in speech and hearing that leads to university teaching and research careers but does not include clinical training in audiology or speech pathology.



Major Requirements: Core requirements listed above; 24 credits including SPHSC 401, 402, 410, 420, 499, and 6 credits in the speech pathology or clinical audiology areas; 16-20 credits outside the department including a mathematics course that deals with calculus, and one course each in statistics, psychology (learning, memory, or cognition), and human physiology.

OPTION III, CLINICAL SCIENCES—AUDIOLOGY

Intended for students who wish to continue graduate study that includes clinical training in the area of audiology.

Major Requirements: Core requirements listed above; 37 credits including SPHSC 315, 330, 332, 350, 351, 370, 380, 391 (diagnostics and rehabilitation), 401, 420, 431; at least 9 credits outside the department in psychology (deviant personality, cognitive development, developmental psychology, neural and sensory bases of behavior), educational psychology (behavior management, statistics), or mathematics (elementary functions).

OPTION IV, CLINICAL SCIENCES—SPEECH PATHOLOGY

Intended for students who wish to continue graduate study that includes clinical training in the area of speech pathology.

Major Requirements: Core requirements listed above; 42 credits including SPHSC 315, 330, 332, 350, 351, 370, 380, 391 (diagnostics) or 451 (audiology), 391 (rehabilitation), 401, 430, 431, 454; two courses outside the department in developmental psychology, deviant personality, or behavior modification.

Teaching Programs: A student wishing state certification as a communication disorders specialist should see the program listing in the College of Education section of this catalog.

Graduate Programs

Master of Science Degree

Intended primarily for students who plan to continue graduate study for the Doctor of Philosophy degree.

Admission Requirements: Courses equivalent to Options II, III, or IV in the undergraduate curriculum. Applicants are judged upon undergraduate scholarship records, Graduate Record Examination scores, and letters of recommendation.

BASIC SCIENCES CONCENTRATION

Graduation Requirements: Minimum of 39 credits beyond the baccalaureate degree, including a thesis, of which 18 must be at the 500 level or above and a minimum of 9 devoted to the thesis.

CLINICAL SCIENCES CONCENTRATION—AUDIOLOGY AND SPEECH PATHOLOGY

Graduation Requirements: A minimum of 45 credits, including a thesis, of which 18 must be at the 500 level or above and a minimum of 9 devoted to the thesis. Students in speech pathology and audiology also fulfill the academic and practical experience requirements for the Certificate of Clinical Competence of the American Speech and Hearing

Association. These requirements necessitate more than the minimum 45-credit program for most students.

Master of Speech Pathology and Audiology Degree

Intended primarily for students who wish careers as speech and hearing clinicians but do not intend to continue graduate study for the Doctor of Philosophy degree.

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

Graduation Requirements: A minimum of 45 credits, of which 23 must be at the 500 level or above. Students also complete the academic and practical experience requirements for the Certificate of Clinical Competence of the American Speech and Hearing Association. These requirements necessitate more than the minimum 45-credit program for most students. No thesis is required.

Doctor of Philosophy Degree

Admission Requirements: Master's degree, potential for making significant contribution to knowledge in normal and/or disordered aspects of human communication, and approved research experience. If an approved research project has not been completed, a student may be admitted with the expectation that the research requirement will be met early during the doctoral program. Students concentrating in speech pathology or audiology must have completed, or nearly have completed, the academic and practical experience requirements for the Certificate of Clinical Competence of the American Speech and Hearing Association. All applicants are judged upon scholarship records at the undergraduate and master's levels, Graduate Record Examination scores, and letters of recommendation.

Graduation Requirements: Students concentrate in one of three areas at the doctoral level: basic speech and hearing science, audiology, or speech pathology. Specific academic requirements are planned on an individual basis. Requirements for all concentration areas include: proficiency examinations, taken during the first year of doctoral study; direct research experience prior to the dissertation; participation in classroom, laboratory, or clinical teaching; a minimum of two departmental seminars; General Examination; dissertation; and dissertation oral defense. There is no foreign-language requirement.

SPEECH COMMUNICATION

107 Parrington

Study in speech communication focuses on an understanding of the nature of speech as a form of behavior and a social process (theory), the development of appropriate analytical methods for critical evaluation of the varied uses of speech in both personal and societal settings (criticism), and the improvement of communication competencies for individual, social, and professional purposes (performance).

Faculty

Thomas Nilsen, Acting Chairman; Arundale, Baskerville, Bell, Bird (emeritus), Booth, Bosmajian, Campbell, Carlsen, Crowell (emeritus), D'Angelo, Espinola, Franzke (emeritus), Hogan (emeritus), Klyn, Leber, Nelson (emeritus),

Nilsen, Nyquist, Post, Rahskopf (emeritus), Shadow, Stephenson, Stewart. B. Baskerville, graduate program adviser.

Undergraduate Programs

Bachelor of Arts Degree

Admission Requirements: Incoming freshmen may enter the major without meeting any special admission requirements. Students declaring a major after entering the University must have a cumulative grade-point average of 2.50 in all University courses. Students transferring from other schools must present a cumulative grade-point average of 2.50 in all courses taken at institutions previously attended. After two or more quarters at the University, eligibility for admission will be based on University grade-point average. Exceptions to the above policy may be authorized by the department.

Major Requirements: 60 approved credits, including SPCH 103, 140, 220, 270, 373, and 400; 32 approved electives in speech, of which 15 credits must be in courses at 400 level (excluding SPCH 499); 2.50 grade-point average in all speech courses.

Teaching Programs: Majors in speech education should see the program listings in the College of Education section of this catalog.

Graduate Programs

Master of Arts Degree

Admission Requirement: Baccalaureate degree in speech communication or equivalent background.

Graduation Requirements: *With Thesis*—40 approved credits, including SPCH 501, of which 18 must be at the 500 level or above and 9 in thesis. Areas of concentration: rhetoric, public address, interpersonal and small-group communication, speech education. Supporting work in closely related areas, both within and outside the department. *Without Thesis*—45 approved credits, including SPCH 501, one seminar in area of specialization, and 10 credits in supporting courses from closely related areas; two major seminar papers in lieu of thesis. In addition to the areas of concentration listed above, a more general master's degree program is available.

Doctor of Philosophy Degree

Admission Requirements: Appropriate master's degree and departmental approval.

Graduation Requirements: General Examination, oral and written; dissertation; satisfactory defense of the dissertation in an oral Final Examination. Areas of concentration: rhetoric and public address, interpersonal and small-group communication; supporting course work in the oral interpretation of literature and speech education.

ZOOLOGY

106 Kincaid

Zoology is that branch of natural science concerned primarily with the characteristics of animals, their develop-

ment, structure, and function, and their relationships with their animate and inanimate environments.

Faculty

Donald S. Farner, Chairman; Bakken, Barash, Cloney, Deyrup-Olsen, Edmondson, Edwards, Farner, Fernald, Gorbman, Griffiths, Hatch (emeritus), Hauschka, Hille, Illg, Kohn, Kozloff, Laird, Martin, Orians, Osterud, Paine, Palka, Pinter, Ray, Richardson (emeritus), Riddiford, Rohwer, Schoener, Scholander, Schroeder, Schubiger, Snyder, Strathmann, Stuver, Truman, Whiteley, Willows. R. Snyder, graduate program adviser.

Undergraduate Programs

Bachelor of Science Degree

Major Requirements: A minimum of 50 credits, no more than 20 in lower-division courses, with a grade-point average of 2.00, to include BIOL 210, 211, 212, ZOO 433, 434 (or 453-454), 456; 400-level lecture and laboratory courses in physiology and cell biology to total 8 credits; BIOL 472; electives to be selected from approved upper-division biological courses. Additional requirements: CHEM 140, 150, 151, 231, 232 (or 231, 235, 236), 241, 242; GENET 451, if the student has not taken BIOL 210, 211, 212; MATH 124, 125, 126 (or 124, 125, Q SCI 281; or Q SCI 281, 291, 292); PHYS 114, 115, 116 (or 121, 122, 123); two years of French or German (Chinese, Italian, Japanese, Russian, or Spanish acceptable). Approved lists of biology courses and alternatives to courses specified are available from the zoology adviser.

Bachelor of Arts Degree

Major Requirements: A minimum of 50 credits, no more than 20 in lower-division courses, with a grade-point average of 2.00, to include BIOL 210, 211, 212 (or 101-102 with grades of A or B), 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; GENET 451, if the student has not taken BIOL 210, 211, 212; MATH 106 or 157, or Q SCI 281, or MATH 124 and 125, or Q SCI 291 and 292. PHYS 114, 115, 116 recommended.

Honors Programs: Bachelor of Science or Bachelor of Arts degree "With College Honors in Zoology" or "With Distinction in Zoology." Consult honors adviser about requirements.

Graduate Programs

Master of Science Degree

Admission Requirements: Acceptance by the Graduate School and the department.

Graduation Requirements: Satisfy the requirements of the department for the Bachelor of Science degree. *With Thesis*—36 credits, of which 18 must be at the 500 level or above and 9 in thesis research; satisfy the departmental foreign-language and teaching requirements; thesis; final examination. *Without Thesis*—Substitute 9 credits of course work at the 500 level or above for thesis; satisfy the departmental foreign-language and teaching requirements; final examination.

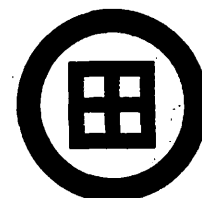


Doctor of Philosophy Degree

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

Graduation Requirements: A minimum of three academic years of study, one quarter of which is spent at a biological

field station; satisfy the departmental foreign-language and teaching requirements, as well as a requirement for appropriate extradepartmental course experience. General Examination; dissertation; Final Examination. A full statement covering current graduate programs in zoology is available from the department upon request.



BUSINESS ADMINISTRATION

Dean

Kermit O. Hanson
126 Mackenzie

Men and women embarking on business careers have the opportunity to involve themselves in the nuclei of many of the social, political, and economic forces in today's world. The School and Graduate School of Business Administration seek to provide students with a foundation upon which continuing learning experiences can respond to change. The School of Business Administration offers an undergraduate program leading to the degree of Bachelor of Arts in Business Administration. The Graduate School of Business Administration offers programs leading to the degrees of Master of Business Administration, Master of 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 Busi-*

ness, published quarterly by the Graduate School of Business Administration, and the *Journal of Financial and Quantitative Analysis*, a specialized journal published each month jointly with the Western Finance Association. Monographs published by the Graduate School of Business Administration include topics of general interest to the business community, as well as topics of a scholarly nature.

To serve the continuing education needs of business persons, the School and Graduate School of Business Administration offer a number of short programs, either University initiated or cosponsored with various community and industry organizations. The management program is designed for middle-to-upper management and focuses on self-renewal in a society that is experiencing an accelerating pace of change. Offerings in the various small business series courses assist owners and managers of small businesses in planning, organizing, and operating their businesses. Other continuing education activities include the Tax Clinic for Small Business, the Entrepreneurship Symposium, Pacific Coast Banking School, and the Savings and Loan School for Executive Development. A number of special-interest programs also are offered (e.g., Women in Management, Impasse Procedures and Collective Bargaining, and Managing Change in Organization). 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 Association of University Women in Business, Business Student Association, Finance Club, Graduate Association of Black Business Students, International Association of Students in Economics and Com-



merce, 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. A supplemental application form should be filed for admission to the School of Business Administration, and inquiries should be made early regarding quarterly deadline dates for submission of this application. If the number of eligible applicants exceeds that for which the space is available, acceptance will be competitive, based on grade-point average.

Specific Upper-Division School Requirements: B ECN 300, 301; MKTG 301; 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 43.) 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 Armed Forces Training School or independent study may be obtained from the undergraduate office, School of Business Administration.

Double Baccalaureate Degrees and Second Baccalaureate Degree

Students who wish to earn double degrees should consult an adviser in the business administration office, preferably sometime during the junior year. Persons who seek a second baccalaureate degree should apply at the University of Washington Undergraduate Admissions Office. To be considered, applicants must complete by quarter of entry the same prerequisites for admission as applicants for the first baccalaureate degree. If the number of eligible applicants exceeds that for which space is available, acceptance will be competitive, based on the grade-point average of the junior and senior years, or last 90 credits.

Graduate Programs

Also see Graduate Programs and Degree Policies, page 43.

Associate Dean and Graduate Program Adviser

Wendell L. French
104 Mackenzie

Graduate Office

109 Mackenzie
543-4660

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, Graduate Management Admission Test score, work experience, educational and professional objectives, and other factors are considered in the admission process. Inquiries concerning the details of admission should be made to: University of Washington, Graduate School of Business Administration, Mackenzie Hall, DJ-10, Seattle, Washington 98195.

Application Procedure

Starting in early March, the Admissions Committee reviews applications for Summer Quarter and Autumn Quarter. A high percentage of admission decisions is made at that time, and these applicants receive notice of the decision soon thereafter. The formal deadline for applications is April 1; applications may be accepted after that date but are not guaranteed consideration.

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 Degree

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. Diversity is sought in terms of geographical, racial, and ethnic backgrounds.

Students are advised to prepare themselves in calculus and BASIC computer programming before starting the program. Such courses are offered during Summer Quarter and may be taken by students who do not have this background, but are planning to start the program Autumn Quarter. In general, the program starts each Autumn Quarter for the majority of entering students. One section of 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 now in its third year of operation. Under this plan, a student may complete the first-year requirements in two quarters and then seek a one-quarter management internship.

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 the 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

Admissions are determined on a competitive basis with primary, but not exclusive, consideration given to graduate and undergraduate grade-point averages, Graduate Management Admission Test scores, letters of recommendation, and educational and professional objectives. Moreover, some attention is given to achieving a balance among entering students across areas of major interest, background, demographic characteristics, etc. 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 develop business-oriented scholarship and research skills in persons preparing for careers in teaching, research, business, or government. Since the inception of the program, the majority of its graduates have entered university teaching careers. Students who complete this program are expected to possess the professional administrative competency that is the objective of the M.B.A. program, and are required to demonstrate academic competence in four areas of study, of which at least three normally are in the Graduate School of Business Administration. In addition, the student must show evidence of competency in research strategies and tools applicable to his or her area of interest. The program requirements consist of preparatory courses and independent study recommended by a Supervisory Committee of faculty, the General Examination, a doctoral dissertation, and a Final Examination.

Admission to Candidacy: The General Examination consists of written and oral parts in all of the prospective candidate's areas. A student may sit for all written examinations in a single quarter or for individual area examinations as scheduled during three consecutive academic quarters (excluding summer). 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.

Areas of Study

Course work in both the School of Business Administration and the Graduate School of Business Administration is offered within five departments as follows:



ACCOUNTING

231 Mackenzie

Accounting involves development and communication of financial and operational information for business and nonprofit economic entities. Courses provide a foundation for careers in accounting (public, industrial, private, governmental, or institutional), for a general business career, or for professions such as law. The notation "Accounting" will be included on the permanent record, or transcript, of a student who graduates with a degree of Bachelor of Arts in Business Administration and who completes with a grade-point average of at least 2.00 the following courses: ACCTG 301, 302, 303, 311, 411, 421, and 6 elective credits in 400-level accounting courses, except 401, 475, 490, and 499.

Faculty

Gerhard Mueller, Chairman; Alkire, Berg, Chow, De-Coster, Elliott, Felix, Heath, May, F. Mueller, Porter, Pratter, Ramanathan, Rhode, Rice, Roller (emeritus), Sundem, Walker.

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; Barsh, S. Brown (emeritus), Chadwick-Brown, Goldberg, Hart, Jamieson (emeritus), Lessinger, Marcus, Robinson, Seyfried, Strong, Walters, Wheeler (emeritus), Wickman.

FINANCE, BUSINESS ECONOMICS, AND QUANTITATIVE METHODS

270 Mackenzie

Finance, Business Economics, and Quantitative Methods facilitates understanding the financial, economic, and quan-

titative 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

Alfred Page, Chairman; Adolphson, Alberts, Borque, Chiu, D'Ambrosio, Diehr, Faaland, Frost, Haley, C. Henning, Hess, Higgins, Jacob, D. Johnson, King, Kraus, Pigott, Schall, H. Scott, Tamura.

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

Borje O. Saxberg, Chairman; Beard, Bell, E. Brown (emeritus), Buck, Fenn, Fiedler, French, Gross, D. Henning, R. Johnson, Kast, Kienast, Klastorin, Knowles, Knudson, LeBreton, Lopez, Meier, Mitchell, Newell, Peterson, Piehl, Rosenzweig, Schreiber, Scott, Summer, Sutermeister, Vesper, Woodworth.

MARKETING, TRANSPORTATION, AND INTERNATIONAL BUSINESS

156 Mackenzie

Marketing provides knowledge of concepts and relationships in the areas of consumer behavior, channels of distribution, determination and measurement of markets, pric-

ing, 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; Etcheson, Gordon, Grathwohl, Harder, Johansson, Kolde, R. Little, W. Little, MacLachlan, Miller (emeritus), Moinpour, Moxon, Murphy (emeritus), Oshikawa, Spratlen, Truitt, Wagner, Wheatley, Yalch.



DENTISTRY

Dean

Sheldon Rovin
D322 Health Sciences

Associate Deans

Samuel F. Dworkin, Alton W. Moore, Saul Schluger.

Assistant Dean

Dan G. Middaugh

In the School of Dentistry the student learns fundamental principles significant to the entire body of dental knowledge and is expected to acquire habits of reasoning and critical judgment that will enable implementation of that knowledge. To the School of Dentistry, the future development of the student is as critical as the professional training. The program of instruction is designed to equip the student, as a practicing dentist, with the knowledge and qualities necessary for solving problems of oral health and disease.

The School of Dentistry expects its students to learn the fundamentals of the basic health sciences, to master certain clinical skills, and to acquire a thorough understanding of professional and ethical principles. In addition, the program is designed to emphasize the modern concepts of dental practice that make appropriate use of dental auxiliary personnel. Emphasis is placed on the role of the dentist in the community and the professional obligations necessary to respond to the oral needs of the total population.

The School of Dentistry is approved by the Council on Dental Education of the American Dental Association and is a member of the American Association of Dental Schools. It is a participating member of the Western Interstate Commission for Higher Education.

The curriculum for the D.D.S. degree includes study in two main areas: basic sciences and clinical dental sciences. Instruction in the basic sciences is provided by the departments of Biological Structure, Biochemistry, Microbiology and Immunology, Pathology, Pharmacology, and Physiology and Biophysics, and the School of Public Health and Community Medicine of the Health Sciences Division. In the clinical dental sciences the departments of Community Dentistry, Dental Hygiene, Endodontics, Oral Biology, Oral Diagnosis and Treatment Planning, Oral Surgery, Orthodontics, Pedodontics, Periodontics, Prosthodontics, and Restorative Dentistry provide instruction in the fields of general dental practice and dental specialization.

As an integral part of the School of Dentistry, the Department of Dental Hygiene has the same basic objectives and offers courses of instruction leading to the degree of Bachelor of Science with a major in dental hygiene.

Admission Requirements

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 (Introduction to Medical 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 pre dental student. The requirements in these last subjects are far more flexible than are those mentioned above and may range over a practically unlimited area, because professional persons should be informed and possess a wide cultural background.

Neither a prior degree nor a minimal number of pre dental 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

A student seeking admission to the D.D.S. degree program must make application through the American Association of Dental Schools Application Service (AADSAS). This central application service is designed to facilitate and expedite the processing of materials for the applicant. An applicant is required to complete the AADSAS application booklet. The deadline for submission of the application is December 1 of the year prior to that for which the applicant seeks admission. Application materials and instructions will be furnished by AADSAS. A copy of the application is forwarded to the University of Washington (if the applicant has so indicated), and this becomes the basis of a file that will be reviewed by the Dental Admissions Committee.

After the application has been received, the student will receive from the Office of Dental Admissions a request for the following supplementary materials:

1. Six letters of recommendation, of which two must contain personal evaluation by science instructors, two must be from nonscience instructors, one should be from a business or professional person where possible, and one will be a character reference.
2. Physician's statement of physical examination taken within the last twelve months.
3. An autobiographical resume.
4. A list by title and credit of those courses presently being taken and those that are planned to be taken in 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.

Dental Admission Test

Each applicant 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 three times a year, usually during October, January, and April at testing centers throughout the country. It is desirable that the applicant participate no later than the October

testing period prior to the December 1 application deadline date. Forms and information pertaining to the dental admission test are available through the Office of Dental Admissions.

Selection Criteria

The Dental Admissions Committee attempts to enroll enough qualified students from the state of Washington to constitute approximately 80 percent of the entering first-year class. The remaining 20 percent of the students comprises qualified applicants residing in neighboring states that do not have dental schools (Alaska, Arizona, Hawaii, Idaho, Montana, Nevada, New Mexico, Utah, and Wyoming). Consideration is given to qualified minority applicants and women from all parts of the United States.

The most important single criterion sought in an applicant is unquestionably scholarship. Without a high level of academic achievement as a standard pervading the course of study in the School of Dentistry, professional levels of performance will suffer irrevocably.

Next in importance is the enrollment of a group of professional trainees who have a high degree of social awareness and a keen appreciation of the place occupied by the health sciences in society.

The dental admission test is given strong consideration, with particular emphasis on the academic average, verbal reasoning, and reading comprehension scores.

The personal attributes most sought by the Dental Admissions Committee are maturity and social awareness.

Letters of recommendation and suggestions by pre dental advisers and instructors are given serious consideration.

Selection Process

When the application is completed, members of the Dental Admissions Committee screen the credentials of the applicant according to the criteria defined in the Admission Requirements section. An interview is held with one or more members of the committee. When the entire committee meets, it reviews the completed records and one of three options is chosen: the application is accepted, rejected, or held for further study.

Each applicant is given written notice of the acceptance or rejection of his or her application as soon as possible after the Dental Admissions Committee has reached a decision. Each applicant generally is informed of the committee's decision no later than July 1.

Honor Code

Each student accepted by the School of Dentistry is expected to participate in the school's honor code.

Tuition Fee Deposit

Applicants accepted by the School of Dentistry will be requested to pay a \$50 enrollment service fee to confirm their intention to enroll at the University. The \$50 payment will



be requested by, and should be returned to, the Registration Appointment Office, Schmitz Hall.

Academic Advancement

At the end of each academic quarter an appropriate evaluation committee of the School of Dentistry reviews each student's accomplishments to determine his or her fitness for advancement. Scholastic standing and conduct consistent with standards determined by the faculty for the professional student are major requirements for advancement. The School of Dentistry reserves the right to dismiss any student from the school for any reason it deems sufficient.

Awards and Honors

Department of Prosthodontics Award: Certificates are presented to two 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 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 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 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 student who has shown outstanding qualities as a scholar and clinician in operative dentistry, with proficiency in accomplishing direct gold restorations.

American Student Dental Association Preventive Dentistry Award: A plaque is awarded by the American Student Dental Association to an outstanding dental student for contribution to preventive dentistry.

Mosby Book Awards: These scholarship book awards are presented to five 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.

Alpha Omega Fraternity Award: This plaque is presented by the Alpha Omega national fraternity to the 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 char-

acter 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 graduating dental student 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 Hygienists' 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 third year and who is felt to be the most worthy to receive the award.

Ben and Betty Zukor Scholarships: Three awards are presented to needy and worthy students 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 first-year student felt to be the most deserving, based on scholastic achievement.

Washington Dental Education Foundation Scholarship: An award of \$150 is presented to a second-year 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 third-year 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 third-year 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 first-year dental student showing both scholarship and need.

Omicron Kappa Upsilon Scholarships: Awards of \$100 each are presented by Sigma Sigma Chapter to dental stu-

dents 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.

Financial Aid to Students

Loan fund information may be obtained through the Office of Student Financial Aid, 105 Schmitz.

Fees

Dental students, 1976-77: 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.

In addition to paying tuition, each dental student is required to purchase the dental issue of equipment and materials necessary for each year of the training period. Current estimates of the cost of the issue per year is as follows: First year, \$2,760; second year, \$1,103; third year, \$1,011; fourth year, none.

Academic Programs

The School of Dentistry offers courses leading to the degrees of Doctor of Dental Surgery (D.D.S.), Bachelor of Science (B.S.), and Master of Science in Dentistry (M.S.D.), as well as certificates in endodontics, orthodontics, pedodontics, periodontics, and restorative dentistry. The Department of Oral Biology offers graduate programs leading to the degrees of Master of Science and Doctor of Philosophy.

Doctor of Dental Surgery Degree

Upon their completion of the curriculum in the School of Dentistry, the D.D.S. degree is awarded to applicants who (1) have given evidence of good moral character; (2) have completed the last two years of dental training as regularly matriculated students in the School of Dentistry; (3) have completed satisfactorily all the required work; (4) have fulfilled all special requirements; and (5) have discharged all indebtedness to the University.

Bachelor of Science Degree

The curriculum leading to the Bachelor of Science degree is given by the Department of Dental Hygiene.

Master of Science and Doctor of Philosophy Degrees

The 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 curriculums leading to the degree of Master of Science in Dentistry are given by various clinical departments of the School of Dentistry through the Graduate School.

Licensure

Admission to the practice of dentistry in any state is 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, having credentials showing he or she has passed parts 1 and 2 of the National Board Dental Examinations, and passing the examination conducted semiannually by the Washington State Board of Dental Examiners.

Additional information about licensure requirements and time of examinations may be obtained from the Division of Professional Licensing, Olympia, Washington 98501.

Department Programs

COMMUNITY DENTISTRY

The Department of Community Dentistry is concerned with the social, legal, political, economic, and psychological aspects of dental health-care delivery.

Faculty

Peter Milgrom, Chairperson; Evans, Guild, Kinne, Midgaugh, Sharp, Weinstein, Wert, Whitacre.

ENDODONTICS

The Department of Endodontics provides training in the diagnosis and treatment of disease of the pulp of teeth. In addition to the courses for dental students, the department offers postdoctoral study for students in the Graduate School working toward the degree of Master of Science in Dentistry. The department also offers a course of study leading to a Certificate of Specialty Training in Endodontics.

Faculty

Eugene Natkin, Chairperson; Harrington, Oswald, 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 postdoctoral students working toward the degrees of Doctor of Philosophy, Master of Science, or Master of Science in Dentistry, as well as clinical training in oral pathology.

Faculty

Ivens Siegel, Chairperson; Gordon, Izutsu, Keller, Midgaugh, Morgan, Robinovitch, Stiefel, Tamarin, Watanabe.

ORAL DIAGNOSIS AND TREATMENT PLANNING

The Department of Oral Diagnosis and Treatment Planning provides training in diagnostic techniques, such as interro-



gation, 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. Truelove, Chairperson; M. Anderson, Faber, Hansen, Harthorne, Nelson, Patten, Rothwell, Rovin, Schubert, 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 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 dental students, the department offers graduate study for students in the Graduate School working toward a degree of Master of Science in Dentistry with a specialization in oral surgery.

Faculty

James R. Hooley, Chairperson; Bloomquist, Cohen, Gehrig, Gordon, Tolas, Topping, West.

ORTHODONTICS

The objective of orthodontics is the prevention and correction of malocclusion of the teeth. In addition to the courses for dental students, the 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

Donald R. Joondeph, Chairman; Keller, Little, McNeill, Moffett, Moore, Newell, Riedel, Turpin, Van Ness.

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 dental courses, the Department of Pedodontics offers graduate-level courses to train individuals for teaching and research careers in pediatric dentistry.

Faculty

John Davis, Acting Chairman; Barriga, 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; Brand, Clagett, Dale, Engel, Gartrell, Levine, Page, Schluger, Selipsky, Silver, Smith.

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 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, Chairperson; Beder, Frank, Lord, Lukens, Nash, Smith, Swoope, Toolson, Wands.

RESTORATIVE DENTISTRY

The Department of Restorative Dentistry is concerned with the restoration or replacement of tooth structure lost through disease or trauma and, consequently, it is involved in the study of the form and function of the masticatory structures.

Faculty

Kenneth Morrison, Chairperson; Adams, C. Anderson, S. Anderson, Brooke, Canfield, Cherberg, Chvoj, Clark, Halpin, Hamilton, Hodson, Jacobson, Johnson, Lillywhite, Miller, Nicholls, Ostlund, Powell, Stamey, Stibbs, Stoddard, Strand, Teel, Warnick, Weaver, Willis, Wills, Youdelis.

DENTAL HYGIENE

The curriculum of the Department of Dental Hygiene offers a professional program leading to the Bachelor of Science degree with a major in dental hygiene. Two academic years of pre-dental hygiene courses are required, followed by two additional years of enrollment in the dental hygiene program.

The undergraduate dental hygiene student receives didactic information and clinical experience in all areas of

preventive dentistry through association with clinical patients, community dental health programs, and school health programs. The curriculum versatility allows undergraduate dental hygiene students the opportunity to gain experience in assuming positions as clinical dental hygienists, dental auxiliary program educators, community services program administrators, or research assistants. An effort is made to allow the curriculum requirements to apply to advanced degrees. The preventive, educational, and clinical skills taught include plaque control, patient education and communication techniques, techniques for prevention of dental caries, removal of soft and hard deposits from crown and root surfaces as well as root planning, 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 health-care delivery and that the profession's first obligation is service to society.

Faculty

Martha H. Fales, Chairperson; Anderson, Ayars, Chin, Farrell, Hoople, Koch, Langslet, McKanna, Pitcher, Redman, Toney, Walters, Wells.

Basic Curriculum in Pre-Dental Hygiene

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, Office of Undergraduate Studies, Premajor and Preprofessional Programs. Students transferring into this program from other institutions should consult the Description of Courses section of this catalog, compare the courses listed with those offered in their colleges or universities, and seek the advice of the director of admissions for course equivalents. Because the number of students admitted to the program is limited, early communication with the Department of Dental Hygiene is strongly urged.

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 while in the dental hygiene program, 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 210, 211, 212, 15 credits; PSYCH 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. Completed dental hygiene application form, available from the Department of Dental Hygiene. Transfer students from other colleges and universities must also submit a separate application to the University of Washington Office of Admissions by March 1.

2. Written statement of plan to complete pre-dental hygiene requirements should accompany the dental hygiene application form. It is to the applicant's advantage to have completed as many pre-dental hygiene requirements as possible before the personal interview. However, the student may be currently enrolled in required courses at the time of applying for admission.

3. Official transcripts of high school and college records, provided directly from the Registrar's Office at each institution in which pre-dental hygiene education is completed, sent to both the Office of Admissions at the University of Washington and the Department of Dental Hygiene. Additional transcripts (or grade cards from the University of Washington) are to be sent each quarter or semester up to the time of entrance into the dental hygiene program.

4. Two letters of recommendation, one from a business or professional person and one from a pre-dental hygiene science instructor. Both must contain a personal evaluation.

5. Completion of the dental hygiene aptitude test. The dental hygiene aptitude test is administered by the American Dental Hygienists' Association. The test is administered three times per year at testing centers located throughout the United States. For this program, the dental hygiene aptitude test should be completed in November or February prior to the March 1 deadline for application into the dental hygiene program. Information brochure and application form may be obtained from the Department of Dental Hygiene or the Testing Division, American Dental Hygienists' Association, Room 1212, 211 East Chicago Avenue, Chicago, Illinois 60611.

Applicants are selected for personal interview pending evaluation of points one through five of the above.

Admission Procedure

The Committee of Dental Hygiene Admissions examines the credentials of each applicant and bases its decision on the objective evaluation of preprofessional education, scholastic records, aptitude test scores, and residential status, as well as the evaluation of personal attributes as determined by the personal interview. Candidates will be given written notice of the status of their application prior to May 1.

Students who reside in Alaska, Montana, Nevada, or Wyoming (states that do not have dental hygiene programs) should write for funding information to the Western Interstate Commission for Higher Education, Post Office Box P, Boulder, Colorado 80302.

Financial Aid and Scholarships

Loan fund and scholarship information may be obtained through the Office of Financial Aids, 105 Schmitz. In addition, the American Dental Hygienists' Association administers scholarships for senior dental hygiene students and an emergency loan fund. Both the scholarships and the loan funds are available only to students currently enrolled in accredited dental hygiene programs.

Tuition and Charges

Students enrolled in the dental hygiene program pay the undergraduate tuition of the College of Arts and Sciences. Expenses for textbooks, uniforms, instruments, and other



equipment, which total approximately \$1,500 per year, are in addition to the tuition fee.

Graduation Requirements

To qualify for the Bachelor of Science degree with a major in dental hygiene, the student must meet both the basic proficiency and distribution requirements of the College of Arts and Sciences and of the curriculum in dental hygiene. The total of 180 quarter credits required for graduation includes 90 quarter pre-dental hygiene credits and 90 quarter dental hygiene credits.

Baccalaureate Curriculum for Certificate Dental Hygienists

The baccalaureate curriculum provides outstanding certificate dental hygienists the opportunity to complete the baccalaureate degree program and to broaden their clinical education with liberal arts and social and basic sciences. A clinical and didactic proficiency examination is required prior to acceptance into the baccalaureate program. The proficiency examinations are administered by the Department of Dental Hygiene. Priority for admission to this program is given to certificate dental hygienists interested or involved in dental auxiliary education or public health. Certificate dental hygienists who apply for acceptance into the baccalaureate program must have a valid license to practice dental hygiene.

Master of Education Degree

A master's degree program, which allows for specialization in dental hygiene education, is offered by the College of Education. Additional information is available from the graduate program adviser, College of Education. Some W. K. Kellogg Foundation and Allied Health traineeships are available.

CONTINUING DENTAL EDUCATION

Continuing Dental Education programs and courses are offered throughout the year to provide dentists, auxiliary personnel, and others involved in health care with current scientific knowledge and methodology of patient treatment. Originating from local, national, and international resources, these programs provide a broad spectrum of interests in response to current needs of the health professional.

A list of courses offered may be obtained from the office of the director.

Director

Dan G. Middaugh

GRADUATE PROGRAMS

Associate Dean and Graduate Program Adviser

Saul Schluger

B319 Health Sciences

Graduate Programs in Dentistry

The School of Dentistry offers a variety of graduate programs, both for those holding a dental degree and for those

holding a baccalaureate degree. Those holding the dental degree may enroll in graduate programs leading to the Master of Science, Doctor of Philosophy, and the Master of Science in Dentistry degrees. Those holding baccalaureate degrees may enroll in programs leading to the Master of Science and the Doctor of Philosophy degrees.

The programs are planned to prepare students to think independently, to evaluate their own services and the literature of the programs, and to develop their clinical operative skills to a level to permit the successful practice of their chosen specialty. Emphasis is placed on the basic principles of diagnosis and treatment that compose one of the clinician's most valuable assets. The seminar method of teaching is generally used. The purpose of the programs is not only to train students in the art of their respective specialties but also to encourage possible preparation for academic careers or for research. The research may be undertaken in basic or applied science. The opportunity for collaborative research is excellent because of the proximity and cooperation of the other colleges, schools, and departments in the University.

Master of Science Degree

A program leading to the Master of Science degree is offered by the faculty in oral biology. Applicants for this degree program should hold a Bachelor of Science or higher academic degree. The purpose of this program is to train qualified teachers and investigators in the clinical and basic science disciplines. This program requires a minimum of seven full-time quarters of in-residence study.

Doctor of Philosophy Degree

The Department of Oral Biology offers an advanced program of study and research leading to the Doctor of Philosophy degree. This graduate program prepares students for professional careers in universities and colleges, research institutes, hospitals, and government laboratories such as those of the National Institutes of Health. Students in this program receive broad training in oral biology and other biomedical basic science areas. Dissertation research is carried out under the guidance of members of the graduate faculty in oral biology. The laboratories of the Department of Oral Biology are excellently equipped for the conduct of biomedical investigations from a number of approaches, including morphological, ultrastructural, biochemical, 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.

Master of Science in Dentistry Degree

The Master of Science in Dentistry degree is granted to successful candidates in endodontics, fixed prosthodontics, oral biology, oral medicine, oral surgery, orthodontics, pediatric dentistry, periodontics, and prosthodontics. Upon completion of the M.S.D. in the clinical disciplines, the student is also awarded a certificate in the specialty. These degree programs are administered by the Graduate School.

Postgraduate Certificate Programs

In addition to the above degree-awarding graduate programs, the School of Dentistry offers postgraduate certificate training programs. Application procedures are the same as for the graduate programs.

Following the successful completion of the prescribed courses by the postgraduate student during the required residency, a certificate in endodontics, fixed prosthodontics, oral medicine, oral surgery, orthodontics, periodontics, or prosthodontics is granted by the School of Dentistry. Upon completion of the program in pediatric dentistry, two certificates, one each in pedodontics and orthodontics, are granted.

Application Procedure

Application for the Master of Science in Dentistry degree with specialization in any one of the fields previously listed, including all necessary credentials, must be submitted to Graduate Dental Education on or before December 1 for consideration for entrance in the following Autumn Quarter. International students are also required to submit TOEFL scores and financial statements before the December 1 deadline. This deadline has been established so that prompt attention to credentials and replies to correspondence may be expedited.

Admission

An applicant may be admitted to the Graduate School to undertake work leading to degrees in Master of Science in Dentistry, Master of Science, or Doctor of Philosophy, or a Certificate of Proficiency, provided that the applicant meets the admissions requirements of the Graduate School for the individual program.

Acceptance to the various departmental programs also requires approval by the Graduate Admissions Committee of the School of Dentistry.

Residence

A minimum of eight consecutive full-time quarters (twenty-four months) of residence is required for the Master of Science in Dentistry degree in the fields of endodontics, oral medicine, periodontics, and fixed prosthodontics; seven full-time quarters (twenty-one months) are required for orthodontics and prosthodontics; twelve quarters (thirty-six months) are required for pediatric dentistry.

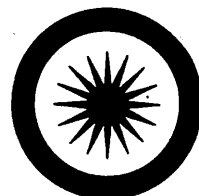
For the postgraduate certificate programs, six consecutive full-time quarters (eighteen months) of residence is required for endodontics; seven full-time quarters (twenty-one months) in oral medicine, orthodontics, periodontics, prosthodontics, and fixed prosthodontics; three years for oral surgery.

Class Schedules

The graduate programs of the School of Dentistry observe the quarter system of the University. In order for the graduate dental programs to be continuous, attendance is also required during Summer Quarter for the clinical programs.

Fees

The fees each quarter are the same for postgraduate training as for graduate training.



EDUCATION

Dean

Frederic T. Giles
210 Miller

Associate Dean

Roger G. Olstad
210 Miller

Assistant Dean

Homer Boroughs, Jr.
200 Miller

Faculty

Abbott, Affleck, Anderson, Andrews, Baily, Banks, Bashey, Batie (emeritus), Beal, Bill, Bolton, Boroughs, Brammer, Briggs, Broedel, F. Brown, R. Brown, W. Brown, Burgess, Cope, Dimmitt, Dohner, Driscoll, Dvorak (emeritus), Edgar, Eleanor Evans, Ellis Evans, Fea, Fenner, Forster, Foster, Freehill, Frerichs, Giles, Gray, Guise, Haring, Hawk, Hayden, Hirabayashi, Hunkins, Hurd, Jarolimek, Johnson, Kaltsounis, Kelly, Kerr, Kersh, Klockars, Krening, Lavelle, Lawrence, Lovitt, Lowenbraun, Lumsdaine, MacDonald (emeritus), Madsen, McCartin, Meacham, Mizokawa, Monson, Morishima, Neel, Nolen, Odegaard, Olch, Olstad, Ostrander, Peckham, Powers (emeritus), Reitan, Ryckman, Salyer, Sax, Schill, Schneider, Scroggs, Sebesta, Settles, John Smith, Strayer, Thalberg, Torkelson, Tostberg, Williams.

Affiliate Faculty

Dunnell, Spain (Anthropology); Koenig, Moseley (Art); Miller, Shapiro (Asian Languages and Literature); Haskins, Kruckeberg (Botany); Farner, Deyrup-Olsen (Zoology); Gregory, Ritter (Chemistry); Edmonson, Pascal (Classics); Edelstein, Godfrey (Communications); Konick, Warnke

(Comparative Literature); Haaga, Hostetler (Drama); North, Worcester (Economics); Irmscher, Stevick (English); Kakiuchi, Morrill (Geography); Kelley, Porter (Geology); Buck, Rabura (Germanics); Pease, Treadgold (History); Granberg, Johnson (Home Economics); Ellison, Legters (Institute for Comparative and Foreign Area Studies); Ahlers, Hiatt (Librarianship); Blumenthal, Dubisch (Mathematics); Cooper, Moore (Music); Fox, Morford (Physical and Health Education); Henley, McDermott (Physics); Gottfried, Matthews (Political Science); Hunt, Lumsdaine (Psychology); Friedrich, Penuelas (Romance Languages and Literature); Jarvi, Steene (Scandinavian Languages and Literature); Augerot, Haney (Slavic Languages and Literature); Costner, Schmitt (Sociology); Booth, Nilsen (Speech Communication).

The several programs offered by the College of Education in undergraduate and graduate work are designed: (1) to help the prospective teacher to develop competence and sophistication in one or more teaching fields and to develop proficiency in the teaching process through study and practice; (2) to introduce students to the study of education as a basic social institution and to the profession of teaching; (3) through research, observation, and direct experience, to develop an understanding of growth and development in children, youth, and adults; (4) to develop an understanding of teaching and learning processes as they affect the selection, organization, presentation, and evaluation of curriculum materials and resources for various age levels and ability groups; (5) to 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 exten-

sive schedule of classroom observation and directed teaching is made available through cooperative arrangement with the public schools in the greater Seattle area.

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 Certification Program is accredited by the National Council for the Accreditation of Teacher Education. The college also is a member of the University Council for Educational Administration.

Employment

The Placement Center, 301 Loew, provides assistance to students and alumni seeking teaching and administrative positions at all levels in public and private educational institutions. Placement files, which are 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.

requirements, must fulfill basic proficiency requirements, a distribution requirement, and a major requirement, and must complete at least 10 credits in professional education courses with a 2.00 minimum grade-point average.

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 selected from the most appropriate courses in English composition, foreign language, or mathematics. Incoming students with 85 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. However, courses (up to 15 credits) taken at the University of Washington or other colleges or universities to satisfy the basic proficiency requirements may not be counted toward the distribution requirement.

Distribution Requirement

For the purpose of general education, a listing of courses has 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 an adviser, at least 20 credits in courses from each of the three fields on the distribution list (see College of Arts and Sciences section of this catalog). *No course required in a major field of study, secondary certification emphasis, or major field of study in a degree-only program may be used to satisfy this requirement.* Students pursuing an elementary emphasis major may include courses from the major department.

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. Both the Provisional or Initial Certificate and the Standard Certificate may be obtained at the University of Washington. Information on out-of-state certificates and emergency and special certificates can be obtained from the State Department of Public Instruction in Olympia.

The Provisional or Initial 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. Inexperienced teachers (those who have not taught during the three-year period of the Provisional Certificate) may exercise the renewal option once without additional credit, provided the certificate is renewed within seven years of the date of issuance of the first Provisional Certificate. The certificate will show the subject areas of competence, as well as the level(s) on which the holder is prepared to teach. Beginning

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 is dependent upon eligibility for admission, enrollment, and registration at the University of Washington.

A minimum of 90 approved credits is required.

Prior admission to the College of Education Teacher Certification Program or acceptance into a noncertificate college degree program is required.

Bachelor of Arts Degree

To qualify for the Bachelor of Arts degree, students in the College of Education, in addition to meeting University



teachers are assigned in accordance with their stipulated competencies. Noncitizens should consult with an education counselor 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 seven years thereafter.

All students obtaining an Initial or Provisional Certificate for teaching shall complete a socioethnic studies requirement prior to the final quarter of the teaching practicum. A minimum of 6 credits in approved courses is required. At least 3 credits shall be in a course(s) that examines the general features of ethnic diversity, cultural pluralism, economic deprivation, and cultural value differences; the additional 3 credits shall be in a course(s) that addresses the characteristics, contributions, and problems of a particular social or ethnic group in the United States. Additional information and a listing of suggested courses that fulfill the requirement may be obtained from the College of Education advisory office. Students seeking admission to block patterns, elementary or secondary, must recognize that the socioethnic requirement may need to be completed prior to entry into the block, because time may not permit such course work during the professional sequential pattern.

The Initial or Provisional Certificate at the elementary school level requires the completion of a professional minor.

Each of the professional minor certificate patterns provides the student a program that is consonant with the requirements of the State Board of Education. Students who can demonstrate equivalent competencies in any of the stipulated areas, as indicated by previous experience or by the successful completion of advanced credit examinations, should see an education counselor for assistance. Courses in professional education completed eleven or more years before admission or readmission are not applicable. Such courses may be re-established by examination.

Admission to the Teacher Certification Program (Provisional or Initial Certification)

Admission to the Teacher Certification Program is based on general criteria prescribed by the college and specific criteria determined by screening committees of the College of Education. Admission to any program is dependent upon the availability of faculty, physical resources, and space in an approved teacher education pattern.

To be considered for admission to any elementary or secondary program, a student must: (1) be in good standing at the University of Washington; (2) be of sound physical and mental health giving promise of success in teaching; (3) remove any University admission deficiencies and complete basic proficiency requirements; (4) satisfy all distribution requirements; (5) complete approximately seventy percent of an approved major; (6) satisfy grade-point average and credit requirements, if applicable; (7) provide a record of documented instructional experience at the appropriate level and in the appropriate area (EDUC 302, Introductory

Practicum in Classroom Teaching and Management, may be utilized); (8) complete a contractual time schedule as required by the specific pattern selected.

Admission to an Elementary Level Pattern

In addition to the above requirements, students interested in an elementary pattern must have completed the following courses and must be interviewed by at least two individuals; the interviews will be arranged by the elementary block coordinator: HUM 201, GEOG 100 or approved substitute, MATH 170.

Five credits in an approved laboratory natural science course (e.g., biology, chemistry, physics). *Note:* Some patterns may have additional admission requirements; if so, they are indicated in the Major and Minor Programs in Education section.

Applicants must provide: (1) two copies of the application form; (2) an up-to-date transcript(s); (3) a record of courses being taken during the present quarter.

Specific Requirements for Admission to the Secondary Level Patterns

Recommendations for admission to secondary teacher certification patterns are administered by faculty members in the various subject-matter fields. The following list includes information on where to obtain additional details and assistance about the admission process and specifies admission requirements for each major area.

At the secondary school level, minor academic programs are available, but not required. Students are encouraged to broaden their teacher preparation by electing one or more supportive teaching fields. Minor departmental requirements are indicated under Major and Minor Programs in Education.

APPLIED ARTS

Business Education (Business Education office, Miller Hall): (1) 2.50 minimum grade-point average in business education; (2) a minimum of three months' documented accumulated full-time business or office work experience, or approved equivalent; (3) personal interview.

Industrial Education (Education advisory office, 207 Miller): (1) 2.50 minimum grade-point average in industrial education; (2) three reference letters; (3) personal interview.

Health Education (advisory office, 101 Hutchinson): (1) 2.50 minimum grade-point average in health education.

Physical Education (advisory office, 101 Hutchinson).

THE ARTS

Art (advisory office, 104 Art): (1) 2.50 minimum cumulative grade-point average; (2) 3.00 minimum grade-point average in art major courses; (3) personal interview; (4) a portfolio of art work (contact School of Art adviser for complete details).

Music (Music Education office, 331 Music): (1) 3.00 minimum grade-point average in music major; (2) personal interview; (3) three letters of recommendation; (4) evidence of work experience (contact School of Music adviser for complete details).

FOREIGN LANGUAGES

Asian Languages and Literature* (Chinese, Japanese) (advisory office, 302C Thomson); Germanics (adviser, 340C Denny); Latin (Classics) (Department of Classics, 218 Denny); Romance Languages and Literature (advisory office, C108 Padelford); Scandinavian Languages and Literature* (adviser, C8B Padelford); Slavic Languages and Literature (advisory office, 111 Thomson).

Foreign Language (for all foreign-language majors): (1) a language examination of record in major department; (2) personal interview in major department.

LANGUAGE ARTS

Communications (Journalism) (Student Services Center, 118 Communications); Comparative Literature (advisory office, B434 Padelford); Drama (advisory office, 114 Drama-TV); English (advisory office, Padelford Hall); Speech Communication (2.50 minimum grade-point average in speech communication courses required; advisory office, Parrington Hall).

Language Arts (for all majors included under language arts): (1) a documented record of working with youth in out-of-school settings (EDUC 301, 3 credits, may be elected), submit to major department; (2) three letters of recommendation (submit to major department); (3) personal interview (arrange with major department); (4) a personal file containing examples of work, a statement of professional purpose, and copies of all transcripts (submit to major department); (5) evidence of aptitude in the major (check with major advisory office).

NATURAL SCIENCES AND MATHEMATICS

Biology (Teacher Preparation Office, 212 Johnson): (1) 2.50 minimum grade-point average in biology major; (2) personal interview; (3) one letter of recommendation (see biology teacher preparation adviser for specific details).

Chemistry (advisory office, 200 Bagley): (1) 2.50 minimum grade-point average in chemistry major.

Earth Sciences and Geological Sciences (science office, 111 Miller): (1) 2.50 minimum grade-point average in earth or geological sciences major.

Mathematics (advisory office, G36 Padelford): (1) 2.50 minimum grade-point average in mathematics major.

Physics (advisory office, 215 Physics): (1) 2.50 minimum cumulative grade-point average; (2) PHYS 407 and 408 (B grade or higher required).

SOCIAL STUDIES

Students with any of the following majors should see the College of Education advisory office, 207 Miller: American Indian studies, anthropology, Asian American studies, Black studies, Chicano studies, economics, geography, history, Institute for Comparative and Foreign Area Studies, political science, psychology, society and justice, sociology.

Social Studies (for all majors included under social studies): (1) 2.50 minimum cumulative grade-point average; (2) letter of recommendation from an adviser in major department; (3) successful completion of a written test for competence in expression; (4) documented experience with youth in out-of-school settings will be given special consideration; (5) two personal interviews of record—(a) either a College Field Committee member in the major department, or a member of the Education Social Studies faculty; (b) a certificated secondary social studies teacher or social studies supervisor under current teaching contract.

Application Procedure, Elementary or Secondary Levels

Make certain the general admission prerequisites and specific admission criteria are understood. If there are questions, obtain assistance as indicated previously. When stipulated requirements have been met, obtain an application for admission to the selection process from the indicated source. The completed application and other material as required are to be turned in to the same office. The selection process will have been initiated.

Application Deadlines, Elementary or Secondary Levels

Applications will be accepted during the *first two weeks* of the quarter preceding the desired entry quarter or the *last two weeks* of the previous quarter, not including Summer Quarter. Specifically:

Autumn Quarter: Last two weeks of Winter Quarter or the first two weeks of Spring Quarter.

Winter Quarter: Last two weeks of Spring Quarter or the first two weeks of Autumn Quarter.

Spring Quarter: Last two weeks of Autumn Quarter or the first two weeks of Winter Quarter.

Summer Quarter: Same as Autumn Quarter.

Elementary Level Certification Program

The Elementary Level Professional Teacher Certification Program is offered in required field-oriented block patterns. The tables on the following two pages portray these three patterns, which include the professional sequence and the professional minor. Patterns not specifically identified will be adjusted within the variable field-oriented block.

Secondary Level Certification Program

The Secondary Level Teacher Certification Program is portrayed immediately following the elementary level field-oriented block patterns.

The secondary certification program will move onto a required three-quarter, field-oriented block sequence for the majority of, if not all, students entering the Teacher Certification Program on or after September 15, 1976.

* Teaching minors only; interested students should inquire at the Education Advisory Office, 207 Miller.



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 and Elementary School Emphasis
65 approved credits required.

INDIAN STUDIES BASIC CORE (30 CREDITS)

ANTH 311, 333, or 334, or 335, 416; GIS 313, 317, 338; EDC&I 464, plus 5 credits selected by the student and the Director of Indian Teacher Education.

SOCIAL STUDIES CORE (30 CREDITS)

HSTAA 201, 432; HST 113; GEOG 100; ECON 200; POL S 210.

ELECTIVE SUPPORT COURSES (5 CREDITS MINIMUM)

ANTH 202; ARCHY 304, 472; ART H 331; EDUC 401;

Field-Oriented Elementary Block Patterns

Northline Consortium Block (Northshore-Shoreline Districts)*

Seattle TEPFO Block (Region I, Region II, Seattle School District)*

First Quarter	Second Quarter	Third Quarter	Fourth Quarter
Learning and Evaluation EDPSY 304 5 credits EDPSY 308 3 credits Teaching Strategies Clinic EDC&I 496 3 credits Field Practicum EDUC 302 3 credits (6 hours per week) Elective 3 credits	Reading and Language Arts Clinic: EDC&I 360 3 credits EDC&I 355 3 credits Clinic Hours (as scheduled) Field Practicum EDUC 402, 403 8 credits (3 hours daily) Electives 3-6 credits	Science, Mathematics, Social Studies Clinic: EDC&I 370 3 credits EDC&I 375† 3 credits EDC&I 365 3 credits Clinic Hours (as scheduled) Field Practicum EDUC 402, 403 8 credits (3 hours daily)	Certificated Teaching Practicum EDUC 402 or EDUC 403 20 credits

Foundations: Crucial Issues in Education
EDEPS 479, 3 credits

Art (EDC&I 317) or Drama (EDC&I 318) or Music (EDC&I 319), 3 credits

Seattle Block may include preparation for Inner City and Urban Teaching.

* Summer Quarter not to be included

† For Seattle TEPFO interns, EDC&I 375 will be moved to the second quarter effective with those entering the pattern in Autumn Quarter 1975.

Variable Field-Oriented Block (Various School Districts)‡

First Quarter	Second Quarter	Third Quarter	Fourth Quarter
Learning and Evaluation EDPSY 304 5 credits EDPSY 308 3 credits Field practicum EDUC 302 3 credits (6 hours per week) Electives 3-8 credits	Reading and Language Arts Clinic EDC&I 360 3 credits EDC&I 355 3 credits Field practicum EDUC 402, 403 5-8 credits (2-3 hours daily) Electives 3-8 credits	Science, Mathematics, Social Studies Clinic EDC&I 370 3 credits EDC&I 375 3 credits EDC&I 365 3 credits Field Practicum EDUC 402, 403 8 credits (3 hours daily)	Certificated Teaching Practicum EDUC 402 or EDUC 403 20 credits

Foundations: Crucial Issues in Education
EDEPS 479, 3 credits

Art (EDC&I 317) or Drama (EDC&I 318), or Music (EDC&I 319), 3 credits

Seattle Assignment may include preparation for Inner City and Urban Teaching

‡ Summer Quarter may be elected for quarters 1, 2, or 3. For summer, the field practicum *must* be scheduled for morning. Student may schedule the quarterly sequence, with approval, to be completed five quarters from commencing the first quarter, not counting Summer Quarter. Quarters 2 and 3 may be reversed if necessary.

GEOG 342; GIS 222, 223, 224, 310, 340; PHY A 285;
POL S 211; PSYCH 250, 443; SOC 362.

Teaching Minor: Elementary School Emphasis
26 approved credits required.

Prior admission to a field-oriented certification pattern.
Courses: EDC&I 317 or 318 or 319, 355 or LING 455,
EDC&I 360, 365, 464; EDPSY 447.

Teaching Minor: Secondary School Emphasis
30 approved credits required; same as Indian Studies Basic
Core.

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 B in at least one of them: PHY A 201, ANTH 202, or ARCHY 205.

To graduate with a Bachelor of Arts degree in this curriculum from the College of Education, a student must have completed: 50 credits selected from both upper- and lower-

Early Childhood/Primary Block Pattern Spring Quarter Admission Only

Spring Quarter	Autumn Quarter	Winter Quarter	Spring Quarter
Learning and Evaluation EDPSY 304 5 credits EDPSY 308 3 credits Theory and Practicum in ECE EDC&I 347 3 credits Field Practicum EDUC 302 (TBA) 3 credits Electives 3-6 credits	Foundations of Early Learning EDPSY 400 3 credits Language Arts and Social Studies in ECE EDC&I 348 3 credits Program Planning in ECE EDC&I 350 3 credits Field Practicum (Pre-Primary) EDUC 402 5 credits (2 hours daily) Electives 3-6 credits	Mathematics and Science in ECE EDC&I 349 3 credits Kindergarten and Primary Teaching EDC&I 345 3 credits Reading EDC&I 360 3 credits Field Practicum Primary EDUC 402 8 credits (3 hours daily)	Certificated Teaching Practicum Preprimary and Primary* EDUC 402 20 credits
Foundations: Crucial Issues in Education EDEPS 479, 3 credits			
Art (EDC&I 317) or Drama (EDC&I 318) or Music (EDC&I 319)			

* Primary emphasis may complete practicum in K-3 assignment; preprimary emphasis must complete 10 credits of practicum in K-3 assignment.
Preparation for Inner City and Urban Teaching may be elected

General Elementary/Special Education Block Pattern Spring Quarter Admission Only

Spring Quarter	Autumn Quarter	Winter Quarter	Spring Quarter
Learning and Evaluation EDPSY 304 5 credits EDPSY 308 3 credits Theory and Practicum in SPE EDSPE 404 3 credits Field Practicum EDUC 302 3 credits Foundations EDEPS 479 3 credits Electives* 3 credits	Reading & Language Arts EDC&I 360 3 credits EDC&I 355 3 credits Program Planning and Evaluation in SPE EDSPE 403 or EDSPE 409 or EDSPE 411 3 credits EDSPE 510 3 credits Field Practicum EDUC 402, 403 5 credits (10 hours per week) EDC&I 317, 318, or 319 3 credits	Science, Mathematics, Social Studies EDC&I 370 3 credits EDC&I 375 3 credits EDC&I 365 3 credits Field Practicum EDUC 402, 403 8 credits (3 hours daily) EDSPE 499 3 credits	Certificated Teaching Practicum EDUC 402 or EDUC 403 20 credits

* Not recommended. May be approved in case of serious hardship.
Preparation for Inner City and Urban Teaching may be elected



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

To graduate with a minor in anthropology, College of Education students must complete 30 credits selected from both upper- and lower-division courses in the Department of Anthropology, including PHY A 201, ANTH 202, and ARCHY 205; and a minimum of 15 credits of the required 30 with a grade of *B* or above (courses in which a student receives a *D* or *E* may not be counted toward the required 30 credits for the minor). Courses below the 200 level may not be counted in the 30 credits.

Art

Teaching Major: Secondary School 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; 9 credits of approved art electives; EDC&I 340.

Teaching Minor: Secondary School Emphasis

15 approved art credits required. Offered only in combination with art major.

Asian American Studies

Teaching Major: Secondary and Elementary 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.

Field-Oriented Secondary Block Pattern

Northline Consortium Block (Northshore-Shoreline Districts)

Seattle TEPFO Block (Region I, Seattle School District)

Variable Field-Oriented Block (various school districts)

May include preparation for Inner City or Urban Teaching

First Quarter		Second Quarter		Third Quarter
Learning and Evaluation		Teaching Methods ⁵	3-4 credits	Certificated Teaching
EDPSY 304	5 credits	Teaching Strategies Clinic ¹		Practicum ²
EDPSY 308	3 credits	EDC&I 496D	3 credits	(40 hrs. per week in
Teaching Strategies Clinic ¹		Field Practicum ²		regular school schedule)
EDC&I 496C	3 credits	EDUC 403 or 404	12 credits	EDUC 403
Field Practicum ²		(24 hrs. per week on		or
EDUC 302	3 credits	approved schedule)		EDUC 404
(6 hours per week)				20 credits
Special Methods ³	2-4 credits			
Electives	3-6 credits	Elective	3 credits	
		Foundations: Crucial Issues in Education (EDEPS 479, 3 credits) ⁴		

1. Northline Consortium Block only.
2. Time allocated for all field practicums includes scheduled seminars.
3. Foreign Language, Science, and Business Education.
4. Required during the first or second quarter for all students entering the Teacher Certification Program after September 15, 1976.
5. Limited offering may require inclusion in the first or third quarter.

The program in Northline and Seattle provides a three-quarter continuous experience. Entry is available Autumn, Winter, or Spring quarters: Summer Quarter may not be utilized. To provide intake opportunity each quarter for all students, currently, some modification of the methods and evaluation course sequence listed above is necessary. These changes are necessitated by the fact that there are not sufficient students to justify offering the methods class each quarter. All other requirements will follow the normal pattern.

The program for the Variable Block consists of the same requirements listed above. However, the Variable Block is designed to permit greater freedom in time to complete the program as well as in choice of location at which the assignment may be accomplished. It is open only to those presenting strong reasons consistent with the concept of flexibility.

The Variable Block may be entered any quarter, including Summer Quarter. The student may elect to complete the requirements in *four* quarters, not including Summer Quarter. However, each quarterly pattern must be completed as stipulated above. The third, final, quarter of the pattern must be completed during Autumn, Winter, or Spring quarter.

Placements in the Variable Block are possible in Seattle, Region II (South or West Seattle); Lake Washington, Highline, Mercer Island, Renton, Edmonds. Other local school districts may be included as the program develops; inquire in the education advisory office, 207 Miller, for additional possibilities.

Admittance to any TEPFO secondary pattern requires prior selection and admission to the Teacher Certification Program.

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, 423, 453, 454.

Teaching Minor: Secondary School Emphasis

22 approved credits selected from the core listing preceding.

Biology

Teaching Major: Secondary School Emphasis

47-54 approved credits required. Courses: BIOL 101-102; BOT 320, 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; ZOOL 208 or 301; ZOOL 362 or 456; ZOOL 330 or 331; ZOOL 409 or BIOL 472. A grade of C or better must be achieved in each required course.

Teaching Major: Elementary School Emphasis

45-50 approved credits required. Courses: BIOL 101-102; BOT 320, 113; or BIOL 210, 211, 212; CHEM 102 or 231, 232, 241; 25 credits of upper-division courses (must include 5 credits in botany and 10 credits in zoology). (Also see natural sciences teaching major.)

Teaching Minor: Secondary School Emphasis

A grade of C or better must be achieved in each required course. 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; BLK S 250; GEOG 227; HST 361, 362; 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*; SPHSC 100; SPCH 140, 329.

Teaching Major: Elementary School Emphasis

62-65 approved credits required. Courses: the same courses as for Teaching Major: Secondary School Emphasis, Track A or Track B.

* Sections in which Black literature is given special emphasis. Consult with an adviser regarding appropriate selection of sections.

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; QMETH 200; BG&S 101, 200; ECON 200, 201; MKTG 300 or 301; BCMU 301; A ORG 460; BG&S 361 or BECN 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; QMETH 200; BG&S 101, 200; ECON 200; A ORG 460 or ECON 201; BCMU 301; EDC&I 314.

Teaching Minor: Secondary School Emphasis

35 approved credits required. Courses: ACCTG 210, 220; BG&S 101, 200; ECON 200; BCMU 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

55 approved credits required. Courses: CHEM 140, 150, 151, 160, 170, 221, 231, 232, 241, 242, 350, 351; PHYS 114, 115, 116, 117, 118, 119 (or approved equivalent); MATH 124.

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).

Chicano Studies, Bilingual-Bicultural

Teaching Major: Secondary or Elementary School Emphasis

78-86 approved credits required. Prerequisite: evidence of competency to teach in the Spanish language. All students to complete the Chicano studies core plus either the social studies core or the Spanish language core.

CHICANO STUDIES CORE (48 CREDITS)

SPAN 231, 331, 359, 480; HSTAA 180, 181; PSYCH 250; MUSIC 300; EDC&I 454; with approval of the Chicano Studies adviser select an additional 10 credits from Chicano Studies courses.

SOCIAL STUDIES CORE (30 CREDITS)

HSTAA 201, 432; HST 113; GEOG 100; ECON 200; POL S 210.

SPANISH LANGUAGE CORE (38 CREDITS)

SPAN 301, 302, 303, 304, 305, 306, 408 or 409, 480, 488, 481 or 482 or 483; EDC&I 329, 335.

* CHEM 350 may be substituted for CHEM 232, and CHEM 351 may be substituted for CHEM 241.



Teaching Minor: Secondary School Emphasis

48 approved credits required. Prerequisite: evidence of competency to teach in the Spanish language. Course requirements the same as the Chicano studies core listed previously.

Elementary School Bilingual-Bicultural Chicano Education Minor

26 approved credits required. Prerequisites: admission to the Teacher Certification Program; evidence of competency to teach in the Spanish language; completion of the following: SPAN 231, Chicano Expressive Culture (5), GIS 302, Introduction to Chicano Studies (5), HSTAA 180, History of the Chicano People to 1848 (5), HSTAA 181, History of the Chicano People Since 1848 (5). Courses: EDC&I 132, 317 or 318 or 319, 355, 360, 365, 370, 375, 453.

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, 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.

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 DANCE 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 DANCE 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 DANCE 101, 102, 103; DRAMA 325 or 210, 211, 212.

Early Childhood Education Teaching Minor (Spring Quarter Entry Only)

24 approved credits required. Prior admission to the field-oriented teacher certification pattern. Courses: EDC&I 317 or 318 or 319, 347, 348, 349, 350, 360; EDUC 301; EDPSY 400.

* Required for speech pathology.

† Ordinarily only 300- and 400-level literature courses may be applied toward the degree.

Earth Science

All required courses must be completed with a grade of C or higher.

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, 340, 361; CHEM 140, 150, 160; PHYS 114, 115, 116, 117, 118, 119 or 121, 122, 123, 131, 132, 133; ATM S 101 or 201 or 301; ASTR 101 or 102 or 201 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 or 417, 418, 419, 423, 405 or 450, 433 or 434, 435; MATH 124, 125, 126; CHEM 140, 150, 151, 160; PHYS 121, 122, 123; ASTR 101 or 102 or 201 or 301; ATM S 201 or 301; GEOL 205.

ASTRONOMY EMPHASIS

Administered by the Department of Astronomy.

Teaching Major: Secondary School 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 or 301, 321, 351; PHYS 114, 115, 116, 117, 118, 119 or 121, 122, 123, 131, 132, 133; ASTR 101 or 102 or 201 or 301; GEOL 101 or 205; OCEAN 101 or 203; 10 to 14 elective credits in 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 102 or 201 or 301; ATM S 101 or 201 or 301; 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).

Elementary Education (General) Teaching Minor

18 approved credits required. Prior admission to a field-oriented teacher certification pattern. Courses: EDC&I 317 or 318 or 319, 355, 360, 365, 370, 375.

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 and 390 or 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 or 5 credits in drama; 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 390 or 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; EDC&I 356.

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, 390 or 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 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,

* Variable topics in ENGL 444 in writing, language, and literature.



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).

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 Major: Elementary 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.

* Variable topics in ENGL 444 in writing, language, and literature.

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.

Germanics

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

64 approved credits required. Courses: ZOOL 118, PSYCH 101, H ED 250, 251, 321, 322, 421, 422, 471, 498, EPI 421, ENVR 411, BIOST 472, GIS 350.

Teaching Major: Elementary School Emphasis

40 approved credits required. Courses: ZOOL 118, PSYCH 101, H ED 250, 251, 321, 322, 421, 422, 471.

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, and three United States history courses, at least two of which must be upper-division, and one upper-division modern Europe course; EDC&I 366; and two electives.

Teaching Major: Elementary School Emphasis

53 approved credits required. 2.50 grade-point average required in history courses taken at the University of Washington. Courses: same as for Teaching Major: Secondary School Emphasis, except that an elective may be substituted for the upper-division modern Europe course. EDC&I 366 not required.

Teaching Minor: Secondary School Emphasis

33 approved credits required. 2.50 grade-point average required in history courses taken at the University of Wash-

ington. 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.

Individually Designed Interdisciplinary Major

45 approved credits minimum required. Primarily designed for those students interested in noncertificated educational roles. (If consideration of an individually designed major pattern is desired to meet initial teacher certification requirements, this will require the submission and ultimate approval of a formal petition administered by the college advisory office, 207 Miller.) A minimum of fifty percent of the credits must be earned in upper-division courses. Professional education courses required for initial certification are not normally included in the program. All individually designed programs must be approved by a faculty committee of the Department of Education; a faculty adviser is required for each student. Complete information and application materials may be obtained in the College of Education advisory office, 207 Miller.

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; PE 292 or approved substitute; fourteen approved electives.

Teaching Major: Elementary School Emphasis

36 approved credits required. Courses: EDC&I 300, 303, 304, 305, 306, 309, 311; twelve approved electives.

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; PE 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

Minor: Secondary School Emphasis

24 approved credits required. Courses: LIBR 440, 441, 442, 443, 453, 454; EDC&I 480, 587.

Minor: Elementary School Emphasis

24 approved credits required. Courses: LIBR 440, 441, 442, 443, 451, 454; EDC&I 587; one elective, either EDC&I 480 or LIBR 452.

Every applicant for an elementary or secondary school library position must hold a teaching certificate for the appropriate level and must meet the minimum standards recommended to the State Board of Education; presently the minimum is 24 quarter credits.

Courses listed above meet (1) recommendations for elementary, junior high, and senior high school librarians, and/or (2) requirements for the librarianship minor: secondary or elementary school emphasis, undergraduate 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.

* 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.



Teaching Minor: Secondary School Emphasis

30 approved credits required beyond Elementary Functions.* Courses: MATH 124, 125, 126, 205, 411, 412, 444, 445.

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 Certification Program); MUSIC 310 or 311 or 490; 280, 380, 381, 382; 443; 432 or 440 or 441 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 Certification Program); MUSIC 316 or 317 or 318; 432; 440 or 441 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 Certification 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

65-69 approved credits required. The natural sciences major for elementary school emphasis students is offered jointly by the departments of Botany, Chemistry, Geolog-

ical Sciences, Physics, and Zoology. Approval of the major may be obtained by the student from one of the following: Chemistry advisory office, Geological Sciences advisory office, Physics advisory office, or 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 320; ZOOL 118 or 208 or BIOL 210, 211, 212; BOT 371 or ZOOL 330 or 362; ASTR 101; ATMS 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

27 core course credits, 18 credits in specialization courses, 22-24 credits in approved electives, 17-20 credits in related fields courses required.

Core courses: PE 325, 331, 332, 350, 410. Specialization courses: PE 290 or 304, 365, 366, 450, 455, 460. Related fields courses: B STR 301; PE 292; PSYCH 100 or 101, ZOOL 118, 119, 208.

Teaching Minor: Secondary School Emphasis

38-40 approved credits required and 19-22 credits in related field courses required.

Core courses: same as those for Teaching Major: Secondary School Emphasis. Specialization courses: PE 290 or 304, 365, 366, 450, 460. Related field courses: same as those for Teaching Major: Secondary School Emphasis.

Teaching Major: Elementary School Emphasis

27 core course credits, 20 credits in specialization courses, 20½-23½ credits in approved electives, 17-20 credits in related field courses required.

Core courses: same as those for Teaching Major: Secondary School Emphasis. Specialization courses: PE 292, 311, 314, 316, 365, 366, 478. Related field courses: same as those for Teaching Major: Secondary School Emphasis.

Teaching Minor: Coaching-Nonphysical Education Majors

27-30 approved credits required. Completion of the minor requires documented extensive experience as a performer at, or beyond, the high school level in at least one sport for a minimum of two seasons.

* 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.

Courses required: PE 292, 301, 331, 336, 366, 368, 493, 498.

Electives from the following (6 credits): PE 290 or 304, 311, 320, 325, 332, 350, 366, 368, 370, 371, 372, 373, 470, 480.

Physics

Teaching Major: Secondary School Emphasis

A grade of C or better must be earned in each required course. 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

A grade of C or better must be earned in each required course. Track A: 35 approved credits required; track B: 31 approved credits required. Courses: track A (with biological science or nonscience major)—PHYS 114, 115, 116, 117, 118, 119, 210, 211, 212, 407; 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: any three of the following: POL S 101, 201, 202, 203, 204; and a minimum of 10 credits from each of the following broad fields*: (1) Political Theory and Public Law, (2) Government, Politics, and Public Administration, and (3) Comparative Government and International Relations. POL S 351 is recommended for teachers in the state of Washington.

The department strongly recommends that a student who intends to teach in senior high school elect a minor in history in addition to his major in political science, and that a student who intends to teach in junior high school elect a minor in geography and take HSTAA 201, in addition to his major in credits in the department.

Teaching Major: Elementary School Emphasis

50 approved credits required. Courses: same as those for Teaching Major: Secondary School Emphasis.

Teaching Minor: Secondary School Emphasis

30 approved credits required. Courses: POL S 101, 202; 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.

Psychology

Teaching Major: Secondary School Emphasis

50 approved psychology credits required. Courses: PSYCH 101 or 102; 231 or 232 or 233; 213 or 217 and 218; psy-

chology electives (MATH 101 or equivalent is prerequisite for PSYCH 213; MATH 157 or 124 is prerequisite for PSYCH 217).

Teaching Major: 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 320, 420, 421, 422, 451, 452, 453; 461, 463; HSTEU 442 or 444, 423 or 445; SLAV 351.

Teaching Major: Elementary School Emphasis

47-57 approved credits required. Courses: same as those for Teaching Major: Secondary 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 following—HSTAA 429; SOC 371, 472, 473; one of the following—PSYCH 305; SOC 270, 271; one of the following—PHARM 310, NURS 489; and 10 approved 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 previously.

To graduate with a teaching major in sociology, a student must take 50 credits in sociology as stated below and have a cumulative 2.50 grade-point average in sociology courses taken at the University of Washington.

Courses: SOC 110, 223, and 40 credits in sociology electives.

* The Department of Political Science maintains a current list of approved courses for the three broad fields.

**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 electives.

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 Autumn Quarter; students should inquire at the department advisory office for current information.

Students are urged to take any one of the SPAN 350, 351, 352 series *before* beginning the SPAN 304, 305, 306 series.

Special Education**Teaching Minor: Secondary School Emphasis**

33 approved credits required. Permission from the special education area faculty. Courses: EDSPE 404, 403 or 409 or 411, 418, 499, 510; EDC&I 462; 15 credits in electives approved by a special education faculty adviser.

Teaching Minor: Elementary School Emphasis

Spring Quarter admission only. 30 approved credits required. 3.00 minimum grade-point average in major field. Miller Analogies Test score. Prior admission to the field-oriented teacher certification pattern. Courses: EDC&I 317 or 318 or 319, 355, 360, 365, 370, 375; EDSPE 403 or 409 or 411, 404, 499, 510.

Speech Education

Students declaring a major in speech must present a grade-point average of 2.50 in all University of Washington courses, and are required to maintain a grade-point average of 2.50 in all speech courses. Students transferring from other schools and directly declaring a major in speech must present a cumulative grade-point average of 2.50 in all courses from other institutions. After two or more quarters of attendance at the University, the University grades will take precedence. Again, a grade-point average of 2.50 must be maintained in all speech courses. Exceptions to the above requirements may be authorized by the department.

Teaching Major: Secondary School Emphasis

60 approved credits required. Courses: SPCH 102, 140, 203*, 220, 270, 334, 368, 369, 373, 456, EDC&I 357 and EDUC 404†; 10-15 credits in approved electives in speech including 5 credits at the 400 level (excluding SPCH 499). In the fifth year the student must elect an additional 15 credits in upper-division courses approved by the Department of Speech.

Teaching Minor: Secondary School Emphasis

35 approved credits required. Courses: SPCH 102, 203*, 220, 368 and 369, or 373, 456, EDC&I 357; 10 credits in approved electives in speech, of which 5 credits must be in upper-division courses.

Teaching Major: Elementary School Emphasis

48 approved credits required. Courses: SPCH 102, 140, 203*, 341‡, 368, 369, 373, 455, SPHSC 348; 15 credits of approved electives, of which 5 credits (excluding SPCH 499) must be at the 400 level.

Speech and Hearing Sciences**Communication Disorders Specialist Majors**

72-80 approved credits required for students who wish to be certified as communication disorders specialists (CDS) (not a teaching major). The baccalaureate degree portion of this program is preprofessional in nature. In order to fulfill the CDS professional requirements, students must apply and be accepted into a postbaccalaureate program of 45 minimum credits. Successful completion of this program will enable the student to meet the Washington State Board of Education requirements for the Initial Educational Staff Associate (ESA) Certificate (CDS) and the academic and practicum requirements for the Certificate of Clinical Competence of the American Speech and Hearing Association. Requirements for the Initial ESA Certificate (CDS) are established and monitored by the Puget Sound Consortium. Details concerning the application and certification process may be obtained from the undergraduate adviser, Department of Speech and Hearing Sciences.

In addition to completing the communication disorders specialist major, students are required to elect and complete EDPSY 304, 308, EDEPS 479, EDC&I 320, EDUC 402, 403, or 404. Students are urged to defer EDUC 402, 403, or 404 until the fifth year. Students entering these education courses will not be admitted to the Teacher Certification Program but will be admitted to the required courses upon request of the Department of Speech and Hearing Sciences.

Admission requirements include a minimum of 90 approved credits by the quarter in which application is made, a cumulative grade-point average of 2.50, and a grade-point average of 3.00 in the following preadmission courses: SPHSC 250, 301, 302, 307, 311.

Courses: 18 credits from the following: DRAMA 338, EDC&I 347, 355, 360, 400, 402; EDSPE 403, 404, 409, 411,

* SPCH 103 may be substituted if taken prior to declaring major.

† Strongly recommended.

‡ Or department-approved substitution.

414, 418, 435; LING 200, 400; PSYCH 320, 305*, 306*, 410; SPCH 455; SPHSC 451.

The following courses are required for all students: SPHSC 303, 310, 315, 330, 332, 350, 351, 370, 380, 391 (Section A) or 451 (Section A), 391 (Section B), 401, 431. The following courses are required for speech pathology: SPHSC 430, 454 plus one course in behavior modification. The following courses are required for audiology: SPHSC 420 and a minimum of 9 credits from the following: PSYCH 305; 306, 414, 421, 423, MATH 105, EDPSY 490 or PSYCH 213.

Teaching Major: Elementary School Emphasis

51 approved credits required. Courses: SPHSC 250, 301, 302, 303, 307, 310, 311. 25 elective credits from the following: SPHSC 315, 330, 380, 401, 402, 410, 420, 430, 431, 450, 454, 484, 499. Designed for students in elementary education as an academic major that provides information concerning the nature, development, and disorders of human language, speech, and hearing.

Swedish (Scandinavian Languages and Literature)

A grade-point average of 2.50 must be maintained.

Teaching Major: Elementary School Emphasis

35 approved credits required. Courses: SWED 220, 221, 222, 223, 224, 225; 300, 301, 302 or 350, 351, 352; 303, 304, 305, 490, 450; SCAND 455; EDC&I 339.

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, 450, 490; SCAND 455; EDC&I 339.

THE STANDARD CERTIFICATE

Admission to the College of Education or to any of the programs within the college assumes and is dependent upon the student's eligibility for admission, enrollment, and registration at the University of Washington.

The Standard Certificate is issued by the State Department 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 three 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

* Ordinarily, only 300- and 400-level literature courses may be applied toward the degree.

with any appropriate suggestions from the field (such work must represent study in both professional and academic fields).

Specific Requirements

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 5 quarter credits may be taken by independent study.
3. A minimum of 22½ approved quarter credits must be completed through the University of Washington.
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

Graduate Program Adviser

Roger G. Olstad
Office of Graduate Studies
210 Miller

Admission to the College of Education or to any of the programs within the college assumes and is dependent upon the student's eligibility for admission, enrollment, and registration at the University of Washington.

By means of its graduate programs, the College of Education provides for the continuing education of teachers and other specialists in various phases of education, including substantive areas of curriculum and instruction; for the preparation of school and college administrators and counselors; and for the scholarly study of the educational process itself—its history, philosophy, and organization, and the sociological and psychological foundations of its operation. In addition to the "fifth," or postbaccalaureate, year required by the state of Washington for the standard teaching credential that may be part of an approved graduate program, certain of the special professional certificates for school personnel that require graduate study may be earned through the College of Education.

Students who intend to work toward advanced degrees must apply for admission to the Graduate School and must



meet its general requirements together with any major field requirements that may be specified. For example, test scores are required and some fields require successful experience relative to the programs. Additional information may be obtained from the graduate program adviser, appropriate members of the faculty, or the Office of Graduate Studies, 210 Miller.

Graduate Degree Programs

The basic graduate programs offered by the College of Education lead to one of three advanced degrees: Master of Education, Doctor of Philosophy, or Doctor of Education. Students entering these programs will be governed by requirements outlined below.

Master of Education Degree

Requirements for the Master of Education degree are: completion of an approved program of a minimum of 45 quarter credits, exclusive of prerequisites, that consists of a minimum of 15 quarter credits in an area of concentration in education; a minimum of 9 quarter credits in related courses in, and outside of, education; thesis: 9 quarter credits, or option of nonthesis: 9 quarter credits in field study, research seminar, or special assignment; final examination.

The Master of Education degree is currently offered in the following specializations: Curriculum and Instruction (includes art education, business education, early childhood education, elementary education, environmental education, Indian education, industrial education, 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 as a full-time student, 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 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, educa-

tional policy studies (foundations of education) including history of education and philosophy of education, higher education, or special education including exceptional children.

Doctor of Education Degree

Assuming the student has completed the master's degree or its equivalent, requirements for the Doctor of Education degree are: a minimum of two academic years of resident study, of which one must be as a full-time student, including 27 quarter credits for dissertation* in addition to the course work specialization; a General Examination, written and oral; a Final Examination after the dissertation has been satisfactorily completed.

The Doctor of Education degree is offered with experiences tailored individually for aspirants to this degree.

A student may concentrate studies and research with emphasis on one of a particular set of topics, such as 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 application forms are to be obtained from the University of Washington, College of Education, Area of Educational Administration, 309 Miller, DQ-12, Seattle, Washington 98195. This application, with the \$10 fee, must be sent to the Intermediate School District office in which the applicant's school is located, and the receipted application returned to the University of Washington at the above address.

1. 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 baccalaureate 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.

* An independent investigation of an area in the subject-matter field, leading to a suitably written dissertation. Such an investigation might take the form of research on pedagogical problems, a contribution to the teaching of the subject matter, or the synthesis of scattered materials that might have potential in teaching but have not yet been reviewed, digested, and made intelligible and useful in these areas of instruction.

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 experience on the appropriate level or levels is one of the requirements 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 Credential 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.



ENGINEERING

Dean

W. Ryland Hill
371 Loew

Associate Deans

Kermit L. Garlid
Irene C. Peden
H. Myron Swarm

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 baccalaureate degree is immediately useful for beginning to solve technical problems in government and industry. However, those engineers who plan to take up research, college teaching, or creative activities on a professional level will need graduate study leading to the master's and doctoral degrees. Increasingly, the master's degree is coming to be considered as the first professional engineering degree.

For undergraduate students, the College of Engineering offers a flexible curriculum that suits the varied needs of

many men and women, both in established departmental programs and in new interdisciplinary studies. Also, the college has active educational and research programs, both departmental and interdisciplinary, at every graduate level.

The College of Engineering has been a major unit of the University since 1899, 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 1974, 1,820 undergraduates and 680 graduate students were enrolled in engineering programs taught by a faculty of nearly two hundred members.

College Facilities

Teaching and research activities of the College of Engineering occupy thirteen major campus buildings and portions of others. All except the hydraulics laboratory are grouped around the engineering quadrangle. These buildings, most of them relatively new, contain the college's offices, classrooms, and numerous research and teaching laboratories. A central engineering library that serves the college supplements the nearby chemistry, mathematics, 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, a laboratory for heat-transfer studies, and a large interdisciplinary research laboratory.

Student Organizations and Activities

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.

Students also serve with faculty members on engineering policy committees, which make recommendations concerning teacher evaluation, curriculum revisions, advising, grading systems, and other matters of interest to students and faculty.

Financial Aid

The college offers financial assistance to undergraduates through industrial scholarships and 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; research assistantships; or teaching assistantships. A student seeking such aid should apply at the office of his or her major department.

UNDERGRADUATE PROGRAMS

The College of Engineering provides flexible curricula that offer a variety of educational experiences to its students. The curricula also facilitate transfer from community colleges and from other four-year colleges and universities.

Admission

Students may enter the college as freshmen or as transfer students with advanced standing. Details of admission qualifications can be found in the general Undergraduate Admission section of this catalog.

Recommended High School Preparation

Students who intend to study engineering should choose high school electives that strengthen their background in mathematics, physical science, and communication. Mathematics through algebra and trigonometry, physics, and chemistry are prerequisites for first-year courses in engineering. A fourth year in mathematics and senior-level English composition are also recommended. Those who have not completed prerequisite courses in high school must take equivalent courses at the University in addition to the regularly required program, although this usually increases the time needed to earn a degree.

Advising Center

Executive Director

James B. Morrison
110 Engineering Library

The Engineer Advising Center assists undergraduate students in planning their educational programs and maintains their academic records until they have selected a major department. At that time, the records are transferred to the major department with which the student plans the remainder of his or her program. For students electing a nondepartmental program (B.S.E. or B.S. degrees), the records are maintained at the advising center, while advising is done by the student's individual faculty adviser under the supervision of a faculty committee.

In the advising center, faculty members from the various engineering departments are available for consultation and career counseling. In addition, students are urged to contact faculty members anywhere in the college for program, course, or career information and discussion. A first-year career-planning course (ENGR 110) is strongly recommended for all students who wish the most complete information on career alternatives.

Types of Programs

The college offers three basic programs leading to Bachelor of Science degrees:

Departmental Major

This program leads to a Bachelor of Science degree in a designated field of engineering (e.g., Bachelor of Science in Electrical Engineering). It is designed for students who intend to practice as professional engineers in a standard branch of engineering or who plan to undertake postgraduate study in that field. The curricula for these degrees are accredited by the Engineers' Council for Professional Development, the principal engineering accrediting agency in the United States. Accredited four-year curricula leading to baccalaureate degrees are offered in the departments of Aeronautics and Astronautics; Chemical, Civil, Electrical, and Mechanical Engineering; Mining, Metallurgical, and Ceramic Engineering; and Computer Science.

Nondepartmental Professional Program

This program leads to a Bachelor of Science in Engineering degree and is designed for students who have well-defined, special educational objectives that departmental programs do not satisfy. The curriculum might emphasize bioengineering, environmental engineering, mineral resources, nuclear engineering, ocean engineering, or another interdisciplinary or specially approved area. Graduates can practice as professional engineers in newly developing fields, or they may embark on postgraduate study in these or allied fields (see the Interdisciplinary Engineering Studies portion of this catalog).

Nonprofessional Program

This program leads to a Bachelor of Science degree and is intended for students who wish to have a significant exposure to science and engineering courses, but who do not plan to engage in professional engineering practice. It provides preparation for work in specific areas such as environ-



mental studies or scientific and technical communication. It also is excellent preparation for entry into professional schools of business, law, or medicine (see Interdisciplinary Engineering Studies in this section).

General Requirements for Graduation

To graduate, students must meet or exceed the requirements of the University, the college, and their particular program or department. College requirements are listed in this section, and program or departmental requirements are given in the specific section that describes the program or department.

Selecting courses that fulfill graduation requirements is the responsibility of each individual. Students are urged to check carefully the course and credit requirements of the program in which they are enrolled.

The college requires a minimum number of credits within certain areas of study and some specific courses within certain areas. All programs require:

Mathematics: 21 Credits

Specific courses required are MATH 124, 125, 126, and 238. The remaining three credits must be taken at the 200 level or higher; MATH 205 or 327 are recommended.

Natural Science: 22 Credits

Chemistry (4 credits) at the level of CHEM 140 or higher and PHYS 121 and 122 (8 credits) are required. The 10 additional credits are often completed by further study in chemistry or physics, but students may elect advanced courses in other fields such as atmospheric science, geological science, geophysics, oceanography, astronomy, or biology. Elementary survey courses are not acceptable in this category.

Engineering College Courses or Alternates: 28 Credits

GROUP A, FUNCTIONAL TECHNIQUES: 12 CREDITS

ENGR 141 (4 credits), FORTRAN, is required. The remaining are to be selected from at least two of the following areas of study: visual presentation, written and oral communication, computational technology, design and syntheses, and laboratory techniques.

GROUP B, ENGINEERING SCIENCE: 16 CREDITS

No specific courses are required by the college. Courses may be selected from materials science, discrete mechanics, continuum mechanics, linear systems, and thermodynamics. In special cases, and with the major adviser's approval, a student may include in the engineering science category various courses in mathematics, science, and engineering (usually upper-division courses and not in the major field; see Undergraduate Programs in the Programs of Study section of this catalog).

A major department may specify as many as 16 credits of particular courses, not already specified for all students, from within the three general areas listed above (see individual departmental requirements). Such courses are intended to provide the student with a strong background for his or her major field of study.

Students who have already completed 135 credits or more of their degree program may use courses numbered 100 to 200 to satisfy basic requirements of the College of Engineering only with their major adviser's approval. Engineering science and functional technique requirements are normally satisfied by upper-division students with the substitution of 300- or 400-level courses that are not in the student's major department or professional program.

Humanities and Social Sciences: 30 Credits

A minimum of 10 credits is required in each area. Humanities include courses in literature, art, music, drama, philosophy, etc., which stress the essential qualities of individual forms of expression. Language courses must be concerned with literature, not skills; similarly, art or music courses must be devoted to music or art forms, not development of students' performing skills. Social sciences include courses in history, economics, psychology, sociology, etc., which stress the social nature of mankind and the development and analysis of societies and/or social institutions (see Humanistic-Social Studies under Departmental and Interdepartmental Programs in this section of the catalog).

Upper-Division Engineering Courses of Study: 66 Credits Maximum

Major departments or specific programs may require as many as 66 credits in their curricula.

Free Electives

The minimum University and college requirement for graduation is 180 credits, but a department may require a higher total. The area requirements cited previously total no more than 167 credits, and the remaining credits (at least 13) may be chosen from any University courses except the following: mathematics, physics, or chemistry courses at a lower level than specified above; courses taken to satisfy an entrance requirement; English courses (e.g., ENGL 150, 151, 160) aimed at developing minimum basic skills for University study; physical education activity courses; lower-division military science courses, and any more than 9 upper-division military science credits.

Special Programs

Cooperative Education (Co-op)

The Cooperative Education Program of the College of Engineering permits engineering undergraduate students in any of the engineering departmental programs to combine practical on-the-job engineering experience with their academic studies. Freshmen who have completed one year of engineering study and transfer students who have completed one quarter of engineering at the University and who have a grade-point average of 2.50 or better may apply for entry into the engineering Cooperative Education Program. Minimum requirements for completion of the co-op program involve completing at least two work experiences, one of which must be six months. Up to three extra quarters can be required for a student to complete the Cooperative Education Program. However, the combination of the academic degree and related work experience will usually be reflected in a better starting salary for co-op graduates.

Graduate internships are also available to graduate students in some engineering graduate programs. Graduate students interested in co-op education internships should obtain the

support of their department and then apply for admission to the co-op Graduate Internship Program.

Employers participating in the program include aerospace firms, electronic equipment manufacturers, consulting firms, utilities, machinery and mechanical equipment manufacturers, construction firms, and a variety of city, state, and federal agencies. Work periods with these employers are coordinated with the academic progress of the student and become more sophisticated as the student nears the end of the academic program. Frequently, students change their majors in engineering because of their work experiences, for cooperative education allows the student a chance to select a field of work while progressing through school based on actual on-the-job experience. With the cost of education rapidly mounting, the co-op program can be an excellent method of earning a substantial portion of a student's college expenses. More important, however, are the educational advantages of cooperative education. The combining of academic and work experience often provides a relevancy for both. It gives reality to learning, increases educational motivation, develops greater human understanding, accelerates the student's progress toward maturity, and provides a valuable orientation to the world of work as well as many useful employment contacts.

Additional information on this program may be obtained from the University of Washington, College of Engineering, Coordinator of the Cooperative Education Program, FH-10, Seattle, Washington 98195.

CONTINUING EDUCATION PROGRAMS

Rapid advances in applied mathematics and in the physical and engineering sciences make it especially important that practicing engineers who have been out of school more than ten to fifteen years continue to update their educations.

Consequently, the College of Engineering offers a variety of Continuing Education programs, which may be divided into two categories: (1) courses carrying Continuing Studies credit, and (2) noncredit courses, short courses, and conferences.

In general, both kinds of Continuing Education courses are offered according to need and are announced in *Spectrum*, in special circulars, and in the news media.

Courses Carrying Continuing Studies Credit

In 1966, the University of Washington established a category of courses that carry Continuing Studies credit. This specially designed credit is *not* intended for application toward a University degree. Instead, the program's aim is to satisfy the immediate needs, for example, of professional engineers and their employers. Quantitatively, 1 credit in Continuing Studies requires the same amount of work as is normally needed for one quarter of University credit within the degree programs. All successfully completed courses are entered on an official transcript available to the student as part of his or her educational record.

Short Courses and Conferences

To serve the needs of the state's engineering and scientific community, from time to time the University offers short, intensive courses on advanced topics. Because of the nature of these courses, formal evaluation of the participants is not possible, hence these courses usually do not carry Continuing Studies credit. Each course ordinarily covers a specialized topic and is offered on a level that approaches the forefront of current knowledge or technology.

GRADUATE PROGRAMS AND SPECIAL FACILITIES

Students who intend to work toward advanced degrees must fulfill the admission requirements of the Graduate School and of the department 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 Program

Inter-Engineering Group

Through the Inter-Engineering Group, under the direction of Associate Dean Kermit L. Garlid, 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 interengineering 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.

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.

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 carrying out fundamental and high-technology engineering research. Faculty and students from throughout the College of Engineering are undertaking a wide variety of engineering research activities within this laboratory. Much of the emphasis of the laboratory has become related in recent years to the laser and its applications. Research is being carried into the development of a new technology of lasers, and, in particular, applications of the laser to a new approach to creating controlled thermonuclear power plants occupies a major role. In addition, active research is under way in bioengineering-related areas as is a continuing effort on advanced aeronautics and aerospace problems. Research support for the efforts here are obtained from the National Science Foundation, the Energy Research and Development Administration, National Aeronautics and Space Administration, and Department of Defense. At the present time, the nature of the research programs being carried out in this laboratory have become progressively more energy related in response to the interest of the faculty and students.

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.

UNDERGRADUATE PREMAJOR PROGRAM

Students are expected to complete most of the basic requirements in mathematics, natural science, functional techniques, and engineering science early in their college work, usually in the first two years. During the last two

years of the undergraduate program, the student concentrates on the engineering course of study for the particular degree objective.

A typical curriculum for the first two years is shown below.

First Year

Courses	Credits
MATH 124, 125, 126 Calculus with Analytical Geometry	15
Science, usually chemistry or physics	12-14
ENGR 141 Introductory FORTRAN Programming	4
Engineering Functional Techniques	4-8
Humanities, social studies, or electives	7-10
Career Planning	1
	<hr/> 45

Second Year

Courses	Credits
MATH 238 Elements of Differential Equat.	3
Additional mathematics	3-6
Science, usually chemistry or physics	8-10
Engineering Science	12-16
Humanities, social studies, or electives	9-15
	<hr/> 45

Requirements in the areas of engineering functional techniques and engineering science are usually met by college courses, which are nondepartmental courses carrying the prefix ENGR and taught by faculty members drawn from throughout the college. Some courses offered outside the college also are acceptable as courses in functional techniques. These courses provide skills essential to engineering and complement the mathematics and science included in the curriculum. They broaden the technical exposure of the student and demonstrate how similar principles are applied in the various engineering disciplines.

Engineering Functional Techniques Courses

VISUAL PRESENTATION

ENGR 123 Graphical Analysis
ART 105, 106, 107 Drawing
ARCH 310, 311, 312 Introduction to Design Graphics

WRITTEN AND ORAL COMMUNICATION

ENGR 130 Techniques of Communication
ENGR 131 Scientific and Technical Reporting
Skill courses in English and speech

COMPUTATIONAL TECHNOLOGY

ENGR 140 Measurement and Experimentation
MATH 114 Elementary Computer Programming
MATH 374 Principles of Digital Computers and Coding

DESIGN AND SYNTHESIS

ENGR 150 Design and Synthesis
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 Courses

MATERIALS

- ENGR 170 Fundamentals of Materials Science
- ENGR 171 Materials Science Laboratory

DISCRETE MECHANICS

- ENGR 180 Engineering Statics
- ENGR 230 Kinematics and Dynamics

CONTINUUM MECHANICS

- ENGR 240 Introduction to Continuum Mechanics

LINEAR SYSTEMS

- ENGR 190 Introduction to Logical System Design
- ENGR 250 Introduction to Engineering System Dynamics

THERMODYNAMICS

- ENGR 260 Thermodynamics

Engineering Elective Courses

These courses provide both engineering and nonengineering students with a general technological component in their courses of study. Such courses as ENGR 307, Energy Controversies, and ENGR 305, Environmental Radioactivity, give students an opportunity to explore important present-day concerns about the impact of technology on society, including a rational analysis of the technical and social questions involved. Other courses, such as ENGR 345, Advanced Topics in Digital Computing, provide an opportunity for students to extend skills and understanding in general areas of interest.

- ENGR 110 Career Planning
- ENGR 161 Plane Surveying
- ENGR 270 Air-Water Interface Transportation Vehicles
- ENGR 280 Material Application in Engineering
- ENGR 305 Environmental Radioactivity
- ENGR 307 Energy Controversies
- ENGR 341 Computer Applications to Engineering Problems II
- ENGR 345 Advanced Topics in Digital Computing
- ENGR 346 Assembly Language Programming
- ENGR 351 Inventions and Patents
- ENGR 360 Introductory Acoustics

Undergraduate and Graduate Major Programs

AERONAUTICS AND ASTRONAUTICS

206 Guggenheim

Aeronautics and astronautics is based on an understanding of the engineering sciences and the use of these sciences to develop the engineering technology associated with trans-

portation 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, Chairperson; Bruckner, Christiansen, Decher, Dill, Eastman (emeritus), Fyfe, Ganzer, Hertzberg, Holsapple, Joppa, Kevorkian, Ness, Oates, Parmerter, 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 205, 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), ENGR 230 (4), A A 320 (2), A A 330 (3), electives (3); 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

32 credits of senior-level technical electives are required. Suitable departmental offerings are: 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 aeroelasticity—A A 480, 481; acoustics—A A 482; environmental aspects of energy conversion—A A 424; applied mathematics—A A 370, 470.



In choosing these electives, it is expected that the student will follow at least two one-year aeronautics and astronautics department sequences in areas of specialization. The remaining technical electives may include suitable courses from other departments. Additional free electives may be needed to obtain the required 180 total 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 adviser and must meet with the approval of both the adviser 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
D. A. Russell

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 baccalaureate degree in engineering, physics, or mathematics are eligible for admission. Degree candidates must complete an approved Program of Study. This program is tailored to the needs and interests of each student. It must, however, 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.

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.

BIOENGINEERING

328 Aerospace Research Laboratory

Bioengineering applies the concepts and techniques of engineering to problems of biology and medicine, and is jointly sponsored by the College of Engineering and the School of Medicine. For a description of this program, see the Inter-school or Intercollege Programs section of this catalog.

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, Chairperson; Allan, Babb, Berg, David, Finlayson, Gardner, Garlid, Heideger, Hoffman, Johanson, Krieger, McCarthy, Sarkanen, 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) are recommended to satisfy

a portion of the natural science requirements. MATH 327 (3 credits) and CHEM 231, 235, and 241 (8 credits) are also recommended. The mathematics course will complete the college mathematics requirement, while the chemistry courses are a part of the engineering science requirement. ENGR 260 (4 credits) together with CH E 200 (3 credits) are also strongly recommended.

THIRD YEAR

First quarter: CH E 310 (4 credits), CHEM 455 (3), technical electives (5), electives (3); total—15. Second quarter: CH E 326 (4), CH E 330 (4), technical electives (6); total—14. Third quarter: CH E 340 (4), CHEM 457 (3), CHEM 461 (3), electives (6); total—16.

FOURTH YEAR

First quarter: CH E 435 (4), CH E 436 (3), technical electives (3), electives (5); total—15. Second quarter: CH E 437 (3), CH E 465 (3), CH E 485 (3), electives (6); total—15. Third quarter: CH E 486 (5), electives (10); total—15.

A minimum grade-point average of 2.00 in chemical engineering courses 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

With Thesis: The requirements for this program are a minimum of 39 credits, of which 30 credits are in formal course work and 9 credits are in thesis. The course work usually is divided in the ratio of about two to one between Chemical Engineering and other departments. At least half of these courses must be numbered 500 or above. *Without Thesis:* The requirements for this program are a minimum of 39 credits of course work, 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 on appreciation for the effects on living systems of one's developments and structures.

Faculty

Dale A. Carlson, Chairperson; H. P. Mittet, Associate Chairman; Baker, Benedict, Bogan, Brown, Burges, Charlson, Chenoweth, Clanton, Colcord, Covert, Dunn, Ekse (emeritus), Elias, Evans, Ferguson, Frank, Hammer, Hartz, Hawkins, Hennes (emeritus), Hoag, Horwood, Ishibashi, Kent, Konichek (emeritus), Macartney, Mar, Mattock, McNeese, Meese, Miller, Mitchell, Nece, Nihan, Norris (emeritus), Perkins, Pilat, Rhodes (emeritus), Richey, Rossano, Sawhill, Schneider, Seabloom, Secrest, Sergev (emeritus), Sherif, Spyridakis, Strausser, Sylvester, Terrel, Vasahelyi, Veress, Waggoner, Welch, Wenk, Wessman (emeritus).

Affiliate Faculty

Baumgartner, Birkeland, Coates, Edde, Hales, Hathaway, Olesen, Smith.

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

First quarter: CIVE 316 (4 credits), CIVE 342 (4), CIVE 350 (4), CIVE 393 (4); total—16. Second quarter: CIVE



320 (4), CIVE 345 (4), CIVE 363 (4), CIVE 380 (4); total—16. Third quarter: CIVE 366 (4), CIVE 381 (4), CIVE 390 (4); total—12.

FOURTH YEAR

Civil engineering electives (22 credits), humanities and social sciences (15), electives (13); total—50.

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 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.

COMPUTER SCIENCE

112 Sieg

Computer science is devoted to the representation, storage, manipulation, and presentation of information, in both theory and practice. Computer scientists are interested in representations of information, algorithms to transform information, languages to express algorithms, hardware and software processors to execute algorithms, and ways to accomplish all of these economically.

The Department of Computer Science is an intercollege department affiliated with both the College of Arts and Sciences and the College of Engineering, and it offers both undergraduate and graduate programs. Faculty is drawn from the College of Arts and Sciences and the College of Engineering. For description of this program, see the Inter-school or Intercollege Programs section of this catalog.

ELECTRICAL ENGINEERING

211 Electrical Engineering

Electrical engineering as a professional field deals with the control of electricity and the electrical properties of materials. Typical major areas of interest are electrical generation and transmission, digital computers, circuit design, control systems, and electro-optics. 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 baccalaureate 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.

The student chapter of the Institute of Electrical and Electronic Engineers, a national professional society, is located in 222 Electrical Engineering.

Faculty

Daniel G. Dow, Chairperson; Alexandro, Andersen, Auth, Bergseth, Bjorkstam, Carlson, Clark, Cochran (emeritus), Damborg, Daniels, Dow, Eastman (emeritus), Ehrenberg, Golde, Guilford, Guy, Harris, Harrison (emeritus), Heald, Helms, Hoard (emeritus), Holden, Hsu, Ishimaru, Johnson, Lauritzen, Lewis, Lytle, Martin, Moritz, Noges, Peden, Pinter, Potter, Redeker, Reynolds, Robbins (emeritus), Rogers (emeritus), Sigelmann, Slaughter, Smith (emeritus), Swarn, Yee, Zick.

Affiliate Faculty

Ancker-Johnson, Reid, Musreliez.

Undergraduate Program

Bachelor of Science in Electrical Engineering Degree

The student advising office, 213 Electrical Engineering, is the source of most curriculum information. The curriculum adviser there can give general academic advice and assist with scheduling. For professional advice, consultation with faculty advisers, according to their posted office hours, is recommended. Also available in 213 Electrical Engineering are copies of the *Bachelor's Degree Planbook*, in which the curriculum requirements are fully detailed, and suggestions for design of an effective sequence of elective courses are provided.

A grade-point average of 2.00 or higher in electrical engineering courses is required for graduation.

The departmental curriculum consist of:

Technical preparation: PHYS 123 (4 credits); specified electrical engineering courses: E E 331, 333, 351, 310, 371.

381, 383, 312 (30); electrical engineering electives (18); professional non-electrical engineering electives (4); total—56.

A typical 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 E E 331, 351, 310.

THIRD YEAR

First quarter: E E 331 (4 credits); E E 351 (4); E E 310 (3); humanistic-social studies, mathematics, or science (3-5); total—14-16. Second quarter: E E 333 (4); E E 381 (4); engineering science (4); humanistic-social studies (3-5); total—15-17. Third quarter: E E 383 (4); E E 371 (4); E E 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.

Many free electives are available. 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 subdivision of electrical engineering. The student is urged to consult with faculty advisers in a particular field if he or she wishes to specialize. Students who plan to continue into graduate studies should consult with the graduate adviser well before completion of their undergraduate programs.

The prospective student is advised that the undergraduate curriculum will be significantly revised for the academic year 1976-77. Information is expected to be available concerning these changes in September, 1976. It can be provided upon request to the Department of Electrical Engineering advising office.

Graduate Programs

Graduate Program Adviser
E. Noges

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 engineering have received their baccalaureate 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. Persons 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

Two options are available: The nonthesis option requires 39 quarter credits of course work, carefully chosen and approved by a committee. In addition, a comprehensive examination is required. The thesis option requires 30 quarter credits of course work similarly chosen, plus a research or engineering project reported in a thesis. 9 or more credits of E E 700 (Master's Thesis) are required in addition to the course work.

Some students may wish to pursue a program toward the degree of Master of Science in Engineering, described elsewhere in this catalog, which is basically interdisciplinary in nature. Such a program may be carried out under an electrical engineering adviser and is of special interest to students with backgrounds in other disciplines or to those seeking education in interdisciplinary 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 engineering, 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 requirements 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 students obtain an effective general education. The Department of Humanistic-Social Studies assists in achieving this goal. It offers courses designed to increase awareness of the full human setting in which the practice of engineering takes place.

Faculty

Myron L. White, Chairman; Botting, Chapman (emeritus), Douthwaite, Elliott, Higbee, Leahy, Skeels, Souther, Trimble.

Courses offered by the department fall into three areas: the humanities, the social sciences, and scientific and technical communication.

Humanities and Social Sciences

All humanistic-social studies courses in the humanities and social sciences are appropriate for fulfilling the College of



Engineering's requirement of 30 credits in these areas. They also are approved for meeting the distribution requirement in the College of Arts and Sciences.

In fulfilling the 30-credit requirement, engineering students may take one or several humanistic-social studies courses, or they may choose to meet it entirely with these courses. However, they also may select appropriate courses from the following fields:

Humanities Area

Architecture, landscape architecture, anthropology, art, art history, Asian languages and literature, classics, classical archaeology, comparative literature, drama, English, Germanics, history, humanities, Institute for Comparative and Foreign Area Studies, linguistics, music, Near Eastern languages and literature, philosophy, Romance languages and literature, Scandinavian languages and literature, Slavic languages and literature, and speech communication.

Social Sciences Area

Architecture, landscape architecture, urban planning, anthropology, archaeology, Asian languages and literature, communications, economics, general and interdisciplinary studies, geography, geological sciences, Germanics, history, home economics, linguistics, Institute for Comparative and Foreign Area Studies, Near Eastern languages and literature, philosophy, political science, psychology, Romance languages and literature, Scandinavian languages and literature, social science, sociology, speech communication, administrative theory and organizational behavior, business economics, business, government, and society, international business, human resource systems, transportation, urban development, educational administration, educational policy studies, higher education, biomedical history, psychiatry and behavioral sciences, and social work.

The College of Engineering has its own approved list of acceptable courses.

To be sure that they are selecting appropriate courses in each area, students should check with the advising center, their departmental advisers, or members of the humanistic-social studies faculty.

Scientific and Technical Communication

The department's courses in scientific and technical communication have two objectives. Some are elective or special courses in which students of engineering and the sciences can increase their proficiency in communicating with others about their work. A second group of courses is designed primarily for students who wish to prepare for careers in scientific and technical communication. Such students may earn a Bachelor of Science degree in the College of Engineering or a baccalaureate degree in the General Studies program of the College of Arts and Sciences.

INDUSTRIAL ENGINEERING

143 Mechanical Engineering

Industrial engineering is invaluable to management in making decisions about problems that concern the best use of people, materials, equipment, and energy to achieve the

aims of an organization. The industrial engineer is engaged in management systems design and in collecting, analyzing, and arranging factual information that is economically useful to management. This activity applies to all types of industry and government agencies. Industrial engineers are a prime source of management talent and are sought in a wide variety of industries.

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.

The industrial engineering program is administered through the Department of Mechanical Engineering, and faculty members responsible for the program hold appointments in that department.

All inquiries concerning the industrial engineering program should be addressed to the industrial engineering adviser in care of the Department of Mechanical Engineering.

Undergraduate Program

Bachelor of Science in Industrial Engineering Degree

ENGR 180, 230, 260, and 123 are engineering college program requirements for the B.S.I.E. degree. ENGR 170, 250, and 131 are strongly recommended. Satisfaction of the minimum professional engineering requirements results from completion of the listed courses plus 9 credits of approved electives. A total of 180 applicable credits is required for graduation, with a grade-point average of at least 2.00 in all engineering courses taken at the University.

THIRD YEAR

First quarter: M E 315 (3 credits), M E 317 (4) and HSS 300 (1), M E 352 (3), electives (4); total—15. Second quarter: M E 313 (4), M E 343 (4), M E 351 (3), ENGR 341 (3); total—14. Third quarter: M E 304 (3), OPSYS 441 (4), approved industrial engineering electives (3), electives (6); total—16.

FOURTH YEAR

First quarter: M E 408 (3), M E 410 (3), M E 412 (4), electives (5); total—15. Second quarter: M E 411 (3), M E 419 (3), OPSYS 443 (4), approved industrial engineering electives (3), electives (3); total—16. Third quarter: M E 420 (4), approved industrial engineering electives (3), electives (7); total—14.

Graduate Study

Graduate studies specializing in the industrial engineering area may be undertaken with the degree of Master of Science in Engineering being awarded upon satisfactory completion of 30 credits in course work and a 9-credit thesis. Students who intend to work toward this advanced degree must obtain admission to the Graduate School. By consultation with the industrial engineering adviser each applicant's academic program is tailored to the individual; but course work must include a basic course in management, operations research, accounting, and statistics.

INTERDISCIPLINARY ENGINEERING STUDIES PROGRAM

Advising Center

110 Engineering Library

Coordinator

D. C. McNeese

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 nondepartmental B.S.E. and B.S. programs.

Bachelor of Science in Engineering Degree

A student must satisfy all college requirements for a baccalaureate degree as specified earlier in this catalog. These consist of 101 credits divided among mathematics, natural sciences, functional techniques, engineering sciences, humanities, and social sciences. The student should select 66 credits to provide a professional Program of Study consistent with his or her career objectives. This program should include at least 36 credits of 300- or 400-level engineering courses, of which at least 18 credits must be at the 400 level. The remaining 30 credits may be chosen from University offerings in engineering, mathematics, or the natural sciences. The engineering and mathematics courses must be at least at the 300 level, but up to 15 credits of natural science courses may be at any level. Courses selected in the 66-credit program should provide a logical sequence aimed at the desired goal of the student.

The minimum University requirement for graduation is 180 credits. Therefore, 13 credits may be selected from among any courses offered by the University except those specifically excluded as free electives.

Two different uses of the B.S.E. degree are available:

1. Nondepartmental, but semiformalized B.S.E. degree programs in bioengineering, 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 fields such as technical writing, engineering sales, or environmental studies.

To obtain a Bachelor of Science degree, a student must satisfy the general college requirements (101 credits) in mathematics, natural sciences, functional techniques, engineering sciences, humanities, and social sciences. The minimum University requirement for graduation is 180 credits, and the student should select the remaining 79 credits to provide a Program of Study consistent with his or her career objectives. Of these 79 credits, at least 35 must be engineering, science, or mathematics courses numbered 300 or above, and at least 25 of the 35 must be in engineering courses. The remaining 44 credits may be selected from among any courses offered by the University, except for those specifically excluded as free electives.

MECHANICAL ENGINEERING

143 Mechanical Engineering

Mechanical engineering is 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, manufacturing, operation, and management.

Faculty

Morris E. Childs, Chairperson; Adey, Alexander; Anderson, Balise, Bodoia, Bunney, Chalk, Chalupnik, Clark, Col-



lins, Corlett, Crain (emeritus), 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, Waibler, 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 CHEM 150, ENGR 170, 180, and 230 be included in the engineering college program. PHYS 123 and CHEM 151 are strongly recommended. Students needing more background in engineering graphics should take ENGR 123, Graphical Analysis, in satisfying their requirements in functional techniques. MATH 327 should be taken in fulfilling the mathematics requirement. Students may begin mechanical engineering courses as soon as they have completed MATH 126, or the equivalent. Satisfaction of the minimum professional engineering requirements results from completion of the listed courses plus 12 credits of mechanical engineering electives in one or more of three areas: energy and fluids, materials and processes, or dynamics and systems. A total of 180 applicable credits is required for graduation, with a grade-point average of at least 2.00 in all engineering courses taken at the University.

THIRD YEAR

First quarter: M E 320 (4 credits)*, M E 352 (3), M E 373 (4), electives (4); total—15. Second quarter: M E 323 (4), M E 374 (3), M E 343 (4), electives (4); total—15. Third quarter: M E 304 (3), 331 (4), M E 353 (4), M E 394 (1), electives (3); total—15.

FOURTH YEAR

First quarter: M E 331 (4 credits), M E 480 (4), M E 495 (3), electives (4); total—15. Second quarter: M E 469 (3), E E 306 (5), mechanical engineering elective (3), electives (4); total—15. Third quarter: mechanical engineering electives (9), electives (6); 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 or ceramic engineering.

Faculty

Douglas H. Polonis, Chairperson; Anderson, Archbold, Brien, Campbell, Fischbach, Jones, Miller, Mueller, Polonis, Sarian, Scott, Stoebe, Whittemore.

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 67 credits. Required is the selection of CHEM 350, Elementary Physical Chemistry, and E E 306, Elements of Electrical Engineering (5), for satisfying part of the engineering science requirements. HSS 300 must be part of the functional technique requirement and be taken concurrently with CER E 203 or CER E 300. Students must select either CER E 402 (3) and CER E 403 (3) or CER E 499 (5).

* Students who have completed ENGR 260 will not take M E 320.

THIRD YEAR

First quarter: CER E 300* (5 credits), CER E 301 (4), CER E 306 (1), CER E 322 (3), MET E 322 (3); total—16. Second quarter: CER E 302 (3), CER E 311 (3), CER E 312 (4), electives (6); total—16. Third quarter: CER E 303 (5), CER E 313 (4), CER E 323 (3); CER E 499 (1), CHEM 351 (3), or electives (1); total—16.

FOURTH YEAR

First quarter: CER E 307 (1 credit), CER E 401 (3), CER E 411 (4), CER E 441 (1); CER E 499 (2), and electives (5) or electives (7); total—16. Second quarter: CER E 442 (1), CER E 470 (3), CER E 402 (3), and electives (8) or CER E 499 (2), and electives (6); total—15. Third quarter: CER E 404 (3), CER E 443 (1); CER E 403 (3), and electives (9) or electives (12); total—16.

Graduate Programs

Students may select courses and research in accordance with their special interests and objectives. Graduate work is mostly concerned with advanced physical sciences 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 baccalaureate 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.

Recommendations for Fulfilling Basic College Requirements: Electives in metallurgy—MET E 198, 201, 202. Natural science—CHEM 140, 150, 160, 350, 351; PHYS 121, 122, 123, 221. Engineering science—ENGR 170, 171, 240, 260.

THIRD YEAR

First quarter: MET E 301 (3 credits), MET E 322 (3), MET E 361 (4), electives (5); total—15. Second quarter: MET E 323 (3), MET E 325 (4), MET E 362 (4), electives (4); total—15. Third quarter: MET E 306 (1), MET E 326 (4), MET E 363 (4), electives (6); total—15.

FOURTH YEAR

First quarter: MET E 468 (1), technical electives (9), electives (5); total—15. Second quarter: HSS 461 (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.

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



Doctor of Philosophy Degree

Students who have completed one year of graduate work may request an examination to determine whether or not the faculty will advise proceeding to the General Examination for the degree of Doctor of Philosophy. A critical examination of the applicant's record, recommendations, and proposed course of study will be pertinent to this decision. In addition to course work, each student is required to prepare for a General Examination on a list of subjects selected by a Supervisory Committee. The General Examination is sufficiently comprehensive to demonstrate the student's ability to deal with broad aspects of materials science, as well as with a specialized subject area. Proficiency in basic research is of paramount importance. Each prospective candidate is required to present a written dissertation that makes an original and independent contribution to knowledge.

MINING ENGINEERING

Division Head

Donald L. Anderson

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, thermionics, and chemical processing. Although the nuclear engineering program is administered by the Department of Nuclear Engineering, close relations exist with other engineering and science departments.

Faculty

A. L. Babb, Chairperson and graduate program adviser; Albrecht, Chalk, Garlid, McCormick, Robkin, Vlases, Woodruff.

Affiliate Faculty

Ambrose, Clayton, Olsen, Omberg, Schmid, Shen, Wirtz.

Undergraduate Program

Bachelor of Science in Engineering Degree (Nuclear Engineering Emphasis)

The course of study for the Bachelor of Science in Engineering degree with a nuclear engineering emphasis provides a student with (1) a background in the fundamental mathematics and physics needed for nuclear energy applications; (2) an introduction to nuclear technology appropriate for either advanced study in nuclear engineering or employment at the baccalaureate degree level; and (3) a solid foundation in an area of engineering that complements nuclear engineering as a discipline.

The Department of Nuclear Engineering requires that PHYS 123, Waves; CH E 330, Transport Processes I; and either ENGR 260, Thermodynamics; or M E 320, Thermodynamics I, be included in the engineering college program as technical preparation for department courses. The departmental requirements are: *Nuclear Technology*: 18 credits minimum—ENGR 305, Environmental Radioactivity; ENGR 307, Energy Controversies; NUC E 400, 444, 455, 477, 485, 486, 488, 489 or 490, 498, 499. *Engineering Mathematics and Natural Sciences*: 30 credits minimum—At least 9 credits from: MATH 324, 325, 326, 438, 464; PHYS 324, 325, 327, 424, 425, 426; A A 370, 470. The remaining 21 credits may be chosen from any University course offered in engineering, mathematics, or natural sciences at or above the 300 level, except that 15 of these credits may be from any level of natural sciences offerings. *Elective Technology Option*: 18 credits—This sequence of courses is prepared by the student and must be approved by the Interdisciplinary Studies Task Group and the Chairperson 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:

Applied mathematics: This option involves the application of mathematical techniques to the solution of problems in nuclear engineering. Numerical methods and computer use are emphasized.

Chemical systems: In this area, emphasis is placed on the development and application of processes and equipment such as those used in the nuclear fuel cycles in which matter is treated to induce a change of state (or phase), energy content, or chemical composition.

Electrical/electronic systems: This area is concerned with the control of electricity and the electrical properties of materials with applications in system theory, computers, physical electronics, and instrumentation and control.

Environmental engineering: In this area, the student obtains an understanding of the growing problems of air, water, and land pollution. This includes the quality and quantity of present production of wastes, their known environmental effect, practical methods of control, and prospects for the future.

Materials technology: This area is oriented toward the materials sciences, with emphasis being placed on atomic, molecular, and crystalline structure, the physical properties of solids, thermodynamic properties of materials, reactions, and mechanical behavior. The preparation, properties, and applications of metals and alloys in various environments also are considered.

Thermal-hydraulic systems: This area provides the student with a strong background in thermodynamics, fluid flow, and heat transfer. It provides the necessary preparation for advanced work in the design and analysis of thermal-hydraulic systems in nuclear steam-supply systems, and nuclear reactor safety analysis.

Graduate Programs

Graduate Program Adviser

A. L. Babb

Master of Science in Nuclear Engineering Degree

Students who have earned a baccalaureate degree in engineering, mathematics, chemistry, or physics are eligible for admission. Strong foundation in atomic and nuclear physics and in advanced mathematical analysis is recommended; 400 or equivalent required.

A total of 42 credits required: 33 in formal course work, including basic courses in nuclear reactor theory, nuclear engineering laboratory, nuclear reactor engineering, nuclear system design, 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 sys-

tems; 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 studies of plasma behavior with emphasis on fundamental concepts such as confinement and heating, and laser-plasma interactions. Explores problem areas associated with fusion reactors, especially neutronics analyses.

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 fundamentals 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 Doctor of Philosophy 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.

OCEAN ENGINEERING PROGRAM

313 Harris Hydraulics Laboratory

Faculty

H. Myron Swarm, coordinator; Adee, Carlson, Childs, Gray, Merchant, Richey, Wenk.

An interdisciplinary ocean engineering program has been established to provide students the opportunity to acquire education and training that they will need to pursue careers in marine-related industries. Its location at the University of Washington provides a complete range of marine environments available for testing and research, and courses both within the College of Engineering and by departments

outside the college give prospective students a broad range of opportunities for study and research.

Graduate study leading to the Master of Science in Engineering degree is offered by the Inter-Engineering Group. Students also may pursue a master's degree within the framework of one of the departments, with an emphasis on ocean engineering. Students who wish to work toward the Doctor of Philosophy degree must be admitted to one of the departmental programs.

Areas of concentration in ocean engineering include: Coastal and Harbor Engineering; Marine Structures; Social, Legal, and Economic Dimensions of Ocean Engineering; and Instrumentation, Data Gathering, and Analysis.

SOCIAL MANAGEMENT OF TECHNOLOGY

316 Guggenheim

Social Management of Technology is a collaborative program of several schools and colleges of the University devoted to study and research in the area of analyzing and managing technology and technological systems. For a description of this program see the Interschool or Intercollege Programs section of this catalog.



FISHERIES

Dean

Douglas G. Chapman
206 Fisheries

Faculty

Bell (emeritus), Bevan, Bledsoe, Bonham, Brannon, Brown, Burgner, Carey, Chapman, Chew, Congleton, DeLacy (emeritus), Devol, Donaldson (emeritus), Eggers, Erickson, Felton, Fletcher, Gales, Gallucci, Gilbert, Hansen, Hersberger, Iwaoka, Jayne, Landolt, Liston, Lord, Matches, Mathews, Mathisen, McCaughran, McKernan, Miller, Nakatani, Nelson, Nevissi, Pauley, Pigott, Richey, D. Rogers, Salo, Schell, Seymour, Smith, Stober, Taub, Thorne, VanCleve, Welander, Whitney, Wissmar.

Affiliate Faculty

Alverson, Amend, Bergman, Bourne, D'Aoust, Eberhardt, Fukuhara, Halver, Hodgins, Johnson, Joseph, Joyner, Katz, Maciolek, Mahnken, Malins, Myers, Olsen, Pereyra, Roubal, Royce, Skud, Southward, Sparks, Steinberg, Stout, Templeton, Tillman, Thompson, Utter, Watters, Weber, Wedemeyer, Woelke.

Adjunct Faculty

Mar, Meier, Newell, Ordal.

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, Associate Director; Devol, Eggers, Felton, Lord, Richey, D. Rogers, Stober, Thorne, Wissmar.

Research Staff

Cederholm, Dawson, Donnelly, Gilbertson, Hartt, Opperman, Parr, Pease, Poe, Roger, B. Rogers, 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.

Research related to the impact of man's activities on the quality of our environment includes projects on effects of logging, toxic effects of salmon cannery and complex municipal-industrial wastes, and pumped-storage 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 intensive 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 and Henderson Inlet. 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. Computerized sonar systems developed at the University are used in a wide variety of projects, ranging from local studies of hake, herring, and salmon, supporting by Sea Grant and the Washington Department of Fisheries, to studies of coastal upwelling regions off Mexico, northwest Africa and Peru, under the National Science Foundation, International Decade of Ocean Exploration Program.

The institute maintains headquarters and laboratory facilities on the University campus and semipermanent field stations at five locations in Alaska. The campus headquarters and the Big Beef 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.

Two physiology laboratories contain facilities for studying the circulatory, respiratory, and osmoregulatory systems and bioenergetic processes of salmonids. Emphasis is on detecting sublethal responses of fish exposed to environmental changes and on enhancing the quality of fish under intensive culture.

The *Kumtuks*, a ninety-nine foot floating physiology laboratory, is used in Puget Sound and nearby waters for the study of fish. It contains large well-equipped laboratories, aquaria, and living quarters for several students and staff.

The motor vessel *Malka*, thirty-eight feet long, is used for inshore oceanographic and biological work in Washington. It is equipped with 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 *Kakhonak* are stationed on Lake Iliamna, the largest lake in Alaska and a major producer of sockeye salmon in North America. They are equipped for studies of limnology and of the fish populations.

Institute for Food Science and Technology

Faculty

John Liston, Director; Iwaoka, Matches, Pigott, Taub.

The Institute for Food Science and Technology incorporates the teaching, research, and advising programs in food science into a single unit. The teaching program includes undergraduate and graduate instruction described elsewhere in this catalog.

The research activities within the institute are concentrated in food microbiology, food chemistry, food engineering, seafood technology, food safety, radiation processing of foods and other materials, biochemical processes in foods, marine microbiology, aquatic microsystems, and nutrition. At least one specific research project is active within each of these areas. 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; Nelson, Nevissi, Schell.

Research Staff

Johnson, Jokela, Lusk, Vick.

The Laboratory of Radiation Ecology undertakes research programs related to contaminants in marine and freshwater environments, including man-produced radionuclides, naturally occurring radionuclides, and heavy metals. Interdisciplinary in nature, the programs involve a combination of field and laboratory studies conducted by faculty and graduate students from the College of Fisheries and from other colleges and departments on the campus.

The 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 measure-

ment and identification of alpha-, beta-, and gamma-emitting radionuclides and of heavy metals in animal, plant, soil, sediment, water, and air samples.

The laboratory's contract research programs with the Energy Research and Development Administration, the Environmental Protection Agency, and the District of Metropolitan Seattle are conducted by a core staff that is strongly supported by undergraduate and graduate students, some of whom select thesis research projects from these programs. Current research programs include bioenvironmental studies of radionuclides at Bikini and other atolls in the Central Pacific and at Amchitka in the Aleutian Islands, preliminary radiological surveillance of a nuclear reactor site, the biogeochemistry of transuranic elements and of naturally occurring alpha-emitting radionuclides in marine environments, and the identification and measurement of heavy metals in central Puget Sound waters by means of atomic absorption spectrometry and neutron activation analysis.

Washington Cooperative Fishery Research Unit

Faculty

Richard R. Whitney, Unit Leader; Gilbert B. Pauley, Assistant Unit Leader; James L. Congleton.

Cooperators in the Washington Cooperative Fishery Research Unit are the United States Fish and Wildlife Service Department of the Interior, Washington Department of Fisheries, Washington Department of Game, and the University of Washington. Research projects are funded by the cooperators, as well as other agencies, with the intention of promoting various types of recreational fishing in Washington State.

Among studies currently underway are: (1) benthic and littoral fishes in Lake Washington, (2) genetic variation in steelhead and rainbow trout, (3) assessment of artificial reefs in connection with a public fishing pier, and (4) feasibility of immunization of salmonids against eye flukes. Dr. Whitney serves as technical adviser to the federal district court in relation to Judge George H. Boldt's decision on Indian fishing rights.

Offices of the unit are in 220 Fisheries Center. Facilities of the cooperating agencies can be made available for use by students through the unit.

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 and some 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 Resources Center.

The Institute for Marine Studies is developing interdisciplinary programs relating marine sciences to social sciences and other disciplines. As these new programs are defined students will find additional options open to them, although any graduate student already may develop his or her 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, Fletcher, Gallucci, Hatheway, Mathews, McCaughran, Rustagi, Schreuder, Sollins, Swartzman, Turnbull.

Adjunct Faculty

Mar, Meier, Newell.

Affiliate Faculty

Eberhardt, Southward.

Research Staff

Brown, Buss, Carey, Gilbert.

The Center for Quantitative Science in Forestry, Fisheries, and Wildlife is an intercollege academic unit sponsored by the College of Forest Resources and the College of Fisheries. The center offers a broad program in applied mathematics and in mathematical services directed principally to the two resource colleges, as well as other life science departments of the University. The applied mathematics program of the Center for Quantitative Science is concerned with quantitative descriptions of the management of both aquatic and terrestrial ecosystems. The center's program consists of six areas of course offerings. These areas include computer programming with particular emphasis on problems of the management of living resources; quantitative ecology, including population, community, and systems ecology; physical processes in biological systems, emphasizing mass and energy transport in ecosystems; operations research, with particular focus on the utilization of renewable resources; applied statistics, with emphasis on statistical inference and experimental design for the biological sciences; and applied analysis consisting of differential and integral calculus applied to the life sciences. Courses in each of the six areas are interrelated in a way that meets a wide range of student interests and needs.

The faculty of the center participates in the research activities of several academic units of the University. These include, in addition to the two resource colleges, the College of Engineering, 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. Computer-based models have been successfully employed in the management of forest stands, control of insect pests, management of fish and aquatic mammal stocks, and in the descriptions of complex ecosystems.

Wildlife Science Program

Chairperson

Donald E. Bevan
201 Administration

Faculty

Donald E. Bevan, Chairperson; Manuwal, Taber, Weisbrod.

Wildlife Committee

Driver, Gessel, Mathews, McCaughran, Salo, Scott, Taber, Whitney.

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 north-western 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 two-hundred-user terminal to provide ready access to the larger computers in the Computer Center, CDC 6400 and CDC CYBER-73. With the cooperation of a multidisciplinary group of national and international experts, faculty and staff of the college and of the Center for Quantitative Science have developed a comprehensive set of resource-management teaching games. The games are being employed as "Link trainers" in a number of courses. They supplement traditional methods by providing students with opportunities to experience management decision making and to test their analytical skills on a variety of simulations of national resource-management problems.

A 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. Be-

sides 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 twenty 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. 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 stu-



dents 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 entering the University directly from high school and indicating intent to major in fisheries or food science are automatically placed in pre-major status. Students transferring from other colleges in the University or from other institutions will, if they have not completed the equivalent of the courses in the premajor program listed below and at least 75 quarter credits in total, also be accepted as fisheries or food science premajors. In general, students on probationary status are not accepted as transfers.

Premajor Program

Prior to becoming a fisheries or food science major, a student must complete the quarter credits in the subjects shown below:

Fisheries Science: General biology (15 credits); general chemistry (10); organic chemistry (5); English (expository writing) (5); mathematics (algebra, calculus) (9); statistical methods (5); speech, public speaking (5); total—54.

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.

Students should apply for baccalaureate degrees during the first quarter of the senior year. If not more than ten years have elapsed since the date of a student's entry into the college, he or she may choose to graduate under the requirements set out in either the bulletin published most recently prior to the date of his or her entry or that published prior to his or her anticipated date of graduation; provided that when in the opinion of the faculty of the college substantial changes have been made in the curriculum since the student's entry, the student's choice shall be subject to the approval of the faculty or Dean, and to the procedures of the Faculty Code. All responsibility for fulfilling graduation requirements shall rest with the student concerned.

The University requires 180 academic credits for graduation, of which 36 must be taken in fisheries or food science. At least 60 of the 180 credits must be in upper-division courses, those numbered 300 and above. Advanced ROTC courses do not count toward upper-division credit, and no more than 18 credits in advanced ROTC courses may be counted toward graduation. For graduation a student must have a cumulative grade-point average of 2.00 in fisheries and food science courses and an overall average of 2.00 in all courses. Additional graduation requirements associated with specific degrees are given below.

Required, recommended, or elective courses may be taken on satisfactory/not satisfactory basis (S/NS); the total number of credits that may be taken S/NS is 25.

Any credit/no credit courses presented at the time of transfer into the College of Fisheries will reduce the number of S/NS credits that may be taken. A combined total of no more than 25 CR/NC or S/NS credits will be accepted for a baccalaureate degree program.

Students who transfer from other institutions to the College of Fisheries are required to earn at least 10 credits in their major subject in this college.

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

Allan C. DeLacy
248 Fisheries

Baccalaureate 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 320 (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 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); POL S 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 M 451, Outdoor Recreation Economics (3); FOR M 452, Sociology of Leisure and Outdoor Recreation (3); 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; 1-5, max. 9); Q SCI 480, Sampling Theory for Biologists (4); URB P 412, 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 446, Algology (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, 472, 473, 477 (4, 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.

Environmental Studies: FISH 459 (5); FD SC 381 (3); WLF S 350, Survey of Wildlife Biology and Conservation (4). 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 B 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 or her 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. The entering student should have 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); FISH 395 (3); FD SC 380, 390, 481, 482, 483, 484, 485, 486, 498 (3; 4; 5; 5; 5; 5; 5; 2-6, max. 6); MICRO 301, 302, General Microbiology and Laboratory (3, 2); ENVH 440, Water and Waste Sanitation (4); ENVH 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);

MATH 124 (5) or Q SCI 291 (3); electives (4 or 6). Third quarter—CHEM 160, 170 (4, 3); MATH 125 (5) or Q SCI 292 (3); electives (3 or 5).

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); ENVH 440 (4); electives (6). Second quarter—FD SC 380, 390 (3, 4); ENVH 441 (4); electives (4). Third quarter—BIOC 405, 408 (5, 3); FD SC 481 (5); electives (2).

Fourth Year: First quarter—FD SC 482, 484, 498 (5; 5; 2-6, max. 6); FISH 395 (3). Second quarter—FD SC 483, 485, 498 (5; 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 baccalaureate degree from an institution of recognized standing, a grade-point average of 3.00 in the junior and senior years of college work, approval of the College of Fisheries, and approval of the Graduate School. Preference will be given to those with a strong background in the basic sciences. A student admitted with a baccalaureate degree is accepted initially for a Master of Science degree program.

The College of Fisheries is now under an enrollment quota imposed on the entire University. This limits the number of students who can be admitted to a number approximately equal to those who graduate. Prospective students should obtain current information on the procedures used to evaluate applications for admission from the graduate program adviser or the Dean's office so as to make the best presentation of their talents and experience in their application for admission.

Graduate Program Adviser

George M. Pigott
225 Fisheries

Alternate Graduate Program Adviser

Donald A. McCaughran

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, 1 credit in FISH 520 and 2 credits in 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.

In addition to the opportunities for graduate work in the College of Fisheries, there are also opportunities in federal and state fishery and water research agencies on or near the campus. Graduate students, besides finding financial support available from such agencies, may, under special arrangements, carry out research that, upon approval, may be used to satisfy the thesis requirements for the advanced degrees.



FOREST RESOURCES

Dean

James S. Bethel
102A Anderson

Associate Dean

Stanley P. Gessel
107B Anderson

Faculty

Allan, Atkinson, Bare, Bledsoe, Bradley, Brockman (emeritus), Brubaker, Bryant, Burges, Chapman, Cole, Dowdle, Driver, Eaton, Edmonds, Erickson, Field, Fritschen, Gara, Gardner, Gessel, Hatheway, Hett, Hrutford, Jayne, Jorgensen, Kenady, Leney, Manuwal, Marckworth (emeritus), Martin, Morison, Murphy, Oliver, Pearce (emeritus), Pickford, Riekerk, Robertson (emeritus), Rustagi, Sarkanen, Schaeffer, Schiess, Schreuder, Scott, Sharpe, Sollins, Spyridakis, Stenzel, Stettler, Swartzman, Taber, Thomas, Turnbull, Ugolini, van Klaveren, Wagar, Waggener, Weisbrod, Wissmar, Witt, Wooldridge, Zasoski.

Affiliate Faculty

Clark, Crouch, Hendee, Johnsey, Kenyon, Lawrence, Lyons, Odegaard, Pitman, Russell, Schrader, Spirodakes, Steinbrenner, Stonecypher, Thomas, Walker, Williston, Wilson, Winjum.

Adjunct Faculty

Gallucci, Mar.

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 undergraduate 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 if students select the appropriate electives. 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 provides assistance to forest resources majors in obtaining 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 professional employment, because such work offers an excellent opportunity for practical experience in the forest resource professional fields.

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 attention as do the other aspects of his qualifications for admittance to the University.

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 a substantial number of 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/not satisfactory or credit/no credit basis. Spe-

cific 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 pre-majors 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. Information on restricted majors can be obtained in student advising office, 214 Anderson, 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 adviser, F. C. Ugolini.

MANAGEMENT AND SOCIAL SCIENCES DIVISION

Chairperson

David P. Thomas
123 Anderson

Faculty

Atkinson, Bare, Bethel, Bradley, Dowdle, Field, Gessel, Jorgensen, Morison, Oliver, Pickford, Rustagi, Schaeffer, Schreuder, Sharpe, Stenzel, Thomas, Turnbull, Waggener.

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, biological, and quantitative sciences to forest resource management and allocation problems. The curriculum in forest management prepares the student to integrate 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 M 100, Introduction to Forest Resources Management (5 credits); FOR M 201 through 207 (to total 4 credits). Mathematics¹—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 sciences²—BIOL 101-102, General Biology (10). Earth sciences³ (4). Social sciences—ECON 200, Introduction to Economics (5); English, engineering, or humanistic-social studies⁴ (3); electives⁵ (5). Engineering sciences—ENGR 123, Graphics (2); free electives (16). Curriculum specialization⁶ (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 studies⁴ (3). Computer programming⁷ (2).

OUTDOOR RECREATION CURRICULUM SPECIALIZATION

Social sciences—SOC 110, Survey of Sociology (5 credits); approved electives⁵ (5); English, humanistic-social studies or engineering⁴ (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 programming⁷ (2).

Upper-Division Requirements

FOREST MANAGEMENT CURRICULUM SPECIALIZATION

Forest resources—FOR B 300, Dendrology (5 credits); FOR B 320, Forest Ecology (5); FOR B 322, Silviculture I Methods (3); FOR M 340, Forest Surveying (3); FOR M 360, Forest Measurements (5); FOR M 362, Aerial Photos in Forestry (3); FOR M 365, Forest Resources Management I (5); FOR M 468, Forest Resources Management II (5); FOR M 469, Forest Resources Management III (5); forest resources electives⁸ (21). Forest resources, wildlife science, quantitative science (10). Free electives (20).

FOREST ENGINEERING CURRICULUM SPECIALIZATION

Forest resources—FOR B 300, Dendrology (5 credits); FOR W 304, Wood; Properties and Best Use (3); FOR B 320, Forest Ecology (5); FOR M 340, Forest Surveying (3); FOR M 360, Forest Measurements (5); FOR M 362, Aerial Photos in Forestry (3); FOR M 365, Forest Resources Management I (5); FOR W 377, Elements of Timber Design (4); FOR M 440, Construction (4); FOR M 441, Forest Engineering (5); FOR M 442, Financial Analysis of Logging Equipment and Operations (4); FOR M 443, Safety in Forest Industries (1); FOR M 446, 447, 448, 449, Senior Forest Engineering Field Studies (15). Civil engineering—CETC 310, Forest Highway Location (5); CETC 417, Cadastral Surveys (3); electives⁸ (6). Business administration

and economics electives⁸ (9). Statistics and operations research electives⁸ (6). Free electives (4).

OUTDOOR RECREATION CURRICULUM SPECIALIZATION

Forest resources—FOR B 320, Forest Ecology (5 credits); FOR M 340, Forest Surveying (3); FOR M 350, Field Studies in Outdoor Recreation (3); FOR M 351, Introduction to Outdoor Recreation (5); FOR M 353, Principles of Natural History Interpretation (3); FOR M 354, Introduction to Management of Recreation Areas (3); FOR M 355, Introduction to Planning and Design of Recreation Areas (3); FOR M 362, Aerial Photos in Forestry (3); FOR M 452, 453, 455, Advanced Outdoor Recreation Studies (2-5); FOR M 459, Case Studies in Outdoor Recreation (5). Forest resources electives⁸ (20-22). Free electives (32).

BIOLOGICAL SCIENCES DIVISION

Chairperson

Leo J. Fritschen
396 Bloedel

Faculty

Bledsoe, Brubacker, Cole, Driver, Edmonds, Fritschen, Galluci, Gara, Gessel, Hatheway, Hett, Kenady, van Klaveren, Manuwal, Morison, Oliver, Riekerk, Schiess, Scott, Stettler, Taber, Ugolini, Weisbrod, Witt, Wooldridge, Zasoski.

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

Forest resources—FOR M 100, Introduction to Forest Resources Management (5 credits); FOR M 201 through

207 (to total 4 credits). Mathematics¹—Q SCI 281, Elements of Statistical Method (5); Q SCI 291, 292, Analysis for Biologists⁷ (6). Physical sciences⁹—introductory chemistry and physics (10). Biological sciences⁹ (10). Social sciences and humanities¹⁰ (15). Science electives¹¹ (15). Earth sciences¹² (5). Free electives (15).

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

Chairperson

Donald E. Bevan
201 Administration

Faculty

Manuwal, Taber, Weisbrod.

Wildlife Committee

Driver, Gessel, Mathews, McCaughran, Salo, Scott, Taber, Whitney.

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 electives¹³ (15); ENGL 271, 272, Advanced Expository Writing¹⁶ (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

Forest resources—FOR B 310, 320, 322, Forest Soils, Forest Ecology, Silvicultural Methods (13 credits); FOR B 329, Microclimatology (3). Quantitative science—Q SCI 456, Mathematical Models in Population Biology (4); Q SCI 457, Management of Exploited Animal Populations (4); Q SCI 382, 383, Statistical Inference in Applied Research (10). Biological sciences—ZOO 362, 464 or 465 (5); BIOL 472 or BOT 450 (3). Fisheries—FISH 401¹⁷ (5). Social sciences—ECON 435, Natural Resource Utilization and Public Policy (5). Wildlife science—WLF S 350, Survey of Wildlife Biology and Conservation (4); WLF S 401²⁴, Biology and Conservation of Birds (5); WLF S 402, Wildlife and Man (3); WLF S 403, Wildlife and Land Use (3); WLF S 404²⁵, Biology and Conservation of Mammals (5). Approved electives (21).

WOOD AND PAPER DIVISION

Chairperson

Bjorn F. Hrutford
344 Bloedel

Faculty

Allan, Bethel, Bryant, Erickson, Gardner, Hrutford, Jayne, Leney, Sarkanen.

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 W 101, Introduction to Wood and Paper (1 credit). 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, 123¹⁸, 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 141, Computer Applications to Engineering Problems (4); ENGR 260, Thermodynamics (4).

Upper-Division Requirements

Forest resources—FOR B 323, 324, Forest Biology I, II (6 credits); FOR W 400, Wood and Fiber Structure (5); FOR W 401, Physics of Wood and Fiber Composites (4); FOR W 403, Fibrous Structure and Rheology I (3); FOR W 406, Wood Chemistry I (3); FOR W 407, Wood Chemistry I Laboratory (2); FOR M 464, Economics of Forest Products Industries (3); FOR W 476, Pulp and Paper Technology (3); FOR W 477, Pulp and Paper Laboratory (2); FOR W 485, Undergraduate Research (3); FOR W 488, Polymer Chemistry (3). Physical sciences—CHEM 350, 351, Elementary Physical Chemistry (6). Engineering—CHE 310, Material and Energy Balances (4);



CH E 330, Transport Processes I (4); CH E 340, Transport Processes II (4); CH E 436, Chemical Engineering Laboratory I (3). Humanities and social sciences electives (27). Free electives (7).

Wood and Fiber Curriculum

SCIENCE OPTION

Lower-Division Requirements

Forest resources—FOR W 101, Introduction to Wood and Paper (1 credit). Mathematics—MATH 105, Elementary Functions (5); MATH 124, 125, 126, Calculus With Analytical Geometry (15); Q SCI 281 or 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, 123¹⁸, 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). Electives¹⁹ (24).

Upper-Division Requirements

Forest resources—FOR B 323, 324, Forest Biology I, II (6 credits); FOR W 374, Wood Utilization (3); FOR W 400, Wood and Fiber Structure (5); FOR W 401, 402, Physics of Wood and Fiber Composites (8); FOR W 403, Fibrous Structure and Rheology I (3); FOR W 406, Wood Chemistry I (3); FOR W 407, Wood Chemistry I Laboratory (2); FOR W 408, Wood Chemistry II (3); FOR M 464, Economics of Forest Products Industries (3); FOR W 476, Pulp and Paper Technology (3); FOR W 477, Pulp and Paper Laboratory (2); FOR W 485, Undergraduate Research (3); FOR W 488, Polymer Chemistry (3). Electives¹⁹ (43).

WOOD PRODUCTS OPTION

Lower-Division Requirements

Forest resources—FOR W 101²⁰, Introduction to Woodland Paper (1 credit). 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 200²², Introduction to Economics (5); English, engineering, or humanistic-social sciences⁴ (6). Electives²³ (39).

Upper-Division Requirements

Forest resources—FOR B 323, 324, Forest Biology I, II (6 credits); FOR W 374, Wood Utilization (3); FOR W 375, Wood Utilization Laboratory (2); FOR W 377, Elements of Timber Design (4); FOR W 400, Wood and Fiber Structure (5); FOR W 401, Physics of Wood and Fiber Composites (4); FOR W 406, Wood Chemistry I (3); FOR W 407, Wood Chemistry I Laboratory (2); FOR M 464, Economics of Forest Products Industries (3); FOR W 470, Wood Deterioration and Control (3); FOR W 472, Plywood and Lami-

nating Processes (3). FOR W 473, Gluing Process Technology (4); FOR W 476, Pulp and Paper Technology (3); FOR W 477, Pulp and Paper Laboratory (2); FOR W 485, Undergraduate Research (3). Electives.²⁴

See Explanation of Requirements on page 176.

Graduate Programs

Graduate Program Adviser

Stanley P. Gessel
107 Anderson

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 specializations: 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. Upon enrollment, 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 baccalaureate degree from an institution of recog-

nized 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 Aid

Students interested in undergraduate and graduate scholarships, fellowships, assistantships, and awards available specifically to students in the College of Forest Resources may contact the Office of Student Financial Aid, 105 Schmitz, for information, which also may be obtained from the associate dean, 107 Anderson.

The Washington Pulp and Paper Foundation, Inc., provides scholarships for students preparing for careers in the pulp and paper industry. Awards are based upon professional promise and scholastic achievement. The foundation is supported by companies of the pulp and paper industry and by supplier companies.

Institute of Forest Products

Director

James S. Bethel
102A Anderson

Assistant Director

Ian G. Morison
107A Anderson

The Institute of Forest Products is the research, continuing education, and information branch of the College of Forest Resources. Besides administering federally funded and state-supported programs in research, the institute coordinates cooperatively sponsored research and teaching programs with federal, state, and private agencies. Services that support the institute include continuing education programs promoting the introduction and the more effective application of new technology in forest resources management. Offered to meet these objectives are symposia, conferences, short courses, specialized certification courses, and publications.

The employment of graduate and undergraduate students on grants and contracts is administered by the institute and its research divisions. Many students earn research and thesis credit toward advanced degrees by working on major forest resources problems, supported by grants or contracts.

Research programs within the institute are administered by three research divisions: Center for Forest Ecosystem Studies, Center for Forest Resources Management, and Center for International Forest Resources Studies.

Center for Forest Ecosystem Studies

Director

Dale W. Cole
204 Bloedel

Faculty

Bledsoe, Brubaker, Driver, Edmonds, Fritschen, Gara, Gessel, Hatheway, Hett, Kenady, Manuwal, Morison, Oliver, Pickford, Riekerk, Scott, Sollins, Stettler, Swartzman, Taber, Ugolini, van Klaveren, Witt, Weisbrod, Wooldridge, Zasoski.

The Center for Forest Ecosystem Studies has two major responsibilities within the College of Forest Resources. It provides administrative supervision for all lands of the college, including both the Arboretum and forest properties (see Research Areas and Faculties). In addition, the center is responsible for the college research programs in the biological areas. The interests of the faculty working in the biological-based investigations are highly diverse, ranging from basic considerations of plant growth to the application of such information to the analysis of forest ecosystems.

Research projects within the center include both individual studies concerned with the many aspects of forest ecosystems and highly interdisciplinary programs such as the



Coniferous Forest Biome of the United States International Biological Program.

Center for Resource Management Studies

Director

Gerard F. Schreuder
228 Anderson

Faculty

Allan, Atkinson, Bare, Bethel, Bradley, Bryant, Dowdle, Erickson, Field, Gardner, Gessel, Hrutford, Jayne, Leney, Morison, Pickford, Rustagi, Sarkanen, Schaeffer, Schreuder, Sharpe, Stenzel, Thomas, Turnbull, Waggener, Wooldridge.

This unit presently conducts research in four different program areas: (1) Land-use planning and decision making in forest management and forest industry; (2) public policies as they influence land use, resource management, outdoor recreation, and the forest industry; (3) goods and services and environmental protection in resource management, harvesting, and wood processing; (4) improving the yield on the utilization of forest resource. In general, research stresses the social, economic, and technological aspects of dealing with wildlands and the forest resource while being fully aware of the ecological and biological aspects.

Center for International Forest Resources Studies

Director

Kenneth J. Turnbull
107C Anderson

Faculty

Allan, Bethel, Bryant, Gara, Gessel, Hatheway, Leney, Schreuder, Taber, Turnbull.

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.

Center for Quantitative Science in Forestry, Fisheries, and Wildlife

Director

Benjamin A. Jayne

Faculty

Bare, Bevan, Bledsoe, Chapman, Fletcher, Gallucci, Hatheway, Mathews, McCaughran, Rustagi, Schreuder, Sollins, Swartzman, Turnbull.

The Center for Quantitative Science in Forestry, Fisheries, and Wildlife is an intercollege academic unit sponsored by the College of Forest Resources and the College of Fisheries. The center offers a broad program in applied mathematics and in mathematical services directed principally to the two resource colleges, as well as other life science departments of the University. The applied mathematics program of the Center for Quantitative Science is concerned with quantitative descriptions of the management of both aquatic and terrestrial ecosystems. The center's program consists of six areas of course offerings. These areas include computer programming with particular emphasis on problems of the management of living resources; quantitative ecology, including population, community, and systems ecology; physical processes in biological systems, emphasizing mass and energy transport in ecosystems; operations research with particular focus on the utilization of renewable resources; applied statistics, with emphasis on statistical inference and experimental design for the biological sciences; and applied analysis consisting of differential and integral calculus applied to the life sciences. Courses in each of the six areas are interrelated in a way that meets a wide range of student interests and needs.

The faculty of the center participates in the research activities of several academic units of the University. These include, in addition to the two resource colleges, the College of Engineering and the College of Arts and Sciences, including the departments of Economics, Geography, and Oceanography, and the graduate schools of Business Administration and Public Affairs.

Both the teaching and the research programs of the center are designed to bring together living systems, mathematics, and the computer for purposes of description and management. Particular emphasis is placed upon the use of the computer for quantitative descriptions of both terrestrial and aquatic ecosystems and resource management. Computerization makes possible a study of the impact of exploratory management policies on simulated resource systems embedded in backgrounds of interrelated physical, biological, and economic activities, and under numerous institutional constraints. Computer-based models have been successfully employed in the management of forest stands, control of insect pests, management of fish and aquatic mammal stocks, and in the descriptions of complex ecosystems.

College Facilities

The college occupies a complex of three buildings: Alfred H. Anderson Hall, the Hugo Winkenwerder Forest Sciences Laboratory, and Julius H. Bloedel Hall. The modernized Anderson Hall, the ten-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 twenty-six thousand bound volumes and thirty-three thousand pamphlets, reports, and monographs. It also has an excellent collection of approximately twenty-five hundred periodicals and many indexes to current literature in forestry and supporting sciences. Under the nationwide Farmington Plan, sponsored by the Special Library Association, the forest resources library has assumed responsibility for collecting foreign material published in the fields of forestry and pulp and paper technology, providing an unusual opportunity for academic research.

The herbarium supplements forest resources students 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 twenty-three hundred acres located at La Grande, Washington, sixty-five miles from the University, consists of highly developed field research facilities and teaching and living accommodations in an excellent terrestrial ecology area.

The Lee Memorial Forest, a 158-acre property at Maltby in nearby Snohomish County, is located about twenty-two miles from the University. It provides for exceptionally valuable studies and demonstrations of forestry practices applicable in western Washington

The 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. MATH 124, 125 or equivalent courses may be substituted.
2. Or BIOL 210, 211, 212.
3. From GEOL 101, 205, 310 or ATM S 101, 201, 301.
4. From ENGL 111, 121, 122, 171, 172 or ENGR 130, 131.
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 FOR M 450, Q SCI 340, ENGR 141, QMETH 200, MATH 114, 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 320.
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 M 100.
21. Or BIOL 101-102 or 210.
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 M 201 through 207, M E 302, 303, ACCTG 210, 220, 230.
24. A minimum of 29 credits must come from approved list.
25. ZOOL 469 may be substituted.
26. ZOOL 465 may be substituted.



INTERDISCIPLINARY GRADUATE DEGREE PROGRAMS

BIOLOGY TEACHING

212 Johnson

Faculty

Ingrith Deyrup-Olsen, Chairwoman; Donald S. Farner, Associate Chairman; Douglas (Microbiology and Immunology), Farner (Zoology), Gordon (Biochemistry), Halperin (Botany), Kohn (Zoology), Meeuse (Botany), Nester (Microbiology and Immunology), Olstad, (Education), Stettler (Forest Resources). Ingrith Deyrup-Olsen, graduate program adviser.

Master of Arts for Teachers Degree

The University of Washington offers an interdisciplinary program leading to the degree of Master of Arts for Teachers in the field of 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 immunology, and zoology. A minimum of 9-12 of these credits must be at or above the 500 level. In project work, 6-9 credits are required. These may take the form of 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

F664 Health Sciences

Faculty

Richard A. Kronmal, Chairman; Basingthwaighe (Center for Bioengineering), Breslow (Biostatistics), Brown (Physiology and Biophysics), Chapman (Fisheries), DeRouen



(Biostatistics), Diehr (Biostatistics), Feigl (Biostatistics), Felsenstein (Genetics), Fisher (Biostatistics), Fletcher (Fisheries), Galluci (Fisheries), Hatheway (Forest Resources), Jayne (Center for Quantitative Science), King (Finance, Business Economics, and Quantitative Methods), Martin (Biostatistics), Martin (Electrical Engineering), McCaughan (Fisheries), Prentice (Biostatistics), Pyke (Mathematics), Schoener (Zoology), Scholz (Mathematics), Shorack (Mathematics), Stevens (Physiology and Biophysics), Smythe (Mathematics), Thompson (Biostatistics), Turnbull (Forest Resources), van Belle (Biostatistics), Wahl (Biostatistics). Richard A. Kronmal, graduate program adviser.

Biology and medicine are undergoing revolutionary advances in their development as quantitative sciences. Rapid technological advances find expression in new research tools, and 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 between 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.

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 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

(Biostatistics Pathway and Probability-Statistics Branch of the Quantitative Ecology Pathway)

Courses	Credits
MATH 394, 395 Probability (3,3)	6
MATH 482, 483 Statistical Inference (3,3)	6
MATH 484 Distribution-Free Inference	3
MATH 485 Analysis of Variance	3

and, depending on student's pathway, one of the following:

BIOST 511, 512, 513 Medical Biometry I, II, III (3,3,3)	9
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or

Q SCI 382, 383 Statistical Inference in Applied Research (5,5)	10
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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. Competence in computer programming must be demonstrated. 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: the Applied Mathematics—Differential Equations Branch and the Probability-Statistics Branch. (4) Under exceptional circumstances, individual programs in other areas of biomathematics may be arranged.

BIOSTATISTICS PATHWAY

Courses	Credits
MATH 394, 395, 482, 483, 484 and 485 (as listed above)	18
MATH 424, 425, 426 Fundamental Concepts of Analysis (3,3,3)	9
or MATH 427, 428 Topics in Applied Analysis (3,3)	9
and MATH 527 Elements of Real Variables for Scientists (3)	9
MATH 581, 582, 583 Advanced Theory of Statistical Inference (3,3,3)	9

9 credits in applied statistics from among the following:

Courses	Credits
BIOST 571 Applied Regression Analysis	3
BIOST 572 Multivariate Statistical Methods	3
BIOST 573 Statistical Methods for Categorical Data	3
BIOST 574 Statistical Computing	3
BIOST 575 Population Models	3
BIOST 576 Statistical Methods for Survival Data	3
BIOST 577 Design of Medical Studies	3
BIOST 578 Special Topics in Advanced Biostatistics	3
Q SCI 486 Experimental Design	3

or approved alternatives

Approved electives in biology of at least 9 credits. Particularly recommended are the following options: EPI 511, 512, 513 (9 or 10 credits); GENET 351 or 451 (3 or 4); HSERV 511, 512, 513 (3, 3, 3). Additional approved electives in biology or applied statistics so that the total is at least 15 credits.

All students are required to register for BINST 580, Seminar in Biostatistics, for 1 credit per quarter, for at least 9 credits. Students who have not had a one-year course in applied statistics will be requested to take BINST 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 BINST 590.

Additional Requirements: (1) Demonstration of competence in computer programming. (2) Examinations. A written examination will be given at the end of the student's first year of graduate study, covering material in theoretical and applied statistics that is presented in the usual first year of the program. This examination is designed to serve as an advising tool for both the student and the faculty. Students pursuing the doctoral degree will be given, at the end of the second year of graduate study, a written examination that serves as a part of the Ph.D. qualifying examination. After successfully passing this written examination, which will cover material in theoretical and applied statistics, the student will take an oral examination consisting of questions on the student's biological specialty and on some selected topics in mathematical and applied statistics. Upon successful completion of the oral examination, the student is advanced to candidacy. (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

Courses (For Both Branches)	Credits
MATH 394, 395, 396 Probability (3,3,3)	9
Q SCI 381 Introduction to Probability and Statistics	5
and Q SCI 382, 383 Statistical Inference in Applied Research (5,5)	10
or BINST 511, 512, 513 Medical Biometry I, II, III (3,3,3)	9
Q SCI 492, 493 Techniques of Applied Mathematics in Biology I, II (3,3)	6
or MATH 238 Elements of Differential Equations	3
and MATH 438 Principles of Differential Equations	3

A selection of at least seven additional courses from the life sciences or quantitative ecology: FOR B 521 (3 credits); BIOL 472 (3); ZOOL 574, 578 (3, 5); GENET 562 (3); Q SCI 450, 451, 452, 456 (4, 3, 3, 4); BMATH 554, 598 (3, 1-3, max: 12); Q SCI 457, 461, 462 (4, 4, 4); FISH 556, 557, 558 (3, 3, 3).

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	3

Stochastic Processes

Courses	Credits
BMATH 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 Techniques of 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

Courses	Credits
MATH 538, 539 Nonlinear Ordinary Differential Equations (3,3)	6

PROBABILITY-STATISTICS BRANCH

Additional course requirements:

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
BIOST 571 Applied Regression Analysis	3
BIOST 572 Multivariate Statistical Methods	3
BIOST 573 Statistical Methods for Categorical Data	3
BIOST 574 Statistical Computing	3
BIOST 575 Population Models	3
BIOST 576 Statistical Methods for Survival Data	3
MATH 424, 425 Fundamental Concepts of Analysis (3,3)	6

Stochastic Processes

Courses	Credits
MATH 491, 492 Introduction to Stochastic Processes (3,3) or BMATH 554 Stochastic Processes in the Life Sciences	6
	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 (BMATH 597) for 1 credit per quarter for at least 5 credits. (2) Examinations. A written examination will be given to all Quantitative Ecology Pathway students at the end of their first year of graduate study, covering material in theoretical and applied statistics that is presented in the usual first-year curriculum. This examination is designed to serve as an



advising tool for both the students and the faculty. To qualify for advancement to candidacy, students in the Probability-Statistics Branch will be given, at the end of their second year of graduate study, a written examination that serves as a part of the Ph.D. qualifying examination. This "second-year examination" will cover topics in applied and theoretical biostatistics. The Probability-Statistics Pathway students will also take a written examination in an appropriate ecological area. After successfully passing these two written examinations, the student is given an oral examination covering his or her ecological specialty and selected topics in mathematical and applied statistics. To qualify for advancement to candidacy, the students in the Applied Mathematics—Differential 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

Constantine G. Christofides, Chairman. Ammerlahn (Germanics), Andrews (Near Eastern Languages and Literature), D. Behler (Germanics), E. Behler (Germanics), Buck (Germanics), Christofides (Romance Languages and Literature), Edmonson (Classics), Ellrich (Romance Languages and Literature), Grummel (Classics), Haney (Slavic Languages and Literature), Hruby (Germanics), F. Jones (English), L. Jones (Romance Languages and Literature), Konick (Slavic Languages and Literature), Kramer (Slavic Languages and Literature), J. Leiner (Romance Languages and Literature), W. Leiner (Romance Languages and Literature), Loraine (Near Eastern Languages and Literature), Mackay (Classics), McKinnon (Asian Languages and Literature), McLean (Germanics), Miller (Asian Languages and Literature), Penuelas (Romance Languages and Literature), Reinert (English), Sehmsdorf (Scandinavian Languages and Literature), Steene (Scandinavian Languages and Literature), Stevick (English), Wang (Asian Languages and Literature), Webb (English), Willeford (English), Ziadeh (Near Eastern Languages and Literature). Willis Konick, 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 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 environ-

ments, 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 postbaccalaureate 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 allowed, 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.

DRAMA ARTS

113 Drama-TV

Faculty

Paul S. Hostetler, Chairman; Christofides (Romance Languages and Literature and Comparative Literature), Falls (Drama), Harmon (Classics), Hostetler (Drama), Jones (English and Comparative Literature), Loper (Drama), Lorenzen (Drama), McKinnon (Asian Languages and Literature and Comparative Literature), Steene (Scandinavian Languages and Literature), Winchell (Drama), Wolcott (Drama), Richard L. Lorenzen, graduate program adviser.

The Drama Arts Group is an interdisciplinary faculty of scholars from the School of Drama and the departments of Comparative Literature, English, Romance Languages and Literature, Asian Languages and Literature, Classics, and Scandinavian Languages and Literature. Through the Drama Arts Group, a Doctor of Philosophy degree is offered in the areas of research and scholarship.

The Doctor of Philosophy degree program in drama arts focuses on the relationship of theatre history and critical theory with the theatre arts. The first-year courses in theatre history, criticism, literature, and architecture or art are followed in the second year by seminars and tutorials with drama arts faculty members or specialists in other disciplines. Students who enter the program are expected to have had some theatre experience, both practical and academic. Participants are strongly encouraged to display competence in an area of the theatre arts while pursuing the Ph.D. degree. Drawing upon the diverse nature of the drama arts faculty, individuals can study a wide range of drama and theatre activity on a truly international level.

Proficiency in one foreign language is required. The General Examination consists of a series of essays prepared in tutorial with an adviser. The essays focus on the major field, and the oral examination concerns both the major and a minor field.

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. The Chairman of the East Asian Studies Group is Prof. Donald C. Hellmann.

Complete course listings and additional information may be obtained from the Institute for Comparative and Foreign Area Studies, the Department of Asian Languages 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

Jack L. Dull (History), Associate Director; Brandauer (Asian Languages and Literature), Chan (East Asian Studies and History), Chang (Geography), Cirtautas (Asian Languages and Literature), Harrell (Anthropology), Hsiao (emeritus), Kapp (History), Knechtges (Asian Languages and Literature), Mah (Economics), Norman (Asian Languages and Literature), Poppe (emeritus), Robinson (East Asian Studies and Political Science), Serruys (Asian Languages and Literature), Taylor (emeritus), Townsend (Political Science), Treadgold (History), Wang (Asian Languages and Literature), Wilhelm (emeritus), Williston (emeritus), Wylie (Asian Languages and Literature), Yen (Asian Languages and Literature), Chan Hok-lam, graduate program adviser.

CHINA REGIONAL STUDIES

This course of study combines language instruction with area training. It is designed for the student, holding a Bachelor of Arts degree in a discipline, who desires concentrated Chinese language and area training at the master's level. Such training may be of particular value to the student going on for a Doctor of Philosophy degree in an academic discipline. Such training, in conjunction with additional training in relevant departments, may also lead to nonacademic careers in government, business, journalism, or teaching. Students with Bachelor of Arts degrees in Chinese 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 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 (5-5 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 and not including language instruction courses). 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 (East Asian Studies), Butow (History), Haley (Law), Hanley (History), Hellmann (Political Science), Henderson (Law), Hiraga (Asian Languages and Literature), Kakiuchi (Geography), Lukoff (Asian Languages and Literature), Lyons (Asian Languages and Literature), McKinnon (Asian Languages and Literature), Miller (Asian Languages and Literature), Niwa (Asian Languages and Literature), Palais (History), Rubin (Asian Languages and Literature), Suh (Asian Languages and Literature), Tatsumi (emeritus), G. Webb (Art), Yamamura (East Asian Studies and Economics). Chan Hok-lam, 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.

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- or topic-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 26 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 KOR 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 L. Dowling, Chairman; Alberts (Finance, Business Economics, and Quantitative Methods), Amoss (Architecture and Urban Planning), Benoliel (Comparative Nursing Care Systems), Bergman (Pediatrics and Health Services), Blackman (Health Services), Bracht (Social Work), Gross (Sociology), Johnson (Management and Organization), Kroll (Public Affairs), 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), Shipman (Public Affairs), Williams (Public Affairs), Shinn (Urban Planning). William L. Dowling and Allan Blackman, graduate program advisers.

Master of Health Administration Degree

A two-year program of studies leading to the degree of Master of Health Administration is offered by the faculty in the interdisciplinary Health Services Administration and Planning Group of the Graduate School. Administrative offices are located in the Department of Health Services, School of Public Health and Community Medicine. The 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.

Admission Requirements: Admissibility to the Graduate School, including a baccalaureate degree from an accredited college or university with at least a 3.00 grade-point average for the last two years of undergraduate work; successful performance on either the Graduate Record Examination or the Graduate Management Admissions Test; a narrative statement regarding the applicant's objectives; three letters of reference; and, for applicants who pass initial screening, final selection interviews by members of the program faculty or their designees. Relevant health field experience is preferred. In general, applications are accepted only for Autumn Quarter of each year.

Graduation Requirements: Degree requirements include three quarters of study with emphasis on multidisciplinary basic 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, specialization 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, F361 Health Sciences, SC-37, Seattle, Washington 98195.

INTER-ENGINEERING

371 Loew

Faculty

Kermit L. Garlid, Chairman; Archbold (Metallurgical Engineering), Kevorkian (Aeronautics and Astronautics), Kobayashi (Mechanical Engineering), Mittet (Civil Engineering), Moritz (Bioengineering), Noges (Electrical Engineering), Richey (Ocean Engineering), Wenk (Social Management of Technology). Kermit L. Garlid, graduate program adviser.

Graduate study leading to the degree Master of Science in Engineering is offered by the faculty of the Inter-Engineering Group. The program is especially designed for those who wish to undertake graduate study in more than one, but normally not more than two or three, different fields of engineering, and may often embrace nontraditional and interdisciplinary areas. Examples of possible study areas include applied mathematics, bioengineering,

ocean engineering, engineering mechanics, energy engineering, and social management of technology.

The objectives of the program are to provide a coherent path for students pursuing the master's degree in inter-engineering fields; to help students avoid unnecessary duplication of effort in several departments while earning such a degree, and to establish and maintain academic standards in a nontraditional program of studies in engineering that are consistent with general Graduate School and University standards. This program is distinct from programs offered by the faculty of the departments of Mechanical Engineering and Civil Engineering leading to the Master of Science in Engineering degree.

Admission to the Program

Admission to the inter-engineering program ordinarily requires a baccalaureate degree in engineering, mathematics, or science with a junior-senior grade-point average of 3.00 or better. Background qualifications, educational objectives, and motivation will be carefully considered, because there may be, in some areas of study, few traditional guidelines or curricula on which to rely.

In addition to information included with the application for admission to the Graduate School, the following supplemental information should be sent to the graduate program adviser, Inter-Engineering Group:

Statement of Degree Objectives—The applicant should include a one-page statement of his or her study, degree, and career objectives.

Graduate Record Examination (Optional)—This is not required, but the results should be sent if the applicant has taken the examination.

Degree Requirements

In order to be eligible for the M.S.E. degree, a student must have been admitted and have a plan of studies and research approved by the Inter-Engineering Group before embarking on the final two-thirds of the credit requirements for the degree. A minimum of 39 credits is required, but programs for specific students may require additional credits, particularly when necessary to establish an adequate background in the field of study. Usually, 9 credits of thesis are required. Of the thirty hours of course work, at least 21 credits must be in courses numbered 500 and above. Except for special cases approved by the Inter-Engineering Group, courses numbered below 400, while they may be essential for successful completion of the program, do not count toward the credit requirement, and no more than 9 credits of 400-level courses may be counted toward the degree. Nonengineering courses are acceptable, provided they meet a specific program objective.

Within the above-stated general degree requirements, the specific requirements that an individual student must meet will depend on his or her background and aspirations, and will be specified in a plan of study and research jointly developed by the student and academic adviser and approved by the student's supervisory committee.



Program Administration

The program is administered by the Inter-Engineering Group, which includes faculty members of several departments of the college that contribute to the program.

After the student has been admitted to the program, an academic and research adviser will be officially selected and a supervisory committee appointed. The committee will consist of at least three faculty members, one of whom is the student's adviser. It has the responsibility of approving the student's plan of studies and research, following the student's progress, conducting the final M.S. examination, and determining that the approved plan has been satisfactorily completed. Supervisory committee actions will be periodically reviewed by the Inter-Engineering Group to ensure that appropriate standards are maintained.

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, Towe. Moncrieff H. Smith, Jr., graduate program adviser.

This interdisciplinary program administered by the Physiology Psychology Group of the Graduate School has been designed to meet a need for intensive training in the overlapping area of the behavioral and the physiological sciences. Currently, physiology and other departments of medical schools are appointing psychologists to carry on certain types of physiological research and to teach medical students. Psychology departments long have felt the need for individuals more highly conversant with physiological techniques and concepts than is usual for persons with a Ph.D. degree in psychology. Further, because physiological psychology is a fruitful research field, numerous research institutes are seeking persons trained in both disciplines.

Individuals could obtain a Ph.D. degree in each subject. In practice, this is rarely feasible, with the result that individuals in physiological psychology and in behavioral neurophysiology usually are less than adequately trained in one or the other of the parent disciplines. Therefore, it is the aim of the faculty in psychology and the faculty in physiology to work jointly to offer graduate students intensive training in the large area of overlap between the disciplines.

The program of each student is supervised by a committee of four faculty members. Each student is expected to do laboratory work in both areas in order to become familiar with current research techniques in the respective departments. Although no formal master's degree program is provided, each student is expected to do independent research in either one discipline or the other prior to undertaking a doctoral research program.

Each student spends approximately a year in basic course work in each discipline. At the conclusion of these two years of study, the student's training consists of advanced seminars in either area, and doctoral research.

Because physiological psychology and neurophysiology are strongly developed at the University of Washington, the graduate student finds the latest in instrumentation and research techniques in both fields.

In addition to the facilities of both the physiology and psychology departments, students have the opportunity of working with laboratory primates at the Regional Primate Center. The center has facilities for a wide variety of behavioral and physiological studies of a number of primate species. Because primates offer unique advantages for both the behavioral and the physiological work, the center is a valuable adjunct to the resources of the training program.

RADIOLOGICAL SCIENCES

Faculty

Kenneth L. Jackson, Chairman; Bichsel (Radiology), Christensen (Radiology), Fairhall (Chemistry), Figley (Radiology), Geraci (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.

Master of Science in Radiological Sciences Degree

The program leading to the degree of Master of Science in Radiological Sciences is offered by the Radiological Sciences Group of the Graduate School. Study for this degree is open to students with baccalaureate degrees in a physical or biological science or in engineering, depending on the option selected. Several curriculum options are offered to satisfy different requirements and interests of biological scientists, physical scientists, or engineers. The various options described below prepare students for careers in health physics, radiological health, radiological physics, radiation biology, or hospital physics.

Thesis topics include studies in radiation biology, radioecology, nuclear medicine, radiochemistry, radiation physics, or nuclear engineering. The first three options also are offered at the Joint Center for Graduate Study in Richland, making available for thesis research the extensive government laboratories there.

A student with a deficiency in one area of the prerequisites may be accepted for the program, provided he or she removes the deficiency during the first year of graduate study. Credit toward the degree is not ordinarily granted for a course used to remove a deficiency.

PHYSICAL SCIENCE OPTION

Prerequisites for this option include a baccalaureate degree in a physical science or in engineering, and a year of general biology at the college level.

Courses	Credits
PHYS 431, 433 Modern Physics Laboratory	3,3
NUC E 484 Introduction to Nuclear Engineering	4
NUC E 485 Nuclear Instruments	3
or CHEM 410 Radiochemical Techniques and Radioactivity Measurements	3
NUC E 477 Introduction to Radioactive Tracer Techniques	3
FISH 473 Aquatic Radioecology II	3
RADGY 501, 502 Biological Effects of Ionizing Radiation	2,2
RADGY 503, 504 Laboratory in Radiation Biology	1,1
RADGY 507 Radiation Hazards Analysis and Control	1

RADGY 517 Radiation Dosimetry	3
RAD S 520 Radiological Sciences Seminar	2
RAD S 700 Master's Thesis	9

BIOLOGICAL SCIENCE OPTION

Prerequisites for this option include a baccalaureate degree in biological science, courses in mathematics through differential and integral calculus and statistics, and chemistry through quantitative analysis and organic chemistry.

Courses	Credits
500-level course in a biological science	3
RADGY 501, 502 Biological Effects of Ionizing Radiation	2,2
RADGY 503, 504 Laboratory in Radiation Biology	1,1
RADGY 505 Radiological Physics	3
RADGY 507 Radiation Hazards Analysis and Control	1
FISH 473 Aquatic Radioecology II	3
CHEM 350, 351 Elementary Physical Chemistry	3,3
CHEM 410 Radiochemical Techniques and Radioactivity Measurements	3
PHYS 221 Quantum Physics	3
PHYS 327 Introduction to Nuclear Physics	3
RAD S 520 Radiological Sciences Seminar	2
RAD S 700 Master's Thesis	9

ENVIRONMENTAL SCIENCE OPTION

An applicant with a baccalaureate degree in a physical science or engineering and a year of general biology at the college level generally will be prepared to pursue this curriculum.

Courses	Credits
CEWA 434 Ecological Effects of Waste Water	4
or FISH 473 Aquatic Radioecology II	3
CEWA 461 Air Resources Engineering I	3
NUC E 484 Introduction to Nuclear Engineering	4
NUC E 485 Nuclear Instruments	3
NUC E 486 Nuclear Power Plants	3
CHEM 410 Radiochemical Techniques and Radioactivity Measurements	3
RADGY 501, 502 Biological Effects of Ionizing Radiation	2,2
RADGY 503, 504 Laboratory in Radiation Biology	1,1
RADGY 517 Radiation Dosimetry	4
RAD S 520 Radiological Sciences Seminar	2
RAD S 700 Master's Thesis	9

MEDICAL RADIATION PHYSICS OPTION

Prerequisites for this option include a baccalaureate degree in a physical science or engineering.

Courses	Credits
CONJ 317-318 Introductory Anatomy and Physiology	6-6
P BIO 437 Computer Programming for Biological Research	3
RADGY 501, 502 Biological Effects of Ionizing Radiation	2,2
RADGY 505 Radiological Physics	3
RADGY 507 Radiation Hazards Analysis and Control	1
RADGY 517 Radiation Dosimetry	3
NUC E 485 Nuclear Instruments	3
RAD S 520 Radiological Sciences Seminar	2
RAD S 600 Independent Study or Research (Hospital Physics Board Certification Related Experience)	3
RAD S 700 Master's Thesis	9

RUSSIAN AND EAST EUROPEAN STUDIES

503 Thomson

Faculty

Peter F. Sugar, Associate Director; Augerot (Slavic Languages and Literature), Boba (History), Carpenter (Slavic

Languages and Literature), Chirot (Sociology), Cirtautas (Asian Languages and Literature), Coats (Slavic Languages and Literature), Ellison (History), Gershevsky (emeritus), Gribanovsky (Slavic Languages and Literature), Haney (Slavic Languages and Literature), Jackson (Geography), Kapetanac (Slavic Languages and Literature), Konick (Slavic Languages and Literature), Kramer (Slavic Languages and Literature), Legters (Comparative and Foreign Area Studies), Micklesen (Slavic Languages and Literature), Paul (Political Science), Reshetar (Political Science), Romanowski (Geography), Sokol (Slavic Languages and Literature), Spector (emeritus), Sugar (History), Swayze (Slavic Languages and Literature), Szeftel (emeritus), Thornton (Economics), Treadgold (History), Velikonja (Geography), Waugh (History), West (Slavic Languages and Literature). Peter F. Sugar, graduate program adviser.

Russian and East European Studies 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, Sociology, 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.

SOCIAL WELFARE

204 Eagleson

Faculty

Scott Briar, Chairman; Beatty (Social Work), Dear (Social Work), Gottlieb (Social Work), Hutchins (Social Work), Maier (Social Work), Patti (Social Work), Rieke (Law), Roberts (Sociology), Robinson (Psychology), Roffman (Social Work), Smith (Law), Whittaker (Social Work), Williams (Public Affairs). Scott Briar, graduate program adviser.

The social welfare doctoral program is administered by the interdisciplinary Social Welfare Group, appointed by the Graduate School and representing the disciplines of law, psychology, public affairs, social work, and sociology.

The doctoral program in social welfare prepares students to contribute to the field of social welfare and the profession

of social work through research, teaching, policy analyses, and program development. The program builds on the premise that the field of social welfare must be scientifically based, continually responsive to service and practice needs, and knowledgeable about developments in related fields and disciplines.

Each student's program is individually designed with an emphasis on interdisciplinary study. In the basic core of required courses, as well as others specially selected, students have ample opportunity to pursue their particular interests.

During the first two years, the student is expected to define and develop the specialized area that will be the focus of the subsequent dissertation research. The area selected must have clear significance for the development of practice, programs, or policies in social work and social welfare. A variety of specialized areas of study are possible within the program, ranging, for example, from studies of child welfare policy, services to the aged, or income maintenance programs, to the effectiveness of social work practice with individuals and families.

Admission Requirements

Applicants should have a master's degree in social work or comparable preparation in a closely related field. The applicants selected for admission are those whose scholastic achievements, previous experience, and aptitude for social welfare research and scholarship indicate the greatest promise for achieving the objectives of the program. In addition, an effort is made to maintain a balanced student group reflecting the range of concerns in social work and social welfare as well as the affirmative action goals of the University.

Financial Aid

A limited number of fellowships, teaching assistantships, and research assistantships are available for qualified doctoral students. Tuition waivers are available to some students. However, it is unlikely that the financial assistance provided to any student will be adequate to cover all educational and living expenses. Application forms for financial assistance are submitted with the application for admission.

Correspondence and Information

Additional information may be obtained from the graduate program adviser, 204 Eagleson.

Graduation Requirements

Successful completion of a set of core courses required of all students and additional courses recommended by the student's Supervisory Committee that will emphasize the interdisciplinary and individualized character of each student's program. Courses must be taken in such fields as economics, law, psychology, public affairs, public health, social work, and sociology. Successful completion of the General Examination for advancement to candidacy. Preparation of a dissertation acceptable to the Supervisory Committee. Successful completion of the Final Examination, the defense of the dissertation.

Students enroll in the following set of social work core courses, plus SOCWL 600 and 800: SOC W 552, History of Poverty and Inequality: The Anglo-American Experience (1485-1900) (3 credits); SOC W 553, Seminar in Contemporary Social Welfare Policy (3); SOC W 580, Introduction to Advanced Research Methods and Design (3); SOC W 598-, Research Problems and Priorities in Social Work and Social Welfare (3-); SOC W -599, Research Problems and Priorities in Social Work and Social Welfare (-3); SOCWL 600, Independent Study or Research (*); SOCWL 800, Doctoral Dissertation (*).

SOUTH ASIAN STUDIES

Faculty

Karl H. Potter (Philosophy), Associate Director; Brass (Political Science), Conlon (History), Curtis (Architecture), Hiebert (Anthropology), Keyes (Anthropology), Morris (Economics), Ruegg (Asian Languages and Literature), Schiffman (Asian Languages and Literature), Shapiro (Asian Languages and Literature), Thrasher (Asian Languages and Literature). Karl H. Potter, graduate program adviser.

The program offers the Master of Arts degree in the field of South Asian Studies. This degree program has been designed for (1) students who have completed the baccalaureate degree and are qualified to pursue graduate study leading to the doctorate, who have career objectives involving teaching and research, who plan to specialize in a traditional discipline but whose geographical area of interest lies within South Asia, (i.e., India, Pakistan, Sri Lanka (Ceylon), Bangladesh, Nepal, and Tibet), and who wish to spend the first part of their graduate training acquiring knowledge of the area; (2) students who plan to enter certain professional training programs at the graduate level (e.g., in education, business administration, journal-

ism, law, or public affairs) and whose career objectives are oriented toward South Asia); (3) students who plan a career in government service (e.g., the diplomatic corps) and who wish to acquire a special understanding of the South Asia area.

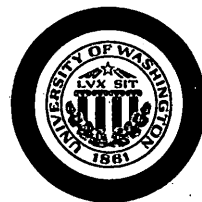
Curriculum

Language training is an essential component of the program. All students are required to complete a minimum training in a South Asian language through the third year of instruction. Students are encouraged to take as much instruction in South Asian languages as possible.

Interdisciplinary study is another essential component of the program. All students are required to take SASIA 510, Introduction to Interdisciplinary Study of South Asia (5 credits). This seminar is designed to introduce the students to work done on South Asia in the various disciplines. SASIA 511, Seminar in South Asia, helps to tie together the student's experience with, and perspective on, South Asian studies.

Course work in the disciplines is the third essential component of the program. Students can select from a broad range of courses in disciplines, which at the minimum must total 28 credits in graduate courses in addition to SASIA 510 (and SASIA 511); 10 of these credits must be at the 500 level or above. At least 20 of these 28 credits must be in courses directly related to the study of South Asia.

Finally, each student must submit two seminar papers in lieu of a master's thesis. The requirement for the seminar papers may be met in the SASIA 510 (and SASIA 511) courses and in graduate courses in the disciplines. Both papers must be read and approved by at least two faculty members. Students must also pass a comprehensive oral examination covering course work and the seminar papers.



INTERSCHOOL OR INTERCOLLEGE PROGRAMS

BIOENGINEERING

*328 Aerospace Research Laboratory
D416 Health Sciences*

Faculty

James B. Bassingthwaighe, Director; Allan S. Hoffman, Assistant Director; Holloway; Huntsman, Moritz, Rushmer, Verdugo.

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 con-

forming to their career objectives. This may be done by enrolling in one of the traditional departments or by formulating an individualized Master of Science in Engineering or Ph.D. degree program under the auspices of the Inter-Engineering Group of the Graduate School. 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, artificial tissues and organs, biomechanics, clinical engineering, computer applications, fertility studies, absorption and transmission of wave energies in tissues, diagnostic ultrasound, systems analysis, health-care delivery, biomathematics, and exchanges in the microcirculation.

COMPUTER SCIENCE

112 Sieg

Computer Science is devoted to the representation, storage, manipulation, and presentation of information, in both theory and practice. Computer scientists are interested in: (1) representations of information, (2) algorithms to transform information, (3) languages to express algorithms, (4) hardware and software processors to execute algorithms, and (5) ways to accomplish all of these economically.

The objective of computer science education is to develop professionally competent and broadly educated computer scientists. Undergraduate education is designed to prepare students for professional careers or graduate studies; especially important is a foundation that will not become obsolete as technology advances and changes.

The computer field has a broad base of industrial and governmental computer users, providing many of the jobs suitable for the Bachelor of Science graduate. Typical jobs are systems analyst, systems programmer, technical salesperson, and hardware or software specialist. Above this base is a pyramid of producers and developers of computer systems, as well as teachers and researchers. Graduate education is appropriate for many of the jobs at these higher levels.

Faculty

Jerre D. Noe, Chairperson; Baer, Dekker, Fischer, Golde, Greif, Herriot, Kehl, Ladner, Ritchie, Shaw.

Adjunct, Research, and Lecturer Appointments

Adolphson, Diehr, Gillespie, Goldstein, Holden, D. L. Johnson, Klee, Rockafellar, Sobolewski.

Undergraduate Program

Undergraduate Adviser

Hellmut Golde
112 Sieg

Bachelor of Science Degree

The Computer Science Program is associated with both the College of Arts and Sciences and the College of Engineering. A student typically enters the program during the sophomore year or at the beginning of the junior year. The required computer science curriculum consists of four components:

GENERAL EDUCATION COMPONENT (80 CREDITS)

A student may satisfy this component by completing 80 credits of approved general education courses. For example, a student in the College of Arts and Sciences may satisfy this component by study in the following areas:

Humanities from the college distribution list: 20 credits.
Social sciences from the college distribution list: 20 credits.
Free electives: 40 credits.

A student in the College of Engineering may satisfy this component by study in the following areas:

Humanities and social sciences: 30 credits with at least 10 in each. Functional techniques: 10 credits, excluding courses from the area of computational techniques. Free electives: 40 credits.

GENERAL PREPARATORY COMPONENT (46 CREDITS)

MATH 124, 125, 126, 205, 238; MATH 391, 392 recommended. PHYS 121, 122, 123. E E 351, 310 and 6 credits of natural sciences, business, or engineering.

COMPUTER SCIENCE CORE COMPONENT (40 CREDITS)

C SCI 201, 241, 321, 326, 378, 431, 441, 445, 446, 447, 470, MATH 464, and 6 credits of C SCI 498.

COMPUTER SCIENCE ELECTIVE COMPONENT (14 CREDITS)

A student may satisfy this requirement by taking additional computer science courses or other approved courses. Examples are courses in operating systems, compiler design, computer architecture, theory of computation, numerical mathematics, applications of computers to other fields, operations research, and management techniques.

Admission Requirements: Each applicant must have: been admitted to the University; earned at least 30 quarter credits applicable toward graduation; achieved an overall University grade-point average of at least 2.50; completed the following courses or equivalent—MATH 124, 125, PHYS 121, and an introductory computer science course such as C SCI 201. Selection of applicants is made primarily on the basis of scholastic achievement and potential. Women and minorities are encouraged to apply. For more information, the computer science undergraduate adviser or the arts and sciences or engineering advising centers should be consulted.

Sophomore Year: Autumn—MATH 205 (3 credits); PHYS 123 (4); C SCI 241 (3); general education component (5). Winter—MATH 238 (3); C SCI 378 (3); general education component (9). Spring—general education component (15).

Junior Year: Autumn—E E 351 (4); C SCI 321 (3); general education component (8). Winter—MATH 464 (3); E E 310 (3); general education component (9). Spring—C SCI 326 (3); C SCI 431 (3); C SCI 470 (4); general education component (5).

Senior Year: Autumn—C SCI 441 (3); C SCI 445 (2); general education component (10). Winter—C SCI 498 (3); C SCI 446 (2); general preparatory component (10). Spring—C SCI 498 (3); C SCI 447 (2); general preparatory component (10).

Graduate Program

Graduate Program Adviser

David B. Dekker
112 Sieg

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. Satisfactory 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 in which he or she plans to write a dissertation. The student should be able to correlate this area of specialization with other fields of computer science. (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.

INSTITUTE FOR MARINE STUDIES

3731 University Way Northeast

Faculty

Donald L. McKernan, Director; Burke, Crutchfield, D. K. Fleming, R. H. Fleming, Hershman, Miles, Stokes, Vesper.

Adjunct Faculty

Bevan, Fleagle, Johnson, McManus, Murphy, Wenk.

Affiliate Faculty

Alverson, McCulloh.

The Institute for Marine Studies offers opportunities for comprehensive and interrelated graduate study and research on contemporary marine problems. In addition to offering a series of courses at the graduate level, the institute draws upon the strength and breadth of the marine programs in many other units of the University. All faculty members are associated, through joint or adjunct appoint-

ments, with other academic units that offer a wide variety of courses appropriate for those concerned with the many aspects of policy and management problems relating to the uses of the ocean by man.

Because the interests of the institute encompass disciplines and activities in many of the colleges and other units of the University, it is under the administrative direction of the Marine Affairs Board, which is composed of deans and senior University administrators.

The institute offers a comprehensive program of graduate study and research with emphasis upon the following marine policy areas: coastal zone planning and administration; international marine policy and management; marine resource development and management; naval power, national security, and foreign policy; offshore technology systems; law and marine affairs; and marine transportation and commerce.

Programs are designed to meet the individual needs of graduate students with varied academic backgrounds and different levels of education and types of experience. The objective is to prepare students for professional careers in policy-making and management organizations and for teaching and research. Emphasis is placed upon breadth, and all students are expected to gain familiarity with pertinent aspects of the social, technological, and environmental sciences. In addition, each student is expected to build upon his or her specialty and develop professional and scholarly proficiency in one aspect of marine studies.

A major focus of interest in courses, seminars, and research is upon contemporary marine policy and management problems. These are examined in terms of the many, and often conflicting, uses of the ocean and its coastal lands and waters and the complex of organizations, which vary in scale from global to local, that are involved in these activities. These problems are examined from many perspectives; goals and objectives are defined and analyzed; alternatives are developed and evaluated; and appropriate procedures are devised for effective decision making. Because of the complexity of these problems, they require the efforts of teams of faculty members and students, each contributing his or her special knowledge and talents.

The institute is developing programs leading to the master's and doctoral degrees in marine affairs, and authority to grant such degrees has been requested. Until such authority is granted, graduate students wishing to pursue programs of study and research in marine studies are enrolled in graduate programs in other academic units of the University. The institute has made arrangements with a number of these units to accommodate its students. Details concerning the procedures will be provided by the institute. An alternative for some students is to take a major program in some other department, school, or college and to complete a minor program in the institute. For students with a degree in law, there is a LL.M. degree program administered by the School of Law that includes a major component of study in the institute. For students preparing for public service in marine and related environmental policy and administrative positions, there is the M.P.A. degree with an emphasis on marine affairs, environment and public policy, or science and public policy offered by the Graduate School of Public Affairs.

Additional information concerning the institute and opportunities for graduate study can be obtained from the Director.

QUANTITATIVE SCIENCE

Faculty

Benjamin A. Jayne, Director; Bare, Bevan, Bledsoe, Chapman, Fletcher, Gallucci, Hatheway, Mathews, McCaughran, Rustagi, Schreuder, Turnbull.

Adjunct Faculty

Mar, Meier, Newell.

Affiliate Faculty

Eberhardt.

Research Faculty

Carey, Gales, Lord, Sollins, Swartzman.

Research Staff

Buss.

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 emphasis on statistical inference and experimental design for the biological sciences; and (6) applied analysis, consisting of differential and integral calculus applied to the life sciences. Courses in each of the six areas are interrelated in a way that meets a wide range of student interests and needs.

The faculty participates in the research activities of several academic units of the University. In addition to the two resource colleges, these include the College of Engineering, the College of Arts and Sciences, the departments of Economics, Geography, and Oceanography, and the graduate schools of Business Administration and Public Affairs.

Both the teaching and the research programs of the Center for Quantitative Science are designed to bring together living systems, mathematics, and the computer for purposes of description and management. Particular emphasis is placed on the use of the computer for quantitative descriptions of both terrestrial and aquatic ecosystems and resource management. Computerization makes possible study of the impact of exploratory management policies on simulated resource systems embedded in backgrounds of interrelated physical, biological, and economic activities and

under numerous institutional constraints. 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.

SOCIAL MANAGEMENT OF TECHNOLOGY

316 Guggenheim

Faculty

Edward Wenk, Jr., Director; Bereano, Hyman, Osborn, Zerbe.

Advisory Faculty

Carlson, Crutchfield, Fleagle, Garlid, Marcus, Rabinowitz, Richardson, Wolfe.

Social management of technology is concerned with ways and means by which technology is guided to produce socially satisfactory outcomes. Involved are 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. Topics include, but are not restricted to, food, energy, health care, communication, transportation, resource development, and municipal services.

The program is administered through a committee of deans from the College of Arts and Sciences, the School and Graduate School of Business Administration, the Graduate School of Public Affairs, and the Graduate School, with the Dean of the College of Engineering serving as chairperson.

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 schol-



arship 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 inter-college 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 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.

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 incomprehension 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 such fields as 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.

WILDLIFE SCIENCE

Faculty

Donald E. Bevan, Chairperson; Manuwal, Taber, Weisbrod.

Wildlife Committee

Driver, Gessel, Mathews, McCaughran, Salo, Scott, Taber, Whitney.

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. A student seeking a degree in wildlife science will apply for admission to either one of the sponsoring colleges. 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 prepare 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 chosen college and select an elective concentration in wildlife science. Additional information may be obtained from a wildlife science adviser in either college or from a member of the faculty.



LAW

Dean

Richard S. L. Roddis
336 Condon

Associate Deans

Harry M. Cross
306 Condon

Charles Z. Smith
322 Condon

Faculty

Andersen, Aronson, Burke, Chisum, Corker, Cosway, Cross, Delgado, Fletcher, Gallagher, Harsch (emeritus), Hardisty, Henderson, Hjorth, Hume, Hunt, Huston, Johnson, Junker, Kummert, Lyness, Meisenholder, Morris, Nottelman (emeritus), Peck, Price, Prosterman, Rieke, Roddis, Rombauer, Seawell, Shattuck (emeritus), C. Z. Smith, F. W. Smith, Stoebeuck, Strickland, Taylor (emeritus), Trautman, Tunks.

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 cocurricular 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; chapters 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 stu-



dents 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, although certain courses are recommended, and a student may choose a program designed to suit his or her interests and needs. Only the course in professional responsibility is 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. Seminars are also offered, and they are built on the belief that an opportunity for sustained research, analysis, and writing at an advanced level is an important part of preparation for the contemporary legal profession. The intended product of the seminar is a high-quality paper.

Postgraduate Degrees in Law

Applicants for admission to the postgraduate (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 a first professional degree (LL.B. or J.D.) and who have a record of superior academic achievement. In the case of the Asian Law emphasis, the applicant must be competent in English and either Japanese, Korean, or 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) and who evidence an interest in law teaching or government service

in his or her country of origin. 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 a 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

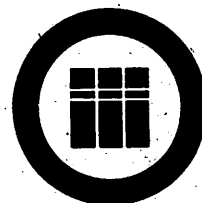
Beginning students may enter the school only in Autumn Quarter, and they are required to be present a few days early to participate in the Foundations of Law Program.

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 or she will be required to take.

Transfers are discouraged, and they are accepted only to the extent vacancies exist solely from applicants who have completed one year at a member school of the Association of American Law Schools. Such applicants must show that they can produce above-average work at this law school, or that they can produce acceptable work at this law school and that only by transferring can they alleviate serious hardship.



LIBRARIANSHIP

Director

Peter Hiatt
133 Suzzallo

Faculty

Ahlers, Bauer (emeritus), Benne, Bevis (emeritus), Chisholm, Gallagher, Hiatt, Lieberman, Mignon, Milczewski, Nelson, Page, Shaw, Skelley, Soper, Turner (emeritus), Zweizig. Peter Hiatt, graduate program adviser.

Established in 1911 in response to the need for professionally qualified librarians, the School of Librarianship is the oldest library school west of the Mississippi River. It was among the first to receive accreditation from the American Library Association, in 1926, and has been accredited ever since. 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.

Libraries, by any name, have become increasingly significant in this age of rapid social and technological change. Through the organization and the stimulation of use of the vast record of humankind's intellectual history, libraries have a major role in the areas of formal and informal education, life-long learning, information transfer, rehabilitation, and cultural identity. Therefore, the goals of the School of Librarianship, redefined in 1973, reflect its role in speeding needed improvements in library services through (1) preparation of candidates for professional careers and leadership roles in the field of librarianship; (2) leadership in encouraging cooperative ventures in the application of innovation and advances within the profession; (3) planning with professional associations, institutions, agencies, and related disciplines in designing programs of instruction and research leading to improved library and

information services; (4) cooperation with other state institutions and agencies and other units within the University concerned with education for library practice in developing programs for library education at various levels; and (5) conduct of systematic study and research on problems, concerns, and policies in librarianship.

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, which include automation, children's services, school librarianship, technical services, and law librarianship. Newly emerging areas and special topics are given attention through special seminar offerings. The school recognizes that its program extends beyond the curriculum, which is designed to provide a broad base for professional-level entry in various career specializations. Colloquia, informal discussion, and student-sponsored service activities supplement the curriculum in stimulating the exchange and development of ideas among students, faculty, and practicing librarians. The faculty and students are continually involved in regional library development activities.

Librarianship is a nonthesis 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 following are required for admission to the School of Librarianship: a degree from a college or university of recognized rank; a 3.00 minimum grade-point average for the courses taken during the junior and senior years of under-



graduate study; one academic year at the college level (or its equivalency) of a modern foreign language; an official score from the Graduate Record Examination general aptitude test taken within five years of the year of application; and approval of both the Graduate School and the School of Librarianship. The foreign-language requirement must be met prior to enrollment. Equivalency can be earned through placement beyond one year, or by passing the Graduate School foreign-language test.

Some familiarity with computer programming, statistics, or college algebra would be helpful for students preparing for a career in academic, research, or special libraries, although this is not a requirement for admission to the program.

International students who hold a baccalaureate degree from an institution in which the language of instruction is not English must submit a recent score from the Test of English as a Foreign Language examination. These students require at least two years to complete the program and may enter only in the Autumn Quarter. To ensure consideration of an application, it is advisable for international students to submit complete credentials by February 1. Applications for admission must be completed by April 1 of each year, and students enter the school in Summer Quarter or Autumn Quarter only. Enrollment as a graduate student is permissible while the four prerequisite courses are being completed.

These courses (LIBR 440, 441, 442, 443) do not carry graduate credit, but they are required before the student begins graduate-level courses in librarianship. LIBR 441, 442, and 443 must be completed either simultaneously or in sequence.

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.*

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 necessarily 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. Specialized law librarianship courses are offered during the academic year only. However, the required prerequisite courses (LIBR 440, 441, 442, 443) can be taken during the preceding Summer Quarter.

Financial Aid

Information about financial aid may be obtained from: University of Washington; Director, Office of Financial Aids; 1400 Northeast Campus Parkway; 105 Schmitz, PE-20; Seattle, Washington 98195.

The School of Librarianship application form for financial aid may be requested from: University of Washington; School of Librarianship; 133 Suzzallo, FM-30; Seattle, Washington 98195. This form is used by the school to select students for any scholarships available, as well as for the one teaching assistant and six to eight student assistant positions.

Information about national and state scholarship assistance may be obtained from: American Library Association; Library Education Division; 50 East Huron Street; Chicago, Illinois 60611, or from your state library.

It is University policy to recruit minority applicants who have potential to do graduate work. The Office for Recruitment of Minority Students, 198 Administration, AF-75, has some funds available specifically for minority students.

Part-time employment, both on and off campus, is sometimes available. For student employment in the University libraries, students must apply in person at the library administration office, M171 Suzzallo. For other on-campus positions, they should contact the Office of Student Employment, 105 Schmitz, PE-20.

Limited loans for emergency purposes may be arranged in the School of Librarianship for enrolled students.

Student Exchange Program

The School of Librarianship participates in the Student Exchange Program of the Western Interstate Commission for Higher Education (WICHE), under which legal residents of Western states that do not have graduate library schools accredited by the American Library Association may pay the tuition and fees charged to legal residents of Washington State rather than the higher nonresident rate. These states are Alaska, Idaho, Montana, Nevada, New Mexico, 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 who can be included in the program each year depends on ap-

propriations by the various legislatures. A student interested in this program must apply to the certifying officer in his or her home state, whose address may be obtained from the Western Interstate Commission for Higher Education, Drawer P, Boulder, Colorado 80302.

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.

Placement of Graduates

The School of Librarianship works closely with the University of Washington Placement Center to assist graduates of the school in finding employment. Positions generally have been available for those who are mobile and willing to begin their professional careers outside of the major metropolitan areas.

Continuing Education

The School of Librarianship maintains a growing program of continuing education with consultations, workshops, and institutes for graduates and others. In addition, graduates from accredited library schools may take courses on a limited basis through nonmatriculated enrollment; those interested in designing an individualized program of study on a nondegree basis may apply to the school. The colloquia series, designed for practicing librarians, brings outstanding leaders to the campus to explore current trends and issues affecting librarianship.



MEDICINE

Dean

Robert L. Van Citters
A315 Health Sciences

Associate Deans

Jack M. Docter, E. Harold Laws, John N. Lein, James W. Haviland, M. Roy Schwarz, Russell Ross.

Assistant Deans

Benjamin H. Belknap, Gary E. Striker, Loren C. Winterscheid, Zenaïdo Camacho.

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 24 credits per quarter. Assumption of an academic load in excess of 24 credits requires special permission from the student's adviser and the Associate Dean for Academic Affairs. A student may decide to embark upon a specific pathway at any time, but is required to make a decision by the fifth quarter.

The Basic Curriculum

FIRST QUARTER (AUTUMN)

Introduction to medicine and the curriculum orientation

- HUBIO 511P Anatomy
- HUBIO 512P Mechanisms in Physiology and Pharmacology
- HUBIO 513P Introduction to Clinical Medicine
- HUBIO 514P Molecular and Cellular Biology I
- HUBIO 515P The Ages of Man

SECOND QUARTER (WINTER)

- HUBIO 520P Cell and Tissue Response to Injury
- HUBIO 521P Natural History of Infectious Diseases and Chemotherapy
- HUBIO 522P Introduction to Clinical Medicine
- HUBIO 523P System of Human Behavior I
- HUBIO 524P Molecular and Cellular Biology II

THIRD QUARTER (SPRING)

- HUBIO 530P Epidemiology
- HUBIO 531P Head, Neck, Ear, Nose, and Throat
- HUBIO 532P Nervous System

- HUBIO 533P Medicine, Health, and Society
- HUBIO 534P Endocrine System
- HUBIO 535P Introduction to Clinical Medicine

FOURTH QUARTER (AUTUMN)

- HUBIO 540P Cardiovascular Respiratory System
- HUBIO 541P Gastro-Intestinal System
- HUBIO 542P Introduction to Clinical Medicine
- HUBIO 543P Medicine, Health, and Society
- HUBIO 549P Genetics

FIFTH QUARTER (WINTER)

- HUBIO 550P Introduction to Clinical Medicine
- HUBIO 551P Skin System
- HUBIO 552P Reproductive Biology
- HUBIO 553P Musculoskeletal System

SIXTH QUARTER (SPRING)

- HUBIO 560P Introduction to Clinical Medicine
- HUBIO 561P Hematology
- HUBIO 562P Urinary System
- HUBIO 563P System of Human Behavior II

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 investigations and clinical medicine. The program allows time for a detailed development of knowledge in one of the basic sciences and a sound education in medicine. Because of the course demands and the need for prolonged periods of research training, five years are required to complete this course of study. The granting of a combined degree is under consideration. A Doctor of Philosophy or Master of Science degree from a basic science department may be obtained under existing rules of the Graduate School, but special arrangements must be made in each case.

In general, each pathway has certain absolute requirements, makes available an opportunity for the selection of courses from a defined list, and offers completely free elective choices. The Doctor of Medicine degree may be granted after satisfaction of basic curriculum and pathway requirements.

The curriculum of the 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

(WAMI Experiment in Decentralized Medical Education)

As an integral part of the undergraduate medical curriculum and 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.

Among the goals of this program were: to increase the number of applications admitted to medical school without requiring "new" buildings; to train increased numbers of primary-care physicians; to redress the maldistribution of physicians in the Pacific Northwest and Alaska; to provide continuing education opportunities to health professionals in the WAMI region; and to bring the resources of the medical center to the communities that have needs.

Students in the WAMI Program phase of the University of Washington School of Medicine receive the first year of their medical school training at Washington State Univer-

sity, University of Alaska, Montana State University, or the University of Idaho. While there, they enroll in courses designed conjointly by faculty members from all universities under the direction of faculty at the University of Washington School of Medicine. After conclusion of one year of study, students return to Seattle, where they receive the second year of their medical education. At the conclusion of the first two years, students enter the elective phase of the curriculum and are required to choose a pathway of study. As a part of the pathway training, students may take a portion of the training at the University of Washington School of Medicine and its affiliated hospitals and a portion from physicians in communities in the four-state area who are members of the School of Medicine faculty. These latter community clinical units are also to be used for a portion of the residency training in the particular discipline. Included among the departments that have community clinical-based learning experiences are Family Medicine, Obstetrics and Gynecology, Internal Medicine, Psychiatry and Behavioral Sciences, and Pediatrics. By capitalizing upon the assets of both the medical center and the community, more students are being trained in the primary-care disciplines. Continuing education opportunities are available to health professionals; resources are being brought to the community level; and, hopefully, more physicians will practice in shortage areas.

Admission*

Requirements for Entrance

The Medical College Admission Test (MCAT) is required and must be taken by autumn of the year preceding the proposed date of enrollment. Minimum science course requirements are: *biology* (8 semester/12 quarter credits), *chemistry* (12 semester/ 18 quarter credits) including one year of *organic chemistry*, and *physics* (8 semester/12 quarter credits). These courses should be completed by time of application if possible; all must be completed prior to anticipated medical school matriculation. Proficiency also is required in *English* and *basic mathematics*. Candidates are considered regardless of major; all must demonstrate substantial academic ability in major fields and required science courses. A minimum of three years of college is required; however, ninety-eight percent of entrants in recent years have had baccalaureate degrees. A broad background in biological science and the humanities; a knowledge of, and exposure to, the needs of individuals and society; and an awareness of health-care delivery systems are desirable.

Candidates for admission are urged to discuss undergraduate credentials and curriculum with premedical advisers at their undergraduate institutions.

Medical College Admission Test

Each first-year applicant must provide the scores received on the MCAT. Arrangements for this test may be made with the premedical adviser at the institution where premedical training is being taken. The MCAT customarily is given in the spring and autumn of each year. As noted, the MCAT must be taken by autumn of the year preceding

* These procedures and policies are subject to change. Information regarding changes is available at the School of Medicine Admissions Office.

the proposed date of enrollment. Additional information on the administration of this test may be obtained by writing to the American College Testing Program, Post Office Box 414, Iowa City, Iowa 52240. Early application for testing is advised.

Although performance on all sections of the MCAT is considered in the selection process, particular emphasis is placed on results in the science and quantitative ability portions. Variations in the type and amount of course work completed by the time of testing are considered in evaluation of MCAT results, particularly where retesting has been employed. All candidates are referred specifically to the section of the Association of American Medical Colleges' (AAMC) *Medical School Admission Requirements* relating to the Medical College Admission Test.

Early Decision Program

The School of Medicine participates in the Early Decision Program as administered by the American Medical College Application Service (AMCAS). Under this program as employed at the University of Washington, candidates: (1) apply prior to September 1; (2) provide all required supplemental information, including MCAT results, by September 1; (3) receive a decision usually by October 1.

Candidates not accepted under the Early Decision Program continue to receive consideration in the regular applicant pool and may then arrange to apply to additional schools. Candidates applying under the Early Decision Program cannot apply to any other United States medical school until after the Early Decision has been made on their application. Candidates accepted under the Early Decision Program cannot matriculate at any other United States medical school.

It is anticipated that only a limited portion of the class will be accepted under the terms of this program. Those considering applying are urged to consult their premedical advisers and the section of the AAMC's *Medical School Admission Requirements* relating to the early decision plan.

Application Process

The University of Washington is a participant in the American Medical College Application Service Program. Applications may be obtained from AMCAS offices, 1776 Massachusetts Avenue Northwest, Suite 301, Washington, D.C. 20036. Because the Admissions Committee begins examining applications a year ahead of the time of entrance, early application is advisable. Deadline for receipt of application by AMCAS is December 15 for regular decision and September 1 for early decision of the year prior to desired date of entrance.

Entering classes consist almost entirely of persons who are legal residents of Washington, Alaska, Montana, and Idaho and, regardless of residence, M.D.-Ph.D. candidates and disadvantaged Black Americans, American Indians, and Chicanos. The AMCAS application and supplemental material are required before an application is reviewed. Except for M.D.-Ph.D. program candidates, supplemental material should automatically be submitted only by candidates within the categories described above. The supplemental materials are: a three-hundred-word autobiography (per-

sonal comments section of the AMCAS application may be used); a premedical committee evaluation (letters from three science and two nonscience collegiate instructors may be substituted); and a \$10 nonresident fee (non-Washington, Alaska, Montana, and Idaho candidates only; may be waived for economic reasons). All other applicants, including nonresidents designating themselves as candidates for the combined M.D.-Ph.D. program, are asked not to submit any of the above supplemental material unless specifically requested. Those considering application as "non-residents," apart from the groups outlined above, should be aware that no such individuals gained admission to the classes entering in the Autumn quarters of 1974 and 1975.

Upon review of an application, the Admissions Committee may request proof of legal residence. The University's Office of Residence Classification provides legal classification of Washington residency. In general, legal classification of Alaska, Montana, and Idaho residents is linked to the Western Interstate Commission for Higher Education (WICHE) certification by the respective states.

Letters of recommendation should evaluate critically the candidate's academic ability, strengths, weaknesses, motivation for medicine, and maturity, the difficulty of course work attempted, and the candidate's special attributes and assets.

Interviews are by invitation only and are granted, after careful review of completed applications, to those candidates considered potentially competitive for the positions available.

Attempts will be made to issue notices of acceptance on or about October 1 (early decision), December 15, January 15, February 15, March 15, etc. Successful applicants should respond in writing to the notice of acceptance within two weeks. Prior to matriculation, the Comptroller's office will require a \$50 deposit from those expected to enter. This deposit is applied to the first quarter's tuition.

The WAMI experiment in decentralized medical education is discussed previously in this catalog. All students enrolled at the University of Washington School of Medicine may, as part of the WAMI Program, receive a portion of training at sites away from the University of Washington campus. Offers of acceptance, therefore, are conditioned upon agreement to participation in WAMI operations. Questions about this program should be directed to the WAMI office; A300 Health Sciences, SC-64; University of Washington School of Medicine; Seattle, Washington 98195.

Applications from those who have failed to meet minimum standards in other medical or dental schools cannot be considered.

Selection Factors

Candidates are considered comparatively on the basis of academic performance, medical aptitude, motivation, maturity, and demonstrated humanitarian qualities. Extenuating background circumstances are considered as they relate to these selection factors.

The University of Washington School of Medicine does not discriminate on the basis of race, creed, national origin,



sex, or age. The School of Medicine is an integral part of a University with strong institutional commitments toward the end of providing higher education to qualified applicants from all backgrounds.

Medical Scientist Training Program (M.D.-Ph.D. Program)

A limited number of highly qualified candidates wishing to pursue both the M.D. and Ph.D. degrees have been considered annually. Medical scientist trainees must be accepted by the medical school for the M.D. degree and by a department of the Graduate School for the Ph.D. degree. They are permitted a wide choice of research specializations from among numerous disciplines and interdisciplinary areas of biomedical sciences. The program emphasizes continuity of both clinical and basic science exposure. Among participating graduate departments and interdepartmental disciplines are Biochemistry, Bioengineering, Biological Structure, Biomathematics, Biostatistics, Biomedical History, Epidemiology and International Health, Genetics, Microbiology and Immunology, Pathobiology, Pathology, Pharmacology, Physiology and Biophysics, and Physiology Psychology.

Applicants should correspond directly with the Director of the Medical Scientist Training Program; BB1325 University Hospital, RM-16; University of Washington, Seattle, Washington 98195, as well as proceeding with regular School of Medicine application indicating clearly by letter to the School of Medicine's Admissions Committee that the applicant wishes to be considered a candidate for the M.D.-Ph.D. program.

Transfer Students

A few transfer students from other medical schools may be accepted for clinical training into the third-year class in those rare instances in which vacancies develop. In general, when vacancies do occur, legal residents of Washington, Alaska, Montana, and Idaho, attending two-year medical schools in the United States, are given consideration. Interested students should contact the Admissions Office, in writing, for the latest information. Transfer applications need to be filed no later than March 1 of the proposed year of entry. All transfers are conditioned upon successful completion of Part I of the National Board Examination, and once admitted, transfer students must meet the same requirements for graduation as other University of Washington medical students.

With the exception of a limited experimental program involving the University of Washington School of Dentistry, no individuals other than medical school transfers are admitted to advanced standing.

WICHE

Western Interstate Commission for Higher Education

The School of Medicine participates in the student exchange program of the Western Interstate Commission for Higher Education, under which legal residents of Western states not having medical schools pay tuition charged to legal residents of Washington State and the state of Washington receives compensation from the participating states for each of its certified students enrolled at the University of Washington School of Medicine. To be eligible for this

program, a student must be certified by his or her home state. State eligibility requirements vary, and the number of students who can be included in the program each year depends on appropriations by the respective state legislatures. 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, University East Campus, Boulder, Colorado 80302.

Medical School Admission Requirements, United States and Canada

This annual publication of the Association of American Medical Colleges includes not only a statement on each United States and Canadian medical school, but also information dealing with a variety of subjects with which all individuals considering medical school application should become familiar. It is recommended that all applicants refer to it and, if possible, obtain a personal copy. Premedical advisers should have a copy of the current edition of this publication. Orders for it, at a nominal fee, should be directed to: Association of American Medical Colleges; 1 Dupont Circle Northwest, Suite 200; Washington, D.C. 20036. Attention: Membership and Subscriptions.

Frequently requested addresses and telephone numbers: University of Washington; Office of Residence Classification; 320 Schmitz, PC-35; 1400 Northeast Campus Parkway; Seattle, Washington 98195; telephone: (206) 543-4188.

University of Washington; Premedical Advisory Service; B25B Padelford, GN-10; Seattle, Washington 98195; telephone: (206) 543-2550.

Financial Information

Fees and Other Charges

All fees and extra service charges are payable in United States dollars and due at the time specified for such fees and charges. The University reserves the right to change any of its fees and charges without notice. Resident tuition presently is \$280 per quarter. Nonresident tuition presently is \$613 per quarter. The average annual cost for books, supplies, equipment, and examination fees for medical students is \$450.

Financial Assistance

The lengthy training required to master the accumulated knowledge necessary to practice medicine is costly. Limited funds are available to the school to assist in providing financial aid to needy medical students. Prior to matriculation, financial aid information and applications for financial assistance will be distributed to all accepted applicants. If an application for financial assistance is made, 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 financial assistance may be made at any time. Payment of monies concerned with most financial awards is made by the University Comptroller.

Outside employment is discouraged, and a number of grants and loans are awarded with the stipulation that the

student not engage in remunerative employment without consent of the Financial Aid Committee.

Research and Training Grants

Each year, grants from various public and private sources are received by individual faculty members and by the School of Medicine to support medical research and training in teaching and research. Training programs, supported largely by the National Institutes of Health, provide training in teaching and research to individuals at the undergraduate, graduate, and postdoctoral levels.

Traineeships

A traineeship is an academic award of honor based upon scholastic achievement, 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.

Student Evaluation and Promotion

Receipt of the Doctor of Medicine degree is contingent upon the satisfactory completion of academic and noncognitive or samaritan requirements. The latter includes the acquisition of behavior patterns and attitudes consistent with the oath that all physicians take at the time of graduation. As such, student evaluation is based upon the faculty's observations of the student's behavior and conduct, as well as upon written papers and examinations. Periodic review of student progress is made by a faculty committee, and students are informed of their deficiencies and the remedial requirements for these deficiencies. Dismissal from the school may occur if a student fails to maintain an acceptable academic record or a student fails to develop the attitudes and behavior patterns appropriate to a career in medicine. Opportunities to make up unsatisfactory work are allowed at the discretion of the Dean and the executive committee of the School of Medicine. Once dismissal has occurred, readmission requires the approval of the executive committee of the School of Medicine. Readmission after dismissal will not be considered unless there is substantial evidence that the problems causing dismissal have been resolved.

All students are required to pass Parts I and II of the National Board Examination before receiving the M.D. degree. They also are required to participate in special surveys and other evaluations directed toward the objectives of the School of Medicine.

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 or her 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 or her desire. A prize may be awarded for the best thesis submitted each year, and certain departments have available prizes for the best thesis written under that department's supervision. The preparation of a satisfactory thesis may carry with it honors in the department. Additional information concerning the thesis program can be obtained from the chairperson of the Medical Thesis Committee or from the 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 curriculum; (3) have fulfilled all special requirements; and (4) have discharged all indebtedness to the University.

Bachelor of Science Degree

Programs leading to a baccalaureate degree with a major in microbiology are offered through the College of Arts and Sciences. The programs are described in the College of Arts and Sciences section of this catalog.

Bachelor of Science in Medical Technology Degree

The medical technology curriculum is designed to train young men and women to be professional employees in hospital, clinic, public health, and medical research laboratories. The prescribed preparatory program consists of two years of University study in which an emphasis is placed upon courses in chemistry and biology. This is followed by a two-year period of full-time instruction and training in medical technology. Information concerning the curriculum and admission to the program in medical technology appears under Laboratory Medicine in this catalog.

Bachelor of Science in Physical Therapy Degree

A curriculum in physical therapy is offered by the Department of Rehabilitation Medicine in the School of Medicine. It provides professional training in the basic sciences and in



the clinical use of accepted physical therapy modalities and procedures. Information concerning admission to physical therapy appears under Rehabilitation Medicine in this catalog.

Bachelor of Science in Occupational Therapy Degree

A curriculum in occupational therapy is offered by the Department of Rehabilitation Medicine in the School of Medicine. It provides professional training in the basic sciences and the clinical use of occupational therapy. Information concerning admission to occupational therapy appears under Rehabilitation Medicine in this catalog.

Bachelor of Science Degree

A curriculum in prosthetics and orthotics leading to the degree of Bachelor of Science is offered by the Department of Rehabilitation Medicine in the School of Medicine. It provides professional training in the basic sciences and the clinical application, design, and fabrication of prostheses and orthoses. Information concerning admission to the curriculum in prosthetics and orthotics appears under Rehabilitation Medicine in this catalog.

Master of Science and Doctor of Philosophy Degrees

Work leading to master's and doctoral degrees is offered, in accordance with the requirements of the Graduate School, in the departments of Biochemistry, Biological Structure, Microbiology and Immunology, Pathology, Pharmacology, and Physiology and Biophysics. Master's degree programs are offered by the departments of Biomedical History 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 work 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 Chairperson of the department in which graduate study is to be pursued. Specific requirements for admission to work for advanced degrees appear in the Graduate 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 Wash-

ington 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 Licensing, Post Office 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, Children's Orthopedic Hospital and Medical Center, Providence Hospital, and Group Health Cooperative of Puget Sound. All clinical departments participate in the training program for first-year trainees in one or more of these institutions. First-year training programs are available in the clinical fields of anesthesiology, general surgery, medicine, neurology, neurological surgery, obstetrics, gynecology, orthopaedic surgery, pathology, pediatrics, rehabilitation medicine, psychiatry and behavioral sciences, 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
E303 Health Sciences

The School of Medicine functions as a center for continuing medical education for physicians and other health-care personnel in the region. The Division of Continuing Medical Education offers a multiplicity of courses each year in Seattle and nearby communities. The division works with the Washington State Medical Association to develop programs that review fundamental material and present clinical applications of recent research.

These courses give practicing physicians and allied health personnel opportunities to keep abreast of recent advances in diagnosis and treatment in the full spectrum of medical specialties, including family practice. The programs are presented by clinical and basic science faculty. A descrip-

tive brochure, giving dates, faculty, enrollment limitations, and the tuition fee for each course, is distributed by the Division of Continuing Medical Education.

All physicians are invited to participate in the regular hospital rounds and conferences scheduled at the University Hospital and at affiliated hospital clinics.

Practicing physicians in communities throughout the state are jointly appointed by the University of Washington and the Washington State Medical Association as continuing medical education coordinators. These physicians use the resources of their sponsoring organizations to develop and coordinate programs to meet educational needs in their own and surrounding communities.

Postgraduate preceptorships provide individualized refresher training programs for physicians and are conducted at the University Hospital, affiliated teaching hospitals, and community hospitals in Seattle, Tacoma, Spokane, and Yakima.

ANESTHESIOLOGY

BB1469 Health Sciences

Faculty

John J. Bonica, Chairperson; Aasheim, Akamatsu, Amory, Black, Butler, Chapman, Cheney, Cullen, de Jong, Eng, Everett, Fink, Freund, Heavner, Hornbein, W. Kennedy, Levy, Martin, Mather, Murphy, E. Pavlin, J. Pavlin, Pflug, Pollack, Ralston, Sivarajan, Ward, Winter.

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

Earl W. Davie, Chairman; Agabian, Bornstein, Davie, Fischer, Gordon, Hauschka, Herriott, Keller, Morris, Neurath, Palmiter, Parson, Shapiro, Teller, Wade, Walsh, Young.

Biochemistry is the branch of the biological sciences in which the chemistry of life processes is studied.

Academic Programs

There is no curriculum that leads to an undergraduate degree in biochemistry, but students who seek a Bachelor of

Science degree in the field of biology (molecular and cell 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: A minimum of 36 quarter credits is required in the thesis program. One-half are in courses numbered 500 or above with a minimum of 9 thesis credits. Nonresearch course credits must be completed within the first year.

Doctor of Philosophy Degree: A minimum of three academic years of study; dissertation; teaching experience as a teaching assistant or predoctoral teaching associate. An adviser may be consulted for additional information. See Graduate School requirements, which appear in the Graduate Study section of this catalog.

BIOENGINEERING

D416 University Hospital

Faculty

James B. Bassingthwaighe, Director; Allan S. Hoffman, Assistant Director; Donald W. Baker, Acting Assistant Director; Daigle, Halbert, Holloway, Huntsman, Moritz, Pollack, Rushmer, Verdugo.

Affiliate Faculty

Afromowitz (Electrical Engineering), Auth (Electrical Engineering), Daly (Mechanical Engineering), Horbett (Chemical Engineering), Ratner (Chemical Engineering), Stoebe (Metallurgical Engineering), Yee (Electrical Engineering), Zick (Electrical Engineering).

The Center for Bioengineering provides a multidisciplinary program of collaborative research and training designed to accelerate the application of new engineering technologies to clinical practice and research. Major areas of involvement include bioinstrumentation, biomaterials, biomathematics, biomechanics, computer applications, fertility studies, microvascular transport, effects of wave energies in tissues, and diagnostic ultrasound.

Faculty and students in the health sciences may engage in studies of mutual interest with faculty and students in the College of Engineering. Programs offered in the College of Engineering can lead to the interdepartmental undergraduate B.S.E. and graduate M.S.E. degrees, and in both the College of Engineering and the School of Medicine a special individual Ph.D. program can be designed. Information on bioengineering also appears in the Interschool or Intercollege Programs section of this catalog.



BIOLOGICAL STRUCTURE

G511 Health Sciences

Faculty

Newton B. Everett, Chairperson; Bolender, Blandau, Broderson, Coates, Eddy, Gaddum-Rosse, Gehrig, Graney, Hampton, Holbrook, Jensen, Kashiwa, Koehler, Landau, Lasher, Luft, Lund, Merchant, Nameroff, Odland, Perkins, Prothero, Robson, Roosen-Runge, Rosse, Schwarz, Stebins, Sundsten, Tamarin, Westrum. Mark A. Nameroff, graduate program adviser.

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, Chairperson; Gottdenker, McCormick, 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 re-

quirements for this degree may be obtained by contacting the department.

The department's courses and research sponsorship in the history of medicine and biology and biomedical ethics 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.

FAMILY MEDICINE

C408 Health Sciences

Faculty

T. J. Phillips, Chairperson; Cole, Deisher, Eaton, Gordon, Leversee, Lincoln, Puryear, Smith.

Family medicine is the discipline concerned with the continuing and comprehensive care of individuals and their families. The prime instructional goal of the department is the education and training of physicians who will apply the knowledge and skills of this and other medical disciplines in family practice. Implicit in this goal is the necessity for continual development of new knowledge and its application in the clinical activities of the department.

The Department of Family Medicine was founded in 1971 and is involved with instruction of medical students in several ways. These include presentations in the basic curriculum of the first two years, elective courses open to all medical students, and responsibility for developing and administering the Family Physician Pathway curriculum. A graduate residency program in family practice provides training consistent with the standards of the American Board of Family Practice, the American Academy of Family Physicians, and the Council on Medical Education of the American Medical Association.

LABORATORY MEDICINE

AA210 University Hospital

Faculty

Paul E. Strandjord, Chairperson; Behrens, Benjamin, Branson, Chatrian, Cheng, Clausen, Clayson, Coyle, Delaney, Detter, Gilliland, Hamernyik, Kaplan, Kenny, Labbe, LeCrone, Lettich, Matthews, McCutchen, McGonagle, Nakonechny, Plorde, Pollock, Raisys, Ray, Roby, Schiller, Schmer, Schoenknecht, Smith, Stauffer, 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. The Allied Health Professions Admission Test is required, and the scores from the test must be available by the April 15 deadline for application to the program. A grade-point average of 2.00, both cumulative and in required courses, is necessary for admission consideration.

Graduation Requirements: MICRO 441, 442, 443, 444; PATH 310; BIOC 405, 408; LAB M 321, 322, 418, 419, 420, 421, 422, 423, 424, 425, 426, and 427. A 2.00 grade-point average in the required courses, as well as an overall cumulative average of 2.00, is necessary for graduation. The 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.

MEDICINE

RR512 University Hospital

Faculty

Robert G. Petersdorf, Chairperson; Aagaard, Adams, Adamson, Agodoa, Albers, Altman, Alvarez, Applebaum, Arend, Banaji, Baylink, Beasley, Beaty, Beeson, Belknap, Bierman, Blackmon, Blagg, Blair, Bleyer, Boman, Bornstein, Brice, Browder, Brown, Bruce, Bruin, Brunzell, Bryant, Buchanan, Buckner, Burnell, Butler, Cabana, A. Camerman, Carlson, Cheever, Chen, Chesnut, Chideckel, Christopher, H. Clark; R. Clark, Clift, Cobb, Cole, Copass, G. Counts, R. Counts, Crill, Cullen, Culver, Curtis, Cutler, Dale, Davidson, deBaintner, DeHaen, Dennis, Dodge, Dohner, Doman, Donahue, Durack, Einstein, Ensinnck, Evans, Farrell, Featherstone, Fefer, Fialkow, Finch, Fleet, Forrey, Frimer, Fujimoto, Gartler, Giblett, Gilliland, Glomset, Glucksberg, Goodell, Goodner, Gotshall, Gould, Green, Griep, Haakenstad, Hall, Halter, Hamilton, Hammermeister, Harker, Harris, Hazzard, Hermodson, Hildebrandt, Hillman, Hlastala, Holcenberg, Hogness, Holmes, Hudson, Hulbert, Huseby, Irby, Johnsen, Johnson, Kennedy, King, Kirby, Klebanoff, Knapp, Knauss, Knopp, Koerker, Kraning, Kushwaha, Kusumi, Lakshminarayan, Langer, Larsen, Lavis, Leonard, Lindner, Linial, Little, Liu, LoGerfo, Maloney, Mannik, Marques, McArthur, McDonald, Meisel, Milder, Milutinovic, F. Mitchell, W. Mitchell, Monsen, Morgan, Motulsky, Naum, Neiman, Nelp, Odland, Ogilvie, Omenn, Oram, Palmer, Parker, Parrish, Paulsen, Pawlson, Pecoraro, Petersdorf, Pincus, Piper, Pitcher, Plorde, Pope, Porte, Preston, Price, Quadracci, Razevska, Richmond, Ritchie, Robertson, Ross, Rowell,

Rubin, Rudd, Saunders, Sawyer, Schuffler, Schultz, Schwindt, Scribner, Shaw, Shen, Sherrard, Silverstein, Simkin, Singer, Slichter, H. Smith, P. Smith, Sobolewski, Sparkman, Spence, Stahl, G. Stamatoyannopoulos, T. Stamatoyannopoulos, Stewart, Storb, Sumi, Swanson, Targoff, Tenckhoff, Thomas, Thompson, Tompkins, Tsoi, Turck, VanArsdel, Van Citters, Volwiler, von Behrens, Wallace, Warren, Weiden, Wenberg, Wergedal, Wilkus, Williams, Wills, Willson, Wood, Woods, Wright.

Active programs in teaching, research, and patient care are carried on at the University Hospital, Veterans Administration Hospital, Harborview Medical Center, United States Public Health Service Hospital, and the Fred Hutchinson Cancer Research Center. Major affiliations for clinical teaching also exist with Providence Hospital and Swedish Hospital. There are many additional affiliations with community hospitals in Seattle, the state of Washington, and the WAMI region. Medical students, interns, medical residents, and postdoctoral research fellows rotate through these various hospitals and participate in the learning experiences offered at each.

MICROBIOLOGY AND IMMUNOLOGY

G305 Health Sciences

Faculty

John C. Sherris, Chairperson; Barnes, Champoux, M. Chilton, Clagett, Clausen, Coyle, Cramer, Douglas, Evans, Falkow, Gilliland, Groman, Hakomori, I. Hellstrom, Holmes, Kenny, Kiehn, Klebanoff, Lara, Laxson, Mannik, Memmer, Minshew, Nester, Nowinski, Ordal, Parkhurst, Pearsall, Pollack, Pollock, Portman, Ray, Schoenknecht, Staley, U. Storb, Weiser, H. Whiteley, Wright. H. Douglas, graduate program adviser.

The Department of Microbiology and Immunology is concerned with two branches of national science. Microbiology deals with microscopic organisms, including bacteria, viruses, fungi, protozoa, and algae and is concerned with the nature and properties of these organisms and their effects on man and the environment.

Immunology deals with specific and nonspecific resistance to tissue injury by foreign or autochthonous substances. The mechanisms of resistance involve primarily the activities of leukocytes and antibodies, including those involved with the specific immune response.

Undergraduate Programs

In addition to courses for health sciences professionals, the Department of Microbiology and Immunology offers programs in microbiology that lead to a baccalaureate degree in the College of Arts and Sciences (see College of Arts and Sciences section of this catalog).

Graduate Programs

Master of Science Degree

Admission Requirements: Students interested in applying for admission should write the Department of Microbiology and Immunology for current, more detailed infor-



mation. A minimum of a *B* grade average in the junior and senior years and approval by the faculty of microbiology and immunology. An undergraduate major in microbiology or immunology is not required. For the nonthesis medical microbiology option, two years of acceptable work experience in a medical or public health laboratory 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, immunochemistry, microbial genetics, and electron microscopy. Research. Laboratory teaching experience. General Examination, dissertation, and Final Examination. There is no foreign-language requirement. *Immunology option*—Same as microbiology option, except for specific additional course requirements.

Combined Doctor of Medicine-Doctor of Philosophy Degree

This degree is offered in cooperation with the School of Medicine. Information about, and application blanks for, the Medical Scientist Training Program may be obtained by writing to: University of Washington; Office of the Dean; School of Medicine; A300 Health Sciences, SC-64; Seattle, Washington 98195.

NEUROLOGICAL SURGERY

RR744 University Hospital

Faculty

Arthur A. Ward, Jr., Chairperson; Calvin, Chatrian, J. DeVito, Dikmen, Dodrill, Harris, Kelly, Levy, J. Lockard, Loeser, R. Lund, G. Ojemann, L. Ojemann, Reitan, A. Troupin, Westrum, Wilensky, Wyler.

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 neurologic 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

Leon R. Spadoni, Acting Chairperson; Briggs, J. Conrad, S. Conrad, DeJong, Donahue, Eschenbach, Figge, Gamette, Gellert, Gibson, Guzinski, Heinrichs, Herrmann, Lein, McGuire, Petra, Schiller, Tabei, Uland, 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

Robert E. Kalina, Chairperson; Bunt, Chandler, Futterman, Hendrickson, Lund, McLean, Minckler, Saari.

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

Victor H. Frankel, Chairperson; Chaplin, Garrick, Greenlee, LaVigne, Lippert, Matsen, Spengler, Stangler, Winquist.

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

Josef Miller, Acting Chairperson; Chinn, Clopton, Dobie, Donaldson, Kimm, Novack, Pfingst, Rees, Smith, Snyder, Sutton.

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

Earl P. Benditt, Chairperson; Alvord, Barker, Beckwith, Camacho, Engel, Giddens, Hall, Hellstrom, Hoehn, Huang, Lagunoff, Lee, Lerner, Lowe, Martin, Moss, Mottet, Norris, Norwood, Page, Quadracci, Reichenbach, Ross, Sale, Schwartz, Schweid, Shaw, Smuckler, Spence, Stauffer, Striker, Sumi, Thorning, Van Hoosier, Vracko, Wiegenstein, Wolf. David Lagunoff, graduate program adviser.

Pathology is both a basic biological science and a specialty of medicine. As a basic science, it deals with the natural history and mechanisms of initiation and expression of disease processes. In its broadest sense, pathology encompasses the entire animal and plant kingdoms. The interests of the department focus on diseases of vertebrates, especially of man. The principal aim of the pathologist is to understand disease manifestations and processes in whatever terms are required. Therefore, the techniques of the pathologist range from those of the physicist and physical chemist through those of the physiologist to the realm of the epidemiologist. Present emphasis in the department is on cellular and molecular pathology, analysis of disease by light and electron microscopy, histochemistry and cytochemistry, analytical biochemistry, cell and organ culture, and immunology.

Courses are offered for undergraduate students, as well as for medical students, dental students, students of medical technology, and other allied health sciences professions. A program leading to a Doctor of Philosophy degree in the field of experimental pathology is offered for both predoctoral students and those with degrees in medicine, dentistry, or veterinary medicine.

Central teaching and research facilities are located in the Health Sciences Center and University Hospital. Closely associated are the personnel and facilities of Harborview

Medical Center, Veterans Administration Hospital, United States Public Health Service Hospital, Children's Orthopedic Hospital and Medical Center, and Swedish Hospital.

Research programs in the department include studies of the basic pathological process involved in arteriosclerosis, cancer, and inflammation (including allergic diseases) and of the injurious effects of various drugs, toxins, foods, and other things derived from the environment. Diseases of certain systems, including organs such as the brain, heart, blood vessels, kidneys, lungs, liver, and skin, are studied with appropriate specialists in these areas. The approach to the study of these basic disease entities and specific systemic diseases utilizes the concepts and techniques of modern biological and physical disease. The combination of modern morphologic techniques with chemical and functional studies is emphasized throughout.

Graduate Programs

Master of Science and Doctor of Philosophy Degrees

Programs in the field of experimental pathology that lead to the Master of Science or Doctor of Philosophy degrees are offered through the Graduate School. Graduates of the program are qualified for research and academic appointments in medical, dental, or veterinary schools, as well as in experimental pathology in government laboratories and private industry.

Postdoctoral Programs

Postdoctoral traineeships in experimental pathology include specialized programs in renal pathology, electron microscopy, immunopathology, tumor biology, genetic pathology, connective tissue and vascular disorders, inflammation, and teratology and environmental pathology and neuropathology. David Lagunoff is program director.

Residency Training Program

The department supervises an internship and residency training program in anatomic pathology and, jointly with the Department of Laboratory Medicine, in clinical pathology for qualified medical doctors. Persons who complete the residency program are eligible for certification by the American Board of Pathology. Edward A. Barker is program director.

PEDIATRICS

RR314 Health Sciences

Faculty

Beverly Morgan, Chairperson; Beck, Beckwith, Bergman, Bernstein, Bleyer, Campbell, Carlson, Chen, Christie, Cohen, Deisher, Doan, Emanuel, Graham, Guntheroth, Hall, Haring, Hayden, Harndon, Hill, Hodson, Holm, Johnsen, Kawabori, Kelley, Knauss, Labbe, Lamson, LaVeck, Lemire, Lopez, Mackler, McCann, Morgan, Murphy, Ochs, Pagon, Pious, Prueitt, Ray, Robertson, Rothenberg, Ruvalcaba, Sanders, Schaller, Scott, Sells, Shepard, Shurtleff, D. Smith, E. K. Smith, N. Smith, Standaert, Sulzbacher, Wedgwood, Wiltz, Woodrum.

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



Instruction is provided through conjoint courses, lectures, conferences, clerkships, and electives. Faculty members participate in teaching the basic curriculum and offer twenty-six electives, including PEDS 465 (Pediatric General Clerkship), which almost all medical students take. A residency program is offered with a wide variety of electives in addition to traditional hospital inpatient and clinic experience. Postdoctoral training is available in virtually every subspecialty area of pediatrics. The major teaching hospitals are University Hospital, Children's Orthopedic Hospital and Medical Center, and Harborview Medical Center.

PHARMACOLOGY

F421 Health Sciences

Faculty

Frank F. Vincenzi, Acting Chairperson; Aagaard, Amory, Bowden, Camerman, Carino, Davis, de Jong, Dille, Friedel, Hinds, Halpern, Horita, Johnson, Juchau, Loomis, Namkung, Siegel, Slaga, Thiersch, Watson, Zachariah.

Pharmacology is the science that deals with the nature of the interactions between drugs and the biological system, and with the application of these drugs to the treatment of disease.

Graduate Programs

Master of Science and Doctor of Philosophy Degrees

Admission Requirement: A baccalaureate degree with a major in any of the sciences, such as biochemistry, chemistry, pharmacy, physics, physiology, psychology, or zoology.

Graduation Requirements: Master of Science degree—PHCOL 511, 512, 513, 514, and two 500-level pharmacology courses. Demonstration of competence in physiology and pharmacology, and a thesis. A foreign language is not required. Doctor of Philosophy degree—PHCOL 511, 512, 513, 514, and six 500-level pharmacology courses. Passing a comprehensive examination covering general pharmacology and the allied disciplines of physiology and biochemistry. General Examination, dissertation, and Final Examination. A foreign language is not required.

PHYSIOLOGY AND BIOPHYSICS

G412 Health Sciences

Faculty

Harry D. Patton, Chairperson; Anderson, Almers, Brengelmann, Brown, Conrad, Crill, Donaldson, Feigl, Fetz, Fuchs, Gale, Gordon, Harris, Hildebrandt, Hille, Hlastala, Hornbein, Illner, Kehl, Kennedy, Kerrick, Kimm, Koerker, Landau, Luschei, Martin, McGuire, Miller, Rowell, Scher, Schwindt, Shaw, Smith, Stahl, Stirling, Taylor, Teller, Towe, Van Citters, Van Hassel, Walike, Wiederhielm, Young, Thelma T. Kennedy, graduate program adviser.

Physiology deals with the processes, activities, and phenomena incidental to, and characteristic of, life and living organisms. Based upon zoology, physics, chemistry, and mathematics, physiology interlocks closely with the other

basic medical sciences—biological structure, biochemistry, pharmacology, and pathology—and with psychology. For this reason, physiology appeals to students with diverse backgrounds and goals. Courses in this field are given for medical, dental, pharmacy, nursing, and graduate students.

Biophysics emphasizes the physical aspects of organs and control systems studied by the instruments and methods of thinking used by physicists.

Graduate Programs

Admission

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 baccalaureate 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 administered by the Physiology Psychology Group of the Graduate School. The basic graduate courses include P BIO 508, 509, 510, 511, 512, 513, 514 (see Interdisciplinary Graduate Degree Programs section of this catalog).

PSYCHIATRY AND BEHAVIORAL SCIENCES

BB1644 Health Sciences

Faculty

C. Eisdorfer, Chairperson; Armstrong, Backus, Bakker, Becker, Bowden, Brinkley, Campbell, Carlin, Carr, Chapman, Chiles, Cox, Croake, Davis, Dietze, Doerr, Dudley, DuHamel, Dunn, Dwyer, Erickson, Fellner, Freeman, Friedel, Gerber, Goldenberg, Hague, Hampson, Holmes, Horita, Hyerstay, James, Johnson, Kogan, Kojak, Louks, D. Martin, J. Martin, Mason, Masuda, Maxim, McGuire, Mendez, Nash, O'Leary, Paige, Petrich, Pietrzyk, Preston, Raskin, Raskind, Reinking, Ripley, Robinson, Rothenberg, Sata, Schau, Schuckit, Shapiro, Stangler, Streissguth, Strother, Taylor, Townes, Tracy, Trupin, Ward, Wilkie, Wilson, Womack.

The department offers course work, clinical training, and research opportunities for undergraduate students, medical students, graduate physicians, and certain graduate students in allied health programs such as psychology, social work, psychiatric nursing, and other allied health professions.

A holistic approach is emphasized, which incorporates intrapersonal, interpersonal, and sociocultural factors. Intrapersonal factors include emotion, perception, cognition, psychodynamics, neurochemistry, neuroanatomy, and the developmental and aging processes. Interpersonal factors focus upon didactic, familial, and group interactions. Sociocultural factors include the cultural, social, institutional, and community systems as well as the physical environment and epidemiology of health and disease.

Undergraduate Programs

A variety of courses in the behavioral sciences and psychiatry are available to students during their undergraduate years. Included among these are psychosocial growth and development, aging and adult development, preventive methods for mental health, cross-cultural mental health, and clinical psychiatry.

Graduate Programs

The medical school curriculum is divided into a core (basic) curriculum and an elective curriculum. The Department of Psychiatry and Behavioral Sciences offers material covering learning theory, cognition, memory, perception, neuropharmacology, social growth and development, epidemiology of health and disease, and psychopathology, as well as the development of interviewing skills and assessment techniques within the core curriculum. Its elective program includes a variety of clinical experiences and advanced didactics and seminars designed to further the knowledge and skills developed during the basic curriculum. In addition, the department encourages research and other scholarly pursuits by students in areas of interest to them. Stipends are available for research studies.

Clinical Psychology Internship Program

A one-year clinical psychology internship approved by the American Psychological Association is offered as an interdepartmental program. This internship is open to candidates for the doctorate in clinical psychology from graduate programs approved by the American Psychological Association. Postdoctoral fellows who have completed predoctoral internships can also be accepted. The training entails supervised experience in psychological assessment, treatment, and clinical research within a wide variety of clinical and community settings.

Courses for Graduate Students in Allied Health Programs

In addition to the medical school curriculum and the psychology internship, a wide variety of courses are available for students in other allied health programs. Among these are included: problems and dynamics of families and small groups, theory of learning and behavior modification, community psychiatry, and clinical psychiatry.

Residency Program

The department offers a three-year psychiatric residency training program leading to eligibility for ABPN certification. Residents in the program must have the equivalent of an M.D. degree received from an accredited medical school. The program is eclectic in its philosophy, with a faculty of mental-health professionals whose expertise covers the gamut from psychoanalytic through biochemical interpretations of behavior. It is aimed at equipping the res-

ident trainee with the breadth and depth necessary for either the general practice of psychiatry or the pursuit of subspecialty interests. Residents interested in child psychiatry are eligible to apply for training in that subdiscipline after two years of general psychiatric training. Training fellowships in child psychiatry and community psychiatry are available.

RADIOLOGY

SS230 University Hospital

Faculty

Melvin M. Figley, Chairperson; Allan, Allen, Berry, Bichsel, Chestnut, Chikos, Christensen, Cole-Beuglet, Figley, Gerdes, Gill, Golestaneh, Graham, Harley, Jackson, Loop, Nelp, Northrop, Parker, Peck, Phillips, Ricketts, Rohrmann, Rudd, Templeton, Troupin, Wooton.

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, Chairperson; Anderson, Becker, Berni, Beukelman, Brockway, Caldwell, Chandler, Clowers, Delateur, DeLisa, Donovan, Dralle, Fordyce, Fowler, Guy, Hagedorn, Hager, Halar, Harlock, Hertling, Horning,



Kraft, Kumar, Lovely, Lucci, Lund, McGee, McMillan, O'Shaughnessy, Peck, Simons, Stolov, Stonebridge, Trotter, Tyler, Warren.

The Department of Rehabilitation Medicine provides instruction for medical students, interns, and residents in a comprehensive approach to rehabilitation problems. This includes special diagnostic and evaluative procedures; methods and rationale in the application of principles of physical therapy, occupational therapy, prosthetics and orthotics, and other health professions; and advanced investigation of special problems encountered in the field. In addition, the department conducts a residency training program for the specialty of physical medicine and rehabilitation.

The department offers curricula leading to the following degrees: Bachelor of Science in Occupational Therapy, Master of Occupational Therapy, Bachelor of Science in Physical Therapy, Master of Physical Therapy, Bachelor of Science in the field of prosthetics and orthotics, and a 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 leisure 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 leading to a Bachelor of Science degree awarded by the School of Medicine 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 established by the College of Arts and Sciences 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; REHAB 290 on a letter-grading 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 detailed copy of the program requirements and selection process from the Division of Occupational Therapy.

Graduation Requirements: REHAB 320, 321, 332, 380, 414, 435, 442, 444, 445, 446, 447, 468, 469, 473, 477, 481, 482, 483, 484, 492, 499; BSTR 331; EDC&I 313; PBSCI 452, 551, 553; SOC 352; 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 him 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, 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 patterns of education lead to basic professional certification in physical therapy. The University of Washington offers a baccalaureate degree program as well as a Master of Physical Therapy degree curriculum. The basic professional program is approved by the American Medical Association in collaboration with the American Physical Therapy Association.

Admission Requirements: Students are admitted to the baccalaureate program at the junior level. Preprofessional 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 and Laboratory (10).

Biological Sciences: B STR 301, General Anatomy (4 credits); ZOOL 118, Survey of Physiology (5) or ZOOL 208, Elementary Human Physiology (5); MICRO 301, General Microbiology (3); MICRO 302, General Microbiology Laboratory (2).

Social Sciences: PSYCH 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. Approximately six persons apply for every position in the program. The average prerequisite and cumulative grade-point average of accepted students is 3.50. 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.

Graduation Requirements: The following courses must be taken in the scheduled sequence, beginning Autumn Quarter only, at the University of Washington: REHAB 320-321; 332, 408, 414, 415, 416, 442, 443, 444-445, 451, 452, 459, 460, 461, 462, 463, 464, 465, 466, 467, 471-472, 475, 476, 489, 490, 491, 495, 499, PATH 310; B STR 331.

STUDENT EVALUATION

The University grade-point system is used. A student in the professional phase of the curriculum must maintain a cumulative grade-point average of 2.50 in all required courses for satisfactory standing and for graduation from the curriculum. At the end of 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.

Graduation Requirements: REHAB 320-321, 332, 340, 341, 342, 343, 414, 420, 421, 423, 427, 428, 429, 430, 442, 443, 444-445, 451, 452, 476.

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 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.

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, Master of Occupational Therapy, and Master of Physical Therapy. An applicant for admission to the Master of Science degree program must be enrolled, or have completed residency training, in the specialty of physical medicine and rehabilitation. An applicant for admission to the Master of Occupational Therapy degree program must be a registered occupational therapist or have a college degree in a related field. Applicants must meet the requirements of the Graduate School and of the program.

The Master of Physical Therapy Program is offered for persons wishing to qualify for entrance into the profession and to develop an area of specialization. Applicants should have a baccalaureate degree in a related field.

Master of Science Degree

It is anticipated that graduate students working toward the Master of Science degree will take some of the course work during the three-year residency and will devote an additional one 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 program is designed to prepare the candidate as an academic or clinical educator, administrator-supervisor, or researcher in the field of occupational therapy, or to develop leadership qualities in a selected area of specialization. Based on the applicant's needs and prior preparation, the program can be planned to cover a span of one to two years.

Admission Requirements: One-calendar-year program, open to the registered occupational therapist with a baccalaureate degree from an accredited institution. Graduate Record Examination score; one year of professional work experience desirable.

Two-calendar-year program approved by the American Medical Association and the American Occupational Therapy Association for the applicant with a baccalaureate degree in a related field from an accredited institution. Graduate Record Examination scores and prerequisites required.



Graduation Requirements: One-year program, minimum of 36 credits, of which 18 must be in courses at the 500 level or above, including established core courses and supporting courses in an area of special interest. Completion of an approved thesis.

Two-year program, minimum of 77 quarter credits, with approximately 30 credits in courses at the 500 level or above, six months of fieldwork, and completion of an approved thesis.

Detailed admission requirements and descriptions of the available programs may be obtained from the Division of Occupational Therapy.

Master of Physical Therapy Degree

This program combines the basic professional curriculum in physical therapy with an individual specialized plan so that in-depth preparation can be achieved in an area of interest. Possible areas of focus include care of the multiple-handicapped child, musculoskeletal mobilization, prevention and treatment of athletic injuries, rehabilitation of the severely disabled, pathokinesiology research, therapeutic use of energy, and neurophysiologic basis of movement. Approximately three years are required for completion of the entire program.

Admission Requirements: Special requirements for admission to the Master of Physical Therapy degree program include completion of the baccalaureate degree and course work prerequisite to the program; attainment of a 3.00 prerequisite and cumulative grade-point average; completion of the aptitude portion of the Graduate Record Examination and completion of the departmental application process by February 1. Admission to this program is competitive.

Graduation Requirements: All students must meet the minimum requirements for a master's degree as outlined in the Graduate Study section of this catalog. In essence, students complete the general two-year basic professional course work, as well as a specific curriculum designed by the student in collaboration with his or her committee. All students are required to complete a major project and a manuscript suitable for publication.

Detailed information concerning admissions requirements and the departmental application procedure are available from the Division of Physical Therapy.

SURGERY

BB487 University Hospital

Faculty

John A. Schilling, Chairman; Canizaro, Cantrell, Carrico, Curreri, DeVito, Dillard, Heimbach, Hessel, Horovitz, Jones, Lennard, Marchioro, Marvin, Merendino, Moe, Mohri, Perry, Radke, Sikkema, Stevenson, Strandness, 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, Mayo, 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

Dean

Rheba de Tornyay

Associate Dean

Dorothy Crowley

Assistant Dean

Elizabeth Byerly

Florence Gray

Faculty

Aeschliman, Alexander, Baker, Barnard, Batey, Benoliel, Blackburn, Blainey, Bolin, Boozer, E. Brandt, P. Brandt, Brengelmann, Brown, Bruno, J. Bush, M. Bush, Byerly, Carnevali, Caulfield, Chrisman, Cobb, Collar, Coombe, Craven, Crowley, de Tornyay, Disbrow, Dodd, Donaldson, Draye, Eggert, Emerson, M. Erickson, R. Erickson, Estes, Etchison, Eyres, Fancher, Fine, Fisher, FitzGerald, Gallucci, Giblin, Graves, Gray, Gruis, Gurel, Haferkorn, B. Hall, C. Hall, Halpenny, Hay, Haynes, Heinemann, Hellstrom, Henry, Hoehn, Innes, Jones, Kang, Kelley, Kotchek, Larson, Leitch, Little, Livingston, MacElveen, Mahomet, Mansfield, McCorkle, McDougall, McKenzie, Mitsunaga, Molbo, Nakagawa, Newcomer, Niland, O'Neil, Ormond, Osborne, Patrick, Pesznecker, Pittman, Poole, Rokosky, Rose, Russell, Saxon, Sharp, Sheets, Siemon, Sivarajan, Smith, Snyder, Sorley, Spietz, Stackman, Suarez, Sullivan, Vandeman, Walike, Ware, Wegsteen, Wenner, Whitley, Williams, Woehrlé, Wolf, Wolff, Woods, Worthly.

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 a wide range of persons from many different social, cultural, and economic groups. The art and science of providing comprehensive nursing care services to people 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 to individuals and groups. The graduates of our nursing programs are expected to collaborate with a variety of health disciplines in planning, implementing, and evaluating health-care services, but these graduates are specifically responsible for the quality of nursing care given. Nurses, as practitioners, are expected to be creative thinkers and initiators of change, and able to make independent decisions regarding nursing care: all based on a sound foundation of scientific and humanistic principles and research related to health care. The professional nurse also assumes the responsibility for directing nursing care of nursing assistants who have less preparation in order to maintain and coordinate giving quality care to individuals and groups.

The first nursing course given at the University of Washington was offered in June, 1918. The School of Nursing



became an autonomous unit in 1945. The School of Nursing is recognized as one of the outstanding schools of nursing in the country and has prepared distinguished leaders, teachers, administrators, researchers, and practitioners who have been active in regional, national, and international nursing endeavors.

The 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 promoting 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. Responsive to the changing needs within our society and acknowledging 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 or her environment. He or she is affected by and affects his or her environment through dynamic reciprocal relationships that involve both health and ability to develop his or her potential. Each individual is concerned with the quality of his or her life, and each person has a right to participate in the decisions affecting his or her well-being.

An individual's ability to utilize his or her full potential is basic to health. Health is influenced by the changes that affect the individual and his or her 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 individuals and their environment. Nursing is a caring process that involves working with others and through others. The process responds to the basic human need for compassion and dignity. Caring encompasses the provision of those elements necessary for promoting, conserving, or restoring health, or enabling a dignified death. It includes those activities that persons would perform unaided if they had the strength, will, knowledge, or courage to do so. Implicit in caring is respect for the individual that is essential to the realization of his 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 or her maximal potential and to continue in a life-long educational pursuit if he or she so desires. Students come to the program with diverse and varying educational 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.

There are five organizational units in the School of Nursing. The five 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. Graduate 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 and 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 are 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 in the need for care. Courses offered in the department are directed to the transmission and expansion of a body of substantive knowledge upon which clinical practice is based. Courses are offered in both specialized and general areas of physiological nursing.

PSYCHOSOCIAL NURSING

Chairperson

Betty Mitsunaga

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, alcoholism 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. The School of Nursing is located in the T wing fronting on Northeast Pacific Street. 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 are available.

In addition to the main campus library, the Health Sciences Library in the T wing incorporates the latest developments in planning and facilities. Some areas of the library remain open at night.

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 Nurses' 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, offers a 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 Program

Assistant Dean, Director of Undergraduate Program

Florence Gray

T301 Health Sciences Teaching

Advisers

Gail Bongard, Doris Carnevali, Carolyn Kellogg

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) a student with no previous preparation in nursing, or (2) a graduate of a hospital or community college school of nursing, who is referred to as registered nurse student.

Objectives

Upon completion of the undergraduate program, the School of Nursing faculty believes the student will be able to make an outstanding contribution to professional nursing. The student—

- (1) Assesses with individuals and groups their health-illness status and context in order to determine nursing care implications.
- (2) Collaborates with others in synthesizing plans to improve health care.
- (3) Formulates a plan of nursing care that contributes to the total plan of health care.
- (4) Implements plans for health and nursing care within broad health care plans or systems.
- (5) Implements teaching to improve nursing and health care.
- (6) Evaluates the effectiveness of nursing care and health plans and systems.
- (7) Develops and maintains helpful relationships with individuals that would facilitate health care.
- (8) Is committed to using research knowledge applicable to nursing and health care.
- (9) Applies research skills to solve and/or study nursing and health problems.
- (10) Appreciates the historical aspects of the profession of nursing and health care and their relationship to current and futuristic goals in the delivery of health care service.
- (11) Is characterized by the appropriate use of independent leadership and collaborative role relationships as indicated by the goals to be accomplished.
- (12) Is characterized by a concern for the uniqueness and rights of individuals and groups in relation to health care.
- (13) Is characterized by continually developing self-awareness.
- (14) Continues developing the ability to learn and be responsible for own learning.
- (15) Is characterized by using social actions with responsibility to bring about changes in the interest of promoting health.
- (16) Is characterized by the ability to use dynamic technological advances to improve nursing and health care.

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 this university or by transfer of students from other institutions.

In filling 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 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 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: CHEM 101 and 102 (10 credits); English composition (5); PSYCH 100 or 101 (5); SOC 110 or ANTH 202 (5); MATH 105 (5) or 106 (3); electives (15-17).

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 place definite restrictions on 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 for deciding how the student's previous nursing program will articulate 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.

A number of spaces have been reserved for the Registered Nurse student, and those interested in pursuing this program should contact the undergraduate advising office for additional details.

Specific School Requirements

NURS 281, 263, 297, 302, 303, 300, 321, 322, 361, 323, 324, 405, 325, 326, 406, 403, 407, 400, 401, 402, 408, 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; a course in statistics; a course in nutrition; English composition, 5 credits; PE 205; electives, 23-27 credits. A total of 192 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 will be available after courses have been taught once. 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 a 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 provi-

sional 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.

Health Care

Any student who enrolls in the School of Nursing is required to have had a recent physical examination, a tuberculin test, 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.

Continuation in Program

The School of Nursing reserves the privilege of retaining only those students who, in the judgment of the faculty, satisfy the requirements of scholarship, health, and personal suitability to the practice of nursing.

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 43.

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 programs in the School of Nursing are consistent with the philosophy of the University of Washington Graduate School. It is assumed that the student enters as a professional practitioner, with basic knowledge and nursing ability, and that, in addition to upper-division preparation in clinical nursing, the student's undergraduate education has provided a foundation in the liberal arts. Graduate offerings provide opportunity for the student to increase clinical skills, to develop teaching or administrative abilities, and to acquire 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.

Master's Programs

Majors are offered in the following areas: comparative nursing care systems, family and community nursing, maternal and 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.

Each student has the opportunity to test nursing theory, to observe and analyze phenomena in the health situations in a specific clinical area, to identify researchable problems, and to specialize in one area of knowledge. Opportunity for the application of these theories is provided throughout the clinical field experience. The student thus achieves a base for continuing the refinement of such competencies after graduation.

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 insure a satisfactory sequence of courses.

MASTER OF NURSING DEGREE

Emphasis is placed upon advanced preparation in an area of specialization in nursing. Supporting courses from at least two fields outside of nursing are required. A foreign language is not required for this degree. A typical program would include:

Area of Study	Credits
Major: advanced nursing courses	19
Related fields: courses in at least two other disciplines . .	12
Research: courses in research and thesis	14
	<hr/> 45

MASTER OF ARTS DEGREE

The Master of Arts 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 exact number of credits may vary, depending on the minor field selected. A student

seeking this degree must demonstrate a reading knowledge of one foreign language.

Area of Study	Credits
Major: advanced nursing courses	19
Minor: courses in another discipline (minimum)	12
Research: courses in research and thesis	14
	<hr/> 45

Post-master's Programs

Students with a master's degree may enroll for an additional period of study at the post-master's level to gain additional depth in one area of study, added breadth in preparation, or increased knowledge and skill in nursing research. The opportunity for post-master's study is offered in selected areas, such as care of the handicapped child, cardiovascular nursing, alcoholism nursing, or nursing education. Individual programs of study are planned in relation to the student's scholarly interests and long-range professional goals.

The University of Washington does not currently offer a doctorate in nursing, although plans for the development of such a program are under study. The professional nurse who wishes to contribute to the advancement of the science of nursing through extending formal study and developing scholarly and research competency in a field related to nursing currently has several alternatives:

NURSE SCIENTIST PROGRAM PATTERN

The nurse scientist program pattern offers the student opportunity to select a scientific field related to nursing (e.g., anthropology, microbiology, physiology, or sociology) as the predoctoral major and nursing as the predoctoral minor. The predoctoral minor requires 35 graduate credits, half of which must be at the 500 level. The minor in nursing is individually planned to conform with the professional and educational goals of the student.

SPECIAL INDIVIDUAL PH.D. PROGRAM

The special individual Doctor of Philosophy degree program is a unique research-oriented program designed for a limited number of exceptionally able and unusually well-qualified students. The program provides a special opportunity for students with well-identified research interests that require a program of studies that crosscuts two or more disciplines. For details, see the Graduate Study section of this catalog.

OTHER ALTERNATIVES FOR DOCTORAL STUDY

Nurses desiring opportunities for advanced study in related fields, such as business administration, education, urban planning, etc., may choose to apply directly to the department or school in which the doctorate is offered. Such students may or may not choose a predoctoral minor in nursing, depending on individual research interests and professional goals.

Admission to Graduate Standing

Admission to the graduate program of the School of Nursing requires acceptance by the Graduate School, as well as admission to the School of Nursing (see 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. Graduate Record Examination (aptitude test) and successful completion of a basic course in statistics are required prior to admission. Professional experience prior to admission is desirable for students selecting majors in some programs such as nursing administration and the family nurse practitioner.

Extra Fees and Expenses

Graduate students who are matriculated in advanced degree programs should plan to have available approximately \$150 for costs connected with the preparation of master's theses. 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.



PHARMACY

Dean

Jack E. Orr
106 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 program offered by the School of Pharmacy consists of three years of professional instruction, which must be preceded by a two-year prepharmacy program. The programs include studies in liberal arts, basic sciences, pharmaceutical sciences, and pharmacy practice 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 and clinical 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 or teaching careers in the specialized pharmaceutical sciences and pharmacy practice areas.

The School of Pharmacy is a unit of the Health Sciences Center and 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. Graduate study was begun in 1912, with advanced work offered toward the Master of Science in Pharmacy degree. Since 1925, the school has provided specialized training in various areas of the pharmaceutical sciences leading to the Doctor of Philosophy degree.

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. Many of the pharmacy classes are taught in Bagley Hall; however, numerous pharmacy classes and those taught by faculty members of the various departments of the School of Medicine are held 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 and relate complex drug therapy to disease state and treatment planning.

For externships, projects, and clerkships, the School of Pharmacy makes use of health-care facilities throughout the state. These facilities include community pharmacies, hospitals, clinics, law-enforcement agencies, and public health units.

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 twenty 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, an off-campus facility, 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 so-

rority; 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. Students also are encouraged to participate in the Council of Students of the American Association of Colleges of Pharmacy.

Employment

As positions become available in pharmacies, they are posted for qualified applicants by the School of Pharmacy.

PHARMACEUTICAL SCIENCES

305 Bagley

Faculty

Lynn R. Brady, Chairman; Allen, Brady, Elmer, Fisher (emeritus), Goodrich (emeritus), Huitric, Krupski, Kuehn, Levy, McCarthy, Nelson, 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 pharmacognosy. Fundamentally, this basic body of knowledge is intended to meet the present needs and, with the contribution of continuing education, the future needs of pharmacy practice for expertise in the pharmaceutical sciences. A limited number of elective courses is available to nonmajors with suitable prerequisites.

Scientific research activities of the faculty include studies on various problems of drug distribution and metabolism, identification of useful natural products, instrumental analysis, mechanism of drug action, microbial metabolism and physiology, radiopharmaceuticals, and structure-activity relationships. A number of projects involving drug distribution, drug metabolism, and radiopharmaceuticals are cooperative efforts with research groups in the School of Medicine.

PHARMACY PRACTICE

308 Bagley

Faculty

William H. Campbell, Chairman; Campbell, Fuller, Hall, Hammarlund, Ivey, Kradjan, Orr, Pittle, E. Plein, J. Plein, Rising (emeritus), Smith.

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. Externships, service-oriented projects, and clerkships are available for experimental learning of both traditional and innovative practice roles. The department offers graduate programs leading to the Master of Science degree with emphasis on hospital pharmacy administration and clinical pharmacy. Courses concerning pharmacotherapeutics and drugs in society are also provided for nonpharmacy majors. In recognition of



the importance of continuation of education for pharmacists and other health practitioners, various lectures, seminars, and workshops are sponsored both on and off campus. This function is recognized as a major responsibility of the department and will be further implemented under the direction of the Director of Continuing Education.

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.

Research programs are conducted by faculty members of the Department of Pharmacy Practice on methods of delivery of pharmaceutical services in health care and on optimizing drug effects in patients. Development and evaluation of innovative teaching techniques also receive major attention. A pharmacy externship program is offered to provide students a better opportunity to relate their academic education to professional pharmacy practice.

Undergraduate Program

Adviser

Edward Krupski
304 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 baccalaureate degree in pharmacy must meet certain general requirements of the University and the following school requirements: Complete the prescribed curriculum, including 29 selected elective credits, of which a minimum of 14 credits must be pharmacy electives, with an overall total of 225 academic credits. Earn a cumulative grade-point average of 2.00 in the professional courses and an overall cumulative average of 2.00. No more than 18 credits in advanced ROTC courses, no more than 6 credits in PHARM 495, and no more than 6 credits in professional courses numbered 499 may be applied toward graduation.

Admission Requirements: Completion of the prepharmacy program is required for admission to the School of Pharmacy. The prepharmacy program may be satisfied by the following courses at the University of Washington or their equivalent at any accredited college or university:

Courses	Credits
Chemistry 140, 150, 151, and 160 (General and Laboratory)	14
English 171, 172 (College Writing)	6
Speech or English Literature (or a total of 9 credits in English composition)	3
Mathematics 105 (Elementary Functions)	5
Mathematics 157 or 124 (Calculus or Calculus with Analytic Geometry)	4 or 5
Chemistry 231, 241, 235, 242, and 236 (Organic and Laboratories)	13
Physics 114, 115, and 116 (General)	12
Physics 117, 118, and 119 (General Physics Laboratories) (not required if taken in high school)	3
Biology 210, 211, and 212 (Introductory) (or approved combinations)	15
Electives from the humanities and/or social sciences	
Total credits at least	90

Applicants who have completed the necessary prerequisites for entry into the School of Pharmacy should be aware that facilities are limited and admission is competitive. In order to be considered for admission to the School of Pharmacy, such applicants must undertake the following:

1. If not currently enrolled in the University, an applicant must submit to the Office of Admissions an application for admission to the University and have a complete set of transcripts sent to that office by registrars of all colleges and high schools previously attended.
2. Submit to the School of Pharmacy a supplementary application together with a complete set of transcripts from all schools attended after graduation from high school.
3. Arrange for a personal interview with the Pharmacy Selection Committee. In lieu of an interview, out-of-state applicants who find it a hardship to appear may submit three letters of recommendation, of which two must be from science professors.

Application forms may be obtained upon request from: University of Washington; School of Pharmacy; 304 Bagley, BG-20; Seattle, Washington 98195.

The academic record must show an overall college grade-point average of at least 2.00 for resident applicants and 3.00 for out-of-state applicants.

The pharmacy supplementary application must be submitted with complete up-to-date scholastic records by April 1 to receive first consideration for admission. The date of April 1 applies only to applications for pharmacy. It does not apply to other schools and/or colleges in the University. Students are ordinarily admitted to the School of Pharmacy only at the beginning of the Autumn Quarter.

An applicant who is admissible to the University is not necessarily assured of admission to the School of Pharmacy.

Applicants from other institutions who have not completed the prepharmacy requirements may apply for admission to the College of Arts and Sciences as premajors, provided they fulfill the minimum criteria for admission to the University.

Those applicants who have not fulfilled the prepharmacy program should complete only the Application for Admission to an Undergraduate College or School and, if admissible to the University, will be assigned to the College of Arts and Sciences as premajors.

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, for which a fee of \$1 is charged. 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.

All required courses in the prepharmacy and professional curriculum are to be taken for a grade when so offered.

First Professional Year

Autumn Quarter: PHSCI 320, Pharmaceutical Sciences Laboratory (3 credits); PHARM 329-, Pharmaceutical Calculations (0-); PHARM 331, General and Physical Principles (4); P BIO 360, General Human Physiology (5); approved electives (3); total—15.

Winter Quarter: BIOC 405, Introduction to Biochemistry (5 credits); PHSCI 321, Pharmaceutical Sciences Laboratory (2); PHSCI 332, General and Physical Principles (3); PHARM -330, Pharmaceutical Calculations (-1); approved electives (5); total—16.

Spring Quarter: B STR 301, General Anatomy (4 credits); MICRO 351, General Microbiology (3); MICRO 302, General Microbiology Laboratory (2); PHSCI 400, Biophysical Medicinal Chemistry (4); approved electives (2); total—15.

Second Professional 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, Biopharmaceutics and Pharmacokinetics (5); PHSCI 414, Pharmacognosy (2); PHSCI 442, Medicinal Chemistry (3); approved electives (2); total—15.

Third Professional Year

Autumn Quarter: PHARM 407, Prescription Practice (4 credits); PHARM 484, Introduction to Clinical Pharmacy (6); approved electives (5); 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
106 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, pharmaceuticals, or pharmacognosy. These pharmaceutical sciences, which apply diverse disciplinary knowledge and techniques to pharmaceutical problems related to bioavailability and pharmacokinetics, drug design, drug metabolism, formulation, production, and quality control, can qualify the graduate to assume a place in teaching, research, manufacturing, or other health-service affiliation.

When substantive information is available, permission may be granted 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 for all graduate students, and the student who has not satisfied this requirement prior to admission is expected to do so at the earliest opportunity. Academic accomplishments and progress toward meeting the requirements of the projected degree program for each student are reviewed at six-month intervals by a departmental graduate evaluations committee.

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
106 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. A nonthesis option is also available.



PUBLIC AFFAIRS

Dean

Brewster C. Denny
266 Smith

Faculty and Cooperating Faculty

Bergman, Brown, Crutchfield, Denny, Elmore, Hare, Hart-Nibbrig, Hashimoto, Johnson, Kroll, Levi, Lines, Locke, Lyden, Marts, Miles, Miller, Pealy, Richardson, Trospen, Wenk, Williams, Wolters. M. Eric Wolters, graduate program adviser.

Graduate Program

Master of Public Administration Degree

Graduate School of Public Affairs is a graduate professional school providing education and research for the public service. The school offers a program of studies leading to the degree of Master of Public Administration, designed to prepare the student for service as a professional administrator in the public service at all levels—local, state, national, and international.

Graduates serve in such varied positions as foreign-service officers, city managers, budget analysts, and legislative staff assistants. The school draws upon those disciplines of the University that contribute to professional education and research in the field, and thus the faculty includes participating members from these disciplines. The school also cooperates with a number of University departments in doctoral programs that have a significant public policy or public administration content.

Admission Requirements: Admission to this program requires formal admission to the Graduate School as well as acceptance by the Graduate School of Public Affairs. There

is no formal requirement for specific undergraduate courses or majors. The school invites applications from students with such varied backgrounds as business administration, economics, engineering, history, political science, public health, social work, or other fields in the social and physical sciences to undertake a program leading to professional public service. The student usually needs a background in the social sciences and the nature and historical background of American institutions, basic preparation in general economics and statistics, and a mature capacity to digest reading and to express ideas in clear and lucid English. The student who lacks sufficient background in these areas may be required to make up these deficiencies by taking or auditing appropriate courses in addition to the course requirements for the degree.

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 general concentrations: (1) public administration, for students primarily interested in general administrative or managerial positions in the public service, and (2) public policy, for students preparing for government positions that require professional preparation in one or more particular areas of public policy such as foreign affairs, science and public policy, social and health policy, natural resources, urban affairs, and the like. With the approval of a program adviser, the student selects courses from those offered by the school and by other University units. Central to the program are



courses offered by numerous other schools and colleges throughout the University, and courses taught by cooperating and participating faculty serve as an integral part of the school's curriculum.

In addition to the basic course work and the internship, the student has the opportunity to participate in seminars at which distinguished public servants appear, in workshops, in conferences sponsored by the Graduate School of Public Affairs, and in the activities of the Institute of Governmental Research. 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 features 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 University is one of eight universities participating in the Education 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 con-

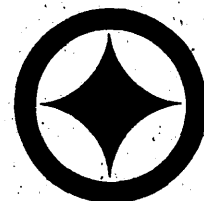
cerned with problems of public policy and administration in the state of Washington and in the Pacific Northwest. In the performance of these roles, a primary mission of the institute is to work with other organizations of the University in bringing the highest standards and criteria of various disciplines to the solution of public problems.

Institute policies are developed through advisory committees composed of representatives of University schools and departments that wish to participate in efforts to formulate solutions to public policy issues. The institute also receives policy advice from committees composed of public officials and civic leaders. Thus, the institute is University-wide in its activities and interests and is an important link between the University and the world of public affairs.

The rapid urbanization of Washington State has created new problems and has intensified old ones for the state government and its local governments, as well as for federal and regional agencies. Consequently, in the activities of the institute staff and its relationships within the University, with public officials, and with citizen organizations, major program emphasis is on problems of urban public policy and administration. The institute develops and administers programs to increase opportunities for cooperative interdisciplinary research by faculty and graduate students on pressing problems of urban society that have lasting research significance.

The institute is administered on behalf of the University by the Dean of the Graduate School of Public Affairs as executive agent. The institute, with a substantial broadening in mission and an expansion of University research and service in urban affairs, is the successor organization to the Bureau of Governmental Research and Services.

Additional information and a detailed publication on this program may be obtained from the University of Washington, Graduate School of Public Affairs, Graduate Program Adviser, 253 Smith, DP-30.



PUBLIC HEALTH AND COMMUNITY MEDICINE

Dean

Robert W. Day
F356 Health Sciences

Associate Deans

James L. Gale
Betty S. Gilson
F358 Health Sciences

Faculty

Alexander, Anderson, Beasley, Bergman, Bergner, Blackman, Boatman, Bobbitt, Breslow, Breysse, Browder, Buchanan, Cooney, Covert, Davis, Day, DeRouen, Diehr, Dowling, Emanuel, Erickson, Feigl, Fish, Fisher, Fox, Foy, Frank, French, Gale, Gianola, Gilson, Gorai, Grayston, Hakomori, Hall, Hallstrom, Hatlen, Henderson, Hibbard, Holub, Hoover, Horstman, Jackson, Kanarek, Kaplan, Kenny, Kleinman, Koenig, Kronmal, Kuo, LaVeck, Lawrence, Lee, Logerfo, Luchtel, Martin, McCaffree, Milner, Mitchell, Morgan, Ochoa, Perrin, A. Peterson, D. Peterson, Phillips, Polissar, Prentice, Reed, Reeves, Richardson, Rider, Sanchez, Schumacher, Shortell, Spiers, Thomas, Thompson, Tompkins, Trivedi, Van Belle, Van Dusen, Wahl, Walker, Wang, Watts, Weiss, Wetzler, Williams, Wilson, Wise.

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" research 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. Proj-



ects 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, Richard A. Kronmal, Ph.D.; Environmental Health, Jack Hatlen, M.S.; Epidemiology and International Health, Noel S. Weiss, M.D.; Health Services, James P. LoGerfo, M.D.; Pathobiology, George E. Kenny, Ph.D.; or to the office of the Dean.

If there is a problem determining the proper department to which to apply, inquiries should be sent to the office of the Dean. Letters of inquiry should indicate as clearly as possible the writer's educational background, relevant work experience, general area of interest, type of training desired, and possible career goals.

The Graduate School of the University of Washington has administrative responsibility for graduate study in whatever division of the University it is undertaken.

The Graduate School coordinates admissions and approves Programs of Study leading to graduate degrees. The student undertaking graduate education, therefore, must be admitted to the Graduate School, as well as to the school, college, or group in which he or she wishes to study. Graduate School application forms will be sent to all persons interested in degree programs offered by this school. The school application 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, May 15; Autumn Quarter, July 1; Winter Quarter, November 1; Spring Quarter, February 1.

Applicants are strongly encouraged to submit their applications well in advance of the deadline. Those whose native language is not English must establish their competence in English, which may be accomplished by the passing of an English language proficiency test.

Financial Aid

Stipend support, formerly made available from a variety of federal sources, is not as assured as was the situation of several years ago. However, some funds are available for the 1976-77 academic year as general support. Several of the departments have training grant student support. In individual cases, it may be possible to arrange limited financial support for students whose area of research and teaching overlap with areas supported by federal research grants. Such support can be on a limited basis only and must be arranged with the principal investigator of each individual grant. A limited number of teaching assistant positions may be available. Inquiries about support may be sent to the program adviser of the department in which the applicant has a major interest.

Graduate Programs

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 office of the Dean.

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 require six quarters to complete the degree. The individual nature of each student's program, based on prior experience, prior training, and career objectives, results in a variation around this average time. 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 for required course work above the basic Graduate School requirement for the master's degree.

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.

Students of the School of Medicine may enter a joint M.D./M.P.H. program, beginning with the second year of medical school.

The basic graduate courses in Biostatistics, Environmental Health, Epidemiology and International Health, and Health Services are offered during the six weeks beginning about July 1 of each year. For prospective candidates entering the program during Summer Quarter, taking this course sequence permits easy and speedy transition to more specialized courses, individual study, and field and research work. 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 is offered through the School of Public Health and Community Medicine.

A Master of Science degree in the field of biostatistics and a Master of Science degree in the field of quantitative ecology are offered through 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. Additional information concerning the graduate programs in Biomathematics appears in the Interdisciplinary Graduate Degree Programs section of this catalog.

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 specializations of biostatistics, environmental health, sanitation, industrial hygiene and safety, epidemiology and international health, health services, and pathobiology.

BIostatISTICS

F600 Health Sciences

Chairperson

Donovan J. Thompson.

The biostatistics specialization prepares the student for technical positions in health research organizations and health-care agencies. It emphasizes mastery of quantitative methods (statistics, operations research, systems analysis); elements of computer programming and data processing. In addition, students specialize in one or more health-related areas, such as epidemiology, biology, or health services research. (See also description of biomathematics program on page 234 for additional degree programs.)

ENVIRONMENTAL HEALTH

F463 Health Sciences

Chairperson

John T. Wilson, Jr.

Undergraduate Program

Bachelor of Science Degree

The Department of Environmental Health offers an undergraduate program for the study of environmental conditions that affect human health and well-being and thus are of major concern in the field of public health. Many environmental hazards have been successfully controlled or modified, but our highly technological and urbanized so-



ciety continues to create new hazards and magnifies existing problems that threaten the social, physical, and mental well-being of all of us. A few of the problem areas requiring environmental health expertise are: maintaining adequate quality and quantities of food and drinking water; safe disposal of waste material; limiting air, noise, and visual pollution; ensuring safe and healthful housing; properly selecting and applying pesticides to control the spread of insect- and rodent-borne diseases; enhancing the working environment; and reducing or limiting occupational exposure to hazardous substances and unsafe conditions and practices. Once the environmental health specialist has identified relevant community and industrial health hazards, that person will seek to reduce or modify those problems. This will be accomplished by educating the people responsible on the need for change in individual behavior, in work practices, or in the physical facilities. The environmental health specialist will enforce applicable laws, codes, ordinances, or regulations pertaining to environmental health when the educational approach is not effective or when an imminent health hazard exists.

The program of study in environmental health trains individuals in the techniques for assessing and managing our environment as it relates to health and safety and for examining the effectiveness and efficiency of community environmental health programs. This program of study is multidisciplinary, with strong foundations in the natural sciences. The courses and learning experiences are designed to provide students with the functional knowledge, skills, and attitudes necessary to initiate needed changes. Core courses and requirements must be taken, but there also exists the opportunity to pursue areas of particular interest and need by individual students. The curriculum provides the student with a basic orientation and training in environmental health concepts and practice, while providing for career flexibility in a number of possible public health, environmental health, industrial hygiene and safety, and occupational health fields.

Most of our graduates are initially employed by local health agencies. A few start employment with state agencies, such as the Department of Social and Health Services and the Department of Labor and Industries, and, at the federal level, with the Occupational Safety and Health Administration in the Department of Labor or the Public Health Service. Employment in these upper-level governmental agencies, as well as most private industry, requires field experience in addition to the baccalaureate degree, if not a graduate degree.

Environmental health specialists have also established careers in areas such as comprehensive health planning, education, and private consultation activities. The student's creativity, initiative, interests, adaptability, and selection of elective courses will, in large part, determine the professional preparedness at graduation and future employment and advancement.

A number of our graduates apply for further study in a variety of graduate programs, including environmental health, industrial hygiene, air pollution, hospital or health-care administration, and radiological health, or professional programs in medicine or dentistry. It is strongly recommended that students have from one to three years of

field experience prior to application for graduate study in a technical area.

Graduation Requirements

A student in this program must meet the distribution course requirements established by the College of Arts and Sciences: 20 credits in humanities, 20 credits in social sciences, and 30 credits in natural sciences. (See Distribution List, College of Arts and Sciences section of this catalog.) He or she should take additional courses in the social sciences and humanities that will help the student develop an awareness and understanding of the social issues and limited skills or techniques in community planning and communications. Pre-environmental health course requirements include CHEM 140, 150, 151, 160 and 231, 232, or 102; BIOL 210, 211, 212, or 101-102; PHYS 114, 115, 116; MATH 105 or 106; MICRO 301, 302; ENGL 171 or 271; and a two- or three-hour course in urban planning.

Required introductory courses in environmental health and public health include: ENVH 411; EPI 420; and BIOS 472.

Environmental health majors are required to complete the technical courses that may relate to their future professional work. These include ENVH 430, 431 (Methods in Environmental Sampling and Analysis I, II), 440 (Water and Waste Sanitation), 441 (Food Sanitation), 450 (Measurement and Control of Air Pollution), 453 (Industrial Hygiene and Safety), 442 (Vector Control), 443 (Human Habitat and Health) or 444 (Institutional Environmental Health), and 457 (Noise and the Environment). Toward the end of the student's academic training, the environmental health major is required to write on an environmental health topic that has been investigated through library, field, and laboratory research and as a study project (ENVH 479, 480, 499). Field training (ENVH 482, 483, 484), involving ten weeks of actual work experience with a local agency, is highly recommended and may be taken between the junior and senior years, during the senior year, or directly following graduation.

Departmental Application Procedure

The process for applying for admission to the environmental health curriculum is as follows:

1. Submit a departmental admission application form during the last quarter of the sophomore year or after completion of at least 90 quarter credits.
2. Arrange for interviews by departmental faculty involved in the undergraduate program.
3. Have three letters of reference sent to this department. These letters should be from persons able to assess personal and academic capabilities.

The application and other necessary materials may be obtained from any of the departmental advisers. Students interested in pursuing environmental health as a major or who want information about the field of environmental health are encouraged to make an appointment with a departmental adviser: Bruce Jackson, Karen VanDusen, or Jack B. Hatlen, F461 Health Sciences, telephone (206) 543-4252.

Graduate Program

Master of Science in Public Health Degree

The graduate program in environmental health is designed to provide training in technical skills and elements essential to effective management of environmental health programs. Emphasis is placed on the knowledge and skills required for employment in environmental health programs in governmental agencies and with industry. The graduate program in environmental health offers two options: (a) environmental sanitation and (b) industrial hygiene and safety. The program objectives for these options include: (a) to prepare graduates with technical knowledge and skills for effective environmental management; (b) to prepare graduates for upper-level positions involving program planning, administration, and management; and (c) to provide training and experience in applied research techniques.

Admission Requirements: Prerequisites for admission to this graduate program include:

1. Bachelor of Science or equivalent degree in environmental health or a physical science or a biological science.
2. Admission to the Graduate School. A grade-point average of at least 3.00 overall or during the last year of college is a guide in considering the scholarship of an applicant.
3. Preference will be given to applicants with two or more years' experience in environmental health practice who are applying for the environmental sanitation option.
4. The applicant is *required* to take the Graduate Record Examination. The Miller Analogies Test is optional.

Graduation Requirements: Six-quarter program of study, including field applications and research, totaling a minimum of 60 credits plus 9 credits of thesis. Submission of an acceptable thesis.

Additional information regarding the program content, degree options, and recommendations on specific courses may be obtained from one of the graduate program advisers, Jack B. Hatlen, environmental sanitation, and Peter A. Breyse, industrial hygiene and safety.

EPIDEMIOLOGY AND INTERNATIONAL HEALTH

F263 Health Sciences

Chairperson

Donald R. Peterson

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

F346 Health Sciences

Chairperson

William C. Richardson

The health services specialization offers graduate training in two areas: community medicine and health services administration and planning (described on next page). 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

Chairperson

George E. Kenny

The pathobiology specialization prepares the student for a research career in academic institutions, research institutes, or public health laboratories. Pathobiology is defined as the study of pathogenic biological agents and their interactions with a host. The agents of interest range from multicellular parasites to viruses and also include tumors as a class of endogenous parasites. Host responses studied are primarily immunologic, although pathological and biochemical responses also are investigated. Training is solidly based in molecular biology with specific application to the study of infectious agents and host responses. Major course work in pathobiology is supplemented by appropriate courses in biochemistry, biostatistics, epidemiology, and microbiology. Admission preference is given a student with a baccalaureate degree in biology or biochemistry.

BIOMATHEMATICS

Chairperson

Richard A. Kronmal

The Biomathematics Group, in which the Department of Biostatistics faculty participates, offers training in mathematics, statistical analysis, and statistical theory. Career objectives include academic teaching and research, as well as positions in research or administrative agencies of federal or local government and private corporations. A career example might be the statistician who designs and analyzes



clinical trials of new drug therapies. Information concerning the graduate program in biomathematics appears in the Interdisciplinary Graduate Degree Programs section of this catalog. Inquiries concerning this program should be addressed to the Chairperson of the Biomathematics Group.

HEALTH SERVICES ADMINISTRATION AND PLANNING

The 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 policy analysis; and 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 Chairperson, Health Services Administration and Planning Group.

Doctor of Philosophy Degree

Programs leading to the Ph.D. degree, offered by the Department of Epidemiology and International Health and by the Biomathematics Group are described in the Interdisciplinary Graduate Degree Programs section of this catalog. Both programs differ from the master's degree program principally in the nature and scope of the program's independent study project and the resulting dissertation, and in the expected time required to complete the program, usually a minimum of three years.

The epidemiology prospective 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.

The Department of Health Services has developed a "doctoral opportunities" program in which doctoral students from various disciplines and schools at the University may take an area of concentration in health services research. The purpose of this program is to build upon the student's basic disciplinary knowledge and methodologies by showing how they can be applied to issues involved in the delivery of health services. Inquiries concerning this program should be addressed to Stephen M. Shortell, Ph.D.

Postdoctoral Training

The school offers three-year residencies in general preventive medicine, approved by the American Board of Preventive Medicine, for training in five subspecialty areas: epidemiology, environmental health, international health, community medicine, and health services administration. Opportunities for combined residencies in general preventive medicine and an appropriate clinical specialty are available. The school also sponsors, jointly with the State of Washington Department of Social and Health Services and the Seattle-King County Health Department, a residency in public health.

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 chairpersons.

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; Blair, Hansen, Jones.

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 or she receives pay. Travel costs are paid by the Air Force.

Financial Assistance Grant Program

Each year a number of selected cadets in the four-year program are awarded AFROTC college scholarships. These cadets are enlisted in the Air Force Reserve and receive tuition, fees, books, uniforms, and \$100 subsistence per month. Course requirements are as described above.

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 students enrolled in the AFROTC Flight Instruction Program (FIP). The Air Force pays the cost for up to twenty-five hours of flight instruction from an accredited flying school. Those who complete the FIP and receive commissions will go on to Air Force pilot training and become Air Force pilots.

Inquiries about enrollment or other information should be addressed to the University of Washington, Professor of Aerospace Studies, Clark Hall, DU-10, Seattle, Washington 98195.

MILITARY SCIENCE

147 Savery

Faculty

Lt. Col. Allan R. Williamson, USA, Professor of Military Science; Bacon, Dorr, Knowlton, Wight.

The Department of Military Science offers the college student several 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 twenty 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 or she agrees to complete the course, to enlist in the Army Reserve, to accept a commission if offered, and to serve on active duty for three years after commissioning. A three-to-six-month option for active duty training with the balance of service in an active Army Reserve unit is also 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 year) is compressed into one year.

Special Two-Year Program

This program is open to upper-division or graduate students presently enrolled at the University or to upper-division or graduate transfer students 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 previous 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.

Scholarship Program for Currently Enrolled Students

This program is open to students enrolled in ROTC. Selections are made on a regional level based upon the recommendation of the Professor of Military Science. The scholarship provides financial assistance during the remaining years of the student's enrollment (up to three years). Each scholarship pays for tuition, books, and laboratory expenses and provides, in addition, \$100 per month, tax free. All other advantages and obligations are the same as those of the four-year scholarship program (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 leadership laboratory classes and when otherwise specified. Additional information concerning the Army ROTC program may be obtained by writing University of Washington; Professor of Military Science; 147 Savery, DK-10; Seattle, Washington 98195; by visiting the AROTC unit at 147 Savery, or by telephoning (206) 543-1930.

NAVAL SCIENCE

309 Clark

Faculty

Capt. Ronald A. Campbell, USN, Professor of Naval Science; Beltz, Egan, Fritsch, Knerr, McClanahan, McGuire.

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 colleges or four-year colleges and must be received prior to March 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 March 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 as regular officers in the United States Navy or Marine Corps.

All naval ROTC students take the same naval science courses during the first two years. Students who elect to be commissioned in the Marine Corps take Marine Corps subjects during their third and fourth years. 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.



SOCIAL WORK

Dean

Scott Briar
204 Eagleson

Associate Dean

Calvin Y. Takagi
205 Eagleson

Assistant Dean

Naomi R. Gottlieb
207 Eagleson

Faculty

Allen, Anderson, Beatty, Bentz, Berleman, Blanchard, Bracht, Briar, Bryant, Carter, Dabalos, Dear, De Lange, Dixon, Duplica, Dwinell, Ellis, Elmore, Farber, Gillespie, Gottlieb, Green, Griswold, Gronewold (emeritus), Hanne-man, Herrick, Hunt (emeritus), Hutchins, Ishisaka, Jaffee, Kelley, Kethley, Leigh, Levy, Lewin, Long, C. Macdonald, Maier, S. Miller, Mundt, Myhr, Northwood, Norton, Ochoa, Parsons, Patti, Resnick, Richey, Roffman, Schinke, Seaberg, Smith (emeritus), Stier, Takagi, Teather, Weather-ley, Weller, Whittaker.

Affiliate Faculty

F. Miller, Mochizuki.

Clinical Faculty

Carter, Cole, Coughlin, Davis, Durgin, Evans, Golosman, Graham, Holland, Klingbeil, Luper, Lytle, L. Miller, Muench, Mykut, Peterson, Rice, Roth, Rygg, Sprague, Ste-vens, Thomas, Twersky, West, Winklebleck, Wilson.

The marked growth in the magnitude, complexity, and in-
tensity of such social problems as poverty, racism, urban

unrest, physical and mental illness, and crime and delin-
quency during the last forty years has generated the need
for new, enlarged, and more effective social welfare pro-
grams 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 per-
sons for competent performance in a variety of professional
roles and functions. The school's undergraduate, graduate,
and continuing education offerings are designed to equip
students possessing differing academic and experience
backgrounds with the knowledge and skills needed for
improved practice. Consistent with the aims of the Univer-
sity, 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 pre-
pares students to receive a Bachelor of Arts degree with a
major in the field of social welfare. Students who desire a
basic liberal arts background with concentration in social
welfare and the social and behavioral sciences may satisfy
their interests by enrollment in this major. Specific objec-

tives include preparation for human services occupations at the beginning level of practice competence, for graduate education in social work or related fields, as well as for 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 Financial Aids, 105 Schmitz, and from the Chairperson, Scholarship Committee, School of Social Work. A limited number of awards are available to graduate students.

Graduate Program

Graduate Program Adviser

Calvin Y. Takagi

Admission to the graduate professional program of the School of Social Work requires formal admission to the Graduate School as well as to the School of Social Work; hence, separate application forms should be submitted.

Master of Social Work Degree

A two-year program of study leads to the Master of Social Work degree. Students are prepared for professional work in social agencies and for programs serving individuals, families, and small groups. Graduates also may work in various capacities with governmental or community groups and organizations in social planning, research, or administrative activities. Consistent with its responsibility to the profession and to the public, the school exercises discretionary judgment concerning the suitability of students for admission to, or continuation in, the degree program.

The curriculum is composed of courses concerned with issues of social welfare; the philosophy, organization, and administration of service delivery systems; social work practice; human behavior and social change; and research methods. Field instructional experiences integral to the educational program are required during both years. Thus, through a blending of theory and practice, the student acquires the knowledge and skills necessary for professional competence.

In the course of his or her graduate education, the student, 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) A particular age group or life cycle stage (e.g., childhood and adolescence, aging); (2) a practice method or problem area.

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 classwork 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 300, 395, 401, 409, 500, 502, 503, 504, 507, 509, 533, 541, 560, 570, 575, 585, 586, 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 primarily for freshmen and sophomores; those numbered from 300 through 499 are upper-division courses primarily for juniors, seniors, and fifth-year students. Graduate students may enroll in 300- and 400-level courses. When acceptable to the major department and the Graduate School, approved 400-level courses may be applied as graduate credit in the major field and approved 300-level courses may be applied in the supporting field(s).

Courses numbered 500 and above are intended for, and restricted to, graduate students. *Courses numbered in the 500 and 600 series with a P suffix denote professional courses for students in the School of Medicine and such courses may not be applied as graduate credit in the Graduate School.*

Undergraduate students of senior standing as well as fifth-year and nonmatriculated students who wish to register for

a 500-level graduate course must obtain permission from the instructor of the class and the departmental chairperson.

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. See page A261 for explanation of abbreviations.

Not all of these courses are offered every quarter. Final confirmation of courses to be offered, information on new courses, as well as a list of hours, instructors, titles of courses, and places of class meetings, is given in the *Time Schedule*, published each quarter.

Graduate courses numbered 600, 700, and 800 are restricted to students in the Graduate School. They appear by number and title only where applicable under the departmental course listings in this catalog. Descriptions for these courses are listed below. 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 premaster graduate students, i.e., those who have not yet completed the master's degree in their major field at the University of Washington. Prerequisite, permission of Supervisory Committee 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 graduate students who have completed the master's degree or the equivalent, or Candidate-level graduate students. Premaster students initiating doctoral dissertation research should register for 600. Prerequisite, permission of Supervisory Committee chairman or graduate program adviser. Name of faculty member responsible for supervising the student should be indicated on the Program of Studies.

COLLEGE OF ARCHITECTURE AND URBAN PLANNING

ARCHITECTURE

Courses for Undergraduates

ARCH 150, 151 Appreciation of Architecture I, II (2,2)ASp,WS
Bosworth, Fundt
Historical survey of the architecture of Western civilization. For nonmajors.

ARCH 152 Environmental Design Professions (3) Sp
Bonsteel
Survey of professional role in shaping physical environment. For nonmajors.

ARCH 250 American Architecture and Urban Environments (2) Sp
Fundt
Study and critical investigation of architecture and the problems of urban design in North America from colonial times to the present. For nonmajors. Prerequisite: 151 or permission.

ARCH 300, 301, 302 Introduction to Design: Laboratory (6,6,6) AWSpS,AWSpS,AWSpS
Registration for credit in these courses permits the student to choose from among a number of sections that introduce design theories, methods, and processes. Sections are given in various studio-seminar-lecture formats and include subjects in four general groups: technological determinants of design; visual-theoretical determinants of design; sociobehavioral determinants of design; introduction to design synthesis sections. Detailed descriptions of work in all sections are available quarterly from the Department of Architecture. Prerequisite: permission.

ARCH 303-304-305 Introduction to Design Synthesis (6-6-6)AWSpS,AWSpS,AWSpS
Provides initial awareness, knowledge, and basic skills needed to develop a mastery of the derivation of building form and the integrative aspects of architectural design. Enrollment limited to students entering the graduate program in architecture with baccalaureate degrees in fields other than architecture. Prerequisites: graduate standing and permission.

ARCH 310, 311, 312 Introduction to Design Graphics (2,2,2) AWSpS,AWSpS,AWSpS
Donnette, Zuberbuhler
Lectures and laboratory in theories and processes of graphic communication for designers: lettering, drafting, multiview and parallel drawing, photographic simulation, descriptive geometry, perspective, shade and shadow, computer graphics, and freehand drawing. Prerequisite: permission.

ARCH 313 Introduction to Architectural Photography (2) AWSpS
Staub
Introduction to the basic elements and processes of architectural photography to include: camera controls, exposure technique, and photo processing. Student must provide own camera with lens, shutter, and aperture controls. Prerequisites: 310, 311, and permission.

ARCH 314 Introduction to Architectural Sketching (2) AWSp
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) AWSp
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) AW
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 Science of the Built Environment (3,3,3) A,W,Sp
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
Fundt
Survey of architecture, city, and land form, from earliest times to circa 1150.

ARCH 351 Survey of Environmental Arts II (3) W
Fundt
Survey of architecture, city, and land form, from circa 1150 to 1750. Prerequisite: 350.

ARCH 352 Survey of Environmental Arts III (3) Sp
Fundt
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) AWSpS,AWSpS,AWSpS
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.

ARCH 410, 411, 412 Design Graphics Laboratory (2,2,2) AWSpS,AWSpS,AWSpS
Donnette, Zuberbuhler
Continuation of design graphics laboratory with emphasis on advanced architectural graphics. Prerequisites: 312 and permission.

ARCH 413 Architectural Photography Projects (2) AWSp
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 417 Architectural Sketching (3) Sp
Sproule
Studio and field exercises in drawing and sketching of natural and architectural subjects. Various media are utilized, including an introduction to the use of color in watercolor sketching. Prerequisite: 416.

ARCH 420 Structural Design I (4) AS
Albrecht, Radcliffe, Torrence
Design of complete building frames in timber, lami-

nated 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 prestressed 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
Lebert
Structural behavior and design of reinforced brick, tile, and unit masonry structures. Offered jointly with CESM 487. Prerequisites: 421, 422 or permission.

ARCH 427, 428, 429 Architectural Problems (3-7, 3-7, 3-7) AWSpS,AWSpS,AWSpS

ARCH 430, 431, 432 The Science of the Built Environment (3,3,3) A,W,Sp
Study of microclimatic controls in the built environment with special emphasis on lighting, acoustics, and thermal phenomena. Lectures, laboratory work, and student presentations. 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
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 446 Greek Architecture (3) Sp
Edmonson
Detailed study of Greek architecture from its beginnings, with special emphasis on the Periclean building program in fifth-century Athens. Offered jointly with ARCH 446 and CL AR 446. (Offered alternate years; offered 1976-77.)

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 SOC W 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 nonmajors.

COLLEGE OF ARCHITECTURE AND URBAN PLANNING

ARCH 451 History of Modern Architecture (3) A
Pundi
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
Pundi
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) W
Pundi
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
Pundi
Study and critical investigation of European and American architecture and urban design from 1750 to 1850. Prerequisites: 451 and permission. (Offered alternate years.)

ARCH 458 South Asian Architecture (3) W
Curis
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
Hildebrand
Examination of significant American environmental design efforts arising from utilitarian needs (e.g., factories, bridges, mass housing schemes, and associated technical building innovations). Prerequisites: 352 and permission.

ARCH 460 Design Theory and Analysis (3) AWSp
Nyberg, Sellgmann
Problematical nature of philosophies of architecture; interaction of philosophical concepts and architectural form and expression. Fundamentals of architectural criticism. Prerequisite: 352 or permission.

ARCH 461 Recent Developments in Architectural Theory (3) W
Sellgmann
Review of recent developments in architectural theory. Concentrates particularly on those that spring from recent work in the epistemology of science and in philosophy. Prerequisite: 460 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 Contract Drawings (3,3,3) AW,AW,AW
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,AWSpS,AWSpS
A group of advanced architectural studies and sequences in general architectural design synthesis, in special projects examining particular architectural determinants in detail, and in architectural research. Prerequisite: permission.

ARCH 513, 514, 515 Design Communication I, II, III (3,3,3) AWSp,AWSp,AWSp
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: permission for 513; 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 CESM 477. Prerequisite: 422 or permission.

ARCH 522 Skin-Resistant 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) AWSpS
Advanced experimental studies dealing with significant architectural relationships involving scholarly investigation, development, and presentation of results. Prerequisite: permission.

ARCH 530, 531, 532 Graduate Studies in the Science of the Built Environment (3,3,3) A,W,Sp
Graduate studies in microclimatic controls in the built environment, including individual opportuni-

ties 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) AWSp
Principles of acoustical designing 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
Sellgmann
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
Detailed organization and composition of contracts, specifications, and related contract documents.

ARCH 573 Professional Practice (3) Sp
Operation of an architectural office and professional practice.

ARCH 575 Graduate Seminar: Research and Analysis (3) WSpS
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. Offered on credit / no credit basis only. 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
R. Schneider
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 593 Graduate Seminar on the Theory of Housing Design (3) A
Dietz
Comparison and evaluation of housing designs: developing the ability to distinguish and apply appropriate referents—historical, stylistic, social, and technical—to the systematic analysis of housing.

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

ARCH 598 Special Topics for Graduate Students (1-6) A WSps

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 WSps

Terminal project 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 (*) A WSps

Offered on credit / no credit basis only.

ARCH 700 Master's Thesis (*) A WSps

Offered on credit / no credit basis only.

BUILDING CONSTRUCTION

Courses for Undergraduates

B CON 301 Building Industry (3) A

Eberharter

Organization and functioning of the building industry, legal, ethical, business, and management aspects. Prerequisite: permission.

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 applied to the building construction industry. Standards for accident prevention and responsibility for compliance are emphasized.

B CON 310 History of Building (3) Sp

Bosworth

Historical survey of building techniques and materials as conditioned by environmental, technical, and social influences.

B CON 330, 331, 332 Building Technology I, II, III (3,3,3) A, W, Sp

Introduction to the functional and constructional characteristics of building components: electrical distribution, lighting, heating, air conditioning, plumbing, fire protection, walls, floors, roofs, etc. Prerequisites: 330 for 331; 331 for 332.

B CON 401, 402 Building Estimating (4,4) A, W

The principles of building costs, estimating, and construction cost control. Prerequisite: 332.

B CON 410 Senior Study (4) A WSps

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 498 Special Topics (1-10, max. 20) A WSps

Systematic study of specialized subject matter. Topic may vary each quarter. Prerequisite: permission of department Chairman.

B CON 499 Undergraduate Research (*, max. 12) A WSps

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 300 Landscape Architecture Proficiency Program (16) S

Nakano, Schaele

Intensive learning experience by which student can develop or enhance perceptual awareness and design sensitivity to the natural and man-made landscape, plus basic skills necessary for more advanced course work required in the Bachelor of Landscape Architecture degree program: landscape perception, graphics, site analysis, and design will be interrelated. Emphasis placed on examination of landscape environments through problem-solving techniques that acknowledge holistic approach to the environment. Case studies and hypothetical design problems provide basis for both studio work and lecture/seminars. Students responsible for laboratory fee to cover cost of transportation, food, and lodging for all field trips associated with course. Diversity of teaching / learning modes are used to develop basic skills as well as a philosophic approach to perceptual awareness regarding man and nature, landscape graphics and presentation techniques, site evaluation and behavioral studies, site analysis techniques and methods, program development, design methodology, design alternatives and criteria, design vocabulary and details, and construction of simple structures and site details. Prerequisites: entry card; selected premajor in the College of Arts and Sciences or major standing in the Department of Landscape Architecture; or for new applicants designation as "provisionary" regular status major in landscape architecture. (Application or permission due May 1.)

L ARC 301 Site Planning (6) A

Haag, Nakano, Small, 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, Haag, Nakano

Urban design through landscape architecture. Design of public use areas in the urban area. Project types for this course are waterfront development, commercial areas, campus and cultural centers, plazas and historical sites; recommendation for policy to be established as part of the design solution.

L ARC 303 Urban Recreational Design (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.

L ARC 320 Site Planning (4) W

Advanced planning, design, construction, and behavioral studies for selected case-study projects. A design survey-studio course with related seminar sessions and field trips in the Seattle area. Prerequisite: permission for students not in the College of Architecture and Urban Planning.

L ARC 331 Landscape Construction (4) A

Untermann

Basic course in site engineering, correlating the design and technical aspects of site development and suitability. Grading, drainage, circulation requirements and alignment, organization concepts relative to landscape resources, site evaluation, utilization and protection, and building and site program analysis and coordination.

L ARC 332 Landscape Construction (4) W

Untermann

Materials and structures in landscape construction. Design criteria and construction techniques for detail elements of landscape architecture. Working drawings, specifications, cost estimates, and procedures.

L ARC 341 Site Planning (3) A

Streetfield

Introduction to site planning and landscape design, covering the factors of site analysis and planning, resource utilization, site suitability related to specific programs and activities; and planning, design, construction, and behavioral studies for selected case study projects. Open to nonmajors.

L ARC 352 History of Landscape Architecture (3) W

Johnston

Analysis of the design treatment of the landscape as an art form and its relation to the culture of each period.

L ARC 361 Theory and Perception of Landscape Architecture (3) A

Haag

Reciprocal relationships of man/nature are explored, with particular attention given to the cultural variations and interpretations of aesthetics, landscape materials, and human behavior and their effects on site planning and project design. Landscape architecture philosophy related to the physical design problems and potentials of the Pacific Northwest.

L ARC 363 Urban Recreation Design (3) Sp

Haag

Special recreational studies in metropolitan, urban, and neighborhood areas; the design, policies, and behavioral studies of existing parks, playgrounds, public places, and commercial recreational areas. Design projects dealing with the play environment for all ages. Open to nonmajors.

L ARC 401 Landscape Design Studio (6) A

Buchanan

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

Jongelán, Small, Untermann

Large-scale site planning and design. Generally related to housing, new communities, and institutional development. Identification of landscape character, resources, and problems of site, cost factors, design alternatives and implications for architectural direction, policy for land acquisition. 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

Landscape planning and 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

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resources; their identification, classification, visual assessment, and interpretation for design planning, program development, and policy decisions. Metropolitan to regional scale.

L ARC 406 Landscape Design Studio (6) AWSpS
Senior projects in landscape architecture, projects vary according to the student's particular emphasis and needs. Open only to majors in landscape architecture with faculty permission and one quarter prior notice.

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

L ARC 412 Landscape Graphics (2) Sp
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
Chittick
Basic horticultural principles with special attention given to the problems encountered in urban situations. Course deals with design implications and the effect of environmental influences, such as wind, sun, heat, precipitation, and soil, on plant growth; maintenance and related cost factors. Prerequisite: experience in plant sciences or BOT 331.

L ARC 422 Plants and Their Design Characteristics (3) Sp
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
Utilization of plants in the urban areas and as major elements of project design. Technical considerations for selection, climate, and cultural suitability; maintenance, costs, and availability. History and theory of composition and abstract design qualities of plants. Open to nonmajors.

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

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) Sp
Streetfield, Untermann
Introductory lecture course relating methods, procedures, and rationale for use of natural process information—soils, vegetation, hydrology, physiography, wildlife, and geology. The planning / design process covers areas of critical concern, environmental restraints, natural systems, landscape character, and capacity of site to recover from human intervention. Open to planners, architects, foresters, geographers, etc.

L ARC 470 Landscape Architecture Tutorial (2, max. 6)
Tutorial course concerned with various aspects of project organization, programming, scheduling of work loads, graphic and verbal communication problems, data collection methods and interpretation, methodologies for landscape planting and design. Prerequisites: fourth- or fifth-year standing and one quarter advance permission.

L ARC 473 Office Procedure (3) W
Haag
Professional practice in the private office and public agencies. Federal, state, and local controls and financing for public projects. Ethics, fees, proposal development, contracts, construction documents, supervision, operational aspects of a private office, relationship to other professionals.

L ARC 476 Professional Operations (3-6, max. 6) Sp
Practicum course for landscape architecture majors for internship and exposure to the potential working experiences at various levels of professional endeavor. Student apprenticeship in selected private offices and public agencies. Offered on credit/no credit basis only. Prerequisite: permission of adviser.

L ARC 477 Landscape Architecture Consultancy Studio (3-6) AWSpS
Simulation of the professional relationship of the landscape architect as a consultant to University students in other design planning and management disciplines (architects, planners, urban designers, forest resources, etc.). Focus is on site analysis, master planning, schematic designs and detailed design, working drawings, and planting plans associated with student projects. Prerequisites: fourth- or fifth-year standing as a major in the Department of Landscape Architecture, permission of faculty sponsor, and 3.00 grade-point average in previous landscape architecture course work.

L ARC 495 Landscape Architectural Studies Abroad (1-10, max. 30) AWSp
Studies conducted under faculty supervision in various locations outside the United States. Prerequisite: permission.

L ARC 498 Special Projects (1-10, max. 30)
AWSpS
Special projects as arranged. Prerequisites: permission and one quarter prior notice.

L ARC 499 Undergraduate Research (1-6)
AWSpS
Individual or small-group studies pertaining to special problems, theories, or issues of landscape architecture and environmental issues. Prerequisites: permission and one quarter prior notice.

URBAN PLANNING

Courses for Undergraduates

URB P 340 American Urban Problems (3) AS
Hancock
Study of major trends and problems in urban America that have grown out of our past or that are developing today. A new topic and new materials are presented each quarter. Topics are selected for their contemporary importance, environmental (biocultural) impact, and planning implications. History is used as our chief record of the past, not as a blueprint of the present and future.

URB P 350 Introduction to Urban Development (4) AW
Introduction to real estate markets, investment, appraisal, accessibility concepts, urban history, urban research, and related topics. Offered jointly with U D 310.

URB P 351 Private Investment in Urban Development (4) AW
Emphasizes the role of the private sector in urban development; valuation and investment theory; techniques of investment analysis and capital allocation. Offered jointly with U D 395.

URB P 381 Legal Aspects of Urban Development (3) W
Legal aspects of modern land utilization including the urban plan, zoning, and private and public ownership—with preliminary discussion of the nature of property and a brief survey of real property law. Offered jointly with U D 320.

URB P 399 Future Patterns of Settlement (3) Sp
Morrill, Schneider
Study of possible future patterns of human use of the environment from apocalyptic to glorious. Review of landscape evolution. Problems of long-range regional and national planning. Offered jointly with GEOG 399. Prerequisite: 340 or GEOG 207 or 277, or permission.

URB P 400 Introduction to Urban Planning (3) AWSpS
Hancock, Norton, Schinn, Wolfe
History, principles, theories of city growth and planning. Emphasis on city structure, present urban problems and planned action. Offered jointly with U D 400. Prerequisite: 340 or 350 or U D 310.

URB P 401 Urban Planning Policies and Programs (3) Sp
Norton
Goals, processes of policy formulation, methods of planning, effectuation, and related problems. Community, regional, state, and national programs. Prerequisite: 411 or permission.

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 both itself and its environment. Prerequisite: 400; seniors only with permission.

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.

URB P 412 Forecasting Methods in Urban Planning (3) Sp
J. B. Schneider
Examination of several forecasting methods, including trend extrapolation, Delphi, relevance trees, morphological boxes, cross-impact matrices, scenario generation, and literature monitoring techniques. Past failures and successes. Applications to urban planning problems.

URB P 420 Quantitative Methods in Urban Planning (3) W
Bell
Methods of statistical analysis applied to urban planning; measurement and inference. Central tendency, correlation, trends, probability, surveys.

URB P 421 Quantitative Analytical Models and Methods (3) Sp
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.

URB P 429 On-line Planning of Urban Systems (3) W
J. B. Schneider
Survey of on-line planning applications; use of various on-line systems to solve urban systems design problems; investigation of hardware / software trade-offs; human factors in man-computer systems design theory as it relates to problem-solving activity.

URB P 430 Introduction to Urban Transportation (3) A
Horwood
 Identification of the framework, central concepts, constraints, and issues of the urban transportation planning problem. Offered jointly with CETC 425.

URB P 446 Field Study (4, max. 8) AWSp
Amoss
 Explicit task assignment in a community development organization under professional and academic supervision. Placement arranged. Participation ordinarily limited to seniors. Prerequisite: permission.

URB P 447 Social Factors in Urban Planning (2) A
Carter
 Analyzing the impact of planning and planning policies on the social environment, including an examination of those social factors important to the planning process, such as neighborhood and community structure, age and sex composition, race, and class. Methods for evaluating and incorporating social information into the planning process. Prerequisite: 400, which may be taken concurrently.

URB P 448 Directed Social Change (3) A
Amoss
 General course for both undergraduate and graduate students on the theories and practice of directed social change and citizen involvement in the planning process.

URB P 449 Planning Problems of the Black Community (3) W
Carter
 Course objective is to enable student 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.

URB P 450 Urban Community Facilities (3) WS
Norton
 Relationships of goal structure and physical requirements of public facilities. Criteria pertinent to schools, parks, utilities, etc., and their effect on the comprehensive plan. Prerequisite: 400.

URB P 451 Housing (3) AW
Grey, Ludwig, Rabinowitz
 Survey of housing and redevelopment problems, theories, standards, and practice. Development of public policies, finance, technological considerations, social factors, and priorities. Offered jointly with U D 451. Prerequisite: 400.

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

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

URB P 461 History of Urban Planning in the United States (3) W
Hancock
 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.

URB P 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 GEOG 466.

URB P 470 Introduction to Urban Design (3) Sp
 Definitions and examples of basic urban design; importance of urban physical form in the attainment of social objectives; heritage of urban design; designing parts of the city; theories of city building; the role of urban design in the fields of architecture, landscape architecture, civil engineering, and urban planning. Enrollment restricted to seniors with permission.

URB P 477 Social Functions of Environmental Form: A Behavioral Basis for Urban Design / Physical Planning (3)
 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.

URB P 478 Psychological Functions of Environmental Form: A Behavioral Basis for Urban Design / Physical Planning (3)
 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.

URB P 479 The Urban Form (3) A
Wolfe
 Examination of the physical patterns of urban areas related to the forces producing them. Observation, identification, and methods of recording aspects of the urban scene. Prerequisite: 400.

URB P 480 Introduction to Urban, Suburban, and Metropolitan Political Systems (5)
 Causes and consequences of variations in urban form and political structure. Social, economic, and cultural characteristics of different urban forms, and processes by which they have developed; emphasis on suburbanization and metropolitanism. Offered jointly with POL S 480. POL S 101 or 102 recommended.

URB P 498 Special Topics (2-4) AWSps
 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.

URB P 499 Special Projects in Urban Planning (5) AWSps
 Independent/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 adviser 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

URB P 500 Survey of Urban Planning (3) A
Miller
 Concepts and logic of planning as a professional activity. Evolution of guiding ideas in relation to changing social, economic, and environmental conditions within the American political framework. Major procedures used by planners. Critical appraisal. Open to graduate students in urban planning and to graduate students in architecture seeking the Urban Design Certificate.

URB P 501 Resources for Urban Planning (2) A
 Introduction to areas of specialized study in 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.

URB P 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.

URB P 506 General Urban Planning (2) Sp
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.

URB P 507 General Urban Planning Laboratory (5) Sp
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.

URB P 508 Specialized Planning Laboratory (5, max. 10) A
 Several different sections or options are to be offered each year, such as regional-environmental planning, urban systems analysis, housing, metropolitan planning, urban design, and community services and organization. Prerequisites: 500 and 501. Some sections may have prerequisite urban planning lecture or seminar courses.

URB P 510 Theories and Methodologies of Planning I (4) W
Ludwig, Shinn
 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. Open to graduate students in urban planning and to graduate students in architecture seeking the Urban Design Certificate.

URB P 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.

URB P 512 Research Seminar (2) A
 Development and presentation of advanced topics of individual investigation.

URB P 527 Urban Region Geocoding and Geoprocessing (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 GEOG 527 and CETC 527.

URB P 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 GEOG 528 and CETC 528. Prerequisites: basic statistics and 527, or permission.

URB P 529 Information Systems Applications to Urban and Regional Analysis (3) Sp
Horwood, Staff
 Logical design of information systems for analysis, policy development, planning and plan monitoring in the context of land-use planning, environmental studies, land resource management, and general public agency planning purposes. Data confidentiality considerations, case studies and critical analyses of current information systems programs. Offered jointly with CETC 529 and GEOG 529.

URB P 530 Land-Use Planning Models (3) A
J. B. Schneider
 Review of theoretical basis of several existing models used to forecast urban growth patterns and their associated land-use, transportation, and energy requirements. Model validation studies in relation to empirical studies of urban growth and change. Environmental implications of alternative urban growth patterns. Offered jointly with CETC 525.

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URB P 534 Airport Systems Planning (3) W

Shinn

Investigation of environmental, sociopolitical, and economic features of air transportation system planning. Emerging technologies, intermodal relationships, the decision-making process. Scenarios of anticipated conflict and resolution problems. Offered jointly with CETC 535.

URB P 540 Seminar in Citizen Participation (3) W

Amoss

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

URB P 545 Minority 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.

URB P 546 Practicum (4, max. 8) AWSp

Amoss, Staff

Field work assignments to participate in some phase of a community problem-solving activity utilizing planning skills. Placement arranged. Offered on credit / no credit basis only. Prerequisite: permission.

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

Seyfried

Practical application of benefit-cost methodology to the decision-making process for urban development. In a "workshop" format, benefit-cost analysis procedures are applied to urban development projects or programs, including urban renewal as defined by legislation. Theory or methodology is utilized as necessary to determine objectives, to identify and to measure benefits and costs, and to specify decision criteria in terms of the public interest. Offered jointly with U D 550.

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

Grey, 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. Offered jointly with U D 551.

URB P 552 Survey of Urban Development (3) A

Topical survey of urban development. Objective to provide substantive information, methodology, theory, and base for additional courses and seminars in area. Topics include urban economy and determinants of land use, capital investment in urban development, land tenure, urban functions and public sector, urban development policy and strategy. Offered jointly with U D 505. Prerequisite: permission.

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

Develops principles for evaluating opportunities to invest in urban real estate, discusses the question of determining the cost of capital for such investments, investigates some problems in the application of an appropriate investment criterion to specific types of opportunities, and explores some aspects of the urban renewal problem. Offered jointly with U D 515 and FIN 515. Prerequisite: 552, U D 505, or permission.

URB P 554 Seminar in Urban Development Location Determinants (3) Sp

Advanced workshop on empirical methods to conduct and evaluate locational studies. Offered jointly with U D 525. Prerequisite: one of the following: U D 505, U D 515, FIN 515, or permission.

URB P 565 Comparative Urbanism (3) W

Wolfe

Characteristics and problems of urbanization in the world; comparisons of origins and development;

physical form, land utilization, and planning. Selected major cities. Offered on credit / no credit basis only. Prerequisite: permission.

URB P 566 Regional Planning Seminar (3) W

Thomas

Regional planning and development theories and methodologies. Critical evaluation of regional planning in selected "economically advanced" and "lesser developed" countries. Offered jointly with GEOG 566. Prerequisite: 466 or GEOG 466.

URB P 567 Research Seminar: Geography and Development (3, max. 6) A

Thomas

Offered jointly with GEOG 567.

URB P 570 Urban Design Process (2) W

Wolfe

The study of concepts, methods, and processes basic to planning, design, and effectuation. Offered on credit / no credit basis only. Prerequisite: 479.

URB P 571 Research and Analytical Methods for Urban Design (3) S

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.

URB P 572 Graphic Communication in Urban Planning (3)

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.

URB P 580 Legal and Administrative Framework for Planning (3)

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.

URB P 591-592-593 Doctoral Seminar I, II, III (2-2-2) A,W,Sp

Researchable issues and research methodology. Discussion and critique of selected pieces of recent research work. Presentation and critique of research proposed by members of the seminar. Credits given on satisfactory completion of the three-quarter sequence. Prerequisite: master's degree or the equivalent in a planning discipline.

URB P 598 Special Topics (1-4) 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.

URB P 600 Independent Study or Research (*) AWSpS

URB P 700 Master's Thesis (*) AWSpS

URB P 800 Doctoral Dissertation (*) AWSpS

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AFRICAN STUDIES

Courses for Undergraduates

AFSTU 300, 301, 302 Basic Swahili (5,5,5)

A,W,Sp

Eastman

Introduction to the structure of spoken and written Swahili. Concentration on the acquisition of ele-

mental conversational skill and an introduction to written texts of graded difficulty. Prerequisites: 300 for 301; 302 for 303.

AFSTU 303, 304, 305 Basic Krio (5,5,5) A,W,Sp

Williams

Elementary structures of Krio with emphasis on the acquisition of basic conversational and reading skills. Prerequisites: 303 for 304; 304 for 305.

AFSTU 306, 307, 308 Practicum in African Languages (3,3,3) A,W,Sp

Eastman, Williams

Introduction to specific African languages with an emphasis on teaching skills that can be acquired in a language laboratory setting. One language is taught every time the course sequence is offered. Languages offered are Hausa, Yoruba, Twi, Duala, and Shona. Students are encouraged to converse with each other, using skills learned by means of tapes and explanations supplied by the instructor. Prerequisites: 306 for 307; 307 for 308, or permission.

AFSTU 400, 401, 402 Intermediate Swahili (3,3,3) A,W,Sp

Eastman

Reading of relatively complicated material from prose to traditional poetry. Emphasis on acquiring an ability to manipulate ideas in Swahili orally and written. Review of structure. Prerequisites: 300, 301, 302, or equivalent for 400; 401 for 402; 402 for 403.

AFSTU 406, 407, 408 Intermediate Krio (3,3,3)

A,W,Sp

Williams

Advanced structures of Krio with further emphasis placed upon conversational skills and reading. Prerequisites: 305; 406 for 407; 407 for 408.

AFSTU 410 Bantu Linguistics (3)

Eastman

General survey of the development of Bantu linguistics with special emphasis on comparative Bantu phonology, morphology, and syntax. Prerequisite: permission.

AFSTU 444 African Studies Seminar (1-3, max. 9)

W or Sp

Interdisciplinary seminar focusing upon one particular aspect of the African continent. Its emphasis may be humanistic, social scientific, or historical. Members of the African Studies faculty and visiting scholars give a series of lectures on areas of their own expertise. Prerequisite: senior or graduate student status.

AFSTU 499 Undergraduate Research (3-5, max. 15) AWSp

Bravmann, Eastman, Williams

Prerequisite: permission.

AMERICAN INDIAN STUDIES

Courses for Undergraduates

AIS 230 Contemporary Indian Issues (3) AW

Introductory survey of the legal, socioeconomic, political, and educational status of both contemporary reservation and urban Indians; special attention is given to the problems and controversies in the delivery of social and educational services, the maintenance of self-determination in tribal governments, and hunting, fishing, and water rights. Not open to students who have taken GIS 313.

AIS 335 Legal Problems of the American Indian (3) AS

Boudry, Ross

Deals with the peculiar legal status of the American Indian in the United States today, with special reference to the reservation situation and such problems as land holdings, heirship, etc. Not open to students who have taken GIS 317. Prerequisite: GIS 230 or GIS 313, or permission.

AIS 475 Special Topics in Indian Studies (1-5, max. 15) AWSpS

Introduces advanced undergraduate students to current research and readings in special Indian Studies content areas.

AI5 499 Independent Study (1-5, max. 15) AWSpS
Readings and/or research under faculty supervision.

ANTHROPOLOGY

Courses for Undergraduates

GENERAL

ANTH 100 Introduction to the Study of Man (5)
Introduction to the subfields of archaeology, physical anthropology, and sociocultural anthropology through the examination of selected problems in human physical, cultural, and social evolution. Not open for credit to students who have had or are currently taking other courses in anthropology, archaeology, or physical anthropology.

SOCIOCULTURAL ANTHROPOLOGY

ANTH 111 Afro-American Culture (3)
Historical development and nature of Afro-American culture in the United States, including discussion of the Atlantic slave trade, slavery as a social institution, the evolution of Black folk culture, and contemporary Afro-American urban culture.

ANTH 202 Principles of Social Anthropology (5)
Introduction to analytical and comparative methods for the analysis of social and cultural systems. Training in fundamentals for more advanced courses in social anthropology.

ANTH 203 Introduction to Linguistic Anthropology (5)
Survey of linguistic approaches, methods, and theories of use within anthropology. Lectures deal with descriptive linguistics, comparative and historical linguistics, ethnographic semantics, sociolinguistics, and language classification.

ANTH 212 Perspectives on Afro-American Culture (3)
Analyses of Afro-American personality and culture, including exploration of contemporary attitudes and issues that emerge from racial awareness, Black identity, hostility, and aggression. Emphasis is placed upon the conflict between adaptive and assimilative patterns.

ANTH 213 Africa (3)
Introduction to the cultures and societies of Africa with emphasis on sub-Saharan Africa.

ANTH 216 Oceania (3)
Contemporary and traditional life in the Pacific Basin.

ANTH 225 Community Development and Action (3)
Use of concepts and examples of directed culture change to analyze community action and community development. Lectures are supplemented by case studies, films, and discussions with those who are actually working with directed culture change.

ANTH 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 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 Asian countries: Burma, Thailand, Laos, Cambodia, Vietnam, Malaysia, Indonesia, and the Philippines. Prerequisite: sophomore standing or permission.

ANTH 318 Peoples and Cultures of the Islamic Middle East (3)
Survey of cultures and peoples of Islamic Middle East and North Africa. First half of the course

emphasizes the integration of peasant, urban, and nomadic societies in the traditional culture and economy; the second half concentrates on the transformation of the traditional life styles through the process of westernization and modernization. Prerequisite: sophomore standing.

ANTH 321 Introduction to the Anthropological Study of Religion (3)
Introduction to the comparative study of religion as approached by the discipline of anthropology. Examination of various types of religious systems recognized by anthropology. Recommended primarily for nonanthropology majors. RELIG 201 or 202 recommended.

ANTH 322 Peoples of South America (3)
Contemporary societies of South America: economic, political, ethnic, and cultural characteristics; historical background. Prerequisite: sophomore standing or permission.

ANTH 333 Art of the Northwest Coast Indian (3)
Emphasis on the structure and style of two-dimensional art of the northern tribes. Offered jointly with ART H 333. Prerequisite: sophomore standing.

ANTH 334 Art of the Northwest Coast Indian (3)
Holm
Three-dimensional art of the Northwest coast cultural area with emphasis on esthetic principles, techniques, and cultural functions. Offered jointly with ART H 334. Prerequisite: sophomore standing.

ANTH 335 Art of the Northwest Coast Indian (3)
Northwest coast Indian art as related to drama and dance with special attention to the Kwakiutl Indians. Offered jointly with ART H 335. Prerequisite: sophomore standing.

ANTH 350 The Civilized and the Primitive (3)
Development of urban modes of life in the light of the common and distinctive social and cultural characteristics of cities, peasantries, 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 353 Anthropological Studies of Women (3)
W Jacobs
Cross-cultural, comparative survey of the varieties of women's cultural experiences, status, and roles. In addition, the anthropological theories used to account for women's status and roles in various cultures are examined in light of methods used to collect and interpret data. Offered jointly with WOMEN 353. Prerequisite: 202 or permission.

ANTH 354 The Comparative Study of Societies (3)
W van den Berghe
Entire societies at various levels of technological complexity are compared to explore problems of their development and structural organization. Both historical and contemporary, and Western and non-Western societies are examined. Offered jointly with SOC 354. Prerequisite: 202 or SOC 110.

ANTH 355 Aging in Cross Cultural Perspective (3)
W Amoss
Survey of strategies for dealing with the fact of aging in various sociocultural systems. Relates the varieties of cultural solutions to the theories on aging, drawn from psychology and medicine, with emphasis on non-Western societies. Prerequisite: 202 or permission.

ANTH 360 Introduction to Cultural Ecology (5)
Hunn, Spain, Watson, Winans
The basic preindustrial subsistence strategies (e.g., hunting/gathering, maritime, pastoralism, agriculture) are examined and compared in the following contexts: interaction of subsistence strategies and natural environment; population size and distribution; population controls; productivity and cultural evolution; dynamic factors and prospects for man's future. Prerequisite: junior standing or permission.

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

ANTH 372 Anthropology of Law (3)
A Ottenberg, Williams, Winans
Major theories and studies in legal anthropology. Dispute settlement, juridical processes, and concepts of law and legal activities. Prerequisites: 202 and 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 402 Societies of Eastern and Southern Africa (3)
Historical background and contemporary life of cultural groups in eastern and southern Africa with special study of selected cases of political and economic organization and cultural change. Prerequisite: 202 or permission.

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

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

ANTH 408 New Guinea Societies (5)
Indigenous peoples of coastal and interior New Guinea and adjacent islands; their aboriginal cultures and modern development in spatial and temporal perspective. The studies deal intensively with the selected general problems of ethnographic method and ethnological and sociological interpretation. Prerequisite: 202 or permission.

ANTH 409 Micronesian Societies (3)
Comparative social anthropology of the social systems of high islands and coral atolls of Micronesia. Intensive treatment of the kinship, religion, ecology, and politics in both traditional and contemporary periods. Prerequisites: 202, and either 216 or permission.

ANTH 410 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 distribution of, and relationships among, aboriginal groups before white contact. Ethnographic comparisons of local organization and land tenure, kinship, law, and religion. Past and present use of aboriginal data in social science theory. Prerequisites: 202, and either 216 or 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 415 North American Indians: Eastern Native America (3)
Amoss, Jacobs, Miller, Nason
Overview of traditional cultures of the East Coast and Great Plains, using anthropological perspectives and data. Insights from Native America that articulate human differences and similarities. Topics are: history, ecozones, languages, and representative culture areas (the Subarctic, Northeast,

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Southeast, and Plains). Prerequisite: 100 or 202 or a background in introductory anthropology.

ANTH 416 North American Indians: Western Native America (3)

Amoss, Jacobs, Miller, Nason
Overview of traditional cultures of the West Coast and intermountain regions, using anthropological perspectives and data. Insights from Native America that articulate human differences and similarities. Topics are: history, eczozones, languages, and representative culture areas (the Southwest, California, Great Basin, Plateau, and Arctic). Prerequisite: 100 or 202 or a background in introductory anthropology. (First time offered: Spring Quarter 1976.)

ANTH 417 North American Indians: 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. May not be taken for credit by students who have had 311. Prerequisite: 100 or 202.

ANTH 418 Meso-American Society and Culture (3)

Analysis of the social and cultural features of Meso-America. Prerequisite: 202 or permission.

ANTH 419 Peoples and Cultures of the Iranian Plateau (3)

Survey of the cultural features of the Iranian Plateau with particular attention to modern problems of cultural change. Prerequisite: sophomore standing or permission.

ANTH 421 Belief, Ritual, and the Structure of Religion (5) W

Amoss, Keyes
Systematic survey of the concepts, models, and theories that characterize the anthropological study of religion. Consideration of religious phenomena with reference to those formulations that provide meaning for social experience and those actions that serve to fulfill social functions. Prerequisites: 202 or 321 or RELIG 201 and 202.

ANTH 422 Religious Systems (5) Sp

Amoss, Keyes
Intensive examination of one type of religious system with reference to the anthropological study of religious phenomena. The type of religious system chosen for study varies. Prerequisite: 421 or RELIG 380.

ANTH 425 Applied Anthropology (3)

Planned and directed social and cultural change. 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 427 Anthropology in Urban Settings (3) Sp

Chrisman, Jacobs, Spain
Cross-cultural examination of theoretical issues in anthropology as they have been studied in urban places. Discussion focuses on ethnic identity and the formation of urban ethnic groups; migration and its rural and urban consequences; family and kinship organization as an adaptation to urban complexity; the nature of urban voluntary associations; law and politics; and the developments in anthropological method. Prerequisite: 202 or permission.

ANTH 428 Anthropological Perspectives on Ethnicity (3)

Keyes, Ottenberg
Survey and evaluation of anthropological approaches to ethnicity and ethnic group relations, with reference to other models including race, caste, class, regional groupings, national, religion, and stratification. Discussion of research design for each approach. Data drawn from precolonial, colonial, and postcolonial periods. Prerequisite: 202 or permission.

ANTH 429 Expressive Culture (5)

Anthropological view of the expressive aspects of culture: plastic-graphic arts, myth and folktale, music, dance, humor and tragedy, play and games. Prerequisite: 202 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 436 Comparative Family Organization (5) A

Harrell
Various forms of family organization and marriage arrangements in nonindustrial societies, emphasizing the effects of ecological and economic variation on family structure and the effects of family structure on relationships between parents, children, spouses, and siblings. Prerequisite: 202.

ANTH 437 Political Anthropology and Social Change (5)

Anthropological studies of local-level politics in colonial, modernizing, and encapsulated societies. Processual approaches to the study of political change. Prerequisites: 202, 371, 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 Law in Changing Societies (5)

Anthropological viewpoints on legal aspects of colonial, modernizing, and encapsulated societies. Problems of plural legal systems and of conflicts in judicial systems. Prerequisites: 202, 372, or permission.

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 registrant has taken courses in child development, introductory anthropology, and psychological anthropology. Offered jointly with NURS 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. Prerequisite: 202 and any introductory course in general psychology or personality theory, or permission.

ANTH 442 Anthropological Aspects of Communication (5)

Introduction to communicational aspects of culture. Prerequisite: 202.

ANTH 444 Contemporary Chinese Society (5)

Harrell
Analysis of society in the People's Republic of China as a product of traditional Chinese society and the changes wrought upon it by the impact of

the West and by the revolutionary policies and practices of the Chinese Communist Party. Offered jointly with EASIA 444. Prerequisite: 403 or EASIA 443 or another acceptable course on Chinese society, or permission.

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 MATH 281, or permission.

ANTH 446 Structural Anthropology (3) Sp

Miller
Contributions of Levi-Strauss and others to anthropology, with concentration on the holistic analysis of culture through myth, ritual, society, and cosmology. Prerequisite: 202 or permission.

ANTH 447 Religion in China (5) Sp

Harrell
Place of religion in Chinese society, examining the doctrines, practices, and social consequences of the eclectic folk religion, the elite Confucian, Taoist, and Buddhist traditions, syncretistic sects, and imported Christianity. Offered jointly with EASIA 445. Prerequisite: one course in Chinese society, politics, or history, or permission.

ANTH 450 Theory and Method in Linguistic Anthropology (5)

Various theories and methods used in linguistic anthropology, with focus on the goal of producing descriptively adequate grammar, carrying out research on world-view, ethnoscientific, sociolinguistic, or typological problems. Students are expected to carry out projects demonstrating their ability to apply theory and method to data gathered on a specific problem in one of these areas. Prerequisite: 203 or equivalent.

ANTH 451, 452, 453 Phonology (3,3,3)

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 LING 451, 452, 453. Prerequisite: LING 200 or 400, either of which may be taken concurrently, or permission.

ANTH 455 Areal Linguistics (3, max. 6)

Linguistics analyses of the languages of a selected area. Offered jointly with LING 455.

ANTH 459 Types and Techniques of Transcription (3)

Analysis of aims and problems in the written symbolization of structured data. Emphasis on field transcription of human movement, music, and language. Prerequisite: 202 or permission.

ANTH 460 History of Anthropology (5)

History of developments in the several fields of general anthropology. Prerequisites: 202 and 15 additional credits in anthropology.

ANTH 461, 462, 463 Syntax (3,3,3)

Newmeyer
Study of the structure of meaningful elements in language; practical experience with a wide variety of languages; taxonomic and generative views of grammar. Offered jointly with LING 461, 462, 463. Prerequisite: LING 200 or 400, either of which may be taken concurrently, or permission.

ANTH 464 Language Policy and Cultural Identity (3) A

Eastman, Schiffman
Examines linguistic policies of the modern national state and their impact on cultural identity, especially of linguistic minorities. In the United States, for example, demands for non-English medium schools and other use of non-English are compared with language policy in other societies (Europe, Africa, Asia). Attention is paid to attitudes underlying second-language instruction, bilingualism, and language loyalty among Americans of non-English language background. The persistence of language minorities in some societies is examined in terms of special cultural factors underlying language loyalty, such as religion, ethnic pride, literacy, etc. Offered jointly with LING 433. Prerequisite: 450 or LING 200 or 400.

ANTH 469 Special Studies in Anthropology (3)
Delineation and analysis of a specific problem or related problems in anthropology. Offered occasionally by visitors or resident faculty. May be repeated for credit by permission. Prerequisite: 202 or permission.

ANTH 490 Problems in Social Structure (3)
Selected current problems in the study of social structure. Prerequisites: 202, 20 additional credits in anthropology, and permission.

ANTH 491 Museology (3, max. 6)
Tutorial involvement with some of the technical competencies required in the acquisition, preservation, preparation, and exhibition of anthropological materials in a museum. Prerequisites: 25 credits in anthropology and permission.

ANTH 492 Data Analysis in Social Anthropology (3)
Introduction to elementary manual and semiautomated techniques for the processing, organization, 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 494 Problems in the Anthropology of Law and Politics (3, max. 6) Sp
Ottenberg, Williams, Winans
Seminar in the interrelationships of law and politics. Political aspects of procedural and substantive law. Law as a basis of political power and authority. The intertwining of political and legal processes. Prerequisites: 371 or 439 and 372 or 437, or 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 497 Cognitive Anthropology (3) W
Hunn
Discussion and practical experience in the collection and analysis of data are stressed, limiting the class size to twenty students. The classwork revolves around several exemplary cognitive anthropological studies, which are replicated as class projects. Each project provides a starting point for debating the central theoretical issues in this specialty. Prerequisites: 202 and major in anthropology, or 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)
Introduction to archaeological data preparation and description designed for students who have had field experience in archaeology. Prerequisites: 205 and 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 symbolism, astronomical and calendric 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 472 Early Man in the New World (3) W
Krieger
Lecture course that examines the archaeological evidence for early human occupation of North and South America, with attention to geological, paleontological, climatic, and other environmental changes. Covers evidence for simple Paleolithic occupations preceding the widely acknowledged cultural sequence that began about 12,000 years ago. A research paper is required. Prerequisite: 304.

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 Guatemala, 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, Guerrero, Puebla, 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 Yucatan, and Highland Guatemala. Knowledge of Spanish recommended. Prerequisites: 304 and permission.

ARCHY 478 Prehistoric Cultures of North America: Western North America (3)
Grayson
Archaeological history of the various regions of North America north of Mexico and west of the Rocky Mountains with primary emphasis on the far western area. Prerequisite: 304 or permission.

ARCHY 479 Prehistoric Cultures of North America: Eastern North America (3) Sp
Dunnell
Precolumbian culture history of the cultural areas within North America east of the Rocky Mountains and north of Mexico. Prerequisite: 304 or permission.

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

ARCHY 481 Advanced Archaeological Analysis: Environmental Remains (6) Sp
Dunnell, Grayson
Combination of lecture and practical laboratory instruction in the preparation of archaeological data for analysis, emphasizing faunal, vegetal, edaphic, and other nontechnological elements of archaeological assemblages and standard techniques for the manipulation of these data. Includes the theoretical bases for the techniques and their uses and limitations in cultural, historical, and processual accounts. Prerequisite: 371 or permission.

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 MATH 281 or Q SCI 281 or SOC 223, and permission.

ARCHY 497 Archaeological Theory and Method I, Formal Theory (3)
Formal
Examination of theoretical constructs in the analysis of archaeological data. Terminology, typologies, and interregional comparisons. Prerequisites: 205, 20 additional credits in 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 370 Introduction to the Primates (3)
In-depth examination of the origin and the distribution of primates in time and space; growth and development, posture and locomotion, sexual and intraspecific differences, special sense organs, oral

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cavity, skin and hair, behavior, and major evolutionary trends. Prerequisite: 201.

PHY A 381 Biological Aspects of African Populations (3)

Ward

Origin and biological nature of African populations with emphasis on the interaction of genetics, ecology, and sociocultural practices in extant populations. Biological perspective of black populations in the New World with emphasis on the United States. Prerequisite: 201 or BIOL 210, 211, 212.

PHY A 382 Human Population Biology (3) A

Nute, Ward

Principles of population biology as they apply to the human species, including basic genetic, demographic, and ecological aspects of human populations discussed from historical and present-day perspectives. Prerequisite: 201 or BIOL 210, 211, 212.

PHY A 384 Biological Aspects of American Indian Populations (3)

Newman, Ward

Peopling of the aboriginal New World, its population at time of discovery, and subsequent changes in genetics, physique, nutrition, and health. Emphasis is first placed upon the historical background through analysis of skeletal remains in their proper archaeological setting. The extant populations of living Indians of both continents are investigated with respect to biological parameters (ecology, demography, and genetics) and the relationship of their quality of life to their biobehavioral welfare. Intensive review of the American Southwest, Mexico, Guatemala, Venezuela, and Peru. Prerequisite: 201 or BIOL 210, 211, 212.

PHY A 387 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 BIOL 101-102 or 210.

PHY A 388 Fossil Man (3)

Presentation of the major trends in the evolution of human morphology and behavior. The remains of fossil man, their geological context, age, and ecological setting, and how this information has been used to reconstruct man's early history. Changes in both morphology and adaptation to environment. Prerequisites: 201 or BIOL 210, 211, 212.

PHY A 390 Ecological Impact of Cities on People (3) W

Newman

Interdisciplinary, integrative approach to the effects of urban stresses upon the biobehavioral characteristics of city people in both developed and underdeveloped countries: pollution, poor nutrition, disease, social breakdown, maladaptive lifestyles, anonymity, and overstimulation. The multifactorial nature of these stresses is emphasized, as well as the mechanisms behind the responses to them. Prerequisite: 201.

PHY A 469 Special Topics in Physical Anthropology (3, max. 6) AWSpS

Newell, Newman, Nute, Swindler

Delineation and analysis of a specific problem or a more general area in physical anthropology. Offered occasionally by visitors or resident faculty. Prerequisite: permission.

PHY A 480-481 Primate Anatomy: Structure and Function (5-5)

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: 201, 382, GENET 451 and statistics, or permission.

PHY A 483 Human and Nonhuman Primate Variability (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: 370 and 482, or permission.

PHY A 484 Human Growth and Development (3)

Principles of growth and development in man from the embryological period through old age. The interaction of genetics and the environment as they determine the growth and maturational processes. The evolutionary aspects of human growth and development. Prerequisites: 201 and BIOL 210, 211, 212, or permission.

PHY A 485 Primate and Human Growth Laboratory (2, max. 8)

Laboratory dealing with current methods used to assess growth and development. Must be accompanied by 484 or 494.

PHY A 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 488 Primate Evolution (5) W

Eck

Major trends in nonhominid primate evolution through the Cenozoic. Discussion of the specimens, geological context, and age of the fossil taxa and their relationship to modern taxa. Practical experience in analyzing fossil material. Prerequisites: 201 and 370, GEOL 361, or permission.

PHY A 489 Evolution of the Hominidae (5) W

Eck

Data and interpretations basic to the Pliocene and Pleistocene evolution of the family *Hominidae*. Presentation of the geological contexts, ages, faunal associations, fossil and cultural remains of the hominid lineages. Practical experience with the hominid fossil material and explanation of the morphological and contextual similarities and differences. Prerequisites: 201 and 370, GEOL 361, or permission.

PHY A 491 Molecular Aspects of Primate Evolution (3) Sp

Nute

Primate evolution from the perspective of molecular evolution. Mechanisms of change affecting informational and structural macromolecules, and their contributions to evolutionary diversification. Concordances and discordances between phylogenetic inferences based on biochemical and paleontological data. Prerequisites: 201 (or BIO 210, 211, 212), and GENET 451, and permission.

PHY A 494 Nonhuman Primate Growth and Development (3)

Newell

Significant physical and behavioral changes that occur from infancy to death with emphasis on the role of ontogeny in the evolution of primates. Prerequisites: 201, 370, and statistics.

PHY A 498 Advanced Topics in Physical Anthropology (3, max. 9)

Series of seminars on different aspects of physical anthropology. Prerequisite: permission.

PHY A 499 Undergraduate Research (*, max. 12) AWSpS

Prerequisite: permission.

Courses for Graduates Only

GENERAL

ANTH 600 Independent Study or Research (*) AWSp

ANTH 700 Master's Thesis (*)

ANTH 800 Doctoral Dissertation (*)

SOCIOCULTURAL ANTHROPOLOGY

ANTH 500 Preceptorial Reading (6)

For beginning graduate students who have not had adequate training in the problems, principles, and methods involved in the analysis and comparison of social and cultural systems.

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 521 Seminar on the Anthropological Study of Religion (3, max. 9) AW Moss, Keyes

Advanced seminar in the anthropological study of religion designed for students who have a background in the theory and applications of theory developed in the anthropological study of religion. Seminar topics vary each quarter. Prerequisites: 422 and graduate standing; permission for graduate students in Religious Studies.

ANTH 525 Seminar in Culture Processes (3, max. 6)

The concept of process and its application to the study of culture.

ANTH 527 Acculturation and Ethnicity (3)

Systematic analysis of psychological, social, and cultural implications of the contact of peoples.

ANTH 529 Seminar in Expressive Culture (3)

Detailed study of selected topics in expressive culture from an anthropological point of view. Prerequisite: 429 or permission.

ANTH 537 Political Anthropology and Law (3, max. 6)

Seminar on special topics in politics and law and their interrelationships. Prerequisites: 437, 439, or permission.

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)
Banfield
Syntactic and/or phonological analysis. Language varies. Offered jointly with LING 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 563 Structural Functional Analysis (3, max. 9)

ANTH 564 Formal Methods of Analysis for Social Anthropology (3)
Seminar on selected nonstatistical mathematical methods and models of relevance to various problems in social anthropology.

ANTH 565, 566, 567 History and Theory of Sociocultural Anthropology (5,5,5)
Core course sequence for the beginning graduate student in sociocultural anthropology in which the development of theory is analyzed and emphasis is placed on the relation between theory and a growing body of ethnographic data. Prerequisites: graduate standing in anthropology or permission; 565 for 566; 566 for 567.

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 SOC 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 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 with sources of material and techniques of wide applicability in the field situation. 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 570 Principles of Primate Taxonomy (3) W
Eck, Nute
Problems in primate classification involving consideration of living and fossil forms and the extent to which application of taxonomic principles can aid in both the definition and solution of these problems. Prerequisite: 488 or 489 or permission.

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. Prerequisite: permission.

PHY A 582 Demographic Genetics of Human Populations (5) Sp
Ward
The influence of demographic factors in the maintenance of genetic variability in human populations. The interaction of biological and sociocultural factors to produce specific demographic profiles. The demographic stability of small populations and factors influencing population regulation. Prerequisites: 482 or GENET 562, and permission.

PHY A 583 Topics in Growth and Development (3, max. 9)
Seminar dealing with various topics of primate growth and development. Topics vary from quarter to quarter. Prerequisite: 484 or 494 or permission.

PHY A 584 Topics in Ecology and Adaptation (3, max. 9)
Seminar dealing with various aspects of ecology and adaptation. Topics vary from quarter to quarter. Prerequisite: 483 or permission.

PHY A 587 Genetic Epidemiology (3) A
Ward
Epidemiology of genetic disease and genetic aspects of the epidemiological distribution of disease in a variety of different populations. Factors influencing reproductive outcome and subsequent growth and development. Interaction of genetic and environmental factors to produce multifactorial diseases. Biological cost of cultural transition: interaction of changing demographic profiles with rapid environmental change (including the influence of public health programs and medical care) to produce new profiles of disease. The genetic consequence of such changes. Offered jointly with EPI 587. Prerequisite: 482 or permission.

PHY A 588 Topics in Primate Evolution (3) WSpS
Eck
Emphasis on fossil taxa and their importance in understanding the morphologies and distributions of members of modern taxa. Prerequisites: 488 and permission.

PHY A 589 Topics in Hominid Evolution (3) A
Eck
Emphasis on the fossil taxa and their importance in understanding the evolutionary history of the modern genus. Prerequisites: 489 and permission.

PHY A 600 Independent Study or Research (*)
AWSpS
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.

HUM 201 The Arts and the Child (3) AWSpS
Cooper, Raven, Silks
Interdisciplinary orientation to the arts designed to acquaint the student with structural and esthetic elements common to art, drama, and music, and those arts-related processes of self-expression and communication basic to a child's general education.

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 105, 106, 107 Drawing (3,3,3)
Perspective, light and shade, composition. Prerequisites: 105 for 106; 106 for 107.

ART 109, 110 Design (3,3)
Art structure as the basis for creative work. Organization of line, space, and color. 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 Graphic Design (3)
Series of basic graphic design projects that involve the primary concerns of visual communication. Projects are intended to reveal the design abilities of the student as well as to offer an introduction to the profession. Prerequisites: 107, 110, 129.

ART 206 Graphic Design (5)
Basic graphic design projects in visual communication. Emphasis is placed on attitudes of investigation and implementation. Prerequisite: 205.

ART 207 Graphic Design: Visual Methods (3, max. 6)
First in a series of courses that apply the fundamentals of photography and photomechanical processes to design. Comprised of theory, demonstration, and laboratory. Prerequisite: 206, which may be taken concurrently.

ART 208 Graphic Design: Visual Methods (3, max. 6)
Photography/illustration and processes related to visual communications and advertising design. Prerequisite: 207, which may be taken concurrently.

COLLEGE OF ARTS AND SCIENCES

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 dyeing 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 esthetic aspects. Prerequisites: 107, 110, 129.

ART 255 Design and Materials: Textile

Construction (3, max. 9)

Knitting, hooking, stitching, and other nonwoven constructional techniques with a variety of textile fibers. 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 263 Introduction to Interior Design (5) Sp

Lew
Covers graphics, structure, space analysis, and the materials of design essential to the profession. Prerequisites: ARCH 300, 301, 310, 311; third-quarter sophomore standing in interior design and permission.

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)

Survey of major crafts from ancient to present times presented through lecture, slides, and films. Studio activity with demonstrations of simple crafts as well as student-initiated craft projects. 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, 263; H EC 125 for 310; 310 for 311; 311 for 312.

ART 316, 317, 318 Design for Industry (5,5,5)

Product design, working drawings, models, presentation drawings, product analysis, display, marketing. Prerequisites: 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 film-makers and their unique contribution to the art of film.

ART 332 Intermediate Sculpture Composition (5,

max. 15)

Advanced work in various media and techniques. Prerequisite: 274.

ART 335 Metal Casting (3)

Introduction to foundry techniques as applied to fine arts casting of nonferrous material. Prerequisite: 6 credits from 272.

ART 336 Advanced Metal Casting (5) Sp

Taylor

Foundry techniques as applied to the casting of art objects. Prerequisites: 335 and permission.

ART 337 Welding (3, max. 6)

Study and application of welding methods as a sculpture technique making use of oxyacetylene, electric arc, and hellarc. Prerequisite: 6 credits from 272.

ART 339 Film Making (5, max. 15)

Fundamentals of camera techniques: lens lighting, meter reading, filming speeds, film types, cinematic

movement, camera movement. Fundamentals of film editing, splicing and timing, sound recording, and synchronizing. Prerequisite: permission.

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. Prerequisites: 203 and permission.

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, and permission.

ART 359 Enameling (5)

Enamel design for metal work or jewelry, champleve, Plique-a-jour, Limoges, Cloissonne on copper, silver, or gold. Prerequisite: 357 or 358.

ART 360 Life (3, 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)

Intermediate graphic design. Theory and presentation. To be taken concurrently with 376, 377, 378. Prerequisites: 207 (3 credits) and 208 (3 credits) for 366; 366 for 367; 367 for 368.

ART 370 Light and Color (3) W

Color in nature and in art, pigments, properties of light, light intensity, the eye, perspective, and other related topics, examined from the point of view of the fine artist and the scientist. Background in literature, history, or fine arts needed. Offered jointly with PHYS 310. Not open to students who have taken GIS 257. Prerequisite: junior standing.

ART 371 Order and Disorder (3)

Symmetry, rhythm, sizes and shapes of things, chaos, and other related concepts examined from the point of view of the fine artist and the scientist. Background in literature, history, or fine arts needed. Not open to students who have taken GIS 239. Offered jointly with PHYS 311. Prerequisite: junior standing.

ART 376, 377, 378 Graphic Design (3,3,3)

Intermediate graphic design. Specialized investigations. To be taken concurrently with 366, 367, 368. Prerequisites: 207 and 208 for 376; 376 for 377; 377 for 378.

ART 411 Graphic Design (3 or 5, max. 15)

Advanced photography. Emphasis on individual creative projects. Prerequisite: permission.

ART 420 Visual Inventions: Multi-Media (5, max. 15)

Kehi
Experimental approach to visual problems employing a variety of media and allowing for a maximum of individual expression in their solution. Prerequisite: junior standing in art.

ART 430 Advanced Biological and Medical

Illustration (2, max. 6) AWSp

Wood

Studio-lecture course of special projects in scientific illustration using both line and continuous-tone techniques. Emphasis is placed on accurate observation and interpretation of specimen with practical application to publication requirements. Prerequisite: permission.

ART 436 Sculpture Composition (5, max. 15)

Individual compositions in various media in large scale. Prerequisites: 15 credits from 332, and permission.

ART 439 Advanced Film Making (5, max. 15)
Advanced individual projects in film-making. 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 452 Video Art (5, max. 15)
Discussion, demonstrations, and practical experiments in closed-circuit television and videotape as creative media. Prerequisites: extensive work in printmaking and film and permission.

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)
Advanced graphic design. Theory and presentation. To be taken concurrently with 478, 479, 480. Prerequisites: 368, 378 for 466; 466 for 467; 467 for 468.

ART 472, 473, 474 Advanced Interior Design (5,5,5)
Comprehensive problems related to contemporary needs, both public areas and residences, usually offered in conjunction with off-campus designers. Further research of historic interior masterpieces. Models, materials and their sources, perspective and working drawings. Prerequisites: 312 for 472; 472 for 473; 473 for 474.

ART 478, 479, 480 Graphic Design (3,3,3)
Advanced graphic design. Specialized investigations. To be taken concurrently with 466, 467, 468. Prerequisites: 368, 378 for 478; 478 for 479; 479 for 480.

ART 485 Advanced Ceramic Art (5, max. 15)
Pottery design and construction, stoneware, clay bodies, glazes. Prerequisite: 15 credits from 353 and permission.

ART 490 Art Education in the Schools (3)
For school administrators and teachers requiring help in problems relating 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 Survey of Western Art—Ancient (5)
Introduction to the major achievements in painting, sculpture, architecture, and the decorative arts in Europe, the Near East, and North Africa, from prehistoric times to the beginnings of Christianity.

ART H 202 Survey of Western Art—Medieval (3)
The arts of the Byzantine Empire, Islam, and Western Christendom through the fifteenth century.

ART H 203 Survey of Western Art—Modern (3)
European art and its extensions from 1500 to the present.

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 211 Survey of Asian Art (5)
Origins and interplay of the major movements of Asian art. (Formerly 301.)

ART H 230 Afro-American Art (3)
History of Afro-American art from colonial times until the present, the African background and its extensions into the West Indies, Brazil, and Surinam.

ART H 302 Egyptian Art (5)
Arts and architecture of the Nile Valley from the Neolithic to the end of the Coptic period. Prerequisite: upper-division standing.

ART H 316 Japanese Painting (5)
Survey of Japanese painting traditions from earliest times to the present. Examples of each tradition are illustrated and discussed in the context of Japanese cultural history. Analysis is made of painting styles as well as of the roles artists have played and the meaning their works have had in Japanese society. Prerequisite: upper-division standing.

ART H 321 Art of India (5)
Arts and architecture of India and peripheral regions from prehistoric times to the modern period. Prerequisite: upper-division standing. (Formerly 421.)

ART H 331 Tribal Art (5)
Survey of the arts of sub-Saharan Africa and Oceania from prehistoric times to the present, and the pre-Columbian arts of Central and South America. Prerequisite: upper-division standing.

ART H 333 Art of the Northwest Coast Indian (3)
Northwest coast Indian art, with emphasis on the structure and style of two-dimensional art of the northern tribes. Offered jointly with ANTH 333. Prerequisite: sophomore standing.

ART H 334 Art of the Northwest Coast Indian (3)
Three-dimensional art of the Northwest coast culture area, with emphasis on esthetic principles, techniques, cultural functions. Offered jointly with ANTH 334. Prerequisite: sophomore standing.

ART H 335 Art of the Northwest Coast Indian (3)
Northwest coast Indian art as related to drama and dance, with special attention to the Southern Kwakwaka'wakw. Offered jointly with ANTH 335. Prerequisite: sophomore standing.

ART H 340 Pre-Classical Art and Archaeology (3)
Survey of the art and the other material remains of the civilizations in the Aegean from the Neolithic Age to the end of the Bronze Age, with special emphasis on Minoan Crete and the Mycenaean kingdoms of mainland Greece; illustrated by slides. The history, techniques, and results of significant excavations are examined. Offered jointly with CL AR 340.

ART H 341 Greek Art and Archaeology (3)
Survey of the material remains and the developing styles in sculpture, vase painting, architecture, and the minor arts from the Geometric to the Hellenistic periods; illustrated by slides. Principal sites and monuments, as well as techniques and methods of excavation, are examined in an attempt to reconstruct the material culture of antiquity. Offered jointly with CL AR 341.

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

ART H 351 Early Medieval and Byzantine Art (5)
Christian art and architecture of the Roman and Byzantine empires and of Western Europe through the eighth century. Prerequisite: upper-division standing.

ART H 352 High and Late Medieval Art (5)
Art and architecture of Western Christendom from the time of Charlemagne to the Renaissance. Prerequisite: upper-division standing.

ART H 361 Italian Renaissance Art (5)
Sculpture, painting, and architecture from 1300 to 1600. Prerequisite: upper-division standing. (Formerly 306.)

ART H 371 Baroque Art (5)
Arts and architecture of Europe from the end of the sixteenth century to the first years of the eighteenth century. Prerequisite: upper-division standing. (Formerly 307.)

ART H 372 Rococo to Romanticism (5)
Mainstream of European art and architecture from about 1710 to about 1830. Attention is also given to Central and Eastern Europe, Scandinavia, and the colonial Americas. Prerequisite: upper-division standing.

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ART H 380 Nineteenth- and Twentieth-Century Art (5)

Arts and architecture of Europe and America from Realism to the present, with emphasis on stylistic and thematic changes in painting. Prerequisite: upper-division standing. (Formerly 308.)

ART H 381 Painting Since the Renaissance (2)

Illustrated lectures. Prerequisite: 203.

ART H 411 Early Chinese Painting: T'ang to Yuan (3)

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)

Chinese painting from the time that the study of individual masters becomes the main task at hand. Prerequisite: upper-division standing.

ART H 415 Early Japanese Painting: Twelfth to Sixteenth Century (3)

Yamato-e and the art of the illustrated hand-scroll of Heian and Kamakura times, and the ink landscape tradition associated with Shubun and Sesshu. Prerequisite: upper-division standing.

ART H 416 Later Japanese Paintings: Sixteenth to Nineteenth Century (3)

Survey of later Japanese painting with emphasis on the art of the Kano, Sotatsu/Korin, Shijo/Maruyama, and Nanga schools. Prerequisite: upper-division standing.

ART H 417 Buddhist Painting of China and Japan (3)

Survey of Buddhist painting in China and Japan from the fifth century until *circa* 1300. Prerequisite: upper-division standing.

ART H 418 Buddhist Sculpture of China and Japan (3)

Survey of Buddhist sculpture in China and Japan from the fifth century until *circa* 1300. Prerequisite: upper-division standing.

ART H 419 Chinese and Japanese Architecture (3)

Religious and secular architecture of China and Japan, with emphasis on Japanese temples and shrines. Prerequisite: upper-division standing.

ART H 420 Art of the Japanese Print (3)

Foundations of Ukiyo-e in Japanese genre from the twelfth through the mid-seventeenth centuries; woodblock technique from the Heian period through the early Edo period. Emphasis on the changing styles and subject matter in Ukiyo-e Hanga from Moronobu through Kuniyoshi. Prerequisite: upper-division standing.

ART H 429 Islamic Religious Art: Mosques (3)

Survey of Islamic religious art as seen primarily in the mosque and its decoration. Emphasis on the development of the mosque form and its various manifestations throughout the Islamic world. Attention is paid to the language and function of pattern and decoration as embodied in the mosque. Prerequisite: upper-division standing.

ART H 431 Pre-Columbian Art (3)

Stylistic and contextual study of the arts of pre-Columbian cultures of Central and South America from prehistoric times to European contact. Prerequisite: upper-division standing.

ART H 432 Oceanic Art (3)

Stylistic and contextual study of the arts of Oceania, through a survey of the cultures of Polynesia, Micronesia, Melanesia, and Australia. Prerequisite: upper-division standing.

ART H 436 Arts of Sub-Saharan Africa I (3)

Stylistic and contextual study of the traditional arts of the Western Sudan and the Western Guinea coast with their archaeological antecedents. Prerequisite: upper-division standing.

ART H 437 Arts of Sub-Saharan Africa II (3)

Survey of the traditional arts of the Central Guinea coast, Nigeria, Cameroon, and Gabon, from pre-

contact times to the present. Prerequisite: upper-division standing.

ART H 438 Arts of Sub-Saharan Africa III (3)

Stylistic and contextual study of the arts of Zaïre, Angola, the Swahili coast, and southern Africa. Prerequisite: upper-division standing.

ART H 439 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)

Shapes, fabrics, and decorations from the Neolithic period to the sixth century, A.D. Offered jointly with CL AR 442.

ART H 444 Greek and Roman Sculpture (3)

History and development of Greek sculpture and sculptors, their Roman copyists, and Roman portraits and sarcophagi. Emphasis on Greek sculpture of the fifth century B.C. Offered jointly with CL AR 444.

ART H 446 Greek Architecture (3)

Detailed study of Greek architecture from its beginnings, with special emphasis on the Periclean building program in fifth-century Athens. Offered jointly with CL AR 446 and ARCH 446.

ART H 454 Romanesque Art (3)

Western European art in the eleventh and twelfth centuries, focusing on monuments along the pilgrimage roads to Compostela in France and Spain. Prerequisite: upper-division standing. (Formerly 453.)

ART H 459 Late Medieval Art of Germany and Central Europe (3)

Painting, printmaking, sculpture, and architecture of the fourteenth and fifteenth centuries. Prerequisite: upper-division standing.

ART H 460 Netherlandish Art—Late Medieval and Renaissance (3)

Arts and architecture of the northern and southern Netherlands from the last half of the fourteenth century through Pieter Bruegel. Prerequisite: upper-division standing.

ART H 461 Early Renaissance Painting in Italy (3)

Painting of the fourteenth and fifteenth centuries in central and northern Italy. Prerequisite: upper-division standing.

ART H 462 High Renaissance Painting in Italy (3)

Painting in central and northern Italy, *circa* 1480 to *circa* 1530: Leonardo, Raphael, the early Michelangelo, Sarto, Correggio, Bellini, Giorgione, and the early Titian. Prerequisite: upper-division standing.

ART H 463 Italian Renaissance Sculpture (3)

From Nicola Pisano to Giambologna. Prerequisite: upper-division standing.

ART H 464 Late Renaissance Painting in Italy (3)

Painting in central and northern Italy, *circa* 1515 to *circa* 1580: Pontormo, Rosso, Parmigianino, Bocciafumi, the later Michelangelo, Vasari, Bronzino, Salviati, the later Titian, Tintoretto, and Veronese. Prerequisite: upper-division standing.

ART H 465 Italian Renaissance Architecture (3)

From the cathedral of Florence to St. Peter's in Rome: the style, symbolism, and theory of architecture. Prerequisite: upper-division standing.

ART H 467 The German Renaissance (3)

Painting, printmaking, sculpture, and architecture of the sixteenth century in Germany, Alsace, Austria, and Switzerland. Prerequisite: upper-division standing.

ART H 471 Rome in the Seventeenth Century (3)

Painting, sculpture, and architecture; concentration on Caravaggio, Bernini, Poussin, and Borromini. Prerequisite: upper-division standing.

ART H 472 French Art—Seventeenth Century (3)

Painting, sculpture, and prints. Special attention is

given to relations with Italy and the lowlands. Prerequisite: upper-division standing.

ART H 473 Age of Rembrandt and Vermeer (3)

Art of the Dutch Republic in the late sixteenth and seventeenth centuries, concentrating on painting, prints, and drawings. Prerequisite: upper-division standing.

ART H 475 The Age of Rubens (3)

Flemish art from the late sixteenth century to about 1650, concentrating on the sources, influence, and European cultural milieu of the art of Peter Paul Rubens. Prerequisite: upper-division standing.

ART H 476 Art—Eighteenth Century (3)

Painting, sculpture, and prints; emphasis on the successive phases of Rococo style and iconography and the emergence of Neoclassicism. Prerequisite: upper-division standing.

ART H 477 Religious Architecture in Colonial Mexico (3)

From the Great Conversion through Rococo: sixteenth-century monastic foundations and the metropolitan cathedrals; the Counterreformation, high Baroque, and Solomonic styles; continuation of orthodox articulation in the eighteenth century and Churrigueresque. Prerequisite: upper-division standing.

ART H 478 English and American Interior Design (3)

Illustrated lectures on the evolution of furniture and interior architecture from about 1400 to about 1830. Prerequisite: 203 or upper-division standing.

ART H 479 Italian and French Interior Design (3)

History of interior architecture and furnishings of Italy and France from the Dark Ages to the early nineteenth century. Prerequisite: 203 or upper-division standing.

ART H 481 Origins of Modern Art (3)

Stylistic and iconographic study of European painting and sculpture from 1750 to 1848. Prerequisite: upper-division standing.

ART H 482 Impressionism and Post-Impressionism (3)

Stylistic and iconographic study of European painting and sculpture from 1848 to 1900. Prerequisite: upper-division standing.

ART H 483 Art of the Twentieth Century (3)

Painting and sculpture in Europe and America from 1900 to the present. Prerequisite: upper-division standing.

ART H 484 Thematic Studies in Modern Art (3, max. 6)

Approach to art of the nineteenth/twentieth centuries through thematic content. The focus varies from year to year: for example, development of landscape painting; treatment of the figure; woman in art; the crisis in portraiture. Prerequisite: 203 or 380 or permission.

ART H 486 Studies in American Colonial Art (3, max. 6)

Surveys of architecture, town design, painting, sculpture, and the decorative arts in the eastern and southwestern colonies from original European settlement until the Revolutionary War. Key figures and developments in English art and architecture are included. Content of the course varies from quarter to quarter. Specific details available from the Art advisory office or from the instructor. Prerequisite: upper-division standing.

ART H 487 American Art from the Revolution to the Civil War (3)

Survey of painting, sculpture, and architecture during the federal and early industrial periods. Developments in printmaking, the decorative arts, and folk art are also studied. Prerequisite: upper-division standing.

ART H 489 Mexican Painting Since 1790 (3)

Colonial background and the emergence of the national style in the nineteenth century in portraiture, genre, and history painting; the persistence of naive art; the proto-modernists, *circa* 1880-1920; and the

casel paintings and mural cycles of Diego Rivera and Jose Clemente Orozco. Prerequisite: upper-division standing.

ART H 490 French Art and Literature: Period Studies (5)
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 FREN 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). (Formerly 485.)

ART H 491, 492, 493 Art History and Criticism (3,3,3)

ART H 494 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. (Formerly 404.)

ART H 495 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 Cezanne, Van Gogh, and Gauguin. Prerequisite: permission. (Formerly 406.)

ART H 496 Study Abroad: Individual Projects (3-10, max. 20)
For participants in Study Abroad programs. Prerequisite: permission.

ART H 497 Art and Architecture of the Kansai (8)
Study, conducted in the field and in lecture/discussion sessions, of all the important monuments of Japanese art in the temples, shrines, and museums of Kyoto, Otsu, Nara, Osaka, and their vicinities. (Formerly 420.)

ART H 498 Individual Projects (3, max. 9)
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 standing in art history; others by permission.

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)
Critical appraisal of the principal research methods, theories, and types of literature dealing with the art of China. Prerequisite: permission.

ART H 515 Seminar in Japanese Art (3, max. 9)
Critical appraisal of the principal research methods, theories, and types of literature dealing with the art of Japan. Prerequisite: permission.

ART H 521 Seminar in Indian Art (3, max. 9)
Critical appraisal of the principal research methods, theories, and types of literature dealing with the art of India. Prerequisite: 421.

ART H 531 Seminar in Tribal Art (3, max. 9)
Methodological and cross-disciplinary problems 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 fourteenth through fifteenth centuries. Prerequisite: permission.

ART H 577 Seminar in Baroque Art (3, max. 9)
Iconographic and stylistic problems of the art of the Baroque period, with emphasis on the principal research methods, theories, and types of literature dealing with the art of the seventeenth and eighteenth centuries in Europe. Prerequisite: permission.

ART H 581 Problems in Modern Art (3, max. 9)
Art-historical problems of the nineteenth and twentieth centuries. Prerequisite: permission.

ART H 590 Seminar in Criticism of Contemporary Art (3, max. 9)
Contemporary art and appropriate critical methodology. Prerequisite: 581.

ART H 600 Independent Study or Research (*)

ART H 700 Master's Thesis (*)

ART H 800 Doctoral Dissertation (*)

ASIAN AMERICAN STUDIES

Courses for Undergraduates

AAS 205 Asian American Cultures (5) A
Provides an overview and an insight into the Asian American subcultures; presents the evolution of Asian American cultures in the United States from 1850 to the present—immigration patterns, evolution of subcultures, evacuation, interracial relations, assimilation, and signs of social disorganization. Not open to students who have taken GIS 305.

AAS 305 Asian American Cultures for Teachers (5) S
Morishima
Specially designed for teachers who wish to learn more about the history, culture, and current concerns of Asians in the United States. Implication for elementary and secondary school are considered. Not open to students who have taken 205, 405, or GIS 305. Prerequisite: permission.

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

AAS 400 Asian American Literary Expression (5) Sp
Focus is on the representative writings, during the last quarter of a century, by those of Chinese, Filipino, Japanese, and Korean ancestry who were born, raised, and educated in America. Essays, novels, plays, and poetry offer a wide range of ideas, attitudes, and concerns of citizens of Asian ancestry whose experience in the United States has been significantly affected by their own unique position in this society. Prerequisite: 205 or 405, or permission.

AAS 405 Asian American Culture (5) AWSp
See 205 for course description. In addition, each student is required to write a minithesis on a special topic and is expected to teach at least one class session. Open only to graduate students; not open to students who have taken 205, 305, or GIS 305. Prerequisites: permission of instructor and student's graduate adviser.

AAS 442 Social Policy and the Asian American Community (5) W
Lee, Russell
Presentation of theoretical bases of a variety of social policies. Focus on organizational and power structures in a variety of social institutions. Real-life examples enable students to see the implications of social policies for an ethnic community. Prerequisite: 205 or equivalent, or permission.

AAS 443 Undergraduate Field Experience (3-5, max. 15) AWSpS
Individual consultation with faculty member(s) and supervised practicum experience in a broad range

of community settings and agencies dealing with Asian Americans. A minimum of one weekly meeting with the faculty member is required. The student is required to submit an in-depth analysis of the experience upon termination of the internship. Prerequisites: 350 or 442 or equivalent, and permission.

AAS 490 Asian American Studies—Special Topics (3, max. 9) AWSpS
Prerequisite: 205 or permission.

AAS 499 Undergraduate Independent Study (1-5, max. 10) AWSpS
Students engage in a variety of possible projects dealing with Asian Americans. The potential projects range from selected readings in preparation for potential research projects to actual experience in conducting research. All such projects are conducted under the auspices of faculty affiliated with the Asian American Studies Program. Students may work individually or in teams, depending upon the scope of the projects or the faculty adviser. Prerequisites: 205 or equivalent, and permission.

ASIAN LANGUAGES AND LITERATURE

Courses for Undergraduates

ASIAN

ASIAN 401 Introduction to East Asian Linguistics (3) A
Norman
Introduction to the structures of the more important East Asian languages with emphasis on phonology. Prerequisite: two years of an East Asian language.

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 dialogues 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. Emphasis is placed on learning correct pronunciation 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
Covers same material as 111 and 112. In conjunction with 222 and 223, allows completion of two years' language study in one school year.

CHIN 134 First-Year Intensive Chinese (15) S
Introduction to sounds and structure of modern Chinese (Mandarin) by the inductive method. After acquiring a certain familiarity with the language, students are introduced to the written language. This course is especially recommended for students (particularly graduates) who plan to devote more time to other subjects during the regular academic year. (Offered Summer Quarter only.)

CHIN 211, 212, 213 Second-Year Chinese (5,5,5) A,W,Sp
Yen
Continuation of 111, 112, 113. Learning of characters and reading of texts is emphasized. Oral practice and structural drill are continued. Prerequisite: 113 or 134, or permission.

CHIN 222 Accelerated Chinese (10) W
Norman
Covers same material as 113 and 211. In conjunction with 121 and 223, allows completion of two years' language study in one school year. Prerequisite: 121 or equivalent.

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CHIN 223 Accelerated Chinese (10) Sp

Norman

Covers same material as 212 and 213. In conjunction with 121 and 222, allows completion of two years' language study in one school year. Prerequisite: 222 or equivalent.

CHIN 234 Second-Year Intensive Chinese (15) S

Rapid learning of characters and reading of texts. Practice in conversational Chinese. Prerequisite: 113 or equivalent. (Offered Summer Quarter only.)

CHIN 300 Advanced Chinese Conversation (1-3, max. 9) A,W,Sp

Extensive practice in conversational Chinese.

CHIN 311, 312, 313 Third-Year Chinese (5,5,5)

A,W,Sp

Norman

Introduction to the reading of unedited texts of many types—newspaper articles, essays, short stories. Oral practice and structural drill are continued. Prerequisites: 213, 223, 234, or equivalent.

CHIN 334 Third-Year Intensive Chinese (15) S

Prerequisite: 213 or 223, or equivalent. (Offered Summer Quarter only.)

CHIN 407 Chinese Reference Works and

Bibliography (3) A

Lo

Introduction to the search of library information on Chinese studies through the use of basic reference works and modern library methods, with twenty-five percent of class time dealing with individual student's subject interest. Prerequisite: 313 or equivalent.

CHIN 411, 412, 413 Fourth-Year Chinese (5,5,5)

A,W,Sp

Brandauer

Reading of literary texts in the modern language. An introduction to the older vernacular style. Prerequisite: 313 or equivalent.

CHIN 415, 416, 417 Readings in Social Science

Texts (3,3,3) A,W,Sp

Yen

Introduction to reading current materials from People's Republic of China. Learning of simplified characters and new terminology. Prerequisite: 313 or equivalent.

CHIN 441, 442, 443 Structure of Chinese (3,3,3)

A,W,Sp

Yen

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

CHIN 451, 452, 453 First-Year Classical Chinese

(5,5,5) A,W,Sp

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 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 301-302, 303 Intermediate Hindi (5-5,5)

A,W,Sp

Shapiro

Systematic expansion of vocabulary and grammat-

ical 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

Haynes

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 inscriptional decipherment. Special emphasis on the introduction of grammatical terminology that is encountered in actual language courses.

INDN 400 Practicum in Minor South Asian

Languages (3, max. 18) A,W,Sp

Haynes, Ruegg, Schiffman, Shapiro, Thrasher

Introduction to any one of various minor South Asian languages (e.g., Kannada, Nepali, Sinhala, Marathi, Telugu, Braj) on a tutorial basis or as reading courses. Students may receive credit for more than one such language, and should check with relevant instructors for more information. Prerequisite: permission.

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 111, 112, 113 First-Year Japanese (5,5,5)

A,W,Sp

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 131 Intensive First-Year Japanese (15) A

Niwa

Beginning course covering same ground as 111, 112, 113 and requiring full-time commitment by the student. In conjunction with 232 and 333, allows completing of three years' language study in one school year. Prerequisite: permission. (Formerly 331.)

JAPAN 134 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 211, 212, 213 Second-Year Japanese

(5,5,5) A,W,Sp

Niwa

Reading and translation of modern Japanese. Also oral work in Japanese. Prerequisites: 111, 112, 113 or equivalent.

JAPAN 232 Intensive Second-Year Japanese (15)

W

Niwa

Covers same ground as 211, 212, 213, requiring full-time commitment by the student. In conjunction with 131 and 333, allows completion of three years language study in one school year. Prerequisites: 131 or equivalent, and permission. (Formerly 332.)

JAPAN 234 Second-Year Intensive Japanese (15)

S

Niwa

Beginning course in reading Japanese modern graded materials, with some translation and conversation. Classes conducted principally in Japanese; student is expected to be acquainted with all forms of spoken grammar. Prerequisite: equivalent of 113 or 131, which may be satisfied by placement examination. (Offered Summer Quarter only.)

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 333 Intensive Third-Year Japanese (15)

Sp

Niwa

Covers same ground as 311, 312, 313, requiring full-time commitment by the student. In conjunction with 131 and 232, allows completion of three years language study in one school year. Prerequisites: 232 or equivalent, and permission.

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: 213 or equivalent, and ASIAN 401.

JAPAN 411, 412, 413 Fourth-Year Japanese

(5,5,5) A,W,Sp

Miller

Reading, translation into English, and discussions in Japanese of modern written texts on the advanced level; during Winter Quarter and Spring Quarter the literary language (*bungo*) also is introduced. Prerequisite: 313 or permission.

JAPAN 431, 432, 433 Readings in Modern

Japanese Literature (5,5,5) A,W,Sp

Lyons

Reading and discussion of selected modern literary texts in the original language, concentrating on the short story and novel, and with close attention to grammar and syntax. Prerequisite: 313 or equivalent.

JAPAN 471, 472, 473 Readings in Classical

Japanese Literature (5,5,5) A,W,Sp

McKinnon

Readings in prose, poetry, and drama, antiquity to nineteenth century. Prerequisite: 313 or equivalent. (Formerly 551, 552, 553.)

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

S

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 224 Accelerated Spoken Korean (10) S

Lukoff

Fundamentals of practical spoken Korean, with emphasis on phonetic accuracy and fluency, and appropriateness of expression. Primarily for students in Korean language reading courses, but open to other students, provided they learn orthography within first two weeks of class. Prerequisite: 211-212 or equivalent. (Offered Summer Quarter only.)

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) AWSpS
For Korean language and literature majors. Prerequisite: permission.

MONGOLIAN

MONG 306 Manchu Grammar for Beginners (3) A

Norman
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. Prerequisite: permission.

MONG 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.

MONG 401, 402, 403 Written Mongolian (3,3,3) A,W,Sp

Norman
Introduction to Mongolian written in the vertical script. Texts of different periods and genres. Prerequisite: permission. (Offered alternate years.)

SANSKRIT

SNKRT 301, 302, 303 Introduction to Sanskrit (5,5,5) A,W,Sp

Thrasher
Intensive study of the basic grammatical structure of the classical language; reading of elementary texts from the epic and classical periods.

SNKRT 401, 402, 403 Intermediate Sanskrit (5,5,5) A,W,Sp

Thrasher
Advanced classical grammar; rapid reading of a *kavya* text or texts, ordinarily a drama or major prose work. Prerequisite: 303.

SNKRT 411, 412, 413 Advanced Sanskrit (5,5,5) A,W,Sp

Thrasher
Intensive reading and analysis of classical texts, chosen from the *sastra* or belletristic literatures. Prerequisite: 403 or permission.

SNKRT 491, 492, 493 Vedic Studies (3,3,3) A,W,Sp

Thrasher
Readings of selected Vedic texts, with linguistic, religious, and historical analyses. Includes extensive background material on Vedic religion, literature, and culture. Prerequisite: 303 or equivalent. (491 formerly 493.)

SNKRT 494 Readings in Religious Classics of India (5) Sp

Potter, Thrasher
Introduction to the older religious literature, with emphasis on the Upanisads, the Dharmaśāstras, and the Bhagavad Gītā. Rapid reading of the texts, plus content analysis of the developing religious forms. Prerequisite: 402.

SNKRT 495 Studies in Indian Thought (3, max. 9) A

Ruegg
Buddhism and its religious and philosophical background in South Asia and Tibet. The original documents studied vary from year to year. Prerequisites: ability to undertake the study of original documents in Sanskrit or Pali or Tibetan and an introduction to Buddhist thought.

SNKRT 499 Undergraduate Research (3-5, max. 15) AWSp

For Sanskrit language and literature majors. Prerequisite: permission.

TAGLG 101, 102, 103 Elementary Tagalog (5,5,5) A,W,Sp

Sumulong
Introduction to the standard language of the Philippines, emphasizing pronunciation and elementary conversation; grammatical elements and basic structures; some reading and writing exercises. Includes discussion of the culture and literature. Prerequisite: permission.

TAMIL

TAMIL 201-202, 203 Elementary Tamil (5,5,5) A,W,Sp

Schliffman
Intensive introduction to the modern spoken language. Transformation drills are emphasized. The writing system and literary dialect are introduced at a suitable stage.

TAMIL 301-302, 303 Intermediate Tamil (5-5,5) A,W,Sp

Schliffman
Intensified use of the modern spoken language, beginning with moderately difficult conversation and drills, and working up to more advanced materials, including radio, plays, continuation of work with written language. Prerequisite: 203.

TAMIL 401, 402, 403 Advanced Tamil (5,5,5) A,W,Sp

Schliffman
Readings in modern literary Tamil. The modern novel and short story as seen in the writings of such writers as Jeyakanthan, Putumaipittan, Vayavan, Janakiraman, Sundara Ramaswamy, and Ramamirthan. Laboratory sessions continue practice in the colloquial dialect. Prerequisite: 303.

TAMIL 455 Structure of Dravidian (3)

Schliffman
Comparative analysis of the phonologies and morphologies of the major Dravidian languages.

TAMIL 499 Undergraduate Research (3-5, max. 15) AWSpS

For Tamil language and literature majors. Prerequisite: permission.

THAI

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.

THAI 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.

THAI 401, 402, 403 Intermediate Thai (5,5,5) A,W,Sp

Cooke
Reading of more complicated material in preparation for classes conducted in Thai in which material is discussed. Review of structure. Prerequisite: 303 or equivalent.

THAI 411, 412, 413 Readings in Thai (5,5,5) A,W,Sp

Cooke
Readings in a variety of modern styles with oral and written practice. Prerequisite: 403 or equivalent.

THAI 499 Undergraduate Research (3-5, max. 15) AWSpS

For Thai language and literature majors. Prerequisite: permission.

TIBETAN

TIB 401, 402, 403 Colloquial Tibetan (5,5,5) A,W,Sp

Norman
Introduction to phonology, morphology, and syntax

of spoken Tibetan (Lhasa dialect) by the inductive method.

TIB 404, 485, 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.

TIB 414 Readings in Tibetan (3, max. 9) AWSp

Wylie
Selections from various Tibetan materials. Prerequisite: 406 or equivalent.

TIB 421, 422, 423 Intermediate Colloquial Tibetan (5,5,5) A,W,Sp

Norman
Instruction and drill in advanced colloquial sentence patterns and syntactical constructions. Prerequisite: 403 or equivalent.

TIB 431, 432, 433 Third-Year Colloquial Tibetan (5,5,5) A,W,Sp

Norman
Advanced instruction and practice in colloquial Tibetan, Lhasa dialect, intended to build on previous oral-aural experience and increase fluency in the modern spoken language. Prerequisite: 423 or equivalent.

TIB 499 Undergraduate Research (3-5, max. 15) AWSpS

Norman, Wylie
For Asian languages and literature majors. Prerequisite: permission.

TURKIC

TKIC 301, 302, 303 Introduction to Uzbek (3,3,3) A,W,Sp

Cirtautas
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, Azerbaijani. (Offered alternate years; offered 1976-1977.)

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. Prerequisite: 303 or permission.

TKIC 404 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. (Offered alternate years; offered 1977-78.)

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) AWSpS

For Turkic language and literature majors. Prerequisite: permission.

LITERATURE COURSES IN ENGLISH

CHIN 361 Ideas and Literature in China, Early Period, in English (5) A

Wang
Historical survey of the major works of early Chinese literature (beginnings to third century A.D.), including introduction to early classics, and the development of poetry, rhyme-prose, and narrative and philosophical prose; major themes and ideas, with special emphasis on Confucianism and Taoism; reference to the political and social context, and relevant developments in the other arts (painting, music, etc.). Previous course work on China is not required. Prerequisite: permission.

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CHIN 362 Ideas and Literature in China, Middle Period, in English (5) W

Knechtges
Historical survey of the major works of Middle Chinese literature (third to thirteenth centuries A.D.), including introduction to the development of classical poetry, "song-verse" (tz'u), the classical essay, and classical short story; major themes and ideas, with special emphasis on Confucianism, Taoism, and Buddhism; political and social context, and relevant developments in the other arts (painting, music, etc.). Previous course work on China is not required. Prerequisite: permission.

CHIN 363 Ideas and Literature in China, Modern Period, in English (5) Sp

Brandauer
Historical survey of the major works of modern Chinese literature (thirteenth century A.D. to the present), including introduction to the development of vernacular literature such as the short story, drama, and novel; major themes and ideas, with special emphasis on Confucianism, Taoism, and Buddhism; political and social context, and relevant developments in the other arts (painting, music, etc.). Previous course work on China is not required. Prerequisite: permission.

INDN 420 Classical Indian Literature in English (5) A

Haynes
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

Haynes
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 321 History of Classical Japanese Literature in English (5) A

Lyons
Historical survey of major works in the Japanese literary tradition. Covers the period from the eighth through the midfourteenth centuries, when the prose and poetry associated with the imperial court developed, flourished, and waned. Prerequisite: permission.

JAPAN 322 History of Medieval Japanese Literature in English (5) W

Lyons
Historical survey of major works of medieval and premodern Japan, from the Muromachi period when the No drama flourished, through the popular literature of the Tokugawa period, including haiku poetry, Kabuki and Bunraku theaters, and comic fiction. Prerequisite: permission; 321 recommended.

JAPAN 323 History of Modern Japanese Literature in English (5) Sp

Lyons
Historical survey of major works in modern Japanese literature, from the late nineteenth century to the present, with particular emphasis on the novel. Prerequisite: permission; 321, 322 recommended.

JAPAN 425 The Japanese Novel in English (5) A

Rubin
Close examination and discussion of several classical and modern Japanese novels, with emphasis on theme and internal structure and their relationship to the Japanese prose tradition. Prerequisites: 321, 322, 323, or permission.

JAPAN 426 Japanese Poetry in English (5) W

Rubin
The *waka* tradition: its sources, developments, and deviations, including *Haiku*; poetic theory and criteria and their significance for the Japanese literary vision, both ancient and modern. Prerequisites: 321, 322, 323, or permission. (Formerly 441.)

JAPAN 427 Japanese Drama in English (5) Sp

Rubin
Examination of the No, Kyogen, Joruri, and Kabuki forms, with particular emphasis on the interrelationship of lyrical, narrative, and dramatic ele-

ments in the Japanese theater tradition. Prerequisite: 321, 322, 323, or permission. (Formerly 443.)

KOR 320 Korean Literature in English (5) Sp

Suh
Historical development of Korean literature. Special consideration of the relationship with Chinese and Japanese literature.

TKIC 320 Eastern Turkic Literature in English (3) A

Chiraitas
Covers both the historical (Chaghatai XV-XIX Centuries) and the modern (mainly Uzbek) periods of Eastern Turkish literature. History, types of literary works, and characteristic elements of prose and poetry are presented by using selected material translated into English. (Offered alternate years.)

Courses for Graduates Only

ASIAN LANGUAGES AND LITERATURE

ASIAN 590 Seminar in East Asian Shamanism (3-5, max. 15) AWSp

Suh
Focus on the primary source materials available for the study of East Asian Shamanism, especially Korean; includes bibliography, translation, and comparative studies of the Shamanism of Japan and China. Prerequisite: advanced reading ability in Korean, Japanese, or Chinese, or permission.

ASIAN 600 Independent Study or Research (*) AWSpS

ASIAN 700 Master's Thesis (*) AWSpS

ASIAN 800 Doctoral Dissertation (*) AWSpS

CHINESE

CHIN 540 Seminar on Chinese Linguistics (3, max. 9) WSp

Norman
Problems of Old and Middle Chinese phonology; dialectology. Prerequisites: 453 and ASIAN 401.

CHIN 542, 543 Introduction to Texts in Ancient Script (3,3) W,Sp

Serruys
Structure of Chinese characters. Development of Chinese script and related problems. Selected texts of inscriptions. 542: Shuo Wen. 543: Bronzes I. Prerequisite: permission. (Offered alternate years; offered 1976-77.)

CHIN 545, 546 Introduction to Texts in Ancient Script (3,3) W,Sp

Serruys
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 1977-78.)

CHIN 551 Second-Year Classical Chinese (5) A

Serruys
Continuation of 451, 452, 453. Focus on early Chou texts: problems of textual criticism and grammar. Prerequisite: 453 or equivalent.

CHIN 552, 553 Second-Year Classical Chinese (5,5) W,Sp

Knechtges
Readings in middle and late classical Chinese texts. Emphasis placed on *ku-wen* prose and historical texts. Prerequisite: 453 or equivalent.

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

Knechtges
Lectures on research methods and materials in Chinese literature. Seminar papers on problems of methodology. A different problem is discussed each quarter. Autumn Quarter includes a general introduction to basic reference works. It is recommended that students with no previous training in Sinological methods complete the Autumn Quarter course before enrolling in the winter or spring proseminar. Prerequisite: permission.

CHIN 561, 562, 563 Studies in Chinese Literature (5,5,5) A,W,Sp

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. Prerequisite: permission.

CHIN 573 Seminar in Chinese Poetry (5, max. 15) Sp

Wang
Directed study of selected works of poetry. Subject emphasis varies each year. Prerequisite: permission.

CHIN 580 Readings in Vernacular Chinese Fiction (5, max. 15) A

Brandauer
Readings and discussion of traditional vernacular texts. Emphasis placed on Sung, Yuan, and Ming short stories, such as those found in the *San-yen* collections; and on Ming and Ch'ing full-length novels, such as the *Shui-hu chuan*, *Hsi-yu chi*, and *Hung-lou meng*. Prerequisite: 413 or 453, or equivalent.

CHIN 581 Seminar in Chinese Drama (5, max. 15) A

Directed study of selected works of traditional drama, focusing on the Yuan *tsa-chu* and the Ming *ch-uan-ch'i* in alternate years. Prerequisite: permission.

CHIN 582 Seminar in Chinese Fiction (5, max. 15) W

Brandauer
Directed study of selected works of fiction, focusing on the vernacular short story and novel. Prerequisite: permission.

CHIN 591, 592, 593 Studies in the History of Chinese Thought (5,5,5) A,W,Sp

Directed readings in selected traditional philosophical texts (*Chuang-tzu*, *Han-fei-tzu*, *Lun-heng*, *Shih-shuo hsin-yu*), and documents of political thoughts and institutions. Subject emphasis varies each quarter. Prerequisite: permission.

HINDI-URDU

HD UR 501, 502, 503 Studies in Hindi-Urdu Literature (3,3,3) A,W,Sp

Haynes
Survey of contemporary Hindi-Urdu prose. Readings by Premchand, Prasad, Rakesh, and others. Prerequisite: 403 or equivalent.

HD UR 510 Structure of Hindi-Urdu (3)
Grammatical analysis of Hindi-Urdu, Hindi-Urdu phonology, syntax, and semantics. Readings from both Western and native grammarians. Prerequisite: 403 or permission, and a course in linguistics is recommended.

INDIAN

INDN 530 Readings in Pali Literature (3, max. 18) WSp

Ruegg
Readings and interpretation of intermediate and advanced texts in Pali, dealing with the Theravada countries of south and southeast Asia (Sri Lanka, Burma, Thailand, Etc.). Prerequisite: 402 or equivalent.

JAPANESE

JAPAN 501 Readings in Bibliographical Materials (5) Sp

Hiraga
Intensive reading and discussion of materials from principal bibliographical sources in the social sciences and the humanities pertaining to Asia. Reports on selected topics and problems. Prerequisite: 413 or permission.

JAPAN 505, 506, 507 Readings in Documentary Japanese (5,5,5) A,W,Sp

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.

JAPAN 531, 532, 533 Advanced Readings in Modern Japanese Literature (5,5,5) A,W,Sp

Rubin
Rapid reading of modern literary texts; discussion of style, content, and problems of literary translation. Prerequisite: 413 or 433 or equivalent.

JAPAN 547 Seminar on Japanese Linguistics (3) Sp

Miller
Directed study in problems in the history and structure of the Japanese language. Prerequisites: 405 and 406, or permission.

JAPAN 560 Seminar in Japanese Theatre (5, max. 15) AWSp

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: permission. (Offered alternate years; offered 1977-78.)

JAPAN 571, 572, 573 Advanced Readings in Classical Japanese Literature (5,5,5) A,W,Sp

McKinnon
Continued readings in classical literary texts. Prerequisite: 473 or permission.

JAPAN 590 Seminar in Japanese Literature (5, max. 15) AWSp

Lyons, McKinnon, Rubin
Close examination of selected periods, writers, or genres, including problems of literary criticism in Japanese literature. Prerequisite: permission. (Offered alternate years; offered 1976-77.)

KOREAN

KOR 501, 502, 503 Seminar in Korean (3-5,3-5,3-5) A,W,Sp

Lukoff
Suh
Readings in important works in Korean literature of the twentieth century. Prerequisite: 413 or permission. (Offered alternate years; offered 1977-78.)

KOR 531, 532, 533 Classical Korean Literature (5,5,5) A,W,Sp

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 1976-77.)

KOR 541, 542, 543 Readings in Hanmun Texts (5,5,5) A,W,Sp

Suh
Readings from representative authors from the fifteenth to the late nineteenth centuries. Prerequisites: 413, CHIN 451 or JAPAN 413, or permission. (Offered alternate years; offered 1977-78.)

KOR 550, 551, 552 Seminar in Korean Literature (3-5,3-5,3-5) A,W,Sp

Suh
Close examination of selected periods, writers, or genres, including literary criticism, in Korean literature. Prerequisite: 543 or 523, or permission. (Offered alternate years; offered 1976-77.)

MONGOLIAN

MONG 579 Comparative Altaic Linguistics (3)
Comparative phonology and morphology of Mongol and Turkic and other related languages. Offered jointly with LING 579. Prerequisite: permission.

SANSKRIT

SNKRT 550 Seminar on Sanskrit Literature (3, max. 9) AWSp

Thrasher
Close examination of selected authors, periods, or traditions, within the context of Indian literary history. Prerequisite: 403 or permission. (Offered alternate years.)

SNKRT 555 Seminar on Sanskrit Grammar (3, max. 6) WSp

Thrasher
Selected problems relating to the history of the Sanskrit language; reading and critical examination of the methodology of Panini's grammar. Prerequisite: 403 or permission. (Offered alternate years.)

SNKRT 560 Readings in Philosophical Sanskrit (3, max. 9) AWSp

Potter, Ruegg, Thrasher
Intensive reading and analysis of Hindu or Buddhist philosophical texts. Prerequisite: 494 or permission.

SNKRT 581, 582 Readings in Buddhist Texts (3, max. 9; 3, max. 9) W,Sp

Ruegg
Interpretation of original sources. Texts vary from year to year. Prerequisites: ability to study sources in the original languages and an introduction to Buddhist thought.

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. Prerequisite: 403 or permission.

TIBETAN

TIB 500 Advanced Literary Tibetan (3, max. 9) AWSp

Wylie
Reading of manuscripts and xylographs with emphasis on biographical, historical, and geographical material. Prerequisite: 406 or equivalent.

TIB 534 Buddhist Tibetan (2, max. 6) AWSp

Ruegg
Reading of Buddhist literature in translation and original Tibetan compositions. Prerequisite: 406 or equivalent.

TURKIC

TKIC 542, 543 Comparative and Historical Grammar of Turkic Languages (3,3) W,Sp

Cirataus
Classification of the Turkic languages; alphabets used; phonology, morphology, and syntax; lexical composition; structure changing developments. Prerequisites: 303 and 404, or TKISH 103. (Offered alternate years; offered 1977-78.)

TKIC 546 Old Turkic (3) W

Cirataus
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 1977-78.)

TKIC 547 Old Uighur (3) Sp

Cirataus
Introduction to script systems; phonology, morphology, and syntax. Reading and translation of mainly Buddhist texts in Uighur script, eighth through eleventh centuries. Prerequisite: permission or background in Old Turkic or a modern Turkic language. (Offered alternate years; offered 1977-78.)

TKIC 561, 562 Middle Turkic (3,3) A,W

Cirataus
Introduction to the phonology, morphology, and syntax of the Middle Turkic languages; reading and translation of texts in Karakhanid (eleventh-twelfth centuries), Khorazmian Turkic (thirteenth-four-

teenth centuries), Kipchak (thirteenth-fourteenth centuries), and Chagatai (fifteenth-sixteenth centuries). Prerequisite: permission. (Offered alternate years; offered 1976-77.)

TKIC 563 Seminar on Turkic Literature (5) Sp

Cirataus
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 1976-77.)

ASTRONOMY

Courses for Undergraduates

ASTR 101 Astronomy (5) AWSp

Emphasis placed on the astronomical concepts fundamental to our present understanding of the universe: the solar system, stars, galaxies, and cosmology. No credit for students who have taken 102.

ASTR 102 Introduction to Astronomy (5) Sp

Introduction to astronomy for students who have had high school physics or the equivalent introduction to physics at the college level. No credit for students who have taken 101. Prerequisite: one year of high school physics or PHYS 101-102 or 110, 111, 112.

ASTR 110 Cosmology: A Cosmic Perspective (3) A

Boynston
Historical discussion of man's continuing quest for an understanding of the physical universe. Emphasis on appreciation of modern cosmological ideas in the context of Greek and Renaissance thought, as well as current scientific concepts of the structure and evolution of our expanding universe.

ASTR 150 The Planets (3) A

Hodge
For liberal arts and beginning science students. Survey of the planets of the solar system, with emphases on recent space exploration of the planets and on the relationship of man and his earth to the other planets.

ASTR 201 The Universe and the Origin of Life (5)
Sequel to 101 or 102, emphasizing modern views of the atomic and molecular evolution of the universe from the initial "big bang" through the formation of the solar system and the emergence of biologic forms on the earth. The latter part of the course considers questions about the existence of, and communication with, extraterrestrial intelligent life, and finally the ultimate fate of the cosmos. Prerequisite: 101 or 102, or PHYS 110, or 114 or 121.

ASTR 301 Astronomy for Scientists and Engineers (3)

Introduction to astronomy for students in the physical sciences. Prerequisite: PHYS 123.

ASTR 321 Basic Astronomy (3) A

Solar system; planetary atmospheres, surfaces and interiors, the moon, comets. The solar wind and interplanetary medium. Formation of the solar system. Three hours of lecture per week. Prerequisites: PHYS 221, 222, 223, or equivalent.

ASTR 322 Basic Astronomy (3) W

General structure of our galaxy in terms of stars, gas, and dust. Interstellar gas, its physical state of temperature, density, ionization. Interstellar molecules and dust. Three hours of lecture per week. Prerequisites: PHYS 221, 222, 223, or equivalent.

ASTR 323 Basic Astronomy (3) Sp

Theory and practice of optical and radio astronomy, data acquisition, and reduction. One lecture hour and four hours of laboratory per week. Prerequisites: PHYS 221, 222, 223, or equivalent.

ASTR 431, 432 Astrophysics and Cosmology (3,3) A,W

Sun and stellar spectra, luminosities, radii, temperatures, and masses. Stellar structure, energy sources

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and composition. Stellar evolution and observational tests of stellar structure and evolution. Prerequisites: PHYS 222 and 223; PHYS 421 should be taken concurrently.

ASTR 433 Astrophysics and Cosmology (3) Sp
Galaxies, optical and radio morphology, and properties. Theory of spiral structure. Clusters of galaxies, the red-shift controversy, radio sources, and quasars. Observational cosmology. Prerequisites: PHYS 222 and 223.

ASTR 497 Topics in Current Astronomy (1-3)
Recent developments in one field of astronomy or astrophysics. Prerequisite varies according to the subject matter.

ASTR 499 Undergraduate Research (*, max. 15) AWP
Current or special astronomical problems. Prerequisite: permission.

Courses for Graduates Only

ASTR 500 Seminar in Elementary Astronomy Instruction (1, max. 5)
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)
Atmospheres, surfaces, and interiors of planets. Natural satellites, asteroids, comets, meteors, meteorites. Meteorite craters, micrometeorites, and meteoritic dust. Interplanetary medium. Prerequisite: modern physics.

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 on Planetary Atmospheres (2)

ASTR 507 Physical Foundations of Astrophysics I (3)
Survey of the 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 magnetohydrodynamics, basic theorems and application to stellar and interstellar magnetic fields. Introduction to plasma physics, waves in a plasma, kinetic theory and transport phenomena in astrophysics. Prerequisite: PHYS 513 or equivalent.

ASTR 511 Galactic Structure (3)
Kinematics, dynamics, and contents of the galaxy. Spiral structure. Structure of other galaxies. Evolution of galaxies. Prerequisite: modern physics.

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

ASTR 513 Cosmology (3)
Homogeneous isotropic models. Microwave and X-ray background radiation, radio galaxies, quasars. Nucleosynthesis, galaxy formation.

ASTR 521, 522 Stellar Atmospheres (3,3)
Theory of continuous radiation and spectral line formation. Applications to the sun and stars. Prerequisite: PHYS 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: PHYS 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 561 High Energy Astrophysics (3)
Observed properties of supernovae, X-ray stars, radio sources, quasars. Theories explaining such objects. Origin of cosmic rays.

ASTR 575 Seminar in Astronomy (1-2, max. 20)
Discussion of recent research in astronomy and astrophysics. Prerequisite: permission.

ASTR 576 Astronomy Colloquium (1, max. 20)
Current research topics in astronomy and astrophysics. Prerequisite: permission.

ASTR 581 Techniques in Optical Astronomy (3) S. Boynton, Wallerstein
Theory and practice of obtaining optical data. Astronomical photoelectric photometers, spectrum scanners, spectrographs, interferometers, image tube, and TV systems. Data-reduction techniques with emphasis on statistical analysis using digital computers. Observations with MRO 30-inch telescope.

ASTR 582 Techniques in Radio Astronomy (3) Balick, Sullivan
Theory and practice in the use of radio telescopes and receivers of all kinds. Course includes a single experiment conducted using 10"x40" student radio telescope in West Seattle. History, basic definitions, and place of radio astronomy; basics of Fourier transforms; general antenna theory; theory and practice of parabolic reflectors, other filled apertures, interferometers of many kinds, aperture synthesis arrays, and very long baseline interferometry; microwave receiver systems.

ASTR 597 Topics in Observational Astrophysics (1-5, max. 20)

ASTR 598 Topics in Theoretical Astrophysics (1-5, max. 20)

ASTR 600 Independent Study or Research (*) AWP

ASTR 700 Master's Thesis (*) AWP

ASTR 800 Doctoral Dissertation (*) AWP

ATMOSPHERIC SCIENCES

Courses for Undergraduates

ATM S 101 Survey of the Atmosphere (5) AWP
Composition and structure of earth's atmosphere; relation of earth to sun and consequent geographical temperature distribution; processes within the atmosphere that produce rain, snow, and other condensation phenomena; tropical and extratropical storms, thunderstorms, chinooks, and cold waves.

ATM S 109 Geophysical Phenomena (4) Sp LaChapelle
Simple techniques of observation and applications. Field study of variety of phenomena such as color of the sky, motion of a waterfall, shape of a snowflake, and the sound of wind. Use of 8-mm. motion picture techniques, including time-lapse studies. Offered jointly with GEOL 109. Prerequisite: permission.

ATM S 201 Introduction to the Atmosphere (3) W
Survey of the most important topics in meteorology

designed for beginning premajors or majors in physical science, engineering, and other technical fields. Composition and structure, radiative processes, water substance and processes, air motions. Prerequisites: one year of high school physics and MATH 124.

ATM S 301 Introduction to Atmospheric Sciences (5) A Reed, Houze
Composition and structure of the atmosphere. Solar and terrestrial radiation. Water substance and processes. Thermodynamic processes. Air motions. Physical properties and processes of the upper atmosphere. Prerequisites: MATH 124 and PHYS 123, or equivalent.

ATM S 321 Physical Climatology (5) Sp Webster
Earth's climate is discussed in terms of its evolution, change, and present state. Using the similarities and differences of the climates of the planets of the solar system as examples, the role of the primary controls of radiation, planetary dimensions, and atmospheric and surface composition as determining factors of the earth's climate are examined. Prerequisite: 101 or 201 or 301.

ATM S 329 Microclimatology (3) Asp Fritschen
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 FOR B 329. Prerequisite: 101 or 201 or 301, or permission.

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

ATM S 351 Atmospheric Observations and Analysis (5) A Badgley, Reed
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: MATH 224, PHYS 123.

ATM S 406 Geophysics: The Atmosphere (3) W Leovy
Structure and composition of the atmosphere, atmospheric radiation, use of meteorological data, humidity and cloud processes, structure and dynamics of large-scale weather systems. Offered jointly with GPHYS 406. Prerequisite: GPHYS 404 or permission.

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

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

ATM S 435 Introduction to Cloud Processes (3) W
Hobbs

Condensation nuclei. Thermodynamics and dynamics of convection. Development of precipitation in warm clouds. Ice nuclei; growth of ice particles in clouds. Orographic clouds and precipitation. Artificial modification. Atmospheric electricity. Prerequisite: 340 or permission.

ATM S 441, 442 Atmospheric Motions (5,5) A,W
Holton, Reed, Wallace

441: preliminary mathematics, vector operations, fundamental equations, simple manipulations of equations, circulation and vorticity, the role of friction. Prerequisites: 340 or MATH 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, elementary time-series analysis, objective map analysis. Prerequisites: 351, ENGR 141, or equivalent.

ATM S 452 Forecasting Laboratory (5) Sp
Houze, Reed, Wallace

Daily practice in map analysis and forecasting, using current weather data. Severe-storm forecasting. Statistical methods. Prerequisites: 351 and 441.

ATM S 462 Sea-Air Transfer Processes (6) S
Badgley

Classroom work and field observations relating to the physical processes occurring at ocean-atmosphere boundary. Transfer of energy, momentum, and moisture and their effects on small-scale and large-scale phenomena, including fog formation, convection, modification of air masses. Prerequisite: 442 or permission.

ATM S 492 Readings in Meteorology or Climatology (*) AWSp
Prerequisite: permission.

ATM S 493 Special Problems in Meteorology or Climatology (*) AWSp
Prerequisite: permission.

Courses for Graduates Only

ATM S 501 Fundamentals of Physical and Synoptic Meteorology (6) A
Hobbs, Wallace

Fundamentals of hydrostatics, thermodynamics, radiative transfer with application to planetary atmospheres. Global energy balance and general circulation. Atmospheric chemistry. Cloud physics. Elementary synoptic analysis. Description and qualitative physical interpretation of atmospheric composition, structure, and motions.

ATM S 510 Physics of Ice (3) A
Hobbs

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. Ice in the atmosphere. Offered jointly with GPHYS 510. Prerequisite: permission.

ATM S 511 Glaciology I: Formation of Snow and Ice Masses (3) W
Raymond

Snow climatology. Transport of snow by wind. Transfer of radiative, sensible, and latent heat at the surface of snow and ice. Freezing of natural water bodies. Heat and mass budget of ice masses. Theories of ice ages. Offered jointly with GPHYS 511. Prerequisite: 510 or permission.

ATM S 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 GPHYS 512. Prerequisites: 510, 511, or permission.

ATM S 513 Glaciology III: Structural Glaciology (3) A
Raymond

Snow metamorphism and primary layering. Dynamic metamorphism, flow structures, and relation to ice deformation. Structure of river, lake, and sea ice. The role and behavior of foreign matter. Physical processes of structural change and relationship between structures and bulk physical properties. Offered jointly with GPHYS 513. Prerequisites: 510, 511, 512, or permission.

ATM S 514 Field Glaciology (6) Sp
LaChapelle, Raymond

Structure and metamorphism of snow cover. Energy exchange at melting snow and ice surfaces. Deformation and flow of glaciers. Climatology and mass budgets. Glacier features. Emphasis on instrumentation, field techniques, and data analysis. Offered jointly with GPHYS 514. Prerequisite: 511 or 512 or permission.

ATM S 521 Seminar in Atmospheric Dynamics (*) AWSp
Holton

Directed at current research in the subject. For advanced students. Prerequisite: permission.

ATM S 523 Seminar in Cloud Physics (*) ASP
Hobbs

See 521 for course description.

ATM S 524 Seminar in Energy Transfer (*) AWSp
Businger

See 521 for course description.

ATM S 525 Seminar in Atmospheric Problems Associated With Air Pollution (2) W
Badgley, Charlson, Harrison

Seminar for both engineers and atmospheric scientists in the atmospheric problems related to air pollution. A wide variety of topics is covered. Offered jointly with CEWA 525. Prerequisite: 301 or permission.

ATM S 526 Seminar in Glaciology (*) ASP
LaChapelle

See 521 for course description.

ATM S 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 GPHYS 531. Prerequisite: PHYS 320.

ATM S 533 Atmospheric Radiation (3) W
Leovy

Solar spectrum. Atmospheric scattering, spectra of water vapor and other gases. Albedo of earth and atmosphere. Radiative heat balance. Prerequisites: PHYS 320 and MATH 238.

ATM S 534 Weather Sensing by Satellites (3) A
Harrison, Leovy

Flight characteristics of spacecraft. Physical laws of remote sensing using microwaves, infrared waves, and visible waves. The importance of surface parameters (temperature, emissivity, sea state). The inversion principle of atmospheric sounding. Comparison of weather analysis from earthbound and satellite data. Prerequisite: 431 or permission.

ATM S 535 The Physics of Clouds (3) Sp
Hobbs, Houze

Studies of the dynamics and microphysics of cloud and precipitation systems, with emphasis on numerical models and their verification. Prerequisite: 435 or permission.

ATM S 539 Dynamics of the Upper Atmosphere (3) A
Holton, Leovy

Properties of the ionosphere, electromagnetic wave propagation, the dynamics of the ionosphere. Of-

fered jointly with GPHYS 539. Prerequisite: 542 or permission.

ATM S 541, 542 Dynamic Meteorology (3,3) W,Sp
Fleagle, Holton, Leovy

541: equations of motion, energy equations, vorticity theory, barotropic fluids (rotating), stratified fluids (nonrotating), stratified rotating fluids. Prerequisites: MATH 328, A R 567 or equivalent. 542: hydrostatic balance, geostrophic balance, anelastic balance. Prerequisites: 541 and 501.

ATM S 543, 544 Planetary Fluid Dynamics (3,3) A,Sp
Fleagle, Holton, Leovy

543: perturbation equations in Eulerian and Lagrangian form, simple wave motions in incompressible and compressible fluids, linear baroclinic instability. Prerequisite: 542, OCEAN 511, or equivalent. 544: The equations of motion in spectral form, nonlinear interactions, laboratory analysis, the general circulation. Prerequisite: 543.

ATM S 545 The General Circulation of Atmosphere (3) W
Wallace

Requirements of the global angular momentum heat, mass, and energy budgets upon atmospheric motions as deduced from observations. A study of the physical processes through which these budgets are satisfied. Prerequisite: 442 or permission.

ATM S 546 Introduction to Atmospheric Turbulence (3) A
Badgley, Businger

Review of derivation of Navier-Stokes equations; turbulent and laminar flow; Reynolds averaging and statistical description of turbulent flow; characteristics of isotropic turbulence; velocity correlations and spectra; turbulent energy equation and scalar variance equation. The closure problem and some examples of how to do it; observational evidence.

ATM S 547, 548 Atmospheric Turbulence (3,3) W,Sp
Badgley, Businger

547: turbulent flux of heat, momentum, and moisture in the layer of the atmosphere next to the earth; Richardson's stability criterion; free convection. Prerequisite: 546. 548: diffusion of matter in the atmosphere; application of Fickian and statistical theories of diffusion; use of Lagrangian and Eulerian correlation functions.

ATM S 551 Advanced Atmospheric Analysis (3-5, max. 10) WSp
Reed, Wallace

Selected advanced nonroutine types of analysis. Exercises in objective map analysis and numerical weather prediction. Prerequisite: 442 or permission.

ATM S 560 Theory of Meteorological Instruments (3) W
Badgley, Businger

Physical theory of operation of meteorological instruments. New and specialized research instruments and more difficult problems involving standard instruments. Prerequisites: one year of calculus and permission.

ATM S 565 Seminar in Atmospheric Science Policy Problems (1-3) W
Fleagle

Decision making and policy determination in major national atmospheric programs. Case studies of policy development for the Global Atmospheric Research Program, climate change, weather modification, and air quality. Individual student study of selected topics, with emphasis on developing and evaluating alternate policies. Oral presentation and term paper. Offered jointly with SMT 565. Prerequisite: SMT 540 or permission.

ATM S 571 Theoretical Climatology (3) W
Webster

Theoretical and dynamical aspects of climatology; response of the atmosphere to perturbations of the extrinsic climatic controls; feedback loops, development of a hierarchy of physical and mathematical models describing climatic states and transitions; critical evaluation of climate forecasting. Prerequisites: 411 and 442, or permission.

COLLEGE OF ARTS AND SCIENCES

ATM S 580 Atmospheric Photochemistry and Chemical Kinetics (3) W

Harrison

Stratospheric and tropospheric chemistries. Concepts of chemical rate processes and photoexcitation. Photoactive species in the atmosphere. Interactions between chemistry and atmospheric motions. Ozone, nitrogen oxides, carbon oxides, sulfur oxides. Very minor species. Hypotheses of chemistry and climate.

ATM S 593 Laboratory in Experimental Meteorology (3, max. 6) Sp

Role of controlled-model experiments in meteorology. Laboratory study of cloud formation and modification; convection cells, turbulent air motion; thermally induced air drainage; flow over obstacles; wave motion; surface of discontinuity; atmospheric circulation. Prerequisite: 542.

ATM S 600 Independent Study or Research (*)

ATM S 700 Master's Thesis(*)

ATM S 800 Doctoral Dissertation(*)

BIOLOGY

The courses in biology listed below are administered by several departments. Other courses in biology are listed under such headings as Biochemistry, Biological Structure, Botany, Genetics, Microbiology and Immunology, and Zoology.

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 of science. 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

Denton, Fernald, Kruckeberg, Meeuse, 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 adaptiveness, 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.

BIOL 103 Introduction to Biology (5) ASP

Piternick

Introduction to basic biological concepts within the context of human biology. Primarily for students in the Educational Opportunity Program. No credit allowed if 100 has been taken. Prerequisite: permission.

BIOL 104 Biology for Elementary School Teachers (5) Sp

Piternick

Basic concepts of biology, with emphasis on background needed for confident use of the new science curriculum materials in the elementary school. Prerequisite: permission.

BIOL 210, 211, 212 Introductory Biology (5,5,5)

AWSp, WSpA, SpAW

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: BIOL 210, 211, 212 or equivalent; one upper-division course in a related area (embryology, histology, physiology, or biochemistry).

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 polyploidy on speciation. Examples of microevolutionary and megaevolutionary changes from plant and animal kingdoms. For advanced undergraduate and graduate students in the biological sciences. Prerequisite: GENET 451 or equivalent. (Offered alternate years; offered 1976-77.)

BIOL 472 Principles of Ecology (3)

Edmondson, Schoener

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, or permission.

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.

BIOL 499 Independent Studies in Biology

Instruction (1-5, max. 15) AWSpS

Clark, Piternick

Individual exploration and direct experience with modes of thought and activity in biology instruction. Prerequisite: 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 movement. (BIOL 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, nucleocytoplasmic interactions, physiology of differentiated cells. (BIOL 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

Stulver

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, max. 6) A

Analysis of structural, physiological, and molecular levels of developmental processes including gametogenesis, fertilization, cell and tissue movements,

induction, and cytodifferentiation. Prerequisites: ZOOL 456 and BIOC 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 involved, using materials, methods, and approaches characteristic of that laboratory. Prerequisites: 586 and permission.

BIOL 591 Problems in Biological Instruction (1)

Seminar in biological instruction; teaching techniques, course and curricula planning.

BLACK STUDIES

Courses for Undergraduates

BLK S 250 The Afro-American and the U.S. Supreme Court (5)

Focus is on those laws that have been passed by Congress and the Constitution, as interpreted by the Supreme Court, that deal with the conditions of Afro-Americans in the United States.

BLK S 490 Research in the Black Community (1-5, max. 10) AWSp

Black, Chandler, Flint, Steele

Collection of hard data in the Black community that provides, under the supervision of a specific faculty member, an opportunity for graduating seniors to learn the techniques involved in social research. Designed for graduating seniors in Black Studies; open to others. Prerequisite: 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, 331, 421, 443, 446, 447, 451, 452, 454, 551, 462, 464.

BOT 110 Plants in Man's Environment (5)

AWSpS

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) SpS

Denton

Introduction to plant classification; field study and laboratory identification of the common plant families and the conspicuous flora of western and central Washington. Two full-day field trips required of all students.

BOT 301 Plant Propagation (2) AWSp

Nishitani

Practical course in methods of plant propagation by seeds, cuttings, budding, layering, 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: BIOL 101-102 or equivalent.

BOT 310 Plants, Man, and Ecology (5) W

del Moral, Kruckeberg

Survey of major ecological principles, stressing plant dominated systems and their interactions with human populations. Topics covered include the distribution, structure, and functions of terrestrial systems, succession, forms of disturbance, ecosystem conservation, and management principles. Lecture, discussion, and audiotutorial laboratory experience. Prerequisite: 110 or 113 or equivalent, or BIOL 100. Not recommended for majors and does not count toward a botany major unit requirement.

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 320 The Plant Kingdom (5) WSp
Introduction to the major groups of the plant kingdom. Structure and reproduction and the theories of evolutionary relationships of the phyla are considered. Not open to students who have taken 220. Prerequisites: BIOL 101-102 or equivalent.

BOT 331 Ornamental Plants (3) Sp
Kruckeberg, Tsukada
Identification, recognition, and use of cultivated trees and shrubs. Emphasis on laboratory and field study of woody species used in Pacific Northwest landscapes; plant exploration and origins of ornamentals. For nonmajors, teaching majors in biology, and students in forestry and landscape design. Prerequisite: 113 or 10 credits in biological science.

BOT 350 Introduction to Plant Geography (4) W
del Moral, Tsukada
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, Whisler
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: BIOL 212 or 101-102, and CHEM 102, or permission.

BOT 373 The Soil and Culture Solution as Media for the Mineral Nutrition of Plants (3) Sp
Walker
Growth media and soil and culture-solution are examined by chemical and physical analyses. Plants are grown both on soils and in culture solutions, and their responses with respect to growth, deficiency symptoms, and mineral contents are observed and assayed. Prerequisites: general chemistry and BIOL 102 or 212, or equivalents.

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 1977-78.)

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 1977-78.)

BOT 444 Plant Anatomy (5) A
Study of the origin and differentiation of tissue systems; practice in interpretation of histology of plant materials. Prerequisite: BIOL 101-102 or 212. (Offered alternate years; offered 1976-77.)

BOT 445 Marine Botany (7) ASp
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 ZOOL 430, and permission.

BOT 446 Algae (5) Sp
Catolico, 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 448 Marine Algal Ecology (3) 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 1977-78.)

BOT 450 Terrestrial Plant Ecology (3) Sp
del Moral
Relationships of populations to their environments; 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 452 Vegetation of Western Washington (5) S
del Moral, Kruckeberg
Intensive field course in which phytosociological methods are applied to several distinctive Washington vegetation types. Focus on unusual habitats, biogeographic patterns, and rare plants. Extended periods are spent in three locations (Mount Baker region, Mount Rainier region, and Cle Elum River area). Fee to defray costs of transportation, housing, food: approximately \$90. Offered on credit/no credit basis only. Prerequisites: 113 or equivalent, and permission.

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

BOT 462 Basidiomycetes (5) A
Stuntz
Structure and classification of the basidiomycetes. Prerequisite: 360 or permission.

BOT 463 Phycomycetes and Related Fungi (5) A
Whisler
Life history, development, taxonomy, and physiology of slime molds and phycmycetes. Prerequisites: 360, MICRO 400, or permission. (Offered alternate years; offered 1976-77.)

BOT 464 Ascomycetes (5) Sp
Stuntz
Structure and classification of the ascomycetes. Prerequisite: 360 or permission. (Offered alternate years; offered 1976-77.)

BOT 466 Rusts, Smuts, and Fungi Imperfecti (5)
Structure, classification, and biology of rusts, smuts, and imperfect fungi, with particular emphasis on the role of these fungi in plant pathology. Prerequisite: 360 or permission. (Offered upon demand.)

BOT 472 Plant Physiology (5) A
Bendich, Cleland, Halperin, Meeuse, Walker
Covers the same field as 371, but stresses biochemical approaches. Recommended for biology majors. Not open to students who have taken 371. Prerequisites: BIOL 101-102, or 212, and completion of, or concurrent registration in, CHEM 232, or permission.

BOT 475 Reproductive Biology of the Flowering Plants (5) SpS
Meeuse, Bastlaan
Strategies and tactics of plant dispersal and pollina-

tion; morphological, physiological, and behavioral adaptations of animal pollinators and dispersers; physiology of seed dormancy and germination in an ecological context; biochemistry and physiology of plant fertilization; practical and theoretical (evolutionary) implications of all the above. Prerequisites: 113 and BIOL 212 or BOT 371 or 472, or permission.

BOT 476 Mineral Nutrition (3) A
Walker
Absorption, translocation, and utilization of essential mineral elements. The soil culture and solutions as nutrient media for the growth of plants considered in theory and practice. Prerequisite: 371 or 472, or equivalent. (Offered alternate years; offered 1976-77.)

BOT 478 Plant Morphogenesis (3) A
Halperin
Course progresses from a general review of the sub-cellular machinery controlling development (information storage, macromolecular assembly, metabolic regulation, cell cycle, etc.), as studied in micro-organisms, animals, and plants, to a study of development at the cell, tissue, and organ level in multicellular plants. Reading based on primary sources. Prerequisite: BIOL 212 or BOT 371 or equivalents. (Offered alternate years; offered 1977-78.)

BOT 479 Plant Morphogenesis Laboratory (2) A
Halperin
Laboratory study of selected experimental systems, with emphasis on independent research. Prerequisite: 478, which may be taken concurrently.

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

BOT 481 Plant Cytology Laboratory (2) W
Haskins, Waaland
Bright-field and phase-contrast microscopy; cytochemical methods; demonstration of optical equipment; individual projects. Prerequisite: 480.

BOT 490 Undergraduate Seminar (1) AW
Presentation and discussion of special topics in botany.

BOT 498 Special Problems in Botany (1-15)
AWSp
Students with suitable background in botany may enroll to do special study in algology, anatomy, bryology, cytology, morphology, physiology, or taxonomy. Prerequisite: 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, Meeuse, Walker
Modern trends and methods in plant physiology. Prerequisite: permission.

BOT 522 Seminar in Morphology and Taxonomy (2, max. 10) AWSp
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.

COLLEGE OF ARTS AND SCIENCES

BOT 524 Topics in Algology (2, max. 10) AWSp
Norris, Waaland
 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, disposition in sediments, and paleoecology. Prerequisite: permission.

BOT 543 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. Not open to students who have taken 443. (Offered alternate years; offered 1976-77.)

BOT 545 Marine Algology (9) S
Norris, Waaland
 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 547 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. Not open to students who have taken 447. (Offered alternate years; offered 1977-78.)

BOT 549 Advanced Algology (9) S
Norris, Waaland
 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 BIOL 472; qualified seniors admitted by permission and petition to the Graduate School. (Offered alternate years; offered 1977-78.)

BOT 554 Palynology and Quaternary Phytogeography (5) A
Tsukada
 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. Not open to students who have taken 454. Prerequisite: 113 or 313, BIOL 472, or permission. (Offered alternate years; offered 1976-77.)

BOT 565 Marine Mycology (9)
Whitler
 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 569 Development in Lower Plants (5) W
Whitler
 Comparative study of growth and differentiation in the higher protista, with emphasis on sporogenesis, sexuality, nutrition, and cell-wall development in the fungi and algae. Not open to students who have taken 469. Prerequisite: 220 or permission. (Offered alternate years; offered 1976-77.)

BOT 570 Plant Metabolism (3) W
Meeuse
 Metabolism of organic compounds, with emphasis on photosynthesis and cellular respiration. Prerequisites: 472, and CHEM 232 or equivalent, and permission. (Offered alternate years; offered 1976-77.)

BOT 571 Plant Metabolism Laboratory (2) W
Meeuse
 Prerequisite: concurrent registration in 570.

BOT 572 Water Relations (3) Sp
Walker
 Permeability and water relationships, with special emphasis on influences affecting behavior of plants in the field. (Offered alternate years; offered 1977-78.)

BOT 573 Water Relations Laboratory (2) Sp
Walker
 Prerequisite: concurrent registration in 572. (Offered alternate years; offered 1977-78.)

BOT 574 Laboratory Techniques in Plant Molecular Biology (5) A
Bendich
 Techniques in molecular biology are applied to plants to teach the methods and the problems peculiar to plant tissues. Procedures for the use of radioisotopes are taught with emphasis placed on the problem of microbial contamination during radiolabeling of plant materials. Other techniques include extraction of proteins and nucleic acids, as well as their fractionation by gel electrophoresis, column chromatography, and density gradient centrifugation. *In vitro* translation of RNA also is done. Prerequisite: permission.

BOT 575 Problems in Algal Physiology (6) S
 Metabolic activity of the algae. Prerequisites: 472 or 371, CHEM 232, and permission. Consult Friday Harbor Laboratories bulletin for the year offered.

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 1976-77.)

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 1977-78.)

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) SpS
 Terminal survey course for nonscience majors. Not to be considered as a preparation for other chem-

istry courses. No credit given to those who have taken one unit or more of high school chemistry.

CHEM 101 General Chemistry (5) AWSpS
 For nonscience and nonengineering majors who plan to terminate their study of chemistry with 101 or 102. Molecular theory, quantitative relationships in chemical 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) AWSpS
 Organic compounds; hydrocarbons, alcohols, aldehydes, ketones, ethers, acids, aromatics, fats and oils, proteins, and carbohydrates. Students who plan to take 231 should not take 102. Prerequisite: 101 or 101 exemption examination.

CHEM 105 Introduction to General Chemistry (3) AS
 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.

CHEM 140 General Chemistry (4) AWSpS
 For science, engineering, and other majors who plan to take a year or more of chemistry courses. Chemical reactions, basic principles, equilibrium systems, structure and bonding, properties of matter. Prerequisites: high school chemistry or physics (both recommended), or CHEM 101 or 105; and qualification for MATH 124 or passage of the CHEM 140 placement test (consult Educational Assessment Center).

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. Mathematics prerequisite is the same as for 140.

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) AWSpS
 Continuation of 140. Prerequisite: 140 or 145.

CHEM 151 General Chemistry Laboratory (2) AWSpS
 Experiments illustrating quantitative relationships in chemistry. Prerequisite: concurrent registration in, or prior completion of, 150 or 155.

CHEM 155 General Chemistry (4) W
 To follow 145. Parallels 150. Prerequisite: 145.

CHEM 157H General Chemistry Honors Laboratory (3) Sp
 To follow 147H. Prerequisite: 147H.

CHEM 160 General Chemistry (4) AWSpS
 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) SpS
 Semimicroqualitative analysis for common cations and anions; separation and identification procedures. Prerequisites: 151 and 160 (160 may be taken concurrently).

CHEM 198, 198H 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, 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) AWSpS

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) AWSpS

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) AWSpS

Continuation of 231 for students planning only two quarters of organic chemistry. Prerequisite: 231.

CHEM 235 Organic Chemistry (3) WSpS

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) ASpS

Continuation of 235 for those desiring three quarters of organic chemistry. Consideration of polyfunctional compounds and natural products. Study of sugars, amino acids, and heterocycles. Prerequisite: 235.

CHEM 241 Organic Chemistry Laboratory (2)

AWSpS

Usually to accompany 231. Preparation of representative compounds. Prerequisites: 231, which may be taken concurrently, and one laboratory course in chemistry.

CHEM 242 Organic Chemistry Laboratory (2)

AWSpS

Usually to accompany 232 or 236. Preparations and qualitative organic analysis. Prerequisites: 232 or 235, which may be taken concurrently, and 241.

CHEM 335H 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 337H. Prerequisites: 337H, which may be taken concurrently, and 346H.

CHEM 350 Elementary Physical Chemistry (3)

WS

Survey of some major topics in physical chemistry. Prerequisites: two quarters of general chemistry, PHYS 116, and MATH 125 (126 recommended) or 157.

CHEM 351 Elementary Physical Chemistry (3)

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 crédits in

a given quarter or 3 crédits 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, MATH 124 and PHYS 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; 351 or 457 recommended.

CHEM 418 Radiochemistry (3) W

Natural radioactivity, nuclear systematics and reactions, radioactive decay processes, decay laws, statistical considerations, applications of radioactivity. Prerequisite: 455 or permission.

CHEM 426 Instrumental Analysis (3)

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, MATH 126 (238 recommended) and college physics.

CHEM 456, 456H Physical Chemistry (3) AWS

Thermodynamics, phase equilibria, colligative properties of solutions, electrolytes, and electrochemistry. Prerequisites: 150 or 155, MATH 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)

ASp

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 reac-

tions, 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) AWSpS

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, Mossbauer spectrometry and isotope replacement studies in the understanding of structure and bonding in inorganic compounds.

CHEM 510 Current Problems in Inorganic and

Nuclear Chemistry (3, max. 18) Sp

For doctoral candidates in inorganic chemistry. Current topics, e.g., acid-base theory; halogens; hydrides; groups III and IV; interstitial, chelate, 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; offered 1977-78.)

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 steric course of reactions. Prerequisite: 531 or permission.

CHEM 540 Current Problems in Organic

Chemistry (3, max. 18) AWSp

For doctoral candidates in organic chemistry. Discussions of topics of current interest and importance. See the department for instructor and topic during any particular quarter.

CHEM 550 Introduction to Quantum Chemistry

(3) A

Origins and basic postulates of quantum mechanics; solutions to single particle problems; angular momentum and hydrogenic wave functions; matrix methods; perturbation theory; variational methods. Prerequisite: 455 or permission.

COLLEGE OF ARTS AND SCIENCES

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 582 Topics in Analytical Chemistry (3, max. 18) AWSp
Open only to students accepted for doctoral work in chemistry.

CHEM 583 Topics in Organic Chemistry (3, max. 18) AWSp
Open only to students accepted for doctoral work in chemistry.

CHEM 585 Topics in Physical Chemistry (3, max. 18) AWSp
Open only to students accepted for doctoral work in chemistry.

CHEM 590 Seminar in General Chemistry (1, max. 18) AWSps

CHEM 591 Seminar in Inorganic Chemistry (1, max. 18) AWSps

CHEM 592 Seminar in Analytical Chemistry (1, max. 18) AWSps

CHEM 593 Seminar in Organic Chemistry (1, max. 18) AWSps

CHEM 594 Seminar in X-Ray Crystallography (1, max. 18) AWSps

CHEM 595 Seminar in Physical Chemistry (1, max. 18) AWSps

CHEM 600 Independent Study or Research (*) AWSps

CHEM 700 Master's Thesis (*) AWSps

CHEM 800 Doctoral Dissertation (*)

CINEMA STUDIES

Courses for Undergraduates

CINE 201 Elements of Cinema (5) A

Dale
Introduction to the art of cinema performed through exposition and examination of basic cinematic procedures. Prerequisite: sophomore standing or above.

CINE 202 Classics of the Cinema I (5) W

Steene

Historical study and critical assessment of the cinema from the beginnings to the 1930s, based on lectures and discussions of a selection of film classics. Prerequisite: 201.

CINE 203 Classics of the Cinema II (5) Sp

Steene

Historical study and critical assessment of the cinema since the mid-Thirties, based on lectures, discussions, and viewings of ten to eleven core films. Prerequisites: 201, 202.

CINE 399 Studies in American Cinema (5) W

Jameson

Course content may vary, but centers on some aspect of American cinema; for instance, Major American Directors of the Fifties, the Western, and American *auteur* courses. Students are urged to take the 200 sequence of Cinema Studies courses prior to this course.

CINE 404 Women and the Cinematic Imagination (5, max. 15) AWSp

Murphy

Examines women's roles in film and the current body of criticism assessing the history of women in the cinema. Topics, which vary each quarter, include: Women in Foreign Films, The Actress and the Director, and Films by Women. Offered jointly with WOMEN 404. Prerequisites: 201, 202, 203, or permission.

CINE 450 Cinema Studies: Special Topics (5, max. 20)

Jameson

Special topics, the subject matter and depth of which are not included in other film courses. Emphasis placed on film movements, national cinemas not covered in other departments, genre courses, and *auteur* courses. Topics of interdisciplinary character: film and the other arts. Prerequisites: 201, 202, 203.

CLASSICS

Courses for Undergraduates

GREEK

GRK 101, 102, 103 Elementary Greek (5,5,5)

A,W,Sp

101, 102: an intensive study of grammar, with reading and writing of simple Attic prose; 103: reading of 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)

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; for 301, 300.

GRK 310, 311, 312 Advanced Grammar and Composition (1,1,1) A,W,Sp

Prerequisite: 208.

GRK 401-402-403 Elementary Modern Greek (5-5-5)

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

McDiarmid

(Offered alternate years; offered 1976-77.)

GRK 414 Plato (3) W

MacKay

(Offered alternate years; offered 1976-77.)

GRK 415 Aristotle (3) Sp

MacKay

(Offered alternate years; offered 1976-77.)

GRK 422 Herodotus and the Persian Wars (3) A

Blitz

(Offered alternate years; offered 1977-78.)

GRK 424 Thucydides and the Peloponnesian War (3) W

Blitz

(Offered alternate years; offered 1977-78.)

GRK 426 Attic Orators (3) Sp

MacKay

(Offered alternate years; offered 1977-78.)

GRK 442, 443, 444 Greek Drama (3,3,3) A,W,Sp

McDiarmid

(Offered alternate years; offered 1977-78.)

GRK 449 Greek Epic (3) A

Roth

(Offered alternate years; offered 1976-77.)

GRK 451 Lyric Poetry (3) W

Grummel

(Offered alternate years; offered 1976-77.)

GRK 453 Pindar: The Epinician Odes (3) Sp

McDiarmid

(Offered alternate years; offered 1976-77.)

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,W,Sp

Pascal

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

Grummel

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

Grummel

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.

cepted as upper-division credit toward a major in Latin or Classics. Prerequisites: for 300, junior standing and permission; 300 for 301.

LAT 305, 306, 307 Survey of Latin Literature (3,3,3) A,W,Sp
Survey of Latin literature from its origins to the end of the second century A.D. 305: Republic. 306: Augustan Age. 307: Silver Age. Prerequisite: four years of high school Latin or 203.

LAT 310, 311, 312 Advanced Grammar and Composition (1,1,1) A,W,Sp
Grummel
Prerequisite: 208.

LAT 401 Medieval Latin (3) Sp
Pascal
Prerequisite: permission.

LAT 412 Lucretius (3) A
Grummel
(Offered alternate years; offered 1977-78.)

LAT 413 Cicero's Philosophical Works (3) W
Grummel
(Offered alternate years; offered 1977-78.)

LAT 414 Seneca (3) Sp
Grummel
(Offered alternate years; offered 1977-78.)

LAT 422 Livy (3) A
Vignoli
(Offered alternate years; offered 1976-77.)

LAT 423 Cicero and Sallust (3) W
Harmon
(Offered alternate years; offered 1976-77.)

LAT 424 Tacitus (3) Sp
Harmon
(Offered alternate years; offered 1976-77.)

LAT 447 Roman Lyric (3) A
Vignoli
(Offered alternate years; offered 1977-78.)

LAT 449 Roman Elegy (3) W
Harmon
(Offered alternate years; offered 1977-78.)

LAT 451 Roman Satire (3) Sp
Vignoli
(Offered alternate years; offered 1977-78.)

LAT 457 Roman Drama (3) A
Pascal
(Offered alternate years; offered 1976-77.)

LAT 458 Roman Epic (3) W
Grummel
(Offered alternate years; offered 1976-77.)

LAT 459 Roman Pastoral (3) Sp
Grummel
(Offered alternate years; offered 1976-77.)

LAT 462 Petronius, The Satyricon (3) S
Grummel, Harmon, Pascal
Readings, lectures, and discussions of selections from Petronius, *The Satyricon*. Prerequisites: four years of high school Latin or 203, or permission.

LAT 475 Improvement of Teaching: Latin (3) S
Examination and evaluation of the various methods of teaching Latin; audiovisual aids; testing materials; textbooks; relation of Latin to other languages; Latin derivatives in English vocabulary. Offered jointly with EDC&I 438. (Offered Summer Quarter only.)

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 EDC&I 439. (Offered Summer Quarter only.)

LAT 490, 490H Supervised Study (*, max. 18) AWSp
Special work in literary and philosophical texts for graduates and undergraduates.

LAT 499 Undergraduate Research (*, max. 18) AWSp

CLASSICS COURSES IN ENGLISH

CLAS 101 Latin and Greek in Current Use (2) AWSp
Designed to improve and increase English vocabulary through a study of the Latin and Greek elements in English, with emphasis on words in current literary and scientific use. No knowledge of Latin or Greek required.

CLAS 205 Bioscientific Vocabulary Building From Latin and Greek (3) AWSpS
Designed to help the student master the scientific vocabulary of his particular field by a study of the Latin and Greek roots that are used to create the majority of scientific terms. Knowledge of Latin or Greek is not required.

CLAS 210 Greek and Roman Classics in English (5) AWSp
Blitz, Edmonson, Grummel, Harmon, MacKay, McDiarmid, 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) Sp
Blitz
Study of the civic and social practices and institutions of everyday Greek and Roman private and public life, including the family, social classes, the courts and legal systems, military service and war, technology and the trades, money and banking, agriculture and rural life. Many lectures illustrated by slides.

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
Examination of the origin and evolution of the ancient epic, loftiest of the ancient literary forms and key vehicle for the development of classical myth. The *Illiad*, the *Odyssey*, and the *Aeneid* are read, with selections from other epics.

CLAS 427 Greek and Roman Tragedy in English (3) W
McDiarmid
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, Plautus, and Terence.

CLAS 430 Greek and Roman Mythology (3) AWSp
Grummel, 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)
Grummel
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 critics.

CLAS 445 Greek and Roman Religion and Culture (3) A
Harmon
Religion in the social life of the Greeks and Romans, with emphasis placed on their public rituals and festivals. Attention is given to the priesthoods, personal piety, rituals of purification and healing, and the conflict of religions in the early Roman Empire. Many lectures illustrated by slides.

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 ART H 340.

CL AR 341 Greek Art and Archaeology (3) W
Blitz, 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 ART H 341.

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

CL AR 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 ART H 442. (Offered alternate years; offered 1976-77.)

CL AR 444 Greek and Roman Sculpture (3) W
Edmonson
History and development of Greek sculpture and sculptors, their Roman copyists, and Roman portraits and sarcophagi. Emphasis on Greek sculpture of the fifth century B.C. Offered jointly with ART H 444. (Offered alternate years; offered 1976-77.)

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 jointly with ARCH 446 and ART H 446. (Offered alternate years; offered 1976-77.)

Courses for Graduates Only

CLASSICS

CLAS 700 Master's Thesis (*)

CLAS 800 Doctoral Dissertation (*)

GREEK

GRK 520 Seminar (3, max. 27) AWSp
Blitz, Edmonson, MacKay, McDiarmid, Roth

The courses numbered 580 through 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 1976-77.)

GRK 582 Herodotus and Thucydides (3) W
(Offered alternate years; offered 1976-77.)

GRK 584 Plutarch, Xenophon, Demosthenes (3) Sp
(Offered alternate years; offered 1976-77.)

GRK 585 Plato, "Republic" (3) A
(Offered alternate years; offered 1977-78.)

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GRK 587 Aristotle, Politics or Ethics (3) W
(Offered alternate years; offered 1977-78.)

GRK 589 Aristophanes (3) Sp
(Offered alternate years; offered 1977-78.)

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 through 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 1976-77.)

LAT 582 Augustan Poetry (3) W
(Offered alternate years; offered 1976-77.)

LAT 584 Survey of Latin Poetry (3) Sp
(Offered alternate years; offered 1976-77.)

LAT 585 The Civil War: Caesar, Cicero, Lucan (3) A
(Offered alternate years; offered 1977-78.)

LAT 587 Roman Comedy, Menander, and Petronius (3) W
(Offered alternate years; offered 1977-78.)

LAT 589 Prose of the Roman Empire (3) Sp
(Offered alternate years; offered 1977-78.)

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 1977-78.)

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 1977-78.)

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 1977-78.)

CLASSICAL LINGUISTICS

CL LI 501 Comparative Phonology of Greek and Latin (3)
Phonological developments of Greek and Latin from Indo-European to the classical periods of both languages.

CL LI 503 History of the Greek Language (3) W 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) Sp Roth
Morphological and syntactical development of the Latin language; the development of Latin as a literary language.

CL LI 506 Italic Dialects (3)
Roth
Principal remains of the non-Latin languages and dialects of ancient Italy.

CL LI 508 Greek Dialects (3)
Non-Attic dialects of ancient Greek, based on a study of inscriptions and the literary remains.

CL LI 510 Mycenaean Greek (3)
Study of the Linear-B tablets found in Crete and on the Greek mainland.

COMMUNICATIONS

Courses for Undergraduates

COMMUNICATIONS

CMU 150 The Mass Media (5)
Ames, Pember, Samuelson, Simpson, Slater, 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 214 History of Mass Media in America (5) AWSpS
Ames, Pember, Simpson
History of mass media in America, including print press, motion pictures, radio, and television. Role of the press in the development of the American nation, democratic systems, and Western culture.

CMU 220 Intercultural Communication (5) A
Introduction for undergraduate students to problems of communicating across cultures and subcultures. Examination of pragmatic situations of cross-cultural communication.

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)
Conrad
Elementary news photography, photo processing, and picture editing. Open only to majors. Prerequisite: 150.

CMU 292 Advanced Still Photography (3)
Conrad
Black and white still photography, introduction to color. Camera and darkroom techniques. Field assignments. For news reporting, advertising production, and free-lance photography. Prerequisites: 291 and permission.

CMU 300 Fundamentals of Applied Communication (5) W
Practice in the implementation of communication requisites, from elementary tactics to advanced and innovative procedures for communicating. Focal point of most practice is use of communication for public policy-oriented organizations. Problem areas for practice include: cooperation, competition, instruction, and invention. Prerequisite: 200 or permission.

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
Ames, Johnston, Pember, Simpson, Yerxa
Structure of news and feature stories. Open to

nonmajors by permission. Prerequisites: 150, 200, 320, and reasonable proficiency in the use of the typewriter.

CMU 322 Reporting (4) AWSp
Jackson, Johnston, 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)
Johnston, 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
Samuelson, Sizemore
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 dummyping of pages. Open only to majors. Prerequisite: 321.

CMU 326 Magazine Article Writing (3)
Nonfiction writing for national magazines and specialized publications. Open to nonmajors. Prerequisite: permission.

CMU 327 Legislative Reporting (12) W Johnston
Full-time coverage of Washington legislature for a daily newspaper and instruction in reporting news of state government. Selected students live in Olympia, interview legislative delegations, report committee and floor sessions, gubernatorial and other press conferences. Open only to majors. Prerequisites: 321, 322, POL S 482, and permission.

PUBLIC RELATIONS

CMU 338 Public Relations (3)
Bowen, Bowes, Dervin, Frazer, Jackson
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)
Bowes
Group application of principles to the field problems of local business or agencies, with reports and recommendations. Open to nonmajors. Prerequisite: 338.

ADVERTISING

CMU 340 Introduction to Advertising (5)
Bowen, Frazer, Roller, Sikorski
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.

CMU 341 Beginning Advertising Copy and Layout (3)
Bowen, Frazer
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 342 Advanced Advertising Copy and Layout (3) WSp
Bowen
Advanced course designed to elaborate and polish skills and techniques developed in 341. Creative strategies, multimedia copywriting experiences, and

campaign theming are emphasized. Open to majors only. Prerequisite: 341.

CMU 344 Advertising Media Planning (3)

Frazer, 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 345 Advertising Campaigns (5)

Bowen, Frazer, 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.

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.

CMU 353 Radio and Television News Writing (3)

Slater
Gathering, writing, editing, and programming news for the broadcast media, including visual treatment for television and film. Open to nonmajors by permission. Prerequisite: 321.

CMU 354, 355 Television News Film Techniques (2,2)

France, Slater
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 News Broadcasting (3,3)

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)

Heller
Writing and production for various broadcast formats, emphasizing audio communication processes. Prerequisite: permission.

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. 8)

Godfrey
Laboratory under on-air conditions at educational station, assignments and duties increasing in complexity as student's growth indicates. Open to nonmajors. Prerequisites: 361 and permission.

CMU 367 Broadcast Internship (2-5, max. 6)

AWSPs
Educational and professional experience in the day-to-day operation of broadcast stations. Internship credit may not be applied to fulfill specific course requirements nor does it apply to the 50 communications credits that must be earned for graduation. Prerequisites for radio-television emphasis: 349, 360, plus additional requirements determined by the coordinator (i.e., for television 361, 365); for broadcast journalism emphasis, 320, 321, 353, plus additional requirements as determined by the coordinator (i.e., for television 354, 357).

CMU 371 Radio Workshop Laboratory (3, max. 6)

Heller
Supervised practice in the various departments of the University's FM radio station, KUOW. Open only to majors. Prerequisite: 360.

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)

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)

Carter
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, Yerxa
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. Prerequisites: 150, 214, or permission.

CMU 407 Content Analysis (3)

Dervin, Samuelson
Use of the techniques of content analysis as a systematic means for the study of communication.

CMU 408 Survey Research Techniques (3)

Bowen, Dervin, Stamm
Use of survey techniques as a systematic means of collecting data for the study of communication. Prerequisite: elementary statistics.

CMU 409 Experimentation in Communication (3)

Carter, Samuelson, Stamm
Use of the techniques of experimentation in the study of communication. Prerequisite: elementary statistics.

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, Frazer
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, Frazer
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, Frazer, Roller
Seminar in problems and procedures in advertising, incorporating presentations by industry professionals concerning current practices. Open only to majors. Prerequisites: senior standing in the advertising sequence, and permission.

CMU 450 Broadcast Programming (3)

Godfrey, Heller
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)

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 EDC&I 488.

CMU 463 Television Production Workshop for Teachers (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 EDC&I 489.

CMU 470 Theory and Criticism of Broadcasting (3)

France, Godfrey, Heller, Slater
Development of social, economic, and critical standards of broadcasting and the function of radio-television in the mass communication process. Open to nonmajors. Not open to graduate students in communications. 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 351, 352, 353 (for actors). Offered jointly with DRAMA 454. Prerequisite: permission.

CMU 474 The Educational Role of the Mass Media (2½, 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)

Edelstein
Propaganda involving selective information and involuntary exposure is analyzed, using specific techniques evaluated in class. Attention is given to

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aspects of propaganda within the United States and in foreign and international settings.

CMU 481 Public Opinion and Communication (5) W *Edelstein*

Public opinion and opinion polling as means of communication information in society. Prerequisites: relevant courses in political science, sociology, psychology, or communications.

CMU 483 International Communication Systems (5) Hall

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 495H, 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 497H. 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. Prerequisites: 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. Open to nonmajors. Prerequisite: 400 or 508.

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 505 Communication and Politics (3) Simpson

Study of the primary literature dealing with communication and American political behavior. Open to nonmajors. Prerequisite: 406.

CMU 506 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 507 Computer Applications in Communication Research (3) Bowes

Potentialities of the computer and the use of the computer in the behavioral sciences. Open to nonmajors. Prerequisites: elementary programming and elementary statistics.

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 Communications Research (3, max. 15) Carter, Dervin, Stamm

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)

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 analyzed and applied. Open to nonmajors. Prerequisite: baccalaureate degree in communications or equivalent.

CMU 570 Seminar in the Theory and Criticism of Broadcasting (3)

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)

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

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 to nonmajors. Prerequisites: 480, 485, or equivalent, or permission. (Offered alternate years with 585.)

CMU 584 Research Seminar in Regional Communication Systems (3)

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 Bowes

Analysis and comparison of communications systems. Directed research in comparative systems and into the role of communications in national development. Open to nonmajors. Prerequisite: 485. (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 800 Doctoral Dissertation (*)

COMPARATIVE AND FOREIGN AREA STUDIES

Comparative Religion/Religious Studies

RELIG 201 Introduction to World Religions: Western Traditions (5) A Webb

Introductory course in the history of religions, concentrating on religious traditions that have developed west of the Indus. Primary attention to the Semitic religions (Judaism, Christianity, Islam) and to their ancient world background with emphasis on basic conceptual and symbolic structures.

RELIG 202 Introduction to World Religions: Eastern Traditions (5) W Conlon

Introductory course in the history of religions, concentrating on religions that have developed in South Asia and East Asia. Primary attention to Hinduism and Buddhism; other important Asian religions are discussed in relation to them, with emphasis on basic conceptual and symbolic structures.

RELIG 210 Introduction to Judaism (5) W Lipstadt

Basic ideas and motifs of Judaism: God, Covenant, Law, Life Cycle (birth, marriage, family life, sexual laws, role of women, death); Cycle of the Year (Sabbath, holidays, festivals); Holy Land, prayer, Messianism.

RELIG 220 Introduction to the New Testament (5) A

Modern scholarly methods of research and analysis in dealing with New Testament books and their interpretation. Attention is given to the genres of various books (gospel, epistle, sacred history, apocalypse), to problems of the relationships among author, material, and intended audience, and to relationships between theme and image.

RELIG 311 Classical Judaism (3 or 5) Sp Lipstadt

Evolution of Judaism from the destruction of the Second Temple (70 B.C.) to the Middle Ages. Jewish concepts and doctrines by priests, political leaders, sages, and philosophers. Emphasis on the evolution and consolidation of the Talmud along with examination of Hellenistic Judaism, Rabbinic Judaism, and Jewish life in the Islamic world. Works studied are Philo, Hillel, Akiba, Saadya, Judah Ha-Levi, and Moses Maimonides. Prerequisites: 201, 210, or permission.

RELIG 320 The World of the Early Church (5) W

Development of the early Christian church within the context of the Greco-Roman sociopolitical, philosophical, and religious environment. Covers the period from the Apostolic Fathers to the Council of Nicaea (A.D. 325). Christian thinkers include Ignatius, Polycarp, Clement of Alexandria, Origen, and Irenaeus. Recommended background: 201 or 220, or HST 307.

RELIG 321 The Age of St. Augustine (5) Sp Cox

Development of the Christian church in the fourth and fifth centuries as a major institution in the Roman Empire, with special attention to the great figures of patristic theology, such as Gregory Nazianzus; Gregory of Nyssa, Cyril of Alexandria, and Augustine. Recommended background: 201 or 320, or HST 307.

RELIG 325 American Religious Thought (5) Sp Simonson

Main theological ideas and the notable events in American church history with focus on selected historically important religious movements and themes in America from the time of the Puritans to the twentieth century. Pertinent American social, political, and cultural concerns are included. A course in Western religious traditions, American history, or American literature is recommended.

RELIG 380 The Nature of Religion and Its Study (5)

Introduction to the study of religion as a general

human phenomenon. Special attention is given to the manner in which different methods of inquiry (phenomenology, anthropology, sociology, psychology, literary criticism, archaeology, philosophy, theology, etc.) illuminate different aspects of religion and help to shape our conceptions of its nature. 201 or 202 or other course in the history of religious traditions recommended.

RELIG 410 Religion and Personality (5) Sp

Willeford

Such fundamental religious concepts as "soul" and "spirit" describe elements of the personality felt to be psychologically real, whatever their objective status. Scholars have tried to establish a phenomenology of the personal experiences named by such concepts and have maintained that these experiences reflect fundamental properties of the human mind. Religion plays an important role in the development of the personality, in its dealing with the major events of life in its search for meaning and value. The course discusses modern attempts to understand and describe this. 201 or 202 and 380 recommended.

RELIG 490 Special Topics (3-5, max. 15) Sp

Webb

Special topics in which students and faculty have developed an interest as a result of work done in other classes. Topics vary with each offering. Prerequisite: 380.

RELIG 491 Seminar: Topics and Issues in Judaism (3-5, max. 15) A

Lipstadt

Topics include: free will, women, death, mysticism, communal structure, civil law, religious law, prophecy, Jewish medical ethics, etc. Emphasis on how the topic is dealt with in the Bible (e.g., Mishna, Gemara, Rabbinic Responsa). Prerequisite: 210 or 311, or permission.

RELIG 499 Undergraduate Research (1-5, max. 15) AWSp

Primarily for comparative religion majors and majors in the Institute for Comparative and Foreign Area Studies. Prerequisites: advanced standing and permission.

East and Inner Asia

COURSES FOR UNDERGRADUATES

INTRODUCTORY COURSES

EASIA 101 Contemporary China (5) W

Townsend, Staff

Introductory survey of contemporary China concentrating on the post-1949 evolution of Chinese government, economy, society, and culture.

EASIA 210 The Far East in the Modern World (5) AW

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 240 Chinese Civilization (5) A

Dull

China's material civilization—including fine arts, literature, religion, and thought—in relation to general development of Chinese society.

RELATED COURSES

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)

CHINA REGIONAL PROGRAM

EASIA 424 Perspectives on East Asia for Teachers (3, max. 6) W

Pyle, Townsend

Examination and evaluation of substantive con-

cepts, resources, and materials employed in teaching about East Asia. Course requirements may vary in relation to the particular background of participants.

EASIA 443 Traditional Chinese Society (5) A

Harrell

General survey of traditional institutions and their changes in modern times. Offered jointly with ANTH 403.

EASIA 444 Contemporary Chinese Society (5) W

Harrell

Analysis of society in the People's Republic of China as a product of traditional Chinese society and the changes wrought upon it by the impact of the West and by the revolutionary policies and practices of the Chinese Communist Party. Offered jointly with ANTH 444. Prerequisite: EASIA 443 or ANTH 403 or another acceptable course on Chinese society, or permission.

EASIA 445 Religion in China (5) Sp

Harrell

The place of religion in Chinese society, examining the doctrines, practices, and social consequences of the eclectic folk religion, the elite Confucian, Taoist, and Buddhist traditions, syncretistic sects, and imported Christianity. Offered jointly with ANTH 447. Prerequisites: one course in Chinese society, politics, or history, or permission.

EASIA 455 Undergraduate Colloquium on China (5) WSp

Palais, Townsend

Interdisciplinary study of China, with emphasis on the modern period. Prerequisite: permission.

EASIA 499 Undergraduate Research (3-5, max. 15) AWSp

RELATED COURSES

ANTH 403 Traditional Chinese Society (5)

ART H 301 Survey of Asian Art (5)

ART H 401 Oriental Ceramic Art (2)

ART H 411 Early Chinese Painting: T'ang to Yuan (3)

ART H 412 Later Chinese Painting: Yuan Through Ch'ing (3)

ART H 417 Buddhist Painting of China and Japan (3)

ART H 418 Buddhist Sculpture of China and Japan (3)

ART H 419 Chinese and Japanese Architecture (3)

CHIN 361 Classical Chinese Literature in English (5)

CHIN 363 Vernacular Chinese Literature in English (5)

CHIN 407 Chinese Reference Works and Bibliography (3)

C LIT 302 World Classics of the Orient (5)

C LIT 410 Literary Motifs (3-5, max. 10)

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)

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 221 B.C. (5)

HSTAS 452 Chinese History: 221 B.C. to A.D. 906 (5)

HSTAS 453 Chinese History: A.D. 906 to A.D. 1840 (5)

HSTAS 454 History of Modern China (5)

HSTAS 476 Western Influences in Russian and Chinese Intellectual History (4)

I BUS 450 East-West Economic Relations (4)

MUSAP 159 Private Instruction: Non-Western Instruments (2-3, max. 9)

MUSIC 318 Music Cultures of the World (5)

MUSIC 497 Music of China (3)

PHIL 415 Chinese Philosophy (5)

PHIL 416 Neo-Confucianism (5)

POL S 414 Chinese Political Thought (5)

POL S 432 American Foreign Policy in the Far East (5)

POL S 442 Government and Politics of China (5)

INNER ASIA

IASIA 430 Survey of Mongol Culture (3) S
Nomadic culture and tribal organization in ancient times; present state and cultural life of Mongolia.

IASIA 431 Tibetan History (3) W

Wylie

Survey of the history of Tibet from earliest times to the present, with emphasis on the status and relations of Tibet in Asian affairs and on the evolution of the political institutions of a "lama-ruler" state.

IASIA 464 Tibetan Buddhism (3) W

Wylie

Survey of the development of Buddhist philosophy and its amalgamation with the teaching of Bon, the pre-Buddhist shamanism in Tibet. The resulting doctrines and phenomenology of Tibetan Buddhism are examined in depth.

IASIA 499 Undergraduate Research (3-5, max. 15) AWSp

For institute majors. Prerequisite: permission.

MONG 320 Mongolian Literature in English (5)

TKIC 320 Eastern Turkic Literature in English (3)

**JAPAN AND KOREA
REGIONAL PROGRAMS**

Japan

EASIA 424 Perspectives on East Asia for Teachers (3, max. 6) W

EASIA 440 The Emergence of Postwar Japan (5) A

Hellmann, Pyle, Yamamura

The making of modern Japan; World War II and surrender; American occupation; postoccupation rebuilding; emergence as an industrial power.

EASIA 441 Economic and Social History of Japan to 1900 (5) A

Hanley, Yamamura

Lecturer-seminar on Japanese economic and social history from 700 to 1900. Includes analyses of the rise and disintegration of the *shoen* system, the rise of commerce, the development of the monetary system, changes in the living standard, demographic changes, and the early phases of industrialization. Political and cultural developments as related to economic and social change. (Taught with 541.) (Offered 1976.)

COLLEGE OF ARTS AND SCIENCES

EASIA 451 Undergraduate Colloquium on Japan (5) W
Beckmann
Interdisciplinary study of Japan with emphasis on the modern period.

EASIA 499 Undergraduate Research (3-5, max. 15) AWSp

RELATED COURSES

ART H 301 Survey of Asian Art (5)

ART H 401 Oriental Ceramic Art (2)

ART H 415 Early Japanese Painting: Twelfth to Sixteenth Centuries (3)

ART H 416 Later Japanese Painting: Sixteenth to Nineteenth Centuries (3)

ART H 417 Buddhist Painting of China and Japan (3)

ART H 418 Buddhist Sculpture of China and Japan (3)

ART H 419 Chinese and Japanese Architecture (3)

ECON 494 Economic Growth of Japan Since 1850 (5)

GEOG 313 East Asia (5)

GEOG 437 Problems in the Geography of Japan (5)

HSTAS 213 History of Japanese Civilization (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)

I BUS 450 East-West Economic Relations (4)

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)

MUSIC 494, 495 Music of Japan (3,3)

POL S 429 International Relations in the Far East (5)

POL S 435 Japanese Government and Politics (5)

Korea

RELATED COURSES

HSTAS 212 History of Korean Civilization (5)

HSTAS 481, 482 History of Korea (5,5)

MUSIC 426 Music of Korea (3)

EASIA 499 Undergraduate Research (3-5, max. 15) AWSp

KOR 320 Korean Literature in English (5)

KOR 411, 412, 413 Readings in Contemporary Korean (5,5,5)

KOR 465, 466, 467 Readings in Korean Documents (5,5,5)

East and Inner Asia

COURSES FOR GRADUATES ONLY

CHINA REGIONAL PROGRAM

EASIA 521-522 Seminar: Introduction to the Interdisciplinary Study of China (5-5) WSp
Townsend

EASIA 530 Seminar on China (3, max. 6) Sp
Chan, Dull, Harrell, Kapp
Problems of Chinese history. Prerequisite: permission.

EASIA 531 Chinese History: Research Methods and Bibliographic Guides (3, max. 6) W
Chan
Introductory research seminar dealing with the methodological and bibliographical problems concerning all periods and aspects of Chinese history from the earliest times to the nineteenth century. Prerequisite: two years of classical or modern Chinese.

EASIA 600 Independent Study or Research (*) AWSp

RELATED COURSES

ART H 511 Seminar in Chinese Art (3, max. 9)

GEOG 505 Research Seminar: China and Northeast Asia (3, max. 6)

HSTAS 551 Field Course in Chinese History, Pre-Sung Period (3-6)

HSTAS 552-553-554 Seminar in Chinese History, Pre-Sung Period (3-6, max. 12)-(3-6, max. 12)-(3-6, max. 12)

HSTAS 561 Field Course in Chinese History, Sung to Modern (3-6)

HSTAS 562-563-564 Seminar in Chinese History: Sung to Modern (3-6)-(3-6)-(3-6)

HSTAS 571-572 Chinese History: Modern Period (3-6)-(3-6)

HSTAS 573-574-575 Seminar in Chinese History: Modern Period (3-6, max. 12)-(3-6, max. 12)-(3-6, max. 12)

POL S 532 The Chinese Political System (3)

POL S 533 Seminar on Contemporary Chinese Politics (3)

POL S 535 International Relations of Modern China (3-5)

INNER ASIA

IASIA 598 Inner Asia Research (5, max. 15) AWSp
Cirtautas, Norman, Ruegg, Thrasher, Wyllie
Geographical focus on Tibet, Mongolia, and Turkestan. Prerequisite: permission.

LING 579 Comparative Altaic Linguistics (3)
Comparative phonology and morphology of Mongol and Turkic and other related languages. Offered jointly with MONG 579. Prerequisite: permission.

JAPAN REGIONAL PROGRAM

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 541 Economic and Social History of Japan to 1900 (5) A
Hanley, Yamamura
Japanese economic and social history from 700 to 1900. Analyses of the rise and disintegration of the *shoen* landholding system, the rise of commerce, the development of the monetary system, changes in the living standard, demographic changes, urbanization, and the early phases of industrialization. Economic and social change through empirical examination and social science techniques. Prerequisite: previous course work in Japanese history or economic history, or permission. Not open to students who have taken 441.

EASIA 555 Introduction to Modern Japanese Studies (5) A
Hanley
Interdisciplinary study of Japan, with emphasis on the modern period.

EASIA 559 Interdisciplinary Seminar on Japan (5) W
Beckmann, Yamamura
Research seminar, with emphasis on Japan's modern development and contemporary problems.

EASIA 600 Independent Study or Research (*) AWSp

RELATED COURSES

ART H 515 Seminar in Japanese Art (3, max. 9)

GEOG 509 Research Seminar: Japan (3, max. 6)

HSTAS 521 Modern Japanese History (3-6)

HSTAS 522 Japan as a World Power, 1895-1945 (3-6)

HSTAS 523, 524 Seminar in Modern Japanese History (3-6, 3-6)

HSTAS 525 Japan in the Twentieth Century (3-6)

HST 543 American Diplomacy and the World Crisis: 1931-41 (3-6)

HST 544-545 Seminar in American Diplomacy and the World Crisis: 1931-41 (3-6, max. 12)-(3-6, max. 12)

LAW 548 United States-Japanese Tax Problems (4)

LAW 549 United States-Japanese Administrative Law Problems (3)

LAW 595 Introduction to Japanese Law (3)

LAW 596 Justiciability Under the Civil Law and the Common Law (4)

LAW 597 United States-Japanese Contract and Sales Problems (4)

LAW 598 United States-Japanese Corporate Relations (4)

LAW 620 Tutorial in Japanese Law (*)

POL S 545 Seminar on Japanese Government and Diplomacy (3, max. 6)

KOREA REGIONAL PROGRAM

EASIA 600 Independent Study or Research (*) AWSp

RELATED COURSES

HSTAS 581 Modern Korean History (3-6)

HSTAS 582-583-584 Seminar on Korean History (3-6)-(3-6)-(3-6)

HSTAS 585 Research Seminar: Modern Korea (3-6)

Russia and Eastern Europe

COURSES FOR UNDERGRADUATES

INTRODUCTORY COURSES

REEU 220 Introduction to East European Studies (5) AWSp

Boba
Geographic setting, ethnic composition, religions, cultural pattern, economic problems, social and political institutions of Eastern Europe in the past and the present.

REEU 243 Russian Civilization (5) AWSp

Waugh
Russia's material civilization, including fine arts, literature, religion, and history; political, social, and legal institutions and thought in relation to the general development of Russian society.

REEU 324 Survey of Soviet Society (5) W

Ellison
Survey of the political, economic, and social institutions, and the literature and fine arts of the Soviet Union.

RUSSIA REGIONAL PROGRAM

REEU 343 Interdisciplinary Undergraduate Seminar on Russia (5) AWSp

Thornton, Waugh, West
Designed as a bridge between the two basic requirements of the Russian Regional Studies baccalaureate program. After introductory lectures, two short periods in Russian history are studied in some depth by way of closely supervised undergraduate research and discussions. Prerequisites: 243, two years of Russian language, and permission of Russia and Eastern Europe undergraduate adviser.

REEU 378 Russia and Asia (3) Sp

Waugh
Russian expansion into Central Asia. Russian and Soviet policies toward nationalities. Tsarist and Soviet relations with adjacent Muslim countries.

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 440 Jews in the Soviet Union (3 or 5) W

Legters
Surveys status of Jews in Russia on the eve of the Revolution, including official and unofficial attitudes toward Jews and Jewish responses as displayed in intellectual currents and social movements. Recounts history of Soviet efforts to cope with the Jewish question after the Revolution; the revival of antisemitism; and Jewish reactions in the form of dissent and emigration. Those students receiving 5 credits are required to write a substantial term paper. Prerequisite: familiarity with modern Russian history.

REEU 450 Survey of the Cultures of the Turkic Peoples of the Soviet Union (3) A

Cirtautas
The nomadic and sedentary cultures of the Turkic peoples in the past and in the present: their cultural life (language, literature, adherence to traditional modes of life) under Soviet Russia's dominance.

REEU 457 Undergraduate Colloquium on Russia (5) Sp

Boba
Interdisciplinary study of Russia, with emphasis

through the historical period. Required of all undergraduate Russia area studies majors. Prerequisite: permission.

REEU 496H The Thought and Arts of Russia (5)

Swayze
Honors program seminar. Prerequisite: permission of Honors adviser.

REEU 499 Undergraduate Research (3-5, max. 15) AWSp

For Russia-majors. Prerequisite: permission.

RELATED COURSES

ECON 495 The Economy of Soviet Russia (5)

GEOG 333 Russia's Changing Landscape (5)

GEOG 433 Soviet Resource Use and Management (5)

GEOG 438 Soviet Regions and Regionalization (3)

HSTEU 438 Modern Russian Intellectual History (5)

HSTEU 439 Soviet Union Since World War II

HSTEU 441 Medieval Russian Chronicles (5)

HSTEU 442 Russian Culture to the Era of Peter the Great (5)

HSTEU 443 Kievan and Muscovite Russia, 850-1700 (5)

HSTEU 444 Imperial Russia, 1700-1900 (5)

HSTEU 445 Twentieth-Century Russia (5)

HSTEU 446 Russian Historiography (5)

HSTEU 447 Russian and East European Bibliography (5)

HSTEU 450 Ethnic History of Russia and East Europe (5)

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 426 Mid-Nineteenth Century Literature in English (5)

RUSS 427 Tolstoy in English (5)

RUSS 428 Dostoyevsky 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 REGIONAL PROGRAM

REEU 344 Interdisciplinary Undergraduate Seminar on Eastern Europe (5)

Kapetanik, Paul, Sugar
Designed as a bridge between the two basic requirements of the East European Regional Studies baccalaureate program. The initial topic is "Heretics and Conformists in Iron-Curtain Europe." Prerequisites: 220 and permission of Russian and Eastern Europe undergraduate adviser.

REEU 360 Socialism and the Intellectual (4) A

Paul
Political and social life in contemporary Eastern Europe as interpreted through films and novels of the "New Wave" artists. Primary focus is on social criticism, with topics including bureaucracy, the role of the intellectual, and ideal *versus* reality in socialist society. Offered jointly with POL S 349.

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 420 Reform and Revisionism in Eastern Europe (5) W

Paul
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.

REEU 458 Undergraduate Colloquium on East Europe (5) Sp

Boba, Sugar
Interdisciplinary study of Eastern Europe with emphasis on the historical period. Prerequisite: permission.

REEU 499 Undergraduate Research (3-5, max. 15) AWSp

RELATED COURSES

GEOG 305 Eastern Europe (5)

GEOG 405 Problems of Eastern Europe (5)

HSTAM 426 Origins of European States (5)

HSTEU 447 Russian and East European Bibliography (5)

HSTEU 450 Ethnic History of Russia and East Europe (5)

HSTEU 451 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)

POLSH 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 (3)

Russia and Eastern Europe

COURSES FOR GRADUATES ONLY

RUSSIAN REGIONAL STUDIES

REEU 500 Interdisciplinary Research Seminar (*) AWSp

Jackson, Thornton
Contemporary problems in the societal, political, and economic development of Russia and East Europe. Seminars are devoted to specific topics, such as comparative cultures and ethnic minorities; economic development and environmental degradation; comparative communism; and problems of a similar interdisciplinary nature. Prerequisite: graduate standing or permission.

COLLEGE OF ARTS AND SCIENCES

REEU 508 Seminar: Problems in the Study of Marxism (3-5, max. 15) AWSp

Legters

Investigation of the deeper and more complex historical and philosophical problems encountered in understanding Marxist thought of the nineteenth and twentieth centuries. Prerequisites: 401, 402, 403, or equivalent in other departments.

REEU 510 Seminar in Soviet Literary Politics (5) Sp

Swayze

Examination of literary policies of the Soviet regime and their impact on Soviet *belles-lettres*. Reading knowledge of Russian desirable. Prerequisites: HSTEU 445 or POL S 441, RUSS 421, or permission.

REEU 600 Independent Study or Research (*) AWSp

RELATED COURSES

C LIT 580 Literary Relations (3-5, max. 15)

ECON 595 Soviet Economics (3)

GEOG 533 Research Seminar: Soviet Union (3, max. 6)

HSTEU 540 Medieval Russian Documents (3-6)

HSTEU 541 Medieval Russian History (3-6)

HSTEU 543 Seminar 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)

East European Regional Studies

REEU 500 Interdisciplinary Research Seminar (*) AWSp

REEU 504 Approaches to East European Politics (3-5) W

Paul

Selected concepts and methodologies useful for the analysis of politics and social structure in the socialist countries of East-Central and Southeastern Europe. Offered jointly with POL S 537. Prerequisite: permission.

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 600 Independent Study or Research (*) AWSp

RELATED COURSES

C LIT 580 Literary Relations (3-5, max. 15)

GEOG 503 Research Seminar: Eastern Europe (3, max. 6)

HSTAM 530 Early Middle Ages (3-6)

HSTEU 551 History of Eastern Europe, 1772-1939 (5)

HSTEU 552 History of Eastern Europe, 1939 to the Present (5)

HSTEU 553-554-555 Seminar on Modern East European History (3-6)-(3-6)-(3-6)

South Asia

COURSES FOR UNDERGRADUATES

SASIA 200 South Asia Today (5)

Potter

Introduction to major aspects of life in present-day India, Pakistan, Bangladesh, Sri Lanka (Ceylon), and Nepal. National and regional cultural, political, social, and economic features. Taught by specialist in the disciplines and areas involved.

SASIA 460 Sociolinguistics of South Asia (3) W

Schiffman, Shapiro

Examination of the sociolinguistics of the South Asian subcontinent. Prerequisite: LING 400 or two years of South Asian language. (Not offered 1976.)

SASIA 472 Introduction to Buddhism (3)

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 491 Hinduism (3)

Potter, Thrasher

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 498 Undergraduate Colloquium on South Asia (5)

Potter

Emphasized are topics involving the interrelationship 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) AWSp

Potter

RELATED COURSES

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)

INDN 420 Classical Indian Literature in English (5)

INDN 421 Modern Indian Literature in English (5)

LING 404, 405, 406 Indic and Indo-European (3,3,3)

MUSIC 428 Music of India (3)

PHIL 286 Introduction to India's Philosophies (5)

PHIL 412 Indian Philosophy (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 510 Introduction to Interdisciplinary Study of South Asia (5)

Introduction to work done in the various disciplines focusing on South Asia.

SASIA 511 Seminar on South Asia (5)

Interdisciplinary seminar for graduate students in which research and writing on individual research topics is critically developed. Designed to provide each student with an opportunity to synthesize his or her studies on South Asia. Prerequisite: 510 or permission of graduate adviser.

SASIA 600 Independent Study or Research (*) AWSp

RELATED COURSES

ANTH 517 Seminar on South Asia (3)

ART H 521 Seminar on Indian Art (3, max. 9)

HSTAS 501 Indian History (3-6)

PHIL 586 Seminar on Indian Philosophy (3, max. 12)

POL S 540 Problems in South Asian Politics (3)

Southeast Asia

COURSES FOR UNDERGRADUATES

ANTH 317 Southeast Asia (3)

ANTH 404 Mainland Southeast Asian Societies (5)

GEOG 434 Problems in the Geography of Southeast Asia (5)

LING 478 Introduction to Southeast Asian Linguistics (3)

POL S 343 Government and Politics of Southeast Asia (5)

POL S 433 International Relations in Southeast Asia (5)

COURSES FOR GRADUATES ONLY

ANTH 516 Seminar on Southeast Asia (3, max. 9)

GEOG 506 Research Seminar: Southeast Asia (3, max. 6)

LING 578 Seminar on Southeast Asian Linguistics (3, max. 9)

POL S 531 Problems of Southeast Asian Politics (3)

Comparative Studies in Ethnicity and Nationality

ANTH 437 Political Anthropology and Social Change (5)

ANTH 464 Language Policy and Cultural Identity (3)

AAS 205, 405 Asian American Culture (5,5)

AAS 490 Asian American Studies—Special Topics (3, max. 9)

EASIA 530 Seminar on China (3, max. 6)

ECON 343 The Economics of Discrimination (5)

- GEOG 227** Historical Geography of Black America (3)
- HSTAA 420** The American Disinherited (3)
- HSTAA 426** American Urban History Since 1870 (3)
- HSTEU 450** Ethnic History of Russia and East Europe (5)
- HSTEU 464** The Jews in Spanish History (3 or 5)
- LING 333** Linguistics and Society (3)
- LING 530** Dialectology (3)
- LING 580** Problems in Linguistics (3, max. 12)
- POL S 211** The Future of American Minorities (5)
- POL S 447** Comparative Politics in Selected Systems (5)
- POL S 449** Politics of Developing Areas (5)
- POL S 549** Problems of Political Development (3, max. 9)
- PSYCH 250** Racism and Minority Groups (4)
- SASIA 460** Sociolinguistics of South Asia (3)
- SOC 362** Race Relations (5)
- SOC 451** Theory and Process of Social Change (5)
- SOC 462** Comparative Race and Ethnic Relations (3)
- SOC 562** Seminar in Comparative Race Relations (3)
- SOC 581, 582, 583** Special Topics in Sociology (3,3,3)

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 the Comparative Literature office each quarter for information concerning offerings. Readings are in English.
- C LIT 261, 262, 263** Modern African Literature (3-5,3-5,3-5) A,W,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, 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 East Asia (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 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 each quarter for information concerning offerings.

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 offerings.

C LIT 400 Heroic Poetry (5)
Ancient, medieval, and Renaissance epic poems, read in English. May include the *Gilgamesh* epic, *Iliad*, *Odyssey*, *Metamorphoses*, *Aeneid*, *The Song of Roland*, and *Jerusalem Delivered*. Consult the Comparative Literature office each quarter for information concerning offerings.

C LIT 401 Modern European Drama (5)
Selected plays, read in English, by Ibsen, Strindberg, Chekhov, Pirandello, Brecht, Camus, Durren-matt, the absurdists, and others, representing naturalism, expressionism, theatricalism, and other movements that have shaped the modern European theater. Consult the Comparative Literature office each quarter for information concerning offerings.

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. Foreign-language texts are read in English translation. Consult the Comparative Literature office each quarter for information concerning offerings.

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 Islam and Europe (3-5)
Literary and cultural relations between Europe and the Islamic cultures of the Near East and North Africa. For centuries there has been a vital interaction between the European literary community and the Near Eastern literary community, the one with which it has the closest link. Course content varies, dealing with some aspect of this interaction (i.e., Arabic-Spanish relations, Balkan-Turkish relations, the image of Persia in Goethe and/or Fitzgerald). Ordinarily, texts are read in English translation. Consult the Comparative Literature office each quarter for information concerning offerings. 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 each quarter for information concerning offerings. 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 each quarter for information concerning offerings.

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 485 Lesser Known Literatures in Comparative Context (3-5, max. 15)
Reading and discussion of selected texts (in translation) from some national literature relatively little known in the English-speaking world. Attention is paid its distinctive features, its role as emitter or receiver of influences, and its role as mediator of influences between other national literary cultures. Among literatures considered are: Czechoslovakian, Dutch, Modern Greek, Polish, Romanian, Yugoslavian, Hungarian, Arabic, Persian, and Turkish. Content varies. Ordinarily, a foreign language is not required. Consult the Comparative Literature office each quarter for information concerning offerings.

C LIT 490 Directed Study or Research (1-5, max. 10) A,W,Sp
Individual study of topics in comparative literature by arrangement with the instructor and the Comparative Literature office.

C LIT 496 Special Studies in Comparative Literature (3-5, max. 15)
To be offered occasionally by visitors or resident faculty. Consult the Comparative Literature office each quarter for information concerning offerings.

Courses for Graduates Only

Consult the Comparative Literature office for information on the quarter and year the courses below will be offered. Graduate-level course numbers merely distinguish courses and do not indicate ascending level of knowledge required to take the course.

C LIT 510 Theories and Methods of Comparative Literary History (5, max. 10)
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 511 Literary Translation (5, max. 10)
Lectures on principles of translating literary works into readable English. Students present and comment on translations made by them and write seminar papers on problems of translation in theory and practice.

C LIT 513, 514 History of European Literary Theory and Criticism (3,3)
Two-quarter seminar concerned with the analysis of the main concepts of literary theory and literary criticism in the Western world as they have developed from the Middle Ages to the present. Emphasis on the philosophical background from which the literary ideas emerged.

C LIT 515 Recent Trends in Literary Criticism (3)
Study of some of the recent trends in literary criticism; in particular, structural, and philosophical approaches.

C LIT 522 Twentieth-Century Literature (3-5)
Examination of selected movements, schools, and trends of significance in literature of Europe and the Americas during the twentieth century. Such phenomena as symbolism, surrealism, dada, expressionism, neorealism, existentialism, the *nouveau roman*, and the absurd are among those that may be considered. Texts in English, French, and German figure most prominently, but Spanish, Italian, Russian, and other materials may also be dealt with. Course content and emphasis vary. Consult the Comparative Literature office each quarter for information concerning course offerings. Prerequisite: normally, a reading knowledge of one foreign language.

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.

COLLEGE OF ARTS AND SCIENCES

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 the Comparative Literature office each quarter for information concerning offerings. Prerequisite: reading knowledge of at least one European language.

C LIT 547 Classical Tradition in Medieval and Renaissance Europe (3-5, max. 15)

Intensive study of a single topic or genre. Course content varies. Consult the Comparative Literature office each quarter for information concerning offerings. Prerequisite: reading knowledge of Latin or Greek, and French or Italian.

C LIT 550 European Realism (3)

Seminar study of works of European Realism (Balzac, Flaubert, Turgenev, Dostoevsky, Tolstoy, the representative Victorians, and the writers of "poetic realism") in connection with various esthetic doctrines and subsequent critical appraisals.

C LIT 555 Studies in Irony (3)

Seminar examining irony in literary, philosophical, and satirical masterpieces from the classical period to contemporary literature.

C LIT 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 LIT 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 the Comparative Literature office each quarter for information concerning offerings. Prerequisite: reading knowledge of one foreign language.

C LIT 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 the Comparative Literature office each quarter for information concerning offerings. Prerequisite: reading knowledge of one foreign language.

C LIT 572 Studies in the Epic (3-5, max. 15)

Examination of epic literature as exemplified by selected works chosen from various cultures and periods (e.g., French and German Medieval Courtly Epic, the Epic in Renaissance and Baroque Europe, Traditions of the Mock Epic). Course content varies. Consult the Comparative Literature office each quarter for information concerning offerings. Prerequisite: ordinarily, reading knowledge of at least one foreign language.

C LIT 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 the Comparative Literature office each quarter for information concerning offerings. Prerequisite: ordinarily, reading knowledge of one foreign language.

C LIT 574 Literary Motifs (3-5, max. 10)

Examination of important fictional figures, situations, and plots that, through their repeated recurrence in world literature, appear to have a profound and universal significance for the human imagination. Course content varies. Consult the Comparative Literature office each quarter for information concerning offerings. Prerequisite: ordinarily, reading knowledge of at least one foreign language.

C LIT 576 Seminar in East-West Literary Relations (3-5, max. 15)

Comparative investigation of literary topics requiring the study of both Eastern and Western documents. Explores parallels and contradictions between the two, in concepts, ideas, and specific topics. The student is required to present a comparative paper on a chosen topic with qualified conclusions. Course emphasis varies. Prerequisite: at least one East Asian language (e.g., Chinese). (Offered alternate years.)

C LIT 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 the Comparative Literature office each quarter for information concerning offerings. Prerequisite: ordinarily, reading knowledge of one foreign language.

C LIT 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 the Comparative Literature office each quarter for information concerning offerings. Neither previous course work in psychology nor knowledge of a foreign language is required.

C LIT 592, 593 The European Romantic Movement (3,3)

Analysis of the chief works of the Romantic movement in England, Germany, and France, and their repercussions in America.

C LIT 596 Special Studies in Comparative Literature (3-5, max. 15)

To be offered occasionally by visitors or resident faculty. Course content varies. Consult the Comparative Literature office each quarter for information concerning offerings.

C LIT 600 Independent Study or Research (*) AWSpS

C LIT 700 Master's Thesis (*) AWSpS

C LIT 800 Doctoral Dissertation (*) AWSpS

COMPUTER SCIENCE

See Interschool or Intercollege Programs.

DANCE

See Music.

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 Play Analysis (3)

Lorenzen, Winchell
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 techniques. 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) A,W,Sp

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) A,W,Sp

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) A,W,Sp

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) A,W,Sp

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 McCoy

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 McCoy

Intensive laboratory course in the theory and the practice of Black theatrical productions, with emphasis on the work of Black playwrights. Prerequisites: 201 and permission.

DRAMA 203 Introduction to Black Theatre: Contemporary Plays (3) Sp McCoy

Continuation of 202. Prerequisites: 202 and permission.

DRAMA 210, 211, 212 Theatre Technical Practice (3,3,3)

Intensive lecture-laboratory in basic theories, techniques, and equipment of stage scenery, lighting, costumes. 210: scene construction and stage technical procedures. 211: costumes. 212: lighting and technical stage procedures.

DRAMA 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.

DRAMA 230 Introduction to Children's Drama (2) W Haaga, Valentineti

Survey of children's drama with an emphasis on philosophies and practices. Includes children's theatre, creative dramatics, and puppetry. Open to nonmajors.

DRAMA 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.

DRAMA 251, 252, 253 Acting (3,3,3) A,W,Sp Loper, Roberts

Intensive course-sequence in acting with integrated laboratory work in movement and voice. Improvisation, mime, scene analysis, and emphasis on realistic acting with introduction to styles and genres. Prerequisites: audition for 251; 251 for 252; 252 for 253, and concurrent enrollment in a movement course.

DRAMA 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.

DRAMA 271, 272, 273 Seminar in Theatre and Drama (2,2,2)

Prerequisite: completion of first year of the Bachelor of Fine Arts program.

DRAMA 274 Great Ages of the Western Theatre (5) A Lorenzen, Wolcott

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.

DRAMA 290, 291, 292 Theatre Technical Practices Laboratory (1,1,1) AWSp,AWSp,AWSp
Laboratory course involving specific production assignment, either in-shop or in-theatre or both. Prerequisites: 210 for 290; 211 for 291; 212 for 292, or permission.

DRAMA 298 Theatre Production (1-2, max. 9) AWSp
Laboratory course for students participating in School of Drama productions. Prerequisite: being cast in a production.

DRAMA 316 Theatrical Makeup (2) AWSp
Galstau
Basic principles, with intensive practice in application of makeup for use on proscenium and arena stages. Open to nonmajors.

DRAMA 324 Children's Theatre (3)
Theory and techniques, play selection and analysis, and rehearsal procedures. Emphasis on directing.

DRAMA 325, 326 Play Production (5,5) W,Sp
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.

DRAMA 331 Puppetry (3) AWSp
Valentinetti
Introduction to puppetry; construction and use of simple puppets as a visual aid in education, recreation, and therapy. Prerequisite: junior standing.

DRAMA 336 Drama in the Elementary School (3) A
Siks
Theory and practice of fundamentals of playacting as they relate to teaching children through improvisation and problem solving, emphasizing child development; correlation with language arts. Prerequisites: 151 and permission.

DRAMA 338 Creative Dramatics (3) AWSp
Haaga, Siks
Analysis of basic principles and techniques of the creative process in informal drama; observation of children and youth.

DRAMA 351, 352, 353 Advanced Acting (3,3,3) A,W,Sp
Loper, Roberts
Theory and practice of period styles. 351: Shakespeare. 352: Moliere and restoration. 353: classical and nonrealistic modern. Prerequisites: 253 for 351; 351 for 352; 352 for 353.

DRAMA 361 Chicano Drama (3) AWSp
Sierra
Focusing on the impact of the religious, economic, political, and class structure of Mexico, and tracing the historical and philosophical evolution of modern day Chicano drama. Prerequisite: HSTAA 180 or permission.

DRAMA 371, 372, 373 Special Studies (2,2,2) A,W,Sp
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.

DRAMA 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 text performed, styles of acting, scenic elements, and the critical theories that influenced the theatre of the period. (Not offered 1977-78.)

DRAMA 375 History of the Roman Theatre and Its Drama (3) W
Lorenzen
See 374 for course description. (Not offered 1976-77.)

DRAMA 376 History of the Medieval and Commedia Dell'arte Theatres and Their Drama (3) Sp
Lorenzen
See 374 for course description. (Not offered 1976-77.)

DRAMA 377 History of the European Renaissance Theatre and Its Drama (3) W
Wolcott
See 374 for course description. (Not offered 1976-77.)

DRAMA 378 History of the English Theatre and Its Drama: 1500-1700 (3) W
Lorenzen
See 374 for course description. (Not offered 1977-78.)

DRAMA 379 History of the European Theatre and Its Drama: 1700-1875 (3) A
Wolcott
See 374 for course description. (Not offered 1977-78.)

DRAMA 401 Innovations in Drama (6, max. 12) S
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.

DRAMA 402 English Summer Theatre School (9-12, max. 12) S
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.

DRAMA 410, 411, 412 Advanced Theatre Technical Practices (3, max. 9; 3, max. 9; 3, max. 9) AWSp,AWSp,AWSp
Apprenticeship, under faculty-staff supervision. 410: scene construction and scene painting. 411: costumes. 412: lighting. Prerequisites: 210 or 418 or permission for 410; 211 or permission for 411; 212 or permission for 412.

DRAMA 413 Advanced Scene Construction and Drafting (5) W
Martin
Advanced and special problems in scene construction and rigging with laboratories in working drawings and construction models. Prerequisite: 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 H 203, or equivalent.

DRAMA 415 Stage Costume Design (3, max. 6) ASp
Cridler
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 or permission; 416 for repeat of course.

DRAMA 416 History of Clothing and Costume (5) A
Cridler
Survey history of Western clothing and theatrical costume; emphasis on civil dress with attention to the distinctions in clothing for the stage. Open to nonmajors. Prerequisite: junior standing.

DRAMA 417 Advanced Stage Costume Construction (3) W
Cridler
Techniques of costume construction, including study of fabrics, color, fundamentals of pattern adaptation, and draping for historic clothing reconstruction. Prerequisites: 211, 416, or permission.

DRAMA 418 Scene Painting (3, max. 6) ASp
Dahlstrom, Forrester
Lecture-laboratory with focus on techniques and principles of scene painting. Uses of various media and types of equipment as applicable to varied scenic pieces. Crew work required in addition to scheduled class hours. Prerequisites: 210 or permission.

DRAMA 419 Stage Lighting (3) Sp
Devin
Theories and methods of lighting with emphasis on lighting plots. Laboratories consist of analysis of lighting instruments and control, color experiments, and basic circuitries. Prerequisite: 212 or equivalent.

DRAMA 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) AWSp
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 436 Drama in the Elementary School (3) Sp
Siks
Theory and practice of fundamentals of playmaking by children employing improvisation, adaptation, interpretation, and communication. Prerequisites: 338 and permission.

DRAMA 437 Laboratory in Teaching Drama to Children (1) AWSp
Siks
Practical experience in teaching drama to children. Prerequisites: 338 and permission.

DRAMA 438 Creative Dramatics and Laboratory (3) ASp
Haaga
Application of basic principles and techniques of creative dramatics through leadership experience. Open to nonmajors. Prerequisite: 338.

DRAMA 451, 452, 453 Rehearsal and Performance (3,3,3)
Prerequisite: 353 or permission.

DRAMA 454 Television Drama Production Seminar (3)

DRAMA 455 Historic Manners and Movement (2)
Laboratory course on the fundamentals of body movement for the stage and a survey of historic manners and movement, with particular attention to the interrelationship with historic costume. Open to nonmajors. Prerequisites: 253 and 211, or permission.

DRAMA 459 Intensive Rehearsal and Performance (6, max. 18) AWSp
Prerequisite: completion of two years in the Bachelor of Fine Arts program.

DRAMA 460 Introduction to Directing (3) A
Sydow
Student is introduced to the art of the stage director. Prerequisites: 153 or 253 and 210, 211, 212, 274.

DRAMA 461, 462 Elementary Directing (3,3) W,Sp
Sydow
Elementary study of the art of the stage director. Prerequisites: 460 and permission for 461; 461 for 462 and permission.

DRAMA 463 Intermediate Projects in Directing (2) AWSp
Hosteller, Sydow
Prerequisites: 462 and permission.

COLLEGE OF ARTS AND SCIENCES

DRAMA 464 Musical Comedy Direction (3)

DRAMA 465 American Ethnic Theatre Workshop (3, max. 9)

Theatre workshop experience in the emerging Black, Chicano, or American Indian drama through in-class and production participation. Prerequisite: permission.

DRAMA 472 History of the English Theatre and Its Drama: 1700-1900 (3) Sp

Lorenzen

Examination of the relationship of the physical theatre and the productions that took place within that theatre. Particular emphasis on the text performed, styles of acting, scenic elements, and the critical theories that influenced the theatre of the period. (Not offered 1977-78.)

DRAMA 473 History of the European Theatre and Its Drama From 1875 (3) Sp

Winchell

See 472 for course description. (Not offered 1976-77.)

DRAMA 474 History and Esthetics of the Motion Picture (3)

DRAMA 475 History of the American Theatre and Its Drama to 1900 (3) Sp

Wolcott

See 472 for course description. (Not offered 1977-78.)

DRAMA 476 History of the Modern American and English Theatre and Its Drama From 1900 (3) A

Winchell

See 472 for course description. (Not offered 1976-77.)

DRAMA 477, 478, 479 History of Far Eastern Theatre and Drama (3,3,3)

Inquiry into the origins and history of theatre and drama of Japan, China, and India and the conventions of their production. Classic and modern dramas form the basis of the study.

DRAMA 490 Special Studies in Acting-Directing (1-6, max. 6) AWSp

Prerequisite: permission.

DRAMA 491 Special Studies in Design-Technical (1-6, max. 6) AWSp

Prerequisite: permission.

DRAMA 492 Special Studies in Children's Drama (1-6, max. 6) AWSp

Prerequisite: permission.

DRAMA 493 Playwriting (3, max. 9)

Professional course. Prerequisite: ENGL 374 or permission.

DRAMA 495 Special Studies in the Theatre Arts of Asia (3, max. 9)

McKinnon, Visiting Artists

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 artists and the idioms of their choice.

DRAMA 496 Stage Costume Problems (2, max. 8)

Crider

Series of specialized courses directed to specific areas and problems of stage costume design and execution: accessories, textiles, masks, wigs, and analysis of construction of historic clothing and/or specialized clothing. Prerequisites: 211, 416, and permission.

DRAMA 497 Theatre Organization and Management (3)

Falls

Theoretical and practical examination of the professional theatre organization and management: legal structures, funding, business practice, and operational procedures. Open to nonmajors.

DRAMA 498 Theatre Production (1-2, max. 9)

AWSp

Laboratory course for students participating in School of Drama productions. Prerequisite: being cast in a production.

DRAMA 499 Undergraduate Research (1-5, max. 15) AWSp

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, max. 9) AWSp

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) AWSp

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) AWSp

Devlin

Practical experience in mounting scenery for a current production. Prerequisites: 413 and permission.

DRAMA 517, 518, 519 Studies in Historic Design (3,3,3)

Dahlstrom, Forrester

Investigation of artistic principles and modes that influenced the art, architecture, furniture, and decor of selected historic periods. Prerequisites: 517 for 518; 518 for 519, or permission.

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

Siks

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

Roberts, Siks

Seminar focuses on fundamentals of acting that relate to a child's "dramatic play"; 552-553 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) AWSp

Hostetter

Apprenticeship with professional director or association with thesis director. Prerequisite: graduate standing.

DRAMA 562 Advanced Directing Projects (3, max. 6) AWSp

Prerequisites: 5 credits in 561 and 2 credits in 563 or equivalent, and permission.

DRAMA 563 Seminar in Directing (2, max. 12) AWSp

Sydow

Seminar discussion on working problems of major productions in which the student is involved; examination of problems of the stage director on the advanced level. Prerequisite: graduate standing in drama.

DRAMA 571, 572, 573 Problems in Theatre History Research (3,3,3) A,W,Sp

Lorenzen, Wolcott

Methods and techniques of research in theatre history. Relationship of theatre arts to other arts and society in major periods of theatre history. Prerequisites: 571 for 572; 572 for 573.

DRAMA 575, 576, 577 Seminar in Theatre History (3,3,3) A,W,Sp

Lorenzen, Wolcott

Prerequisites: 571, 572, 573.

DRAMA 581, 582, 583 Analysis of Dramatic Literature (3,3,3) A,W,Sp

Loper, Winchell

Modes of analysis intended for graduate students in drama (design, directing, and theatre history). Intensive analytical work on a limited number of play texts selected from the classical Greek period to the present. Prerequisite: graduate standing.

DRAMA 585, 586, 587 Seminar in Drama (3,3,3) A,W,Sp

Loper, Winchell

Seminar inquiring into the relationships between scholarship, criticism, and theatre art. Prerequisite: permission.

DRAMA 599 Advanced Studies in Theatre Arts (1-5, max. 10) AWSp

Independent projects of group study of specialized aspects of theatre arts. Prerequisites: graduate standing and permission.

DRAMA 600 Independent Study or Research (*) AWSp

DRAMA 700 Master's Thesis (*) AWSp

ECONOMICS

Courses for Undergraduates

INTRODUCTORY COURSES

ECON 200 Introduction to Economics (5) AWSp
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) AWSp

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) AWSp

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 260 Economic History of the Western World (5) AWSp

Analysis of the sources of long-run economic change from Neolithic times to the present. Develops basic analytical concepts of economic change and applies them to human history. Approximately one-half of the course deals with economic development until the settlement of the American colonies, and the other half deals with American economic development.

ECON 312 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.

GENERAL THEORY

ECON 300 Intermediate Price Theory (5) AWSp

Fundamental concepts and principles. Demand, supply, market price, and the determination of price under competitive and monopolistic conditions; relation between price and costs. Prerequisites: 201 and MATH 157 or 124, or equivalent, or permission.

ECON 301 National Income Analysis (5) AWSp

Analysis of the determinants of the aggregate level

of employment, output, prices, and income of an economy. Prerequisites: 201 and MATH 157 or 124, or equivalent, or permission.

ECON 306 Development of Economic Thought (5)
From the early modern period to the present, with some discussion of its relation to natural science and other social sciences. The main subjects treated are Adam Smith and the classical school, Karl Marx, later Marxism, and the transition to J. M. Keynes. Prerequisites: 200, 201, or equivalent, or permission.

ECON 400 Fundamentals of Microtheory (3)
Fundamentals of microtheory 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. Prerequisites: 200 or equivalent recommended and permission.

ECON 401 Fundamentals of Macrotheory (3)
Fundamentals of macrotheory 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 200 or equivalent recommended.

ECON 406 Undergraduate Seminar in Economics (5)
Seminar provides undergraduate student an opportunity to apply the tools of economic analysis in a critical examination of theoretical and empirical work. A list of topics for the seminars is available in the Department of Economics office. Enrollment preference is given to majors in their junior or sophomore years. Prerequisites: 201 and permission.

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 MATH 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 MATH 124.

ECON 412 Introduction to Mathematical Economics III (5)
Theory and application of linear algebra and matrix methods with special emphasis on problems originating in economic theory. Prerequisite: 411 or MATH 124.

ECON 416 Urban Economics (5)
Application of economic analysis to urban trends, problems, and prescriptions, such as changing urban form and function, urban public finance, housing and renewal, poverty and race, transportation, and environmental problems. Offered jointly with GEOG 416. Prerequisite: 300 or 400, or equivalent.

MONEY, BANKING, AND CYCLES

ECON 320 Money and Banking (5)
Demand for, and supply of, money; the banking 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)
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 ECON 300, 301, or equivalent, or permission.

GOVERNMENT REGULATION AND INDUSTRIAL ORGANIZATION

ECON 330 Government and Business (5) AWSp
Analysis of the economic effects of various govern-

mental regulatory agencies and policies. Emphasis placed upon the observed economic effects of policies intended to regulate business practices, control prices, conserve resources, or promote competition. Examination of antitrust legislation as a means of promoting desired market performance. Prerequisite: 201 or equivalent.

ECON 404 Industrial Organization and Price Analysis (5)
Study of the economic determinants and consequences of various industrial market structures. The relationship between market structure and economic behavior is studied. Topics include the theory of the firm, oligopoly, imperfectly competitive markets. The empirical basis for theories of market behavior also is studied. Prerequisite: 300 or equivalent.

ECON 435 Natural Resource Utilization and Public Policy (5) AWSp
Special emphasis on elements of economic theory relating to resource-oriented industries. Case studies in the theory and practice of resource management dealing with both stock and flow resources. Benefit-cost analysis and the evaluation of multipurpose resource projects. Prerequisite: 201 or permission.

LABOR ECONOMICS

ECON 340 Labor Economics (5) AWSp
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 343 The Economics of Discrimination (5)
Trosper
Examines discrimination based on race, sex, or ethnicity. Using economic analysis, it treats the causes and consequences of discrimination. Attention also focused on the role of the government both in assisting and combating discrimination. Prerequisites: 200, 201, or equivalent.

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, ideology, programs, and 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.

PUBLIC FINANCE

ECON 350 Public Finance (5) AWSp
Elementary treatment of the theory of public finance; theory of nonmarket decisions, welfare and allocative effects of taxation, principles of fiscal policy, problems of the public debt. Prerequisites: 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 (5)
Application of economic theory and methodology to political phenomenon. Emphasis on theory construction with application in the American context. Offered jointly with POL S 416. Prerequisites: 201, 400 or equivalent.

ECONOMIC HISTORY

ECON 460 Economic History of Europe (5)
Origins of the modern European economy; historical analysis of economic change and growth from medieval times that stresses the preconditions and consequences of industrialization. Offered jointly with HST 481. 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 465 Economic History of South Asia (5)
Historical analysis of economic structure and the phenomenon of economic stagnation in the region. Examines the impact of imperialism and the international economy on the area in the nineteenth and twentieth centuries. Focuses on problems of economic change and growth as they bear on current efforts at economic development; 200, 201 recommended.

ECON 466 Economic History of China: 1840-1949 (5)
Study of the post-1840 Chinese economy, with a brief introduction to the social-economic background of the earlier period. Explanations of China's long economic stagnation, and analyses of the impact of external factors and the role of the government in China's economic development before 1949. Prerequisite: permission; 200, 201 recommended.

INTERNATIONAL TRADE

ECON 370 Introduction to International Economics (5) AWSp
International trade, commercial policy, and the balance of payments are studied in a theoretical context and used 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 SYSTEM AND DEVELOPMENT

ECON 390 Comparative Economic Systems (5)
Study of resource allocation, growth, and income distribution in capitalist, market socialist, and cen-

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trally 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 (5)
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 (5)
Trosper
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 (5)
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 (5)
Analysis of the economic growth of Japan since circa 1850 to the present. The reasons for rapid industrialization, various effects of sustained economic growth, and significant contemporary issues are investigated. Prerequisite: permission; 200 and 201 recommended.

ECON 495 The Economy of Soviet Russia (5)
Analytical survey of techniques of planning and resource allocation in the Soviet economy. Criteria for evaluating economic performance, growth, and efficiency. Prerequisite: 300 or equivalent, or permission.

STATISTICS AND ECONOMETRICS

ECON 281 Introduction to Economic Statistics (5)
AWSp
Basic statistical concepts; characteristics of economic data; statistical analysis of economic data. Prerequisites: 200 and 201.

ECON 480 Economic Statistical Analysis (5) AW
Application of statistical techniques to economic problems with emphasis on applications. Prerequisite: 281 (calculus at level of MATH 124 or ECON 410 may be used).

ECON 482 Introduction to Regression Analysis (5)
Specification and estimation of economic problems by simple and multiple regression equation. Prerequisites: 201, and 480 or 481.

GENERAL

ECON 408 Problems of Peace and Conflict Resolution (3)
Study of factors 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 POLS 408. Prerequisite: permission.

ECON 496H Honors Seminar (5) W
Honors and other superior students are given opportunity to develop research techniques, to pursue topics in breadth and depth, and to apply their tools of economic analysis to selected topics in economic theory and to current issues of national and international economic policy. To be taken in the senior year. Prerequisite: permission.

ECON 497 Honors Directed Study (5) Sp
Students individually arrange for independent study of selected topics in economic theory and its application under the direction of a member of the economics faculty. The research paper, if accepted, is the student's senior thesis. Prerequisite: permission.

ECON 498 Special Topics: Undergraduate Theory (5)
Introduces to advanced undergraduate students current research going on in economic theory and its application to contemporary problems. Prerequisites: 300, 301, and permission.

ECON 499 Undergraduate Research (1-6) AWSp
May not be applied toward an advanced degree. Prerequisite: permission.

Courses for Graduates Only

GRADUATE CORE PROGRAM

ECON 500 Microeconomic Analysis I (5) AW
Elements of choice theory. Value and demand, cost and supply, and the implied resource allocation under different constraints of competition. Prerequisites: 300, 301, and 410, or MATH 124, or permission.

ECON 501 Microeconomic Analysis II (5) 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 Macroeconomic Analysis I (5) AW
Analysis of theories of income, employment, and output under static conditions; quantity theory of money; relation of monetary and "real" theories; stability and instability of income over time; growth of the economy. Prerequisites: 300, 301, and 410 or MATH 124, or permission.

ECON 503 Macroeconomic Analysis II (5) WSp
Recent developments. Prerequisite: 502 or permission.

ECON 505 Microeconomic Theory: Problems and Applications (3)
Seminar for graduate students who have completed the basic core sequence in price theory. Designed to extend the student's analytic and problem-solving abilities by working systematically through a programmed set of readings and problems. The material includes both formal analytical techniques and applications of economic theory. Prerequisite: 501.

ECONOMIC THEORY AND HISTORY OF ECONOMIC THOUGHT

ECON 507 History of Economic Thought (3)
Classical and neoclassical economics with emphasis on the latter.

ECON 511 Advanced Microeconomic Theory: Selected Topics (3, max. 12)
Seminar in advanced microtheory. Selected topics of 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. Prerequisite: permission.

ECON 520 The Economics of Property Rights (3)
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 (3)
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 535 Economics of Location (3)
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 (3)
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 (3)
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.

ECON 535 Economics of Natural Resources I (3) W
Pricing, 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
The second of two-course sequence. One applied area selected for particular emphasis. Students are expected to complete a substantial paper. Team projects are an option. Prerequisites: 435, 500, 535, or permission.

ECON 537 Economic Aspects of Marine Policy (3) W
Crutchfield, Stokes
Development of pertinent economic concepts and their application to selected topics in marine policy decision making. Offered jointly with IMS 508. Prerequisite: IMS 501 or permission.

LABOR ECONOMICS

ECON 541, 542 Labor Economics (3,3)
Selected topics in labor economics. Prerequisite: permission.

ECON 546 Economic Studies of Health Care (3) Sp
McCaffree, Watts
Examination of topics related to the economics of health care, including supply and demand factors, financing of care, efficiency and cost of delivery, and allied areas. Offered jointly with HSERV 546. Prerequisite: graduate standing in the School of Public Health and Community Medicine; others by permission.

ECON 548 Economics of Labor and Human Resources (3) Sp
Hashimoto
Economic analysis of policy-related topics in human resources. Topics include labor demand and supply, education and occupation, wage structures and income inequality, discrimination, and poverty. Offered jointly with PB PL 548. Prerequisite: equivalent of 400, or permission; not open to Economics majors.

ECON 556 Seminar in Urban Economics (3)
Use of economic theory to explain land-use trends, transportation, housing and renewal, the ghetto, and the public economy in urban areas. Offered jointly with GEOG 556. Prerequisites: 300, 301, or equivalent.

PUBLIC FINANCE AND TAXATION

ECON 550 Public Finance I (3) W
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
Welfare, allocative, and stabilization effects of tax-

ation and public spending; theory of shifting and incidence of taxation; analysis of fiscal policy; problems of the public debt; allocative and welfare consequences of inflationary finance. Prerequisites: 500, 502, and 550, 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.

ECONOMIC HISTORY

ECON 504 Economic History and Economic Development (3) A
Analysis of determinants of long-run development, emphasizing institutional, demographic, and technological changes; consideration of both theoretical and empirical studies. Prerequisite: 300 or equivalent.

ECON 561 European Economic History (3) W
Economic growth of the Western world since the decline of the Roman Empire. Prerequisites: 504 and permission.

ECON 562 American Economic History (3) Sp
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
Modern developments in general equilibrium theory and welfare economics, with relation to international trade. Prerequisite: permission.

ECON 572 International Trade Theory II (3) Sp
Problems of foreign trade and exchange controls, and international monetary policies. Prerequisite: permission.

ECONOMIC SYSTEMS AND DEVELOPMENT

ECON 504 Economic History and Economic Development (3) A
See under Economic History heading for course description.

ECON 590 Theory and Practice of Economic Planning (3)
Theoretical issues and success criteria; models, techniques, and applications of planning in the allocation of economic resources. Prerequisite: permission. (Offered alternate years.)

ECON 591 Theoretical Issues in Economic Development (3)
Analysis of issues in economic development with application to the less-developed countries of the world today. Prerequisite: 504.

ECON 595 Soviet Economics (3)
Analysis of problems of economic measurement, economic development, resource allocation, planning and decentralization in the Soviet Union. Prerequisite: permission. (Offered alternate years.)

MATHEMATICAL ECONOMICS

ECON 513 Mathematical Economics: Activity Analysis (3)
Linear programming. Theory of convex bodies. Input-output models. Competitive equilibrium and Pareto optimum. Linear activity analysis of production and applications. Prerequisites: 412, 500, or permission.

ECON 514 General Equilibrium Analysis (3)
Study of the existence, uniqueness, and stability of general equilibrium models under the assumptions of competition. Emphasis is on recent developments in the literature with consideration given to both positive and normative economics.

ECON 515 Special Topics in Mathematical Economics (3)
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)
Study of the sources of meaningful comparative statics theorems in economics, with special emphasis on extremum problems, qualitative analysis, and dynamic stability. Mathematical concepts necessary for access to the current literature are developed.

STATISTICS AND ECONOMETRICS

ECON 580 Econometrics I (3)
Study of empirical estimation techniques and related methodological problems.

ECON 581 Econometrics II (3)
Advanced study of econometric methods and techniques. Prerequisites: 481, 482, and 580.

GENERAL

ECON 600 Independent Study or Research (*) AWSp

ECON 700 Master's Thesis (*) AWSp

ECON 800 Doctoral Dissertation (*) AWSp

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.

COURSES IN ENGLISH FOR FOREIGN STUDENTS

(These courses are administered by the Committee on Language Learning.)

ENGL 150 Intermediate Oral English for Foreign Students (5) A
Concentration on pronunciation problems, basic grammatical patterns, and idioms from the point of view of oral practice and fluency.

ENGL 151 Advanced Oral English for Foreign Students (5) AWSp
Advanced version of 150, as well as an introduction to basic writing.

ENGL 160 English for Foreign Students: Intensive (15) S

Intensive course specifically intended to prepare the foreign student for the coming academic year. Oral and written work. This course satisfies the foreign student English requirement.

ENGL 303 Advanced Written English for Foreign Students (3, max. 9) AWSp
Content varies each quarter: composition, humanities, and science readings.

ENGL 304 Introduction to Scientific and Technical Communications for Foreign Students (4) A

Trimble
Scientific and technical writing and reading for foreign students well grounded in oral English. Concentration on (1) application of rhetorical concepts most frequently used in scientific and technical writing, (2) grammatical analysis in areas traditionally difficult for foreign students, and (3) grammatical-rhetorical analysis of scientific and technical discourse. Offered jointly with HSS 304.

ENGL 305 Scientific and Technical Report Writing for Foreign Students (4) W

Trimble
Application of the problem-solving approach to scientific and technical writing. Concentration on (1) 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 HSS 305. Prerequisite: 304 or HSS 304 or permission.

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
Analysis of short stories and novels, with emphasis on nineteenth- and twentieth-century writers.

ENGL 212 Poetry (5) AWSp
Analysis of poetry, with emphasis on nineteenth- and twentieth-century poets.

ENGL 213 Drama (5) AWSp
Analysis of plays, with emphasis on modern dramatists.

VARIETIES 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 those 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.

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ENGL 241 The Bible as Literature (5) AWSp
Introduction to the development of the religious ideas and institutions of ancient Israel, with selected readings from the Old Testament and New Testament. Emphasis on reading the Bible with literary and historical understanding.

ENGL 251 Introduction to World Literature (5) AWSp
Introduction to literature from various ages, languages, and cultures, representing different genres, by writers of major literary and historical significance.

ENGL 261 The Medieval Tradition in Literature (5) AWSp
Introduction to literature of medieval England, from the fifth to the fifteenth centuries. Some works are read in modern English translation; others (especially later works) are read in Middle English.

ENGL 267 Introduction to American Literature (5) AWSp
Survey of the major writers, modes, and themes in American literature, from the beginnings to the present. Specific readings vary, but regularly included are: Taylor, Edwards, Franklin, Poe, Hawthorne, Melville, Emerson, Thoreau, Whitman, Dickinson, Twain, James, Eliot, Stevens, O'Neill, Faulkner, Hemingway, Ellison, and Bellow.

WRITING 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,W,Sp
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.

UPPER-DIVISION COURSES

Students who register in 300-level and 400-level courses should have completed one or more courses in literature at the 200 level or the equivalent.

ENGL 311 Chaucer (5) ASp
Chaucer's *Canterbury Tales* and other poetry, with attention to Chaucer's social, historical, and intellectual milieu.

ENGL 312 Medieval and Renaissance Drama, Exclusive of Shakespeare (5)
Works by such dramatists as Kyd, Marlowe, Jonson, Webster, Beaumont, Fletcher, and Ford, with some medieval liturgical plays, cycles, and moralities.

ENGL 313 Renaissance Literature (5)
Poetry and prose by such writers as Wyatt, Surrey, Gascoigne, Spenser, Sidney, Marlowe, Drayton, Shakespeare, Lyly, Lodge, Nash, and Raleigh, with attention to the religious, intellectual, and literary contexts. (Offered alternate years.)

ENGL 314 Shakespeare to 1603 (5) AWSp
Shakespeare's career as dramatist before 1603 (including *Hamlet*). Study of history plays, comedies, and tragedies.

ENGL 315 Shakespeare After 1603 (5) AWSp
Shakespeare's career as dramatist after 1603. Study of comedies, tragedies, and romances.

ENGL 321 English Literature of the Seventeenth Century (5)
Poetry and prose by such writers as Donne, Jonson, Herrick, Marvell, Herbert, Crashaw, Vaughan, Dryden, Edward Taylor, Bacon, Browne, Burton, Hobbes, and Bunyan, with attention to the religious, intellectual, and literary contexts.

ENGL 322 Milton (5) AWSp
Milton's early poems and the prose; *Paradise Lost*,

Paradise Regained, and *Samson Agonistes*, with attention to the religious, intellectual, and literary contexts.

ENGL 323 English Drama, 1660-1800 (5)
Restoration and eighteenth-century plays by Dryden, Wycherley, Etherege, Congreve, Goldsmith, Sheridan, and others.

ENGL 324 Restoration Literature, 1660-1700 (5)
Dryden and other satirists and playwrights, diarists, and essayists. (Offered alternate years.)

ENGL 325 Early Eighteenth-Century Literature (5) AWSp
Works by Swift and Pope and such other writers as Defoe; Addison, Steele, Gay, and Thomson.

ENGL 326 Later Eighteenth-Century Literature (5)
Works by Johnson, Boswell, and representative dramatists, novelists, and poets.

ENGL 327 English Novel: Eighteenth Century (5) AWSp
Defoe, Richardson, Fielding, Smollett, Sterne, early Jane Austen, and representative minor novelists.

ENGL 331 Romantic Poetry (5) AWSp
Blake, Wordsworth, Coleridge, and their contemporaries.

ENGL 332 Romantic Poetry (5) AWSp
Byron, Shelley, Keats, and their contemporaries.

ENGL 333 English Novel: Early and Middle Nineteenth Century (5) AWSp
Austen, the Brontës, Dickens, Thackeray, and other representative novelists.

ENGL 334 English Novel: Later Nineteenth Century (5) AWSp
Eliot, Hardy, Conrad, and other representative novelists.

ENGL 335 Victorian Poetry (5)
Tennyson, Browning, Arnold, Hopkins, and such other poets as Hardy, D. G. Rossetti, Meredith, Clough, Morris, Wilde, and Yeats.

ENGL 336 Nineteenth-Century English Prose (5)
Nonfictional prose by such writers as Burke, Coleridge, Wordsworth, De Quincey, Carlyle, Mill, Arnold, Newman, and Ruskin.

ENGL 341 Modern British Poetry (5)
Hardy, Yeats, Eliot, Auden, and such other poets as Lawrence, Muir, Owen, Graves, Empson, Thomas, Larkin, Hughes.

ENGL 342 English Literature 1900-1930 (5) AWSp
Works by Joyce, Yeats, Eliot, Lawrence, Forster, Woolf, and others.

ENGL 343 English Literature Since 1930 (5) AW
Works by such writers as Bowen, Orwell, Waugh, Cary, Snow, Murdoch, Auden, Thomas, Lessing, Pinter, Greene, Durrell, and Beckett.

ENGL 351 American Literature: Beginnings to 1800 (5) W
Responses to the New World and literary strategies in the literature of the colonies and the early republic. Works by Taylor, Edwards, Franklin, and others.

ENGL 352 American Literature: Early Nineteenth Century (5) AWSp
Conflicting visions of the national destiny and the individual identity in the early years of America's nationhood. Works by Emerson, Thoreau, Hawthorne, Melville, and such other writers as Poe, Cooper, Irving, Whitman, Dickinson, and Douglass.

ENGL 353 American Literature: Later Nineteenth Century (5) AWSp
Literary responses to an America propelled forward by accelerating and complex forces. Works by Twain, James, and such other writers as Whitman, Dickinson, Adams, Howells, Crane, Dreiser, and Dubois.

ENGL 354 American Literature: 1914-45 (5) AWSp
Works by such writers as Anderson, Lewis, Cather, O'Neill, Frost, Pound, Eliot, Cummings, Hemingway, Fitzgerald, Faulkner, Steinbeck, Hart Crane, Stevens, and Porter.

ENGL 355 American Literature Since 1945 (5) AWSp
Works by such writers as Ellison, Miller, Warren, West, Williams, Wright, Flannery O'Connor, Salinger, Albee, Mailer, Vonnegut, Barth, Heller, Baldwin, Hawkes, Kesey.

ENGL 356 American Poetry: Beginnings to 1917 (5)
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.

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.

ENGL 358 The Literature of Black America (5)
Selected works by Afro-American writers, with emphasis on twentieth-century literature.

ENGL 361, 362, 363 Types of Contemporary Poetry (5,5,5) A,W,Sp

ENGL 371 Modern European Literature in Translation (5) AWSp
Fiction, poetry, and drama from the development of modernism to the present. Works by such writers as Mann, Proust, Kafka, Gide, Hesse, Rilke, Brecht, Sartre, and Camus.

ENGL 372 Modern Jewish Literature in Translation (5) 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, Wiesel, Grade, Halpern, and Agnon.

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.

ENGL 375 Women and the Literary Imagination (5, max. 15) AW
Study of women writers or ways various writers have portrayed woman's image, social role, psychology, etc.

ENGL 376 Women Writers (5, max. 15)
Study of the work of women writers in English and American literature.

ENGL 381 History of Literary Criticism (5)
Survey of the classical sources (Plato, Aristotle, Longinus, Horace) and major writers of English criticism, such as Sidney, Jonson, Dryden, Pope, Johnson, Wordsworth, Coleridge, Arnold, Wilde, Richards, Leavis, and Trilling.

LANGUAGE COURSES

ENGL 390 English Language Study (5) AWSp
Wide-range introduction to the study of written and spoken English. The nature of language; ways of describing language; the use of language study as an approach to English literature and the teaching of English. Prerequisite: upper-division standing.

ENGL 391 English Grammar (5) AWSp
Description of sentence, phrase, and word structures in present-day English. Open to sophomores.

ENGL 392 Current English Usage (5)
Principles for deciding what constitutes good English in an individual's speech and writing.

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.

ENGL 394 English Prose Style (5) Sp
Analysis of the traits of language that contribute to the effects of writings in prose.

ENGL 395 American Writers: Studies in Major Authors (5, max. 15)
Concentration on one writer or a special group of American writers.

ENGL 396 British Writers: Studies in Major Authors (5, max. 15)
Concentration on one writer or a special group of British writers.

ENGL 397 Topics in American Literature (5, max. 15)
Exploration of a theme or special topic in American literary expression.

ENGL 398 Topics in British Literature (5, max. 15)
Themes and topics of special meaning to British literature.

ENGL 399 Special Studies in Literature (5, max. 15)
Concentration on a theme or topic in literature, not confined by national boundaries or historical periods.

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: 331, 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)
Analyses of dramatic structures. American, British, and European plays representing the kinds of comedy from classical to modern.

ENGL 412 Types of Dramatic Literature: Tragedy (5)
Analyses of dramatic structures. American, British, and European plays representing the nature of tragedy from classical to modern.

ENGL 413 Romances and Folk Literature (5)
Medieval romance in its cultural and historical setting, with concentration on the evolution of Arthurian romance. (Offered alternate years.)

ENGL 414 The Popular Ballad (5)
The origin, development, and transmission of both texts and tunes of English and Scottish folk ballads in Great Britain and North America. (Offered alternate years.)

ENGL 415 Introduction to the Folktale Among Literate Peoples (3)
Skels
Techniques of classification, geographic-historical distribution, theories of origin and interpretations,

and related areas of investigation of the oral prose folk narrative of literate peoples. Offered jointly with HSS 471. Prerequisite: upper-division standing.

ENGL 416 Introduction to American Folklore (5) W
Study of different kinds of folklore inherited from America's past and to be found in America today. The cultivation of an awareness of authentic folklore and of how to collect it. Offered jointly with HSS 472.

ENGL 417 Utopias and Social Ideals (5)
Reading of major works in the Utopian tradition of English and American literature (e.g., More, *Utopia*; Bellamy, *Looking Backward*; Mill, *On Liberty*; Huxley, *Brave New World*).

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.

ENGL 422, 423, 424 Advanced Verse Writing (5,5,5) A,W,Sp
Intensive study of ways and means of making a poem. Prerequisite: 274, 275 or 276, or permission.

ENGL 425, 426 Advanced Short Story Writing (5,5) AWSp,AWSp
Experience with the theory and practice of writing the short story. Prerequisites: 277, 278, or permission.

ENGL 427, 428, 429 Novel Writing (5,5,5) AWSp,AWSp,AWSp
Experience in planning, writing, and revising a work of long fiction, whether from the outset, in progress, or in already completed draft. Prerequisite: permission.

ENGL 430, 431 Playwriting (5,5)
Experience in planning, writing, and revising a play, whether from the outset, in progress, or in already completed draft.

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.

ENGL 442 Language Learning (5) W
Consideration of how an individual achieves psychological and esthetic grasp of reality through language; relates language development to reading skills, literary interpretation, grammar acquisition, oral fluency, discursive and imaginative writing.

ENGL 443 Current Developments in English Studies: Conference (5)

ENGL 444 Special Topics in English for Teachers (3-5, max. 10)

CONFERENCES AND SEMINARS

ENGL 490, 491 Major Conference (3,3) AWSp,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 the instructor. Required of, and limited to, Honors seniors in English.

ENGL 493, 494 Advanced Writing Conference (3-5, 3-5) AWSp,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) AWSp
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)

COLLEGE OF ARTS AND SCIENCES

- ENGL 599** Special Studies in Literature (5, max. 15)
ENGL 600 Independent Study or Research (*)
ENGL 700 Master's Thesis (*)
ENGL 800 Doctoral Dissertation (*)

ENVIRONMENTAL STUDIES

Courses for Undergraduates

ENV S 101 Introduction to Environmental Studies (3) ASp

Introduction to the complexity of environmental problems, using current issues in environmental problems as the focus for discussions. The course differentiates between the natural science, technological, and institutional views of the environmental issues and presents an introduction to integrate these views in the understanding of environmental problems.

ENV S 204 Natural Processes in the Ecosystem (5) AWS

Boersma
 Survey of factors such as: climate, water, soil, geological processes, dynamics of plant and animal communities, and natural selection, as they affect the ecosystem. For students who wish to obtain a broad picture of the basic processes of the natural ecosystem and their implications to manipulations of the environment. Should precede GEOG 205; ENV S 101 is recommended. Not recommended for students who have had more than 20 credits of natural sciences.

ENV S 225 Environment, Population, and Food Production (3) A

Boersma
 Population growth and food production in relationship to climate, green revolution, energy, carrying capacity, and quality of life.

ENV S 342 Interactions of Man and the Environment (3) WSpS

Fleming, Staff
 Study of man's relationship to the environment and the changes this relationship has undergone as human activity has become more complex. The impact of environment upon human activity and the impact of human activity upon the environment. Integrative nature of environmental studies stressed through lecture and problem-solving activities. Complex nature of environmental problems and the multidisciplinary techniques required for their investigation and solution. Prerequisite: junior standing or fulfillment of distribution requirements. Last time offered: Winter Quarter 1977.

ENV S 352 Environmental Impact Assessment (3) A

Dearborn, Sharp
 History, concept, methods, and practice of environmental impact assessment (EIA) are surveyed to provide a comprehensive understanding of environmental assessment. Application of state and federal regulations for assessing environmental impacts is studied through case studies of a wide variety of private and public projects. Emphasis is placed upon integrating EIA into planning process. Prerequisite: 342 or permission.

ENV S 361 Environmental Values and Perceptions (5) AS

Sharp
 Lecture and seminar with focus on the way individual and cultural values affect our perception of, and relation to, the environment. Explores role of individual characteristics in perceptual acuity and value formation, conflicting values within and between societies, impingement of these conflicts on environmental problems, and possible methods of resolution with emphasis on American environmental experience. Prerequisite: junior standing.

ENV S 365 Workshop in Presenting Environmental Issues (3) A

Cranston
 Techniques for formulating and presenting informational programs on environmental issues. Students select the issues, investigate background material,

and develop programs to convey the information to a wide audience. Programs can involve all media techniques, slide/tape, television, film, and radio. Open to all juniors with or without communications background. Prerequisite: one upper-division environmental studies course or permission.

ENV S 432 Environmental Politics and Policy (5) A

Lee
 Survey of the politics of environmental problem recognition, policy formulation, and implementation. Offered jointly with POL S 483. Prerequisites: 101, POL S 101 or 202, or permission.

ENV S 433 Energy and Environmental Policy (5)

Brewer, Lee
 Institutional, economic, and political implications of energy development, for society at large and for environmental values in particular. Prerequisite, one of the following: ENGR 307, POL S 101 or 202, or permission.

ENV S 441 Economics of Environmental Management (3) Sp

Crutchfield
 Alternative economic policies for managing man's use of the environment. Economics of pollution and residual control, recreation, common pool resources, conservation of renewable and nonrenewable resources. Prerequisite: ECON 201 or permission.

ENV S 451 Problems in Shoreline Management (3) W

Lecture-seminar with focus on various problems in shoreline management including economic uses, legal and administrative approaches to shoreline management, with particular reference to Washington's Shoreline Planning Processes. Prerequisites: junior standing or above, BG&S 200, or permission.

ENV S 453 Practicum in Environmental Assessment (3-5) Sp

Undertakes preparation of model environmental impact assessment. Students from various departments form multidisciplinary teams to study in depth environmental problems and develop courses of action. Prerequisite: 352 or 451 or impact assessment course in another department.

ENV S 481 Environmental Law (3) W

Legislative, administrative, and common law dealing with the environment. Introduces the student to the fundamental concepts and classic issues underlying the body of law and policy dealing with the environment. Review of ideas includes: air and water quality, noise, energy management, and land use. For nonlaw students. Prerequisite: BG&S 200 or FOR M 207, or permission.

ENV S 482 Land-Use Law (3) Sp

Introduction to the basic strands of land-use law; explores the constitutional and legislative background of laws controlling land use; develops an understanding of the legal strategies available to channel land development, and the limits of these strategies; explores the "taking" issue. For nonlaw students. Prerequisites: 481, LAW 466, or permission.

ENV S 498 Special Topics in Environmental Studies (1-5, max. 10)

Lecture, seminar, and/or team study of topics varying from quarter to quarter. Prerequisites: upper-division standing and permission.

GENERAL AND INTERDISCIPLINARY STUDIES

Course numbers under this heading are reserved by the Division of General and Interdisciplinary Studies for curricular innovations. Descriptions of GIS course offerings are available during pre-registration and in-person registration in the Office for Undergraduate Studies, C14 Padelford.

GENERAL STUDIES

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 301H Honors Colloquium (Social 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 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 340-341 Community Fieldwork: Law (5-5) A,W

Iglitzin
 Interdisciplinary seminar-fieldwork course in the area of law, including work in the court system, probation and parole, and in penal institutions of the city, county, and state. A maximum of 20 credits in the 340-349 sequence together with 350 may be counted toward a degree in the College of Arts and Sciences. Offered on credit/no credit basis only. Prerequisite: permission.

G ST 342-343 Community Fieldwork: Health (5-5) A,W

Iglitzin
 Interdisciplinary seminar-fieldwork course in health-care area, including work in hospitals, free clinics, nursing homes, etc. A maximum of 20 credits in the 340-349 sequence together with 350 may be counted toward a degree in the College of Arts and Sciences. Offered on credit/no credit basis only. Prerequisite: permission.

G ST 344-345 Community Fieldwork: Social Services (5-5) W,Sp

Iglitzin
 Interdisciplinary seminar-fieldwork course in the social service area. Students do counseling in mental health clinics, work with physically handicapped persons, youth centers, and other service agencies. A maximum of 20 credits in the 340-349 sequence together with 350 may be counted toward a degree in the College of Arts and Sciences. Offered on credit/no credit basis only. Prerequisite: permission.

G ST 346-347 Community Fieldwork: Education (5-5) W,Sp

Iglitzin
 Interdisciplinary seminar-fieldwork course on education. Students work in alternative schools, day-care centers, tutoring and educational programs for the disadvantaged. A maximum of 20 credits in the 340-349 sequence together with 350 may be counted toward a degree in the College of Arts and Sciences. Offered on credit/no credit basis only. Prerequisite: permission.

G ST 348-349 Community Fieldwork: Special Topics (5-5) A,W and/or W,Sp

Iglitzin
 Interdisciplinary fieldwork-seminar course on issues of special topical importance. A maximum of 20 credits in the 340-349 sequence together with 350 may be counted toward a degree in the College of Arts and Sciences. Offered on credit/no credit basis only. Prerequisite: permission.

G ST 350 Independent Fieldwork (1-5, max. 15)

Off-campus independent fieldwork in community agencies, apprenticeships, internships, as approved for College of Arts and Sciences credit. Faculty sponsor may be required. A maximum of 15 credits in 350, or a maximum of 20 credits in the 340-349 sequence together with 350, may be counted toward a degree in the College of Arts and Sciences. Offered on credit/no credit basis only. Prerequisite: permission of Office for Undergraduate Studies.

G ST 391 Supervised Study in Selected Fields (*, max. 15) AWSpS

Special supervised study in a field represented in the 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 (5) AWSpS

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

Garfiter, 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 nonscience 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) AWSpS

Galiki, 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 461 Genetics Laboratory (4) Sp

Doermann
Intended for students who desire laboratory experience in the use of genetic materials. Prerequisites: 451 or equivalent and organic chemistry.

GENET 479 Laboratory Problems in Medical Genetics (9) AWSpS

Flalkow, Garfiter, Motulsky
In-depth work on a selected laboratory problem in medical genetics. Intended primarily for junior and senior medical students. Prerequisites: HUBIO 449 and permission.

GENET 499 Undergraduate Research (*) AWSpS

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) AWSpS

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 1977-78.)

GENET 551 Mutation and Recombination (3) A

First course in a three-quarter sequence in molecular genetics. Contributions of research with microorganisms 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 students with current materials and methods of investigating genetic structure, replication, recombination, and mutation in virulent bacteriophages. Offered as a concentrated three-week course during Summer Quarter. 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 1977-78.)

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 1976-77.)

GENET 562 Population Genetics (3) Sp

Felsenstein
Mathematical and experimental approaches to the genetics of natural populations, especially as they relate to evolution. Prerequisite: permission.

GENET 564 Molecular Cytogenetics (3) Sp

Byers
Cellular processes of gene transfer in mitosis, meiosis, and gametogenesis, with emphasis on ultrastructure and macromolecular mechanisms. Prerequisite: permission.

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 of Research (*) AWSpS

GENET 700 Master's Thesis (*) AWSpS

GENET 800 Doctoral Dissertation (*)

GEOGRAPHY

Prerequisites: In addition to specified prerequisites for individual courses, students should meet the general course level requirements as indicated by the numbers, except where they may have special preparation or background in geography or in related fields.

INTRODUCTION TO GEOGRAPHY

GEOG 100 Introduction to Geography (5) AWSp

Introduction to the basic patterns of human occupancy of the earth; analysis of population, settlement, and resource-use problems; introduction to geographic theories pertaining to spatial organization, interaction, and environmental perception.

GEOG 200 Introduction to Human Geography (5) W

Velikonja
Survey of noneconomic components of patterns and systems of human occupancy of the world. Emphasis on cultural processes, dynamic change, functional relations and networks. No prerequisite; 100 recommended.

INTRODUCTION TO FIELDS IN GEOGRAPHY

GEOG 205 Man's Physical Environment (5) ASP

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) ASP

Beyers, Boyce, Krumme, 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, secondary, and tertiary production, to transportation, and to the geography of consumption. Special attention given to cities and the distribution of activities within cities.

GEOG 226 Introduction to Geographic Research (5) A

Beyers, Krumme, Morrill, Sharp
An introduction to the various approaches to geographic pattern solving. Topics include defining geographic problems, methods of analysis, seeking, organizing, and analyzing spatial data, and modeling spatial processes.

GEOG 227 Historical Geography of Black America (3) W

Hodge, 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

Boyce
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 nonstate, 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
Exploration, migration routes, pioneer settlement, and the moving frontier in relation to geographical phenomena. Criteria for differential development of regional cultures.

GEOG 342 Geography and Inequality in the United States (3) Sp
Morrill, Sharp
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, Vellkonja
Study of the spatial variations and interrelationships of political activities and systems.

GEOG 399 Future Patterns of Settlement (3) Sp
Morrill, Schneider
Study of possible future patterns of human use of the environment from apocalyptic to glorious. Review of landscape evolution. Problems of long-range regional and national planning. Offered jointly with URB P 399. Prerequisite: 207 or 277 or URB P 340, or permission.

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 ECON 416. Prerequisite: ECON 300 or 400, or equivalent.

GEOG 440 Regional Analysis (5)
Beyers, Krumme
Analysis of regional industrial structures and economic change.

Application of shift and share, cohort, multiplier, input-output, location-interaction, and programming models to the analysis and the projection of urban and regional population patterns, and income distributions, interurban and interregional growth differentials, regional, and interregional linkages and flows, as well as urban and regional impacts of government expenditures. Prerequisite: 207 or permission.

GEOG 441 Geography and Industrial Change (5)
A
Thomas
Analyses of changes in the spatial and structural components of industrial activity patterns. Attention also focused on understanding the nature and influences of dominant forces affecting industrial change. Examples drawn primarily from North America and Western Europe.

GEOG 442 Social Geography (5) A
Morrill, Sharp, Vellkonja
Spatial patterns of population distribution and settlement; of migration and the spread of ideas; of social characteristics and social relations; social regions.

GEOG 443 Location and Movement Models (3)
Sp
Morrill
Application of models of optimum location and allocation; assignment, transportation, and spatial equilibrium; spatial interaction; geographic simulation; and spatial diffusion.

GEOG 444 Geography of Water Resources (3) W
Marts
Analysis and appraisal of water resources in land and industrial development; problems and policies of river basin planning with emphasis on the Pacific Northwest.

GEOG 447 The Geography of Air Transportation (3) A
Fleming
Geographic analysis of world air routes, passenger and cargo flows, and airport activities; consideration of physical, economic, political, and institutional determinants of routes and flows. 207 and 277 recommended; junior standing or above preferable.

GEOG 448 Geography of Transportation (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 Transportation (5)
Fleming
Geographic analysis of ocean trade routes, cargo and passenger flows, and port activities. Evaluation of the role of the transportation carrier in international trade. Prerequisite: 207 or permission.

GEOG 450 Theories of Location (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 (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 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 URB P 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 476 Urban Political Geography (3) Sp
Hodge
Study of the spatial organization of cities as it relates to political processes. Topics include political and administrative districting (causes and consequences), facility location conflicts, and spatial variation in voting behavior. Considerable emphasis on case studies within the Seattle metropolitan area. Prerequisite: 207 or 277 or permission.

GEOG 477 Urban Location and Structure (3) A
Ullman
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 linkages, 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
Beyers
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. Contemporary political and economic integration trends are evaluated in their regional context.

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
Russian/Soviet 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

Hodge, Morrill

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 (5)

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.

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)

Jackson

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 35 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 (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.

CARTOGRAPHY

GEOG 360 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 (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. Prerequisites: 360 and a computer programming course, or permission.

GEOG 458 Map Intelligence (3) W

Sherman

Analysis and appraisal of United States and foreign maps and atlases; mapping agencies, coverage, organization, and indexing; symbolism, scales, projections, and military grids; map library problems and operation.

GEOG 462 Problems in Map Compilation and Design (5) Sp

Sherman, Youngmann

Application and analysis of map intelligence procedures as related to map compilation. Measurement and experimental study of psychophysiological factors in design of map elements. Prerequisite: 360.

GEOG 464 Problems in Map Reproduction (3) W

Sherman

Processes and photographic techniques applicable to cartographic and geographic presentations. Prerequisite: 360.

GEOG 465 Research in Cartography (3) Sp

Youngmann

Detailed examination of research activity and trends. Graphic communication is emphasized. Materials are presented in a problem-oriented fashion and specifically chosen to provide essential research topics and techniques for the student seriously contemplating a future in cartographic research. Prerequisites: 365 and 426, or permission.

GEOGRAPHY AND EDUCATION

GEOG 467 Geography in the Social Studies Curriculum (3) S

Discussion of the concepts and content of geography essential to effective social studies curricula. Offered jointly with EDC&I 467.

INDUSTRY RESEARCH TECHNIQUES

GEOG 426 Quantitative Analysis of Spatial Distributions (5) A

Hodge, Morrill

Application of statistics to spatially ordered data. Descriptive and inferential statistics of spatial (bivariate) distributions. Theoretical spatial distributions. Problems of spatial autocorrelation and pattern analysis. Trend surface, factorial ecology, and regionalization. Prerequisite: basic statistics course.

GEOG 490 Field Research (6, max. 12)

Development and application of skills essential to geographic field investigations: (1) training in the use of field techniques and base materials; (2) evaluation of these in variety of research situations; (3) analysis and interpretation of field data; and (4) presentation of results of field investigations.

GEOG 499 Special Studies (*, max. 15) AWSp

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, Vellkonja

GEOG 505 Research Seminar: China and Northeast Asia (3, max. 6) WSp

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

Kakiuchi

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 Urban Region Geocoding and Geoprocessing (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 CETC 527 and with URB P 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 CETC 528 and with URB P 528. Prerequisites: basic statistics and 527, or permission.

GEOG 529 Information Systems Applications to Urban and Regional Analysis (3) Sp

Horwood, Staff

Logical design of information systems for analysis, policy development, planning, and plan monitoring in the context of land-use planning, environmental studies, land-resource management, and general public agency planning purposes. Data confidentiality considerations, case studies, and critical analyses of current information systems programs. Offered jointly with URB P 529 and with CETC 529. Prerequisite: graduate standing.

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, Vellkonja

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) AWSp

General instructional strategies, including expository and inquiry approaches, together with use of media. Explanation in geography and geographic

COLLEGE OF ARTS AND SCIENCES

theory and principles as the basis of instructional sequencing. Prerequisites: appointment as a teaching assistant in the Department of Geography and permission.

GEOG 556 Seminar in Urban Economics (3) W *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 ECON 556. Prerequisites: ECON 300, 301, or equivalent.

GEOG 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 URB P 566. Prerequisite: 466 or URB P 466.

GEOG 567 Research Seminar: Geography and Development (3, max. 6) A *Thomas*

Offered jointly with URB P 567.

GEOG 570 Research Seminar: Natural Resources Analysis (3, max. 6) W

Prerequisite: graduate standing.

GEOG 575 Research Seminar: Political Geography (3, max. 6) *Veikonia*

GEOG 577 Research Seminar: Internal Spatial Structure of Cities (3, max. 9) ASp *Boyce*

Prerequisite: 478 or permission.

GEOG 600 Independent Study or Research (*) **AWSp**

GEOG 700 Master's Thesis (*) AWSp

GEOG 800 Doctoral Dissertation (*)

GEOLOGICAL SCIENCES

Courses for Undergraduates

GEOLOG 101 Physical Geology (5) AWSpS

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 nonscience majors.

GEOLOG 102 Geology and the Human Environment (5) W *Dunne*

Beginning course relating geology to an awareness and an 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.

GEOLOG 103 History and Ancient Environments of Life (5) Sp *Rensberger*

Introduction to the evolution of life and its environments as documented in the rocks through geologic time, three billion years ago to the present. Prerequisite: 101 or 205.

GEOLOG 109 Geophysical Phenomena (4) Sp *LaChapelle*

Techniques of observation by the simplest possible means are developed and applied. Phenomena such as color of the sky, motion of a water fall, shape of a snowflake, and the sound of wind are studied and examined during field excursions. Students use 8-mm. motion picture techniques, including time-lapse studies. Offered jointly with ATM S 109. Prerequisite: permission.

GEOLOG 205 Introduction to Geological Sciences

(5) AWSp

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.

GEOLOG 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.

GEOLOG 308 Geology of the Northwest (5) WSpS

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.

GEOLOG 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. Prerequisite: 101 or 205, or equivalent.

GEOLOG 312 Glaciers and Volcanoes of the Pacific Northwest (3) S

Porter

Character and origin of Pacific Northwest volcanoes, their eruptive history and potential hazards. Distribution and nature of present and former glaciers in Washington; evidence for reconstruction history of the glacial ages and the chronology of recent glacier fluctuations in the Cascades. Interrelationships of glaciers and volcanoes. Two all-day Saturday field trips to Cascade volcanoes.

GEOLOG 320 Mineralogy (5) AW

Christensen, Ghose, 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: CHEM 101 or 140.

GEOLOG 321 Principles of Petrology (5) Sp

Evans, McCallum, Vance

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.

GEOLOG 340 Structural Geology (5) WSp

Cowan, Stewart

Interpretation of rock structures and their genesis. Prerequisite: 321 or permission.

GEOLOG 361 Surface Deposits and Fossils (5) WSp

Whitney

Basic concepts of stratigraphy and paleontology and the interpretation of geologic history.

GEOLOG 401 Field Geology (6) AS

Off-campus field work in general geology, emphasizing geologic mapping and report writing. Prerequisites: 301, 320, 321, 340, 361, or permission.

GEOLOG 405 The Earth's Interior (3) W

Bostrom

Geophysical evidence as to the earth's interior regionalization and workings; development of the major surface features.

GEOLOG 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.

GEOLOG 414 Photogeology (3) W

Porter

Geologic interpretations of aerial photographs with

emphasis on solving field problems. Prerequisites: 311, 340, 361, or equivalent. (Offered odd-numbered years.)

GEOLOG 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 GPHYS 415. Prerequisites: upper-division standing and permission.

GEOLOG 416 Glacial Geology (4) A

Porter

Interpretation of glacial history through study of sediments and landforms, with emphasis on climatic implications, chronology, and correlation. Prerequisite: senior standing or permission.

GEOLOG 417 The Late Cenozoic Glacial Ages (3) Sp

Porter

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 QUAT 417. Prerequisites: 205, senior standing, or permission.

GEOLOG 418 Periglacial Processes and Environments (4) A

Washburn

Introduction to environmental processes in glacier-free areas, with emphasis on frost action and its effects. (Offered odd-numbered years.)

GEOLOG 423 Optical Mineralogy (4) A

Christensen, Vance

Petrographic microscope and recognition of common minerals in thin section. Prerequisite: 320 or equivalent.

GEOLOG 424 Petrography and Petrology of Igneous Rocks (5) W

McCallum, Vance

Systematic study of igneous rocks and their origin, using the petrographic microscope. Prerequisite: 423 or equivalent.

GEOLOG 425 Petrography and Petrology of Metamorphic Rocks (5) Sp

Evans, Vance

Systematic study of metamorphic rocks and their origin, using the petrographic microscope. Prerequisite: 423 or equivalent.

GEOLOG 426 Sedimentary Petrology and Petrography (5) ASp

Stewart, Whetten

Occurrence, characteristics, and origin of sedimentary rocks, with emphasis on chemical and physical processes of formation. Petrographic analyses in laboratory. Prerequisites: 320, 423, or equivalent.

GEOLOG 430 Macroscopic Invertebrate Fossils (5) A

Mallory

Systematic study of invertebrate fossils and the principles of paleontology. Prerequisite: 101 or 205, or equivalent. (Offered even-numbered years.)

GEOLOG 436 Micropaleontology (5) A

Mallory

Principles of paleontology as applied to micropaleontology; the systematic study of foraminifera. Prerequisites: 361, 430, or permission. (Offered odd-numbered years.)

GEOLOG 437 Evolution of the Vertebrates (5) W

Rensberger

Introduction to the osteology and evolution of the major groups of vertebrates. Prerequisite: 103 or BIOL 101- or 210. (Offered even-numbered years.)

GEOLOG 438 Evolution and Classification of the Mammals (5) W

Rensberger

Evolutionary changes and classification of the

major groups of mammals from the Mesozoic to the present. Prerequisite: 437 or equivalent. (Offered odd-numbered years.)

GEOL 443 Advanced Structural Geology (5) A
Misch
Analysis in space and time; genetic interpretation; principles of geotectonics. Prerequisite: 340 or equivalent.

GEOL 449 Stress and Deformation of Geological Materials (3) Sp
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.)

GEOL 450 Techniques in Geophysics (3) A
Bostrom
Introduction to geophysics of the solid earth, outlining instruments, techniques, and interpretation. Prerequisite: senior standing in geology or permission.

GEOL 461 Stratigraphy (5) A
Wheeler
Systematic study of spatial relations of surface-accumulated rocks and their space-time implications. Prerequisites: 321, 361, or equivalent.

GEOL 471 Rock and Mineral Analysis (5) W
Gresens
Survey of analytical methods employed in geochemistry, emphasizing the theoretical basis for various techniques and their limitations. With laboratory. Prerequisites: 320, 321, CHEM 160, or equivalent; GEOL 474 recommended.

GEOL 472 Elements of Geochemistry (4) A
Gresens
Introduction to the interpretation and understanding of geological processes from the chemical standpoint. Prerequisite: senior standing in geological sciences or permission.

GEOL 474 Introduction to X-Ray Crystallography (3) W
Glase
Point groups and space groups. Reciprocal lattice. Theory of X-ray diffraction from single crystals. Powder diffraction; identification of unknowns and determination of precise cell dimensions. Single crystal camera (precession and Weissenberg) techniques; determination of cell dimensions and space groups; study of exsolution and phase transformation in rock-forming silicates. Structure factor formula and the use of three dimensional Fourier and Patterson series in the determination of crystal structures. Prerequisites: 320 and PHYS 123.

GEOL 476 Isotope Geology (3) W
Stulver
Discussion of methods involving the application of radioactive isotopes in age dating (radiocarbon, ionium, potassium-argon dating, etc.), and of stable isotope variations in nature in determining the temperature history of the earth and igneous rock formation. Applications of global aspects of the hydrologic cycle, age dating in archaeology, and geochemical cycling of elements. Prerequisite: background in introductory mathematics.

GEOL 481 Mineral Industry Economics (4) W
Cheney
World mineral resources, their distribution, exploitation, and depletion, social economic and political effects, international control and trade, industrial organization, government policies, taxation, tariffs, marketing, and pricing; elements of production costs. Offered jointly with MIN E 481. Prerequisites: 205, MIN E 322, or permission.

GEOL 486 Economic Geology of Sedimentary Rocks (5) A
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.)

GEOL 487 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.

GEOL 488 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.

GEOL 498 Undergraduate Thesis (5) AWSp
The thesis must be submitted at least one month before graduation. Prerequisites: senior standing and permission.

GEOL 499 Undergraduate Research (*, max. 5) AWSp
Prerequisite: permission.

Courses for Graduates Only

GEOL 511 Seminar in Geomorphology and Hydrology (*) AWSp
Dune, Porter, Washburn

GEOL 512 Seminar in Pleistocene Research (*) AWSp
Porter, Washburn

GEOL 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 even-numbered years jointly with QUAT 513. Last time offered jointly with QUAT 513: Spring Quarter 1976.)

GEOL 514 Quaternary Stratigraphy of the Eastern Hemisphere (3) Sp
Porter
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 odd-numbered years jointly with QUAT 514. Last time offered jointly with QUAT 514: Spring Quarter 1978.)

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 521 Metamorphic Minerals (5) W
Misch
Nature and paragenesis of metamorphic minerals; physical, chemical, and geological interpretation of paragenesis. Prerequisite: 425 or equivalent. (Offered odd-numbered years.)

GEOL 522 Metamorphic Processes (5) W
Misch
Deformation and crystallization, migmatization, and mobilization. Prerequisite: 425 or equivalent. (Offered even-numbered years.)

GEOL 523 Advanced Optical Mineralogy (4) A
Christensen
Universal stage, petrofabrics, advanced optical theory, feldspar determination.

GEOL 524 Petrography and Petrogenesis of Igneous Rocks (5) Sp
McCallum, Vance
Classification and nomenclature of igneous rocks.

Igneous rock associations, magma types, and petrographic provinces. Origin and differentiation of magmas. With laboratory. Prerequisite: 424 or equivalent.

GEOL 525 Theoretical Metamorphic Petrology (4) A
Evans
Theoretical treatment of metamorphic mineral assemblages and metamorphic processes. Prerequisites: 425, CHEM 456, or equivalent.

GEOL 526 Theoretical Igneous Petrology (4) W
McCallum
Review of thermodynamics. Fundamentals of phase equilibria involving liquids, solids, and gases. Physical properties of silicate melts. Crystal growth and nucleation. Diffusion in melts. Experimental studies on synthetic and natural systems. Prerequisite: 424 or equivalent.

GEOL 527 Rock-Forming Minerals (3) A
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 531 Stratigraphic Paleontology (5) Sp
Mallory
Principles of stratigraphic paleontology and chronologic biostratigraphy. Prerequisites: 430, 461, or equivalent. (Offered odd-numbered years.)

GEOL 532 Paleocology of Invertebrates (5) Sp
Mallory
Properties of fossil populations and interpretation of habit and habitat in the geologic past. Prerequisites: 321, 430, or permission. (Offered odd-numbered years.)

GEOL 533 Seminar in Vertebrate Paleontology (3, max. 9) AWSp
Rensberger
Advanced topics in vertebrate evolution, morphology, classification, function, ecology, and stratigraphy. Subject to be chosen by class at beginning of quarter. Prerequisite: advanced standing in paleontology, vertebrate zoology, or physical anthropology.

GEOL 542 Seminar in Structural Geology and Tectonics (2) A
Cowan
Reading and discussion of important concepts in structural geology and tectonics; topic is one of current interest and varies from year to year. Prerequisite: 340 or equivalent.

GEOL 545 Structure of Europe (5) Sp
Misch
Structural evolution and geotectonics of Europe. (Offered odd-numbered years.)

GEOL 546 Structure of Asia and West Pacific Rim (5) Sp
Misch
Structural evolution from Central Asia to West Pacific; geotectonic principles. (Offered even-numbered years.)

GEOL 547 Literature on Structural Geology (3 or 5) W
Misch
Selected readings and seminars on Cordilleran structure.

GEOL 549 Structural Analysis of Tectonites (4) Sp
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: 449. (Offered odd-numbered years.)

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 prop-

erties at high pressures and temperatures. Offered jointly with GPHYS 553. Prerequisite: A A 567 or equivalent.

GEOL 563 West Coast Cenozoic Stratigraphy (5) Sp
Mallory
Lithologic and faunal studies of the West Coast Cenozoic. (Offered even-numbered years.)

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 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 572 Solution Geochemistry (4) W
Gresens
Principles of solution chemistry applied to interactions between solids (silicates) and aqueous fluids. Construction of phase diagrams in terms of temperature, ion activities, Eh, and pH. Applications of ionic equilibria to geologic situations ranging from weathering through hydrothermal ore solutions to open-system metamorphism. Methods of calculating metasomatic gains and losses. Three lectures and one problem-solving session per week. Prerequisites: 472 or equivalent and CHEM 456 or equivalent.

GEOL 573 Application of Microprobe Techniques (4) W
Evans

GEOL 574 Advanced X-Ray Crystallography (4) WSp
Ghose, Subrata
Theory of X-ray diffraction; determination of crystal structures with special emphasis on minerals and inorganic compounds, through the application of three dimensional Patterson function, Fourier series, and direct methods; structure refinement; determination of cation distribution, exsolution, and antiphase domain structure through X-ray diffraction. Prerequisite: 474 or permission.

GEOL 576 Geochronometry (4) A
Stuiver
Principles, methods, and applications of dating rocks and organic materials.

GEOL 582 Seminar in Sedimentology (2) W
Stewart, Whetten
Lectures, discussions, and readings on selected problems of current interest.

GEOL 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: MATH 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 oceans. A nonrigorous development of the equations of motion with examples drawn from dynamical oceanography. Prerequisite: MATH 238 or equivalent.

GPHYS 405 Geophysical Continuum Mechanics (3) W
Analysis of stress. Finite and infinitesimal strain. Measurement and interpretation of strain in geological materials. Elasticity applied to determine stress in the earth's crust. Creep of solids and flow of geological materials. Prerequisite: MATH 238 or equivalent.

GPHYS 406 Geophysics: The Atmosphere (3) 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 ATM S 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: PHYS 323 or equivalent.

GPHYS 415 Principles of Glaciology (4) A
Lachappelle, 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 GEOL 415. Prerequisites: upper-division standing and permission.

GPHYS 431 Seismology and Earthquake Engineering (3) A
Evans, Hartz, Merchant, Smith
Presents an overview of earthquake processes and details of the characteristics of destructive ground motion; illustrates the effects of such motion on engineering structures; reviews current practice in estimating earthquake hazards for important structures such as nuclear power plants. Offered jointly with CESM 431. Prerequisite: MATH 238 or permission.

GPHYS 501 Earth Potential Fields (3) A
Booker, Lister
Application of potential theory to the interpretations of magnetic and gravity anomalies. Heat flow and interpretations. Global tectonics. Prerequisite: 403.

GPHYS 502 Geophysics of Solids (3) W
Blacic, Merrill
Introduction to the applications of solid-state physics to geophysics. The origin and the properties of remanent 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
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
Croison
Theory and practical application of data collection and analysis applied to geophysical problems. Dig-

ital 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. Prerequisite: 504 and permission.

GPHYS 510 Physics of Ice (3) A
Hobbs
Structure of the water molecule. Crystallographic structures of ice. Electrical, optical, thermal, and mechanical properties of ice. Growth of ice from the vapor and liquid phases. Physical properties of snow. Offered jointly with ATM S 510. Prerequisite: permission.

GPHYS 511 Glaciology I: Formation of Snow and Ice Masses (3) W
Raymond, Untersteiner
Snow climatology. Transport of snow by wind. Transfer of radiative, sensible, and latent heat at the surface of snow and ice. Freezing of natural water bodies. Heat and mass budget of ice masses. Theories of ice ages. Offered jointly with ATM S 511. Prerequisite: 510 or permission.

GPHYS 512 Glaciology II: Dynamic Glaciology (3) Sp
Raymond, Untersteiner
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 ATM S 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 ATM S 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 ATM S 514. Prerequisite: 511 or 512 or permission.

GPHYS 520 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 ATM S 531. Prerequisite: PHYS 320.

GPHYS 535 Introduction to Plasmas 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

Description and theory of earth's permanent magnetic field. Secular variations. Solar and lunar magnetic variations. Atmospheric tides. Dynamo theory. Ionosphere. Solar-terrestrial relationships. Magnetic storms. Prerequisites: PHYS 426 or A A 567, or permission.

GPHYS 537 Magnetosphere I (3) Sp
Parks

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

Parks
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 ATM S 539. Prerequisite: ATM S 542 or permission.

GPHYS 551 Advanced Potential Theory and Applications (3) A

Crosson
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 methods; implications with regard to the mass distribution in the earth. Prerequisites: 501, 502 and MATH 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; eigenvibrations of the earth. Prerequisite: A A 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 GEOL 553. Prerequisite: A A 567 or equivalent.

GPHYS 554 Earth Rotation and Tidal Forces (2) Sp

Bostrom
Causes and consequences of changes in the rotation of the earth.

GPHYS 571 Gravity and Geomagnetism 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 OCEAN 571. Prerequisites: MATH 324, PHYS 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 OCEAN 573. Prerequisite: permission.

GPHYS 574 Tectonophysics (3) A

Blacic
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: 502 or 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 594 Waves in Geophysics and Engineering (3) Sp

Crosson, Evans, Fyfe
Examination of the fundamental concepts and mathematical descriptions of wave propagation; group and phase velocity, dispersion, effects of boundaries, normal mode and progressive wave descriptions; waves in elastic solids, acoustic waves, electromagnetic waves; sources of waves; waves in inhomogeneous media; applications to acoustics, seismology, and earthquake engineering. Offered jointly with CESM 594 and A A 594.

GPHYS 600 Independent Study or Research (*) AWSp**GPHYS 700 Master's Thesis (*) AWSp****GPHYS 800 Doctoral Dissertation (*)****GERMANICS****Courses for Undergraduates****GERM 101, 102, 103. First-Year German (5,5,5) AWS,AWSpS,AWSp**

The methods and objectives are primarily audiolingual, with emphasis on speaking and listening. Secondary objectives are reading and writing.

GERM 104 Individualized First-Year German (1-15) AWSpS

Individualized approach to elementary German instruction. Students progress at their own pace. Credits vary, depending upon amount of material mastered, from 1 to 15, and any number of credits, up to 15 may be earned per quarter. Students must register initially for 5 credits.

GERM 111, 112, 113 First-Year German (5,5,5) AW,WSp,ASp

Primary emphasis is placed on an accelerated acquisition of the reading skill. A foundation for proficiency in writing, speaking, and listening is the secondary objective of the course. A structural and grammatical approach rather than an audiolingual approach is used.

The following courses are considered to be basically equivalent and may not all be taken for credit: GERM 101, 111, and the first 5 credits of 104; 102, 112, and the second five credits of 104; 103, 113, and the last 5 credits of 104. However, students are free to take other combinations for credit (e.g., the first 5 credits of 104 followed by 102 and then 113).

GERM 121, 122 First-Year Reading German (5,5) AS,WSp

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,Sp

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 150 Conversational German Through Films (2, max. 6) AWSp

Conversational German in everyday situations,

based on a widely acclaimed German film series, with special interest to travelers. Emphasis on oral, rather than written, German and conversation practice in small groups an integral part. Although the series progresses through the year, beginners may enroll in any quarter. Students registered for 101, 102, 103 may also register for 150 in order to take advantage of the visual material presented.

GERM 181, 182, 183 First-Year Yiddish (5,5,5) A,W,Sp

Garrin

Introductory course in Yiddish language. Prerequisites: 181 for 182; 182 for 183.

GERM 201 Basic Second-Year German (5) AWSpS

Readings and oral practice in German, plus grammar review. The student may not receive credit for both 201 and 211. Prerequisite: 103 or equivalent.

GERM 202 Intermediate Second-Year German (5) AWSpS

Continuation of 201. The student may not receive credit for both 202 and 212. Prerequisite: 201 or equivalent.

GERM 203 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) AW

Primary emphasis is placed in the reading skill. The active reproduction of German is de-emphasized. The student may not receive credit for both 201 and 211. Prerequisite: 113 or equivalent.

GERM 212 Intermediate Second-Year Reading (5) WSp

Readings in German history and culture. Student may do supervised work in readings relating to his own discipline. The student may not receive credit for both 202 and 212. Prerequisite: 211 or equivalent.

GERM 213 Advanced Second-Year Reading (3) ASp

Readings in contemporary German history and culture. Student may do readings relating to his own discipline. Prerequisite: 212 or equivalent.

GERM 230 Conversational German (5) S

Intensive. For participants in the German House and in special summer programs only. Prerequisite: 103 or equivalent.

GERM 250 Advanced Conversational German Through Films (2, max. 6) AWSp

Barrack

Conversational German in everyday situations, especially of use to travelers. Focus on oral practice in small groups, rather than on written German. Although the series progresses through the year, qualified students may enroll in any quarter. Prerequisite: 4 credits of 150 or one year of college German, or equivalent.

GERM 260 Lower-Division Scientific German (5) W

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 281, 282, 283 Second-Year Yiddish (5,5,5) A,W,Sp

Garrin

Readings from Yiddish literature and advanced grammar. Prerequisites: 183 or equivalent for 281; 281 or equivalent for 282; 282 or equivalent for 283.

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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 299 Directed Reading (1-5, max. 10) AWSp
Strictly for nonmajors who have demonstrated a level of proficiency equivalent to the completion of 203, and who wish to go on with reading original texts in German literature and thought, and yet who do not wish to compete in a 300-or-400-level major course, or who do not wish to be restricted to the subject matter of these 300-and-400-level courses.

GERM 301, 302, 303 Grammar and Conversation (3,3,3) A,W,Sp,SpS
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 building. 302 and 303: stress conversation and composition. Prerequisite: 15 credits in second-year German or equivalent.

GERM 307 Third-Year Composition (5) S
For participants in special summer programs only. Not open for credit to those who have had 301, 302, 303.

GERM 310 Introduction to Twentieth-Century Literature (3) AS
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 Novelle (3) WS
Critical analysis, interpretation, and comparison of German novellen, and consideration of the theory and development of the German novelle 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 353 German Democratic Republic—Literary and Cultural Development (3) W Ziemann
Comprehensive survey of the traditions leading to the founding of the German Democratic Republic (GDR), which follows its history and examines the cultural development since 1945. Films, tapes, slides, translated literary materials, and articles devoted to aspects of GDR culture and everyday life are used. Prerequisite: HST 113, or equivalent; HST 303 recommended.

GERM 354 Great German Humanists of Renaissance and Baroque (3) Sp Dunnhaupt
Major literary works by German humanist and Baroque authors in English translation are analyzed and serve as points of departure for discussion of cultural, historical, religious, and socioeconomic aspects of the period 1492-1700. Renaissance and Reformation authors include: Erasmus von Rotterdam, Martin Luther, Murner, Hutten, Kaisersberg, and the Meistersinger school. For the Baroque, discussion focuses on selected texts from Grimmelshausen, Opitz, and others. Prerequisite: sophomore standing or permission.

GERM 401, 402 Grammar and Composition (3,3) A,W
Primarily for majors and minors. Prerequisites: 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) SpS
Barrack, Voyles
From early Germanic to the present. Open to junior majors.

GERM 405 Linguistic Analysis of German (3) ASpS
Barrack, Voyles
Prerequisite: third-year German, or permission.

GERM 407 Advanced Composition (5, max. 10) S
For participants in special summer programs only. Not open for credit to those who have had 401, 402, 403.

GERM 410, 411, 412 Survey of Modern German Literature and Culture (3,3,3) A,W,Sp
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. Hoffman, 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, Stadler, Stramm, van Hoddia, 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, Dunnhaupt, Hertling, Hruby
413: Medieval Literature: German literature from 750 to 1400, with esthetic and historical consideration of works from the Carolingian and Clunian 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 Böhmen*. 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. Faustus*, 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) S
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) AWSp
For conversation proctors in 130.

GERM 479 Special Topics in the Teaching of Foreign Languages (3, max. 9) S
Intensive workshop for inservice and preservice teachers of all foreign languages on some aspect of foreign-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. 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) Sp
Introduction to the works of outstanding scholars in

the field of Germanics. For senior majors. Prerequisite: permission.

GERM 495 Proseminar in German Literature (3, max. 15) Sp
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) AWSpS

GERM 498 Studies in the German Language (1-5, max. 15) AWSpS

COURSES IN ENGLISH

GERM 339 The Early Hesse in English (3)
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 340 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 341 Franz Kafka in English (3)
McLean
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)
Rey
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)
Offers 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.

GERM 345 Bertolt Brecht in English (3)
McLean
Brecht's life and work, particularly his plays and writings on theatre, and some poems and short prose pieces to provide additional perspective on his life and work as a whole. The development of his writing and of his ideas and attitudes.

GERM 346 The Contemporary German Novel in English (3)
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)
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 Minnesänger and courtly epics.

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 to Thomas Mann and C. G. Jung.

GERM 350 The German Drama in English (3) A*South*

Survey of the German drama from the eighteenth to the twentieth centuries in English translation.

GERM 352 Inside Hitler Germany in English (3) W*South*

Critical analysis of German literature and culture from 1933 to 1945.

GERM 360 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 Literary Theory and Methodology (3) W***South***GERM 501 Bibliography and Methods of Research (3) A****GERM 502 Stylistics, Literary Terminology, and Interpretation (3) A***Herling, Rey, Ziemann*

Introduction to stylistic aspects of German composition combined with the clarification of essential terms used in literary criticism and with exercises in various methods of interpreting poetry, drama, and prose.

GERM 503 Contemporary German Literature (3) W*Rey, Ziemann*

Seminar analyzing the esthetic movements and thought of contemporary West, as well as East German literature, the social and political problems dealt with in the works of representative authors, and major experimental concepts. Some previous exposure to the German literature and civilization after 1945 is expected.

GERM 510 Medieval Literature and Civilization (3) Sp*Hruby*

Survey of medieval culture and literature for students with no previous instruction in this period. Reading of selections and discussion of major works of lyric and epic poetry with stress on the courtly period. Slides and tapes of art and architecture. Prerequisite: reading knowledge of Middle High German.

GERM 511 Literature and Civilization From 1500 to 1700 (3) A*Dunnhaupt*

Survey of sixteenth- and seventeenth-century culture and literature for students with no previous instruction in this period. Discussion of works by Brant, Luther, Sachs, Opitz, Gryphius, and other poets of German Renaissance, humanism, and Baroque.

GERM 512 Literature and Civilization From 1700 to 1770 (3) A*South*

German civilization and literature in the eighteenth century: absolutism, feudalism, mercantilism, Baroque-Rococo, Enlightenment. The century is

characterized by the two contrasting trends of rationalism *versus* irrationalism: enlightenment-sentimentality, tradition-originality, humanity-individual, rules-organism, etc. These contrasting views are traced in religion, philosophy, music, art; in didactic *versus* idyllic literature, anacreontic *versus* experience lyrics, bourgeois family *versus* adventure *versus* educational novel, and in the changing genre definitions of the drama.

GERM 513 Literature and Civilization From 1770 to 1806 (3) A*Ammerlahn*

Study of the development of German literature and culture from the late Enlightenment through storm and stress to classicism, culminating in the master-works of Goethe, Schiller, Herder, Kant, Holderlin, Mozart, and Beethoven. Emphasis is on literature and esthetic theory, while attention is given to the cultural, political, and social background of the period.

GERM 514 Literature and Civilization From 1806 to 1848 (3) W*D. Behler*

Covers the historical era of the Prussian reforms and the Napoleonic wars to the ill-fated revolution and attempts at parliamentary government in 1848 and in a literary sense moves from romanticism to Biedermeier, and the movement of "Young Germany" with the beginnings of realism.

GERM 515 Literature and Civilization From 1848 to 1890 (3) W*Herling*

Survey of German literature and thought from the German Revolution of 1848 to Bismarck's recall in 1890, with emphasis on major literary contributions of German-speaking countries from poetic realism through naturalism. Prerequisite: graduate standing in Germanics.

GERM 516 Literature and Civilization From 1890 to 1918 (3) W*Rey*

The beginnings of modern German literature up to the end of World War I, presented within the context of German civilization during that period.

GERM 517 Literature and Civilization From 1918 to 1945 (3) Sp*McLean*

Consideration of German expressionism, the "New Objectivity" in the literature of the Twenties, National Socialist literature, exile literature, and war and concentration camp poetry of the Thirties and World War II, in relation to the social, political, and economic history of Weimar and National Socialist Germany.

GERM 518 Literature and Civilization From 1945 to the Present (3) Sp*Ziemann*

Survey of the historical, cultural, and literary development of both East and West Germany after World War II for students with no previous instruction in this period. Discussion of works from West Germany by Bachmann, Boll, Eich, Enzensberger, Grass, Johnson, Weiss, etc.; and from East Germany by Brecht, Heym, Kunert, Becher, etc.

GERM 521 Seminar in the Literature of the Reformation and Renaissance (3)*Hruby***GERM 522 Seminar in Baroque (3)***Dunnhaupt***GERM 525 Seminar in Romanticism (3)***Behler*

(Offered 1977-78.)

GERM 526 Seminar in Nineteenth-Century Drama (3)*South***GERM 527 Seminar in Nineteenth-Century Prose (3)***Herling*

(Offered 1977-78.)

GERM 528 Nineteenth-Century Poetry (3) A*Ammerlahn, McLean, Rey*

Representative selections from Holderlin, the late

Goethe, and from prevalent trends in nineteenth-century poetry such as romanticism, "Young Germany," poetic realism, and the experimental poetry of naturalism.

GERM 533 Seminar in Eighteenth-Century Literature (3) Sp*Ammerlahn, South*

Study of one or more of the literary movements: Enlightenment, sentimentalism, anacreontics, storm and stress, classicism, early romanticism, and works by principal authors such as Gottsched, Bodmer, Gellert, Lessing, Wieland, Klopstock, Herder, Lenz, Goethe, Schiller, Jean Paul.

GERM 534 Storm and Stress (3) W*Herling*

Extensive investigation of poetological and esthetic concepts advanced by initiators and exponents of German storm and stress. Analyses of narrative and dramatic works of storm and stress reveal reflections and implementations of the new theoretical concepts. Prerequisite: graduate standing in Germanics.

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 Dadists, Brecht, and Enzensberger, to such contemporaries as Eich, Hei-Buenbittel, the concrete poets, Celan, and Bachmann.

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.

GERM 542 Twentieth-Century Prose (3) Sp*Behler, McLean, Rey, Ziemann*

Selected modern German novels, short novels, and short stories by representative authors dealing with the social and political problems of Germany as well as with individual problems of existence and identity.

GERM 550 Gothic (3)*Barrack, Voyles*

(Offered 1977-78.)

GERM 551 Seminar in Germanic Philology and Linguistics (3) W*Barrack, Voyles*

Topics vary. Prerequisites: basic knowledge of German and at least one elementary linguistics course.

GERM 552 Old High German (3)*Voyles*

(Offered 1977-78.)

GERM 555 Old Saxon (3)*Voyles***GERM 556 Middle High German (3) W***Hruby***GERM 558 Middle High German Literature II (3)***Hruby***GERM 560 Modern Dialects (3)***Barrack, Voyles***GERM 564 Early Middle High German Literature (3)***Hruby*

Comprehensive presentation of early Middle High German literature in the original.

GERM 565 Seminar in Courtly Epic (3)*Hruby*

Aspects and methods of literary analysis pertaining to the study of medieval courtly epics.

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GERM 566 Late Middle High German Narrative (3)
Hruby
 Study of the evolution of the late Middle High German novelistic narrative.

GERM 567 Minnesang (3) W
Hruby
 In-depth study of medieval German lyrics in the context of German and European literary and intellectual development. Poems of the period from Kurenberger through Walther are analyzed with stress on grammatical, formal, stylistic, and ideological interpretation. Prerequisite: adequate knowledge of Middle High German.

GERM 568 Seminar in Heroic Epic (3)
Hruby
 Literary and historic problems of the German heroic epic, with special emphasis on the *Nibelungenlied* and the *Dietrichsepiek*.

GERM 569 Didactic and Religious Medieval Literature (3)
Hruby
 Comprehensive study of Middle High German religious and didactic poetry from the twelfth century to the fifteenth century.

GERM 575 Teaching of German Literature and Civilization (3) SpS
South
 Teaching of German language and literature on the advanced level in secondary schools and colleges.

GERM 576 Modern Methods and Materials in Teaching German (3) WS
Rabura
 The audiolingual method and its application; current developments in foreign-language teaching; evaluation of teaching materials.

GERM 577 Principles of Second-Language Learning (3)
Rabura
 Examination of the roles of aptitude, attitude, and motivation as factors affecting second-language learning in general, and German specifically. Recent developments (e.g., individualized instruction) are examined and demonstrated. Prerequisites: foreign-language teaching methods course and graduate standing.

GERM 580 Seminar in German Literature (3, max. 12) A
 Open topics seminar with varying content.

GERM 581 Seminar in Poetry (3, max. 12) Sp
 Open topics seminar with varying content.

GERM 582 Seminar in Drama (3, max. 12) A
 Open topics seminar with varying content.

GERM 583 Seminar in Prose (3, max. 12) W
 Open topics seminar with varying content.

GERM 590 German Mysticism of the Late Middle Ages (1-5)
E. Behler

GERM 591 German Idealism and Materialism (3)
E. Behler

GERM 592 German Existentialism and Neomaxism (3)
E. Behler

GERM 600 Independent Study or Research (*) AWSpS

GERM 700 Master's Thesis (*) AWSpS

GERM 800 Doctoral Dissertation (*) AWSpS

HISTORY

Upper-division courses (300 and 400 level) in the Department of History do not generally require prerequisites. Most 400-level courses deal with a single nation during a limited period. The 300-level courses deal with broader subjects at a relatively advanced level. Both are primarily for juniors and

seniors, but they are open to freshmen and sophomores with an interest or background in the subject of the course.

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, Katz, C. Thomas
 History of the origins of Western civilization to the fall of Rome.

HST 112 The Medieval World (5)
Bacharach, Boba
 Survey of the political, economic, social, and intellectual history of the Middle Ages. Not open to students who have taken HSTAM 331 or 332 or 333.

HST 113 The Modern World (5) Sp
Bridgman, Pinkney
 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) AW
Kilcup
 Kinds 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 of nuclear physics to the security hearing of J. Robert Oppenheimer. The course includes a study of the scientific achievements that made the bomb possible, the organization of a community of scientists in the United States, the history of the Manhattan Project, the decision to deploy the bomb, the moral misgivings of the scientists involved, and the problem of espionage and security, ending with the security hearings 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)
Bacharach
 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, Lytle, Sugar
 Political, social, economic, and cultural history from the Peace of Westphalia to the fall of Napoleon.

HST 303 Contemporary European History Since 1815 (5) Sp
Bridgman, Emerson, Pinkney, Sugar
 Political, social, economic, and cultural history from the fall of Napoleon to the present.

HST 304 European Expansion Overseas Since 1650 (5)

Bell
 Survey of the expanding northern European empires (England, Holland, France) of the seventeenth and eighteenth centuries; British naval and economic pre-eminence in the early nineteenth century; height of European expansion and conflict overseas from 1870 to 1920; imperial disintegration and collapse in the mid-twentieth century; legacy of empires and imperialism. Survey course in modern European history recommended.

HST 307 History of Christianity (5) 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
Kilcup
 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
Griffiths
 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
Griffiths
 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)
Bacharach
 Slavery as a universal historical phenomenon lending itself to a comparative analysis is studied in terms of its philosophical justifications, economic importance, and local practices. The following historical periods are surveyed: the ancient Near East, Greece, Rome, Islam, Africa, Latin America, and North America.

HST 362 The Ending of Slavery in History: A Comparative Study (5)
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.

HST 395H Modern Historical Writing, Honors Seminar (5)
Levy
Introduction to new types of problems examined by historians and to the new techniques that have evolved for solution of those problems. Opens with a brief historiographical introduction, reaching back to the "scientific" historians of the mid-nineteenth century, then continues by examining the impact on historians of new disciplines such as psychology, sociology, and economics, and of new techniques such as statistics and prosopography. Readings are in the theorists and in those who followed their lead. Admission by departmental invitation only.

HST 411 Origins of Modern Science: The Physical Sciences (5)
Hankins
History of the physical sciences seen through an intensive study of key periods in their development. Emphasis on the nature of scientific revolutions and the role of individual scientists. Prerequisite: one introductory course in a physical science.

HST 412 Science and the Enlightenment (5)
Hankins
The role of science in relation to intellectual, social, economic, and religious forces in the eighteenth century, and growth of the international community in science during the same period.

HST 425 History of the British Empire and Commonwealth Since 1783 (5)
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) A
Butow
The confrontation between Japan and the United States from Perry to MacArthur with emphasis on the period from 1905 to 1945.

HST 447 Historical Case Studies in Strategy and Policy (4) Sp
Fowler
Study of the precepts of Clausewitz and Mahan in several wars or diplomatic situations, chosen from the nineteenth and twentieth centuries. Designed for upper-division and graduate students. Enrollment limited to twenty. Prerequisite: permission.

HST 450 History of West Africa From A.D. 1000 to the Present (5) W
Griffith
States of the Western Sudan to 1600; the trans-Atlantic slave trade; the Fulbe *ijhads*; 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
Griffith
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)
Griffith
Development of political, social, and economic institutions in Africa south of the Zambezi River from the Portuguese arrival to the present; the Cape Colony, Afrikaaner, 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
Bacharach
The Arab countries from the emergence of Islam.

HST 462 History of the Near East: 1300-1789 (5) W
Bacharach
The Arab countries to the accession of Sultan Selim III.

HST 463 History of the Near East Since 1789 (5) Sp
Bacharach
The Arab countries from the westernizing reform movements to the present.

HST 464 History of North Africa (5)
North Africa (Libya, Tunisia, Algeria, and Morocco) from the time of the Muslim conquest to the establishment of independence from European colonial rule. Economic, social, and cultural developments are emphasized, as is the process by which separate states came into being. Relations with the rest of the Muslim world, with Africa to the south, and with Europe are examined.

HST 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 (3 or 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 ECON 460. ECON 200, 201 recommended.

HST 491H-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
Levy
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, Chicano, 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, Chicano, and Indian history into current high school and college curricula. Designed for present and future teaching of American history.

HST 498 Senior Seminar (3-5, max. 15)
Each seminar examines a different subject or problem. A list of the seminars and their instructors is available in the Department of History office. Students must have the permission of the instructor of the seminar in which they plan to enroll.

HST 499 Undergraduate Research (1-5, max. 15) A,W,Sp

Courses for Graduates Only

HST 511 History of Science (3-6)
Hankins

HST 512-513-514 Seminar in the History of Science (3-6)-(3-6)-(3-6) A,W,Sp
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, max. 12)-(3-6, max. 12) 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) Sp
Griffith
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 supplement the lectures and written exercises.

HST 600 Independent Study or Research (*) A,W,Sp

COLLEGE OF ARTS AND SCIENCES

HST 700 Master's Thesis (*) AWSpS

HST 800 Doctoral Dissertation (*) AWSpS

HISTORY OF THE AMERICAS

Courses for Undergraduates

HSTAA 135 The American People and Their Culture in an Era of World War, Revolution, and Social Change: A History of the United States Since 1940 (5) W
Pease

Investigation of the principal forces in the history of the United States during the recent era of world-wide social changes. Primarily through study of documents, personal testimony, and other source materials, through written reports on historical problems, and through group tutorials, lectures, and audiovisual presentations, students are encouraged to examine evidence and to think "historically" about persons, events, and movements within the memory and era of their own generation and that immediately preceding theirs. Primarily for first-year students.

HSTAA 180 History of the Chicano People to 1848 (5)
Gil

Historical survey of the Chicano people from pre-Hispanic times to the war between the United States and Mexico.

HSTAA 181 History of the Chicano People Since 1848 (5)
Gil

Historical survey of the Chicano people since the war between the United States and Mexico. 180 recommended.

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, Pressly, Saum

Establishment of the constitutional system; national expansion; intellectual and cultural development; internal conflicts, the Civil War, and Reconstruction.

HSTAA 331 Modern American Civilization From 1877 (5) Sp
Burke, Pease, Pressly

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 reforms, 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 384 History of Inter-American Relations (5) W
Gil

Inter-American relations, focusing on the diplomatic and military responses of the United States to the problems of Latin America since 1776, are surveyed historically with commensurate emphasis on the activities of regional organizations. 381, 382, 383 recommended.

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)

Examination 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 404 New England: From the Foundings to the Civil War (5) W or Sp
Johnson

New England from the time of the first contacts between white settlers and the aboriginal inhabitants to the region's emergence to national leadership in the mid-nineteenth century. Emphasis on Puritanism, the New England town, adjustment to empire, revolution and constitution making, the growth of party, abolitionism, the flowering of a regional culture, and the personalities who embodied these key themes and periods.

HSTAA 409 American Social History: The Early Years (5)
Flint, 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)
Flint, 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
Pressly

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 414 History of the Occupation and Uses of the American Land, 1607-1914 (5) W
Carstensen

Traces the history of the larger features of the occupation of the American land and the ways in which the great natural resources—furs, farm lands, metals and minerals, forests, fish, water and water power—were claimed and used. Open to upper-division students who must demonstrate a general knowledge of American history.

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 or 5)
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. Students taking this course for 3 credits attend three weekly lectures. Those receiving 5 credits attend the same three weekly lectures plus two additional class hours devoted to discussion and special research projects. For history majors and students with urban specialties.

HSTAA 426 American Urban History Since 1870 (3 or 5)
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; relationship between the changing physical city and the factors that gave the design its substantive form. Students taking this course for 3 credits attend three weekly lectures. Those receiving 5 credits attend the same three weekly lectures plus two additional class hours devoted to discussion and special research projects. For history majors and students with urban specialties.

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, Tocqueville, 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)
Holl

Seminar 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
 Political, social, economic, and intellectual developments in the United States from 1920 to the present.

HSTAA 432 History of Washington and the Pacific Northwest (5)
Carstensen, Saum
 Exploration and settlement; economic development; growth of government and social institutions; statehood.

HSTAA 435 The American Jewish Community, 1654-1885 (5) Sp
Lipstadt
 Examination of the political, social, economic, and religious history of the American Jewish community from its inception in 1654 through the Sephardic period, the German period, and up to the beginnings of the Eastern European influx of immigrants, with emphasis on the development of Jewish communal and religious institutions as they reflect the unique character of the American Jewish community.

HSTAA 436 American Jewish History Since 1885 (5)
Lipstadt
 Political, social, economic, and religious history of the American Jewish community from the period of the great eastern European migration until the present. The integration of the immigrant community into the general American community; the rise of nativism; the development of American socialism; World War I and World War II; and the reactions of the American Jews to these events.

HSTAA 443 Black Americans, 1619-1877 (5)
Flint
 General survey and critical examination of the forces that have shaped the history of Black Americans from the colonial period to the end of Reconstruction, with special emphasis on community, institutional, and social development.

HSTAA 444 Black Americans, 1877 to the Present (5)
Flint
 General survey and critical examination of the forces that have shaped the history of Black Americans since the end of Reconstruction, with special emphasis on community, institutional, and social development.

HSTAA 451 Constitutionalism in America: Seventeenth and Eighteenth Centuries (5) W
Bestor
 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. Credit cannot be received for both 351 and 451. Prerequisite: 10 credits in American history.

HSTAA 452 Constitutionalism in America: Nineteenth Century (5) Sp
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 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 353 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 353 and 453. 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 1789 (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 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 EDEPS 495.

HSTAA 461 Diplomatic History of the United States, 1776-1901 (3 or 5) A
Fowler
 Foreign policy of the United States government prior to the twentieth century. Emphasis on international wars, territorial expansion, and the peculiarities of the American position in world politics. Students taking this course for 3 credits attend three weekly lectures. Those receiving 5 credits attend the same three weekly lectures plus two additional seminar hours weekly.

HSTAA 462 Diplomatic History of the United States, 1901-Present (3 or 5) W
Fowler
 Foreign policy of the United States government during the twentieth century. International wars and the other major episodes in diplomacy are emphasized. Students taking this course for 3 credits attend three weekly lectures. Those receiving 5 credits attend the same three weekly lectures plus two additional seminar hours weekly.

HSTAA 477 History of Canada (3) AWSpS
Solberg
 Analyzes political, economic, social, and cultural aspects of Canadian history from the foundation of New France to the present. Focus also on events and problems since 1867 and on twentieth-century events in British Columbia and Quebec.

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.

HSTAA 486 History of Mexico: Colonial Origins to 1822 (5) W
Alden, Gil, Solberg
 Political, social, and economic history of Mexico from its discovery by the Spanish to its independence from Spain.

HSTAA 487 History of Mexico: 1822 to the Present (5) Sp
Alden, Gil, Solberg
 Political, social, and economic history of Mexico from its independence from Spain to the present. 486 recommended.

HSTAA 488 History of the Caribbean and Central America (5)
Gil
 Political, social, and economic history of principal countries in the Caribbean and Central America from their discovery to the present.

Courses for Graduates Only

HSTAA 501 American History: Early (3-6) W
Johnson

HSTAA 503-504 Seminar in American History: Early (3-6, max. 12)-(3-6, max. 12) W,Sp
Johnson

HSTAA 509-510 Seminar in American Urban History (3-6, max. 12)-(3-6, max. 12)
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, max. 12)-(3-6, max. 12)-(3-6, max. 12)
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) AW
Burke

HSTAA 532-533-534 Seminar in American History: Recent Period (3-6, max. 12)-(3-6, max. 12)-(3-6, max. 12) A,W,Sp
Burke, Pease

HSTAA 554 American History: Intellectual (3-6)
Saum

HSTAA 555-556 Seminar: American Intellectual History (3-6)-(3-6)
Saum
 Develops research and writing competence in American intellectual history. Prerequisite: permission.

COLLEGE OF ARTS AND SCIENCES

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, max. 12)-(3-6, max. 12)-(3-6, max. 12)
Alden, Solberg
Problems of historical research in the history of Latin America from colonial beginnings to the present.

HSTAA 586-587 Seminar in Comparative Colonial History (3-6)-(3-6)
Alden

ANCIENT AND MEDIEVAL HISTORY, INCLUDING BYZANTINE

Courses for Undergraduates

HSTAM 201 Ancient History (5) 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 development of Rome from the beginnings in the eighth century B.C. to the beginning of the Middle Ages.

HSTAM 331 Early Middle Ages (5)
The Dark Ages, feudalism, emergence of the medieval order of civilization, and the development of Romanesque culture.

HSTAM 332 Central Middle Ages (5)
Europe in the central Middle Ages: culture of cathedrals and universities, formation of national states, development of urban society.

HSTAM 333 Late Middle Ages (5)
Disintegration of the medieval order under the impact of the national state, the secularization of society, and the decline of the church. Movements of reform and revolution. The culture of late Gothic Europe.

HSTAM 334 Medieval Culture (5)
Selective study in literature, art, music, philosophy, and religion of Europe during the Middle Ages.

HSTAM 336 The Humanist Ideal: From the Greeks to the Renaissance (3) A or W
Ferrill, Griffiths, C. Thomas
Students read certain ancient, medieval, and Renaissance texts, selected to show the continuity and the transformations of the humanistic tradition, and write periodic essays on their reading as well as a term paper. Intended to supplement courses on the history of the respective periods.

HSTAM 351 Medieval Italy (5)
Italy, from the barbarian invasions to the Renaissance, considered in the framework of European and Mediterranean cultures.

HSTAM 401 Early Greece (3)
Ferrill, Thomas
Study of the political, institutional, and cultural history of early Greece, with emphasis on the origins of Greek civilization.

HSTAM 402 Greece 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.

HSTAM 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.

HSTAM 405 Topics in Ancient History (3, max. 6)
Ferrill, Katz, Thomas
An umbrella course that makes it possible to treat a special topic in the history of the ancient world during the period from the Bronze Age to the fall of the Roman Empire. One topic is studied in depth during the quarter. Prerequisite: permission.

HSTAM 411 The Early Roman Republic (3)
Ferrill
Political, social, economic, and cultural history, with emphasis on the development of the constitution and territorial expansions.

HSTAM 412 The Late Roman Republic (3)
Ferrill
Political, social, and cultural history, with special emphasis on the period of Cicero and Caesar.

HSTAM 413 The Early Roman Empire (3)
Ferrill
Political, social, economic, and cultural history, with emphasis on the Julio-Claudians.

HSTAM 414 The Late Roman Empire (3)
Ferrill
Political, social, economic, and cultural history, with emphasis on the decline of ancient civilization.

HSTAM 421 The Byzantine Empire (5)
Boba, 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.

HSTAM 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.

HSTAM 431 Topics in Medieval History, 500-1000 (5)
Boba
Study in depth of one or more topics in the history of Europe during the early Middle Ages. Prerequisite: a course in medieval history.

HSTAM 432 Topics in Medieval History, 1000-1250 (5)
Boba
Study in depth of one or more topics in the history of Europe during the High Middle Ages. Prerequisite: a course in medieval history.

HSTAM 433 Topics in Medieval History, 1250-1500 (5)
Study in depth of one or more topics in the history of Europe during the Later Middle Ages. Prerequisite: a course in medieval history.

HSTAM 441 Church and State in the Middle Ages (5)
Boba
Changing theories and realities of relationship between religious and secular elements of medieval civilization.

HSTAM 442 Central Europe in the Middle Ages (5)
Boba
Origins and medieval history of Germany, Austria, Bohemia, and Poland, considered as a region within the sphere of Western European civilization.

HSTAM 452 The Early Renaissance (1300-1450) (3)
Griffiths
Growth of a humanist culture in the Italian city-state in contrast with the Gothic values of the waning Middle Ages.

HSTAM 453 The High Renaissance (1450-1560) (3)
Griffiths
Climax of the humanist tradition and the expansion of European culture.

Courses for Graduates Only

HSTAM 501 Greek History (3-6)
Edmonson, Thomas
Problems in the history of the Athenian constitution.

HSTAM 511 Roman History (3-6)
Ferrill
Roman history, 31 B.C.-A.D. 37.

HSTAM 512-513 Seminar in Ancient History (3-6)-(3-6)
Ferrill, Thomas
Detailed study of special topics in ancient history. Prerequisite: permission.

HSTAM 521 Byzantine History (3-6)
Boba, Katz

HSTAM 530 Early Middle Ages (3-6)
Boba
Field course. Survey of early European history through the times of tribal migrations and invasions from Asia. Problems and methods of research. Prerequisite: permission.

HSTAM 531 Medieval European History (3-6)

HSTAM 532, 533, 534 Medieval European Seminar (3-6, 3-6, 3-6) AWSp
Prerequisites: a reading knowledge of French or German and Latin.

HISTORY OF ASIA

Courses for Undergraduates

HSTAS 201 Ancient Indian Civilization (5) A
Conlon
Introductory course dealing with the religions, literature, philosophy, politics, arts, and history of India from earliest times to the Muslim invasion.

HSTAS 202 Modern Indian Civilization (5) 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.

HSTAS 211 History of Chinese Civilization (5) A
Dull
Intensive survey of Chinese civilization from earliest times to today. Course designed to introduce all students, including East Asian history majors, to the general sweep of Chinese history. The focus is on social, cultural, and intellectual developments.

HSTAS 212 History of Korean Civilization (5)
Palais
Survey of Korean civilization from earliest times to the present. Course explores various aspects of the development of Korean society and culture in terms of government organization, social and economic change, literature, and art.

HSTAS 213 History of Japanese Civilization (5)
Fyle
Introduction to Japanese civilization from prehistory 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, Ming, and early Ch'ing periods.

HSTAS 454 History of Modern China (5)
Kapp
 China from approximately 1800 to the present, with major emphasis on political and intellectual history since 1895. The focus is on the processes of modernization and revolution, and on the relationship between them.

HSTAS 476 Western Influences in Russian and Chinese Intellectual History (4)
Treadgold
 Comparative analysis of stages of Western impact on Russian (1462-1917) and Chinese (1582-1949) thought previous to the proclamation of Marxism-Leninism as the official ideology.

HSTAS 481, 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 502, 503 Seminar: History of India (3-6, max. 12; 3-6, max. 12) W,Sp
Conlon
 Seminar on selected topics and problems in the history of medieval and modern India. Prerequisites: HSTAS 501 and 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, max. 12)-(3-6, max. 12)-(3-6, max. 12) A,W,Sp
Dull
 Prerequisite: reading knowledge of Chinese.

HSTAS 561 Field Course in Chinese History: Sung to Modern (3-6)
Chan
 Introduces Western language materials on Chinese history from the Sung dynasty to the modern period in order to give students bibliographical and other assistance in preparing for examinations in this field of history.

HSTAS 562-563-564 Seminar in Chinese History: Sung to Modern (3-6)-(3-6)-(3-6) A,W,Sp
Chan
 Professional writing seminar in Chinese history from Sung to modern times. Prerequisite: reading knowledge of Chinese.

HSTAS 571-572 Chinese History: Modern Period (3-6)-(3-6) W,Sp
Kapp
 Field course in modern Chinese history, emphasizing extensive reading in the secondary literature on modern China. Course provides firm foundations for preparation of graduate field examinations and for future research and teaching. Readings are organized around major problems of interpretation in Chinese history since 1800. A portion of 572 is devoted to preparation of seminar papers on significant topics. Prerequisite: 454 or permission.

HSTAS 573-574-575 Seminar in Chinese History: Modern Period (3-6, max. 12)-(3-6, max. 12)-(3-6, max. 12) A,W,Sp
Kapp
 Research seminar in modern Chinese history. Training in the materials and methods of research, and preparation of extended research papers. Prerequisites: 571-572 or 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 English Political and Social History (5,5,5) A,W,Sp
Temmel
 England from the earliest times to the present, stressing the origins of American institutions and social patterns.

HSTEU 369 The Destruction of European Jewry, 1932-45 (3 or 5) W
Lipstadt
 Examines the history of anti-Semitism; the dimensions of the holocaust; the holocaust organization and the victims' responses; the reaction of the world to the events in Europe, Allied policies, refugee policy, and American actions. The numerous legal, historical, and sociological questions raised by these events are examined.

HSTEU 370 The Vikings (3)
Conroy, Flatin, Runblom
 Study of the Vikings at home in Scandinavia and abroad, with particular emphasis on their activities as revealed in archaeological finds and in historical and literary sources. Offered jointly with SCAND 370.

HSTEU 371 Intellectual History of Modern England (3)
Levy
 Relates the changes in political theory, philosophy, science, and literature to the historical events of the period 1500 to the present.

HSTEU 378 The Making of Contemporary France, Studied in French (3) W
Nostrand, Pinkney
 Study of the historical origins and subsequent development of nine contemporary problems and characteristics of French government and politics, economy, and society. Offered jointly with FREN 378. Prerequisite: FREN 203 or 222 or equivalent.

HSTEU 380 History of Scandinavia to 1521 (3)
Runblom
 Survey of Scandinavian history from the Viking Age to 1521, with emphasis on the efforts at unification between Iceland, Denmark, Norway, and Sweden, and their relationship to the European continent. Offered jointly with SCAND 380.

HSTEU 381 History of Scandinavia to 1809 (3) Sp
Runblom
 Survey of Scandinavian history from 1521 to 1809, with special emphasis on the Lutheran Reformation, the Thirty Years War, and the Napoleonic Wars. Offered jointly with SCAND 381.

HSTEU 382 History of Scandinavia From 1809 to the Present (3) Sp
Runblom
 Survey of Scandinavian history from 1809 to the present, with major emphasis on the political, social, cultural, and economic development of the Scandinavian countries. Offered jointly with SCAND 382.

HSTEU 391 The History and Culture of Rome From the Empire to the Renaissance (3)
 History and culture of Rome from the Empire to the Renaissance (A.D. first century to 1550). Prerequisite: enrollment in Foreign Study Program in Rome.

HSTEU 392 The Topography and Monuments of Imperial, Medieval, and Renaissance Rome (4)
 Prerequisite: enrollment in Foreign Study Program in Rome.

HSTEU 393 The City of Rome: Group and Individual Study (5)
 City of Rome: group and individual study of selected regions of the city and of coherent groups of monuments or works of art. Prerequisite: enrollment in Foreign Study Program in Rome.

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HSTEU 401 The Reformation (3)

Griffiths
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 Wars of Religion (3)

Griffiths
Effects of theology on the politics of the sixteenth century, with special emphasis on the changes in political 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 the history of modern Europe.

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)

Ullman
Political, economic, and military developments in Europe under the impact of the Cold War.

HSTEU 415 Europe in the Six Years' War (1939-45) (5)

Emerson
Inquiry to discover what the war of 1939-45 was about and what it did to the more than five hundred million Europeans.

HSTEU 421 France: 1429-1789 (5)

Lytle, Pinkney
Political and cultural history, from Joan of Arc to the eve of the French Revolution. (Villon, Rabelais, Montaigne, Moliere, Voltaire, Rousseau, de Tocqueville.)

HSTEU 422 The French Revolution and Napoleon: 1789-1815 (5)

Lytle, Pinkney
Transformation of France under the Revolution of 1789; the Reign of Terror and Napoleon; the impact of the revolution and Napoleon upon Europe.

HSTEU 423 France Since 1815 (5)

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, Emerson
Political, institutional, cultural, and military history of World War I, with special emphasis on the impact of the war on European society.

HSTEU 438 Modern Russian Intellectual History (5)

Ellison, Treadgold
Development of Russian social and political thought and philosophy from the seventeenth century to the Revolution of 1917.

HSTEU 439 Soviet Union Since World War II (5)

Ellison
Covers both domestic and foreign policy and includes political, economic, social, and cultural developments.

HSTEU 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 1976-77.)

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 1977-78.)

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

Ellison, Treadgold
Russia and the USSR from Nicholas II to the present. Prerequisites: 444 or HST 111, 112, and 113, or permission.

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
Boba
Analysis of bibliographical problems in the social sciences and the humanities. For seniors and graduate students. Prerequisite: one East European language or German.

HSTEU 450 Ethnic History of Russia and East Europe (5) WS

Boba
Survey of races and ethnic groups in stages of ac-

quiring 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)

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, Temmel
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)

Temmel
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, max. 12)-(3-6, max. 12)-(3-6, max. 12) 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)
Lytle, Pinkney

HSTEU 522-523-524 Seminar in French History (3-6)-(3-6)-(3-6) A,W,Sp
Lytle, 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 1976-77.)

HSTEU 541 Medieval Russian History (3-6)
Waugh

Prerequisites: 443 or permission and reading knowledge of Russian.

HSTEU 543 Seminar in Medieval Russian History (3-6, max. 12) Sp
Waugh

Prerequisite: reading knowledge of Russian. (Offered alternate years; offered 1977-78.)

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 and either French or German.

HSTEU 548 Field Course in Soviet History (3-6) Sp
Ellison

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)
Fugar

Prerequisite: reading knowledge of one major European or one East European language.

HSTEU 553-554-555 Seminar in Modern East European History (3-6)-(3-6)-(3-6) A,W,Sp
Sugar

Study and research involving special methods dealing with the histories of the East European countries in the modern period.

HSTEU 562 Early Spanish History (3-6)
Ullman

Problems in the history of Spain, antiquity through the Middle Ages.

HSTEU 563 Modern Spanish History (3-6)
Ullman

Problems in the history of Spain, 1500 to the present.

HSTEU 571 English History: Tudor and Stuart (3-6)
Levy

HSTEU 572 English History (3-6)
Bell, Temmel

HSTEU 573-574 Seminar in Modern English History (3-6)-(3-6)
Bell, Temmel

HSTEU 575-576 Seminar in Tudor-Stuart History (3-6)-(3-6)
Levy

Seminar in the history of England under the Tudors and the Stuarts. Prerequisite: 571 or permission.

HOME ECONOMICS

Courses for Undergraduates

HEC 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.

HEC 125 Textiles (3)
King

Relationship of raw materials, their properties, structural characteristics, and finishes utilized in textile production to quality and cost. Consideration of production and marketing practices. Textile legislation affecting consumer needs and choices.

HEC 134 Clothing (5)

Economic and esthetic aspects of clothing selection and construction.

HEC 148 The Home, Its Equipment, and Management (3)

Management of resources to achieve family goals. Principles of management, kitchen and laundry planning, work simplification, wiring, and selection and care of household equipment.

HEC 225 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.

HEC 231 Clothing Selection (2)

Sociological, psychological, economic, and esthetic aspects of clothing for the individual. Not open to students who have had 134.

HEC 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 129, or equivalent.

HEC 240 Home Furnishing (3)

Study of the house and its furnishings for present-

day living. Not open to freshmen or to students who have taken 347.

HEC 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.

HEC 307 Nutrition (5)

Chemistry and human metabolism of protein, carbohydrate, fat, vitamins, and minerals. Appraisal of energy balance. Assessment of human nutrient requirements and nutritive value of foods. Current problems in the field of nutrition. Prerequisites: general and organic chemistry and human physiology.

HEC 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.

HEC 316 Demonstration Techniques (3)
Martinsen

Principles and techniques of food and equipment demonstrations; television and radio programs; food photography; recipe development. Prerequisite: 314 or permission.

HEC 317 Foods II (3)

Study of new food products, food additives, and convenience food items. Food laws, label information, food buymanship, and characteristics of certain wines and spirits. Prerequisite: 314.

HEC 319 Nutrition and Nursing (3) A
Monsen, Worthington

Basic principles of nutrition and their relationship to health problems. Chemistry and metabolism of the nutrients essential for 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 modifications as appropriate in the nutritional component of medical treatment. Prerequisites: CONJ 317-318 and organic chemistry.

HEC 320 Nutrition and Dental Health (4) WSp
Yamanaka

Chemistry and metabolism of essential nutrients and their relationship to dental health; effects of age on nutritional needs; nutritional values of foods; influence of the environment on nutrition; dietary counseling of dental patients. Prerequisites: CONJ 317-318, and organic chemistry, or permission.

HEC 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 129 or equivalent, or permission.

HEC 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 129 or equivalent, or permission.

HEC 329 Weaving: Basic Structural Design (3)

Weaving as an art form; fundamentals of loom design and operation; experimental problems in basic fabric structure. Prerequisites: permission and junior standing.

HEC 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.

HEC 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 socioecon-

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omic environmental factors and to differing age groups. Prerequisite: 134.

H EC 347 Home Furnishing (5)
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)
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)
Hall
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, social security, investments, taxes, trusts, and wills.

H EC 354 Family Economics and Finances (5)
Hall
Economic and social conditions affecting the consumer. Use of financial resources to achieve family goals. Family budgeting, credit, savings, insurance, social security, investments, taxes, trusts, and wills. Not open to students who have taken 350. Prerequisites: ECON 200 and junior standing.

H EC 356 Family Relationships (3)
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 (2, max. 6)
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)
Childs, Ostrander
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. Prerequisite: 307 or equivalent.

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
Nutrition as a factor in etiology and treatment of disease. Journal readings. Prerequisite: 407.

H EC 409 Food and People (3) A
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
Monson
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 473 and 474. Prerequisites: senior standing in clinical dietetics or 407, and BIOC 405, or permission.

H EC 415 Experimental Foods (3)
Illustrating scientific principles by subjective and objective testing of foods. Individual research problems. Prerequisite: 405 or permission.

H EC 425 Advanced Textiles (3)
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 ECON 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: 329 or equivalent.

H EC 432 History of Costume and Textiles (4)
Fabrics and costumes of ancient civilizations and medieval European countries with consideration of their respective cultural origins. Prerequisites: HST 111 and 112, or equivalent, junior standing in home economics or permission.

H EC 433 History of Costume and Textiles (4)
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)
Shigaya
Application of the principles of drafting, grading, and flat-pattern designing for men and women. Developing a special line for mass production. Compilation of a portfolio. Prerequisites: 234, 334, 434 and ART 105, 106, and 109.

H EC 437 Socio-Psychological Aspects of Clothing (3)
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 PSYCH 345.

H EC 438 Cultural Aspects of Clothing (3)
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, esthetics, 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)
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)
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 ready-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)
Individual projects in specific fields of furnishings.

Laboratory problems. Prerequisites: permission, or 347, and upper-division standing.

H EC 454 Consumer Economics (3)
Hall
Federal and state legislation of concern to consumers. Federal, state, and private consumer protection agencies and aids. Consumer responsibility and behavior in the marketplace and in environmental protection. Prerequisites: 354 and ECON 200.

H EC 456 Advanced Family Relationships (3)
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)
Role of nutrition in human growth and development with emphasis on prenatal, infancy, preschool, school-age, and adolescence. Demonstration of the development of feeding behavior in children by use of videotapes and live subjects. Prerequisites: 300 or 307 or 319.

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 470 Clinical Dietetic Experience (2) A
Hogan
Opportunity for student in clinical dietetics to participate in 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 EDC&I 328. Minimum of three hours each week for ten weeks by arrangement. Prerequisite: enrollment in clinical dietetic program.

H EC 471 Clinical Dietetic Experience (2) W
Buerger, Fontana, Simonds, Valerio
For course description and prerequisite, see 470. Taken concurrently with 457. Minimum of three hours each week for ten weeks by arrangement.

H EC 472 Clinical Dietetic Experience (2) Sp
Fontana, Simonds, Valerio
For course description and prerequisite, see 470. Taken concurrently with 407. Minimum of three hours each week for ten weeks by arrangement.

H EC 473 Clinical Dietetic Experience (4) A
Buerger, Simonds, Valerio
For course description and prerequisite, see 470. Taken concurrently with 410. Minimum of six hours each week for ten weeks by arrangement.

H EC 474 Clinical Dietetic Experience (4) W
Buerger, Fontana, Simonds, Valerio
For course description and prerequisite, see 470. Taken concurrently with 411. Minimum of six hours each week for ten weeks by arrangement.

H EC 480 Special Problems in Family Economics (*) AWSp
Individual study and research in family economics. No more than 10 credits in the 480 series may be applied toward any one degree. Prerequisite: permission.

H EC 481 Special Problems in Institution Administration (*) AWSp
Individual study and research in institution administration. No more than 10 credits in the 480 series may be applied toward any one degree. Prerequisite: permission.

H EC 482 Special Problems in Home Economics Education (*) AWSp
Individual study and research in home economics education. No more than 10 credits in the 480 series may be applied toward any one degree. Prerequisite: permission.

HEC 483 Special Problems in Family Relationships (*) AWSp

Individual study and research in family relationships. No more than 10 credits in the 480 series may be applied toward any one degree. Prerequisite: permission.

HEC 484 Special Problems in Costume Design (*) AWSp

Individual study and research in costume design. No more than 10 credits in the 480 series may be applied toward any one degree. Prerequisite: permission.

HEC 485 Special Problems in Textiles (*) AWSp

Individual study and research in textiles. No more than 10 credits in the 480 series may be applied toward any one degree. Prerequisite: permission.

HEC 486 Special Problems in Foods (*) AWSp

Individual study and research in foods. No more than 10 credits in the 480 series may be applied toward any one degree. Prerequisite: permission.

HEC 487 Special Problems in Home Furnishing (*) AWSp

Individual study and research in home furnishing. No more than 10 credits in the 480 series may be applied toward any one degree. Prerequisite: permission.

HEC 488 Special Problems in Home Management (*) AWSp

Individual study and research in home management. No more than 10 credits in the 480 series may be applied toward any one degree. Prerequisite: permission.

HEC 489 Special Problems in Nutrition (*) AWSp

Individual study and research in nutrition. No more than 10 credits in the 480 series may be applied toward any one degree. Prerequisite: permission.

HEC 491 Clerkship in Clinical Dietetics (5) WSp

Buerger, 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.

HEC 492 Advanced Clerkship in Clinical Dietetics (10) S

Buerger, 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 health-care facility. The clinical facilities are selected to meet the interests of the individual student. Forty hours of supervised clinical experience each week for ten weeks. Prerequisites: senior standing in the clinical dietetic program and completion of 491.

HEC 494 Workshop in Home Economics Education (2½) S

Current problems in home economics education. Prerequisites: EDC&I 327 and EDUC 375, or equivalent.

HEC 496H 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**HEC 505 Effects of Nutrition and Environment on Mental and Physical Development (3) Sp**

Monsen
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.

HEC 506 Clinical Nutrition in Normal and Handicapping Conditions of Children (6)

In an interdisciplinary clinical setting application of principles of advanced nutrition to 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 preclinic and postclinic 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.

HEC 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.

HEC 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, BIOC 405, or equivalent.

HEC 510 Community Nutrition (3)

Survey of nutrition programs in communities, including program planning, nutrition education, grantsmanship, surveillance, nutrition problems of all risk groups. Laboratory experience in selected community agencies provided. Prerequisites: 457 or equivalent, 509, or permission.

HEC 511 Field Work in Public Health Nutrition (2-12, max. 12)

Observation and participation in community agency nutrition programs. Prerequisite: permission.

HEC 515 Seminar in Foods (1-3, max. 9)

Library research and seminar on selected topics in recent developments in food chemistry, selection, processing, and preparation. Prerequisite: 314 or equivalent, or permission.

HEC 525 Seminar in Textiles (3) Sp

Readings and discussion of factors affecting economic utilization and technical development of textile products. Trends in current research and methods of investigation. For graduate students in textiles and clothing. Prerequisites: 125, 225, 425, or equivalent.

HEC 537 Seminar: Clothing (3, max. 6)

Selected readings and discussion of research and trends in production and marketing of apparel, and in esthetic and behavioral aspects of clothing usage. Prerequisites: graduate standing; approved undergraduate preparation in textiles, clothing, and art, or allied disciplines.

HEC 554 Social and Economic Problems of the Consumer (3-5) Hall

Selected topics in the family economics field. Prerequisites: 454 or equivalent, and permission.

HEC 556 Seminar in Family Relationships (3)

Seminar on recent developments in the field of family relationships, with emphasis on current research methods and findings. Prerequisites: 456 or equivalent, and permission.

HEC 562 Home Economics Education (*)

Study of achievements, trends, functions, methods, and teaching materials.

HEC 600 Independent Study or Research (*) AWSp**HEC 700 Master's Thesis (*) AWSp****HUMANITIES****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.

HUM 201 The Arts and the Child (3) AWSpS

Cooper, Raven, Siks
Interdisciplinary orientation to the arts designed to acquaint the student with structural and esthetic elements common to art, drama, and music, and those arts-related processes of self-expression and communication basic to a child's general education.

LINGUISTICS

For courses in English for foreign students, see ENGL 150, 151, 160, 303, 304, 305, and SPCH 111.

LING 101-102-103 Introduction to Language (5-5-5) A,W,Sp

An introduction to the nature of language; patterns of language change; the relevance of the study of language to the study of mental processes.

LING 200 Introduction to Linguistics (5) AWSpS

Brame, Contreras, Ioup, Newmeyer, Saporta, Williams
Introduction to the scientific study of language; language and writing; phonological and grammatical analysis; language change; related disciplines.

LING 201 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.)

LING 333 Linguistics and Society (3) A

Newmeyer, Saporta
Interaction of language, culture, and society, and the relationship of linguistic theory to societal problems. Ethical and political considerations involved in the application of linguistic theory also are discussed.

LING 400 Survey of Linguistic Method and Theory (3) AWSpS

Brame, Contreras, Ioup, Newmeyer, Saporta
Background and scope of modern linguistics; languages of the world; language analysis; relation to other disciplines. Not open to students who have had 200.

LING 401 Linguistics and Related Disciplines (3) Dale

Designed to provide students in linguistics (and other fields) with an exposure to some of the major approaches to the study of language.

LING 402 Survey of the History of Linguistics (3) Shapiro

Survey of the main trends in linguistic theory from ancient times until the advent of transformational-generative grammar. Includes Greek and Roman grammar, non-Western theories of grammar, nineteenth-century comparative and historical grammar, Prague School grammar, and American structuralist grammar. Prerequisite: 400 or equivalent or permission.

LING 404, 405, 406 Indie 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.

LING 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 psycholin-

COLLEGE OF ARTS AND SCIENCES

guistic nature of reading; structure of orthographic systems; reading and developmental psycholinguistics; linguistic models of reading pedagogy. Prerequisite: course in reading or linguistics.

LING 433 Language Policy and Cultural Identity (3) A

Eastman, Schiffman
Examines linguistic policies of the modern national state and their impact on cultural identity, especially on linguistic minorities. In the United States, for example, demands for non-English medium schools and other use of non-English are compared with language policy in other societies (Europe, Africa, Asia). Attention is paid to attitudes underlying second-language instruction, bilingualism, and language loyalty among Americans of non-English language background. The persistence of language minorities in some societies is examined in terms of special cultural factors underlying language loyalty, such as religion, ethnic pride, literacy, etc. Offered jointly with ANTH 464. Prerequisite: 200 or 400, or ANTH 450.

LING 441 Linguistics and Poetic Language (3) W
Relationship between linguistic structures, linguistic universals, and the poetic uses of language; linguistic description in the analysis of literature. Prerequisite: 400 or permission.

LING 443 Philosophy and Linguistics (3) A

Lucian, Small
Study of some of the connections between recent linguistics and philosophy, primarily philosophical problems that arise in the attempt to understand current linguistic theories and the implications of linguistics for philosophy. Offered jointly with PHIL 443. Prerequisite: permission.

LING 445 Teaching English as a Foreign Language (3) W

Ioup
Linguistic analysis as a basis for the teaching of English as a foreign language; language as rule-governed behavior. Prerequisite: 400.

LING 447 Language Development (3) ASp

Dale
First-language acquisition and use by children. Emphasis on theoretical issues and research techniques. Offered jointly with PSYCH 457. Prerequisites: 400 or PSYCH 306, and senior or graduate standing.

LING 449 Second-Language Learning (3) Sp

Ioup
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.

LING 451, 452, 453 Phonology (3,3,3) A,W,Sp

Brame, Contreras
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 ANTH 451, 452, 453. Prerequisite: 200 or 400, which may be taken concurrently, or permission.

LING 454 Methods in Comparative Linguistics (3) W

Voyles
Method and theory of comparative linguistics in relation to anthropological research. Prerequisite: 400 or permission.

LING 455 Areal Linguistics (3, max. 6)

Linguistic analyses of the languages of a selected area. Offered jointly with ANTH 455.

LING 461, 462, 463 Syntax (3,3,3) W,Sp,A

Newmeyer
Study of the structuring of meaningful elements in language; practical experience with a wide variety of languages; taxonomic and generative views of grammar. Offered jointly with ANTH 461, 462, 463. Prerequisite: 200 or 400, which may be taken concurrently, or permission.

LING 464 Articulatory Phonetics (2 1/2) S

Function of speech mechanisms, and dimensions of speech sounds. Practice in the transcription and

production of sounds from a wide variety of languages.

LING 465 Problem Solving in Phonology (5) S

Training in practical solutions to phonological problems from a variety of languages. Prerequisite: permission.

LING 466 Problem Solving in Grammar: Theory and Practice (5) S

Training in practical solutions to grammatical problems from a variety of language structures against a background of constituent structure theory. To be taken concurrently with 467.

LING 467 Grammatical Exercises (2 1/4) 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 Advanced Linguistic Analysis (5) S

LING 473 Field Methods (5) S

Guided practice in gathering and analyzing data from a non-Indo-European language. Prerequisite: 472, which may be taken concurrently, or the equivalent.

LING 478 Introduction to Southeast Asian Linguistics (3) Sp

Cooke
Survey of language families of Southeast Asia. Typology and relationships. Research needs and problems. Prerequisites: 452, 462.

LING 499 Undergraduate Research (1-5) AWSpS

Courses for Graduates Only

LING 500 Proseminar (3) A

Introduction to bibliography and research in linguistics.

LING 501, 502, 503 Linguistic Analysis Laboratory (3,3,3)

Schiffman
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.)

LING 505, 506 Indo-European Comparative Grammar (2,2) W,Sp

Systematic treatment, with extensive surveys of individual language groups. Prerequisite: 504.

LING 514, 515, 516 Seminar in Comparative Linguistics (2,2,2) A,W,Sp

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, Lucian
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 524 Seminar in Descriptive Linguistics (3, max. 6)

Individual and joint research on selected topics in descriptive linguistics. Topics change each quarter. Typical topics are semantics, generative grammar, phonological theories. Prerequisites: 453, 463.

LING 530 Dialectology (3) S

Schiffman
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,W,Sp

Brame
Problems in phonological theory, generative phonology, phonological change. History of phonological analysis. Prerequisites: 451, 452, 453.

LING 553 Analysis of Linguistic Structures (3, max. 6) Sp

Syntactic and/or phonological analysis. Language varies. Offered jointly with ANTH 553. Prerequisite: permission.

LING 561, 562, 563 Advanced Syntax (3,3,3) A,W,Sp

Brame, Newmeyer
Intensive investigation of the historical background of, and recent developments in, transformational syntax. Prerequisites: 461, 462, 463.

LING 565 Contrastive Linguistics (3) Sp

Ioup
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 567 Syntactic and Semantic Development (3) Sp

Dale
Advanced study of the patterns of child language, linguistic approaches to characterizing them, and psychological approaches to understanding the nature of development. Includes cross-linguistic comparisons, the relationship of comprehension to production, the cognitive basis for syntax, early semantic systems, and others. Offered jointly with PSYCH 567. Prerequisites: 461 and course in child language.

LING 578 Seminar in Southeast Asian Linguistics (3, max. 9) Sp

Cooke
Advanced consideration of specialized problems in Southeast Asian linguistics. Reports on individual research. (Offered alternate years; offered 1977-78.)

LING 579 Comparative Altaic Linguistics (3) W

Comparative phonology and morphology of Mongol and Turkic and other related languages. Offered jointly with MONG 579. Prerequisite: permission.

LING 580 Problems in Linguistics (3, max. 12) AWSp

Brame, Contreras, Ioup, Newmeyer, Shapiro, Williams
For advanced students of linguistics, dealing with significant movements, techniques, skills, and theories 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 (*) AWSpS

LING 700 Master's Thesis (*) AWSpS

LING 800 Doctoral Dissertation (*) AWSpS

MATHEMATICS

Courses for Undergraduates

MATHEMATICS

MATH 100, 102 Algebra (5,5) AW,WSp

Similar to the first three terms of high school algebra. Assumes no previous experience in algebra. Open only to specially admitted students (i.e. (1) educational opportunity students, or (2) students admitted with a mathematics deficiency). Such students are eligible for credit only if (1) they have completed fewer than two years of college prepara-

tory mathematics or (2) they have completed two years but have received a grade below C in one or more semesters of those two years. (Not open to regularly admissible students.)

MATH 105 Elementary Functions (5) AWSp
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) AWSp
Brief introduction to logic, set theory, and probability theory. 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) AWSp
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 101 or equivalent; 105 or equivalent recommended.

MATH 124, 125, 126 Calculus With Analytic Geometry (5,5,5) AWSp, AWSp, AWSp
Plane analytic geometry, differentiation of algebraic and transcendental functions, definite and indefinite integrals, technique of integration, vectors, vector-valued functions, infinite series. Applications. No more than 5 credits from 124 or 134H may be counted toward any degree. Prerequisites: 105 or qualifying test, and trigonometry for 124; 124 or 134H for 125; 125 or 135H for 126.

MATH 134H, 135H, 136H Calculus With Analytic Geometry (5,5,5) A, W, Sp
Honors sections of 124, 125, 126. No more than 5 credits from 124, or 134H, 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) AWSp
Elementary treatment of the differential and integral calculus of simple functions. Intended for students who wish only a brief course in calculus. Credit does not apply toward a mathematics major. Prerequisite: one and one-half years of high school algebra or 101 or equivalent.

MATH 170, 171 Mathematics for Elementary School Teachers (3,3) AWSpS, SpS
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 may not apply toward a major in mathematics. Elementary education majors are required to take 170. Prerequisites: one year of high school algebra, and one year of geometry for 170; 170 for 171.

MATH 205 Elementary Linear Algebra (3) AWSp
Systems of equations, vector spaces, matrices, linear transformations, characteristic vectors. Not open for credit to students who have taken 302. Prerequisite: 124 or 157.

MATH 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) AWSp
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) AWSp
Brief introduction to some of the fundamental ideas of elementary number theory. Prerequisite: 126 or 136H.

MATH 302, 303 Linear Algebra (4,3) AWSp, AWSp
Vector spaces; linear transformations; systems of linear equations; equivalence and similarity of matrices; quadratic forms. Prerequisites: 126 or 136H for 302; 302 for 303.

MATH 305 Introduction to Mathematical Logic (3) WSp
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 PHIL 120.

MATH 324, 325, 326 Advanced Calculus I, II, III (3,3,3) AW, WSp, Sp
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: either 302 or 205 for 324, 303 recommended; 324 for 325; 325 for 326.

MATH 327 Advanced Calculus (3) AWSp
Functions of several variables, partial derivatives, the gradient, extremal problems, line integrals, double integrals, Green's theorem. Prerequisite: 126 or 136H. Not open for credit to students who have taken 324.

MATH 328 Advanced Calculus (3) AWSp
Implicit function theorem, Lagrange multipliers, surfaces and surface integrals, vector analysis in three dimensions, theorems of Gauss and Stokes. Not open for credit to students who have taken 325. Prerequisite: 327 or 324.

MATH 374 Advanced Computer Programming (3) AWSp
ALGOL language structure and its use in algorithm description and application. Prerequisites: 114 or ENGR 141, 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 (3,3,3) 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 407, 408 Mathematical Optimization Theory (3,3) WSp, Sp
Theory of linear programs and its applications: systems of linear inequalities, duality, the simplex algorithm, matrix games. Nonlinear programs and Lagrange multipliers. Assignment problems and various combinatorial extremum problems involving directed graphs. Prerequisites: 302 for 407; 407 for 408.

MATH 411, 412 Introduction to Modern Algebra for Teachers (3,3) A, W
Development of the number systems of elementary algebra; groups, rings, integral domains and fields; polynomials. Designed for 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) Sp
Survey of the development of mathematics from its earliest beginnings through the first half of the twentieth century. Prerequisite: 402 or 412.

MATH 424, 425, 426 Fundamental Concepts of Analysis (3,3,3) A, W, Sp
Sets, real numbers, topology of metric spaces,

normed linear spaces, multivariate calculus from an advanced viewpoint. Prerequisites: 325 or 236H, and 303 or permission for 424; 424 for 425; 425 for 426.

MATH 427 Topics in Applied Analysis (3) AW
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) WSp, Sp
Fourier series, orthonormal functions and boundary value problems, calculus of variations. Prerequisites: 234H or 324 or 327, and 238 for 428; 428 for 429.

MATH 438 Principles of Differential Equations (3) AWSp
Linear systems, existence of solutions, solution by series, special functions. Prerequisite: 236H; 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 or 234, and 302 or permission, for 441; 441 for 442; 442 for 443.

MATH 444, 445 Foundations of Geometry (3,3) A, W
Axiomatic treatment of the foundations of Euclidean geometry. Introduction to non-Euclidean geometry. Designed for teaching majors. Prerequisites: 126 or 136H for 444; 444 for 445.

MATH 464 Numerical Analysis I (3) A
Basic principles of numerical analysis, classical interpolation and approximation formulas, finite differences and difference equations. Prerequisites: 238, 324 or 327, and 114 or ENGR 141.

MATH 465 Numerical Analysis II (3) W
Numerical methods in algebra. Systems of linear equations, matrix inversion, successive approximations, iterative and relaxation methods. Prerequisites: 303 and 464.

MATH 466 Numerical Analysis III (3) Sp
Numerical differentiation and integration. Solution of differential equations and systems of such equations. Prerequisite: 465.

MATH 496H Honors Seminar (*, max. 9) AWSp
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 EDC&I 478.

MATH 498 Special Topics in Mathematics (2-5, max. 15) AWSp
Reading and lecture course intended for special needs of advanced students. Prerequisite: permission. (Offered when demand is sufficient.)

PROBABILITY AND STATISTICS

MATH 281 Elements of Statistical Method (5) AWSp
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, Q SCI 281, and PSYCH 217, 218 may be counted toward any mathematics degree. Prerequisite: 105.

MATH 391 Elementary Probability (3) AWSp
Sample space, random variables, laws of probability. Combinatorial probabilities. Distributions: binomial, normal; expectation, variance. No more than 6 credits from among 281, 391, 392, Q SCI 281, and PSYCH 217, 218 may be counted toward any

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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 394. Prerequisite: 126 or 136H.

MATH 392 Elements of Statistics (3) AWSp
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, Q SCI 281, and PSYCH 217, 218 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: 327 or 324 or 236H.

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 481 Probability (5) A
Fundamental concepts; discrete and continuous random variables; expectation law of large numbers; important distributions; characteristic functions; central limit theorem. No more than 6 credits from among 394, 395, and 481 can be counted toward any mathematics degree. Prerequisites: 327 or 324, and senior or graduate standing, or permission.

MATH 482, 483 Statistical Inference (3,3) AW, WSp
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
General linear hypothesis tests and estimates. Distribution theory of tests. Tests of all contrasts. Fixed, mixed, and random models. Prerequisite: 483.

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, queueing theory, stationary processes. Prerequisites: 396 for 491; 491 for 492.

Courses for Graduates Only

MATHEMATICS

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: 405 or equivalent for 501; 501 for 502; 502 for 503.

MATH 504, 505, 506 Modern Algebra (3,3,3) A,W,Sp
Theory of groups, rings, integral domains, and fields; polynomials; vector spaces, Galois theory, and theory of ideals. Prerequisites: 404 or equivalent for 504; 504 for 505; 505 for 506.

MATH 507, 508 Foundations of Mathematics (3,3) S,S
Fundamental concepts and methods of mathematics; the axiomatic method; the logical founda-

tions of mathematics. Prerequisite: 412 or equivalent for 507, 445 recommended; 507 for 508.

MATH 510 Seminar in Algebra (*, max. 5) AWSp
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, L_p spaces, L_2 Fourier transform theory. Prerequisites: 427, 428, 429, or permission.

MATH 528, 529 Hilbert Space Operators (3,3) W,Sp
Spectral theorem 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) AWSp
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 operations in Hilbert space, group representations, Fourier series and integrals, topological linear spaces, potential theory, and numerical analysis.

MATH 534, 535, 536 Complex Variable (3,3,3) A,W,Sp
Complex numbers; analytic functions; contour 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
Schrödinger 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, Poincaré-Bendixon theory; topological methods, fixed-point theorems. Prerequisites: 324 (or 236H) and 438 for 538; 538 for 539. (Offered alternately with 578, 579; offered 1975-76.)

MATH 541, 542, 543 Special Topics in Applied Mathematics (3, max. 9; 3, max. 9; 3, max. 9) A,W,Sp
Such topics as mathematical quantum theory, fluid 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. Stoke's 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
Review of Banach, Hilbert, and L_p spaces. Locally

convex spaces (duality and separation theory, distributions, and function spaces). Operators on locally convex spaces (adjoints, closed graph/open mapping and Banach-Steinhaus theorems), Banach algebras (spectral theory, elementary applications). Spectral theorem for Hilbert space operators. Additional topics chosen by instructor. A working knowledge of real variables, general topology, and complex variables is assumed.

MATH 550 Seminar in Geometry (*, max. 5) AWSp
Prerequisite: permission.

MATH 551, 552, 553 Special Topics in Geometry (2-3, max. 9; 2-3, max. 9; 2-3, max. 9) A,W,Sp
In recent years the following subjects have been covered: Riemannian geometry, differentiable manifolds, complex manifolds, geometry of convex bodies.

MATH 557, 558, 559 Special Topics in Numerical Analysis (3, max. 9; 3, max. 9; 3, max. 9) A,W,Sp
Such topics as linear systems, approximation theory, or the numerical solution of differential equations are covered.

MATH 561, 562, 563 General Topology (3,3,3) A,W,Sp
Theory of sets; metric spaces; topological spaces; compactness and other covering properties; function spaces; polyhedra; dimension theory. Prerequisites: 400, which may be taken concurrently, and 426 for 561; 561 for 562; 562 for 563.

MATH 564, 565, 566 Algebraic Topology (3,3,3) A,W,Sp
Classical and modern approaches; complexes and their 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 Kevorkian, Pearson
Properties of diffusion, wave, and Laplace-type equations. Initial and boundary value problems. Series expansions, transform methods. Singularities, Green's functions. Classification of second-order equations; theory and applications of method of characteristics. Numerical techniques. Offered jointly with A A 569. Prerequisite: 428 or A A 568.

MATH 570 Seminar in Topology (*, max. 5) AWSp
Prerequisite: permission.

MATH 571, 572, 573 Special Topics in Topology (2-3, max. 9; 2-3, max. 9; 2-3, max. 9) A,W,Sp
Special topics from general and algebraic topology.

MATH 574, 575, 576 Advanced Partial Differential Equations (3,3,3) A,W,Sp
Classification, existence, uniqueness, and boundary value problems for partial differential equations. Green's function and associated integral equations. Prerequisite: 426 or 527.

MATH 578, 579 Special Functions (3,3) W,Sp
Special functions arising from eigenvalue problems, asymptotic developments by contour integration, analytic continuation, complex variable aspects of Fourier integrals. Prerequisite: 427. (Offered alternately with 538, 539; offered 1976-77.)

MATH 585 Numerical Mathematics (3)
Numerical solution of linear algebraic systems, algebraic eigenvalue problems, ordinary and partial differential equations. Offered jointly with C SCI 585. Prerequisites: 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 C SCI 586. Prerequisite: 585 or permission.

MATH 600 Independent Study or Research (*) AWSpS

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. 5) AWSp
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 (*) AWSpS

MATH 700 Master's Thesis (*) AWSpS

MATH 800 Doctoral Dissertation (*)

MUSIC

DANCE

Courses for Undergraduates

DANCE 101, 102, 103 Ballet Techniques I (3, max. 6; 3; 3) 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.

DANCE 104, 105, 106 Modern Dance Techniques I (3, max. 6; 3; 3) A,W,Sp
Skinner
Basic vocabulary of movement skills; coordinated control of limbs and torso; refinement of perception of moving in time space; integration of dance patterns into brief sequences. Prerequisites: 104 or permission for 105; 105 or permission for 101.

DANCE 123, 124, 125 Contemporary Dance I, II, III (1,1,1) A,W,Sp
Concepts and techniques of dance as a modern art form. Prerequisites: 123 for 124; 124 for 125, or permission.

DANCE 145 Introduction to Dance History and Literature (1) AWSp
Boris
Historic survey of dance and development of specific dance forms together with a study of major dance literature.

DANCE 201, 202, 203 Ballet 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.

DANCE 204, 205, 206 Modern Dance Techniques II (3,3,3) A,W,Sp
Skinner
Intermediate. Continued development of flexibility, strength, correct body placement, stamina, and rhythmic awareness; expansion of movement vocab-

ulary; dance studies involving a variety of patterns. Prerequisites: 106 or permission for 204; 204 or permission for 205; 205 or permission for 206.

DANCE 220 Pointe Technique (1, max. 6) AWSp
Fundamentals of the technique of dancing on the toes (*en pointe*). Prerequisites: 103 or permission and concurrent registration in dance techniques course.

DANCE 223 Men's Special Techniques (1, max. 6) AWSp
Special techniques for the male dancer in both ballet and modern dance styles. Prerequisites: 103 or permission and concurrent registration in dance techniques course.

DANCE 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 square, Spanish, Scandinavian, or Scottish. See *Time Schedule* for specific offering. Prerequisite: 103 or audition.

DANCE 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.

DANCE 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. Prerequisite: 103 or audition.

DANCE 240, 241, 242 Structure of Music in Relation to Dance (1,1,1) A,W,Sp
Basic course sequence to develop the dancer's awareness of the structural elements of music as they apply to movement. Prerequisites: MUSIC 120 and 240 or permission for 241; 241 or permission for 242.

DANCE 282 Fundamentals of Rhythm (2) Sp
Understanding of fundamental rhythm concepts and their application in the development of technique and style in basic dance forms.

DANCE 301, 302, 303 Ballet Techniques III. (3, max. 6; 3, max. 6; 3, max. 6) A,W,Sp
Dance techniques at the advanced 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: 203 or permission for 301; 301 or permission for 302; 302 or permission for 303.

DANCE 304, 305, 306 Modern Dance Techniques III (3, max. 6; 3, max. 6; 3, max. 6) A,W,Sp
Skinner
Intermediate-advanced. Increased refinement of kinesthetic training and its application to dance sequences of greater complexity. Prerequisites: 206 or permission for 304; 304 or permission for 305; 305 or permission for 306.

DANCE 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.

DANCE 324 Partnering Techniques (1, max. 6) AWSp
Unison techniques for ballet and modern dance. Duets and *Pas De Deux* from existing dance repertory. Prerequisites: 203 or permission and concurrent registration in a dance techniques course.

DANCE 325 Pre-Classic Dance Forms (1, max. 6)
Court, social, and country dance forms originating in western Europe between the fourteenth and seventeenth centuries that serve as exemplary models of period form and style. Prerequisite: 103 or permission.

DANCE 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.

DANCE 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.

DANCE 328 Popular Dance Styles (1, max. 6)
All forms of American social dance, contemporary and traditional. Prerequisite: 103 or audition.

DANCE 329 Tap and Soft-Shoe Techniques (1, max. 6) AWSp
Rail
Study and practice of tap and soft-shoe techniques. Study of the history and development of modern tap dancing. Prerequisites: audition and permission.

DANCE 355 Dance Composition (2, max. 6) AWSp
Skinner
Practice in modern dance; analysis of choreography; creative work. Prerequisite: permission.

DANCE 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.

DANCE 401, 402, 403 Ballet Techniques IV (3, max. 6; 3, max. 6; 3, max. 6) 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.

DANCE 404, 405, 406 Modern Dance Techniques IV (3, max. 6; 3, max. 6; 3, max. 6) A,W,Sp
Skinner
Advanced. Technical skills applied to longer dance sequences; development of a personal style; projection of mood, emotion, or dramatic situation; readiness of response to a choreographer's wishes. Prerequisites: 306 for 404; 404 for 405; 405 for 406.

DANCE 464 Contemporary Dance Workshop (1, max. 3) AWSp
Skinner
Three-quarter sequence covering: improvisation as an art and skill; indeterminacy and chance procedures in choreography; contemporary repertoire. Prerequisites: 206 and 355.

DANCE 465 Experimental Dance Workshop (3, max. 9) AWSp
Workshop-laboratory designed to explore experimental approaches to dance. Prerequisite: permission.

DANCE 470 University Dance Companies (1, max. 12) AWSp
Participation in dance productions, either studio showings or staged performances, presented under faculty direction or supervision. Prerequisites: audition and permission.

DANCE 499 Undergraduate Independent Study (*, max. 6) AWSp

MUSIC

Courses for Undergraduates

Courses primarily for nonmajors (see also Ensembles).

MUSIC 100 University Singers (1, max. 12) AWSp
Eichenberger

MUSIC 116, 117, 118 Elementary Music Theory (2,2,2) AW,WSp,Sp
Prerequisites: 116 for 117; 117 for 118.

MUSIC 120 Survey of Music (5) ASP
Clarke
Studies in listening with emphasis on the changing components of Western art music. Illustrated lectures, laboratory section meetings, and presentations by guest artists.

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MUSIC 121 The Orchestra (2) AWSp
McInnes, Sokol
Development of the orchestra and its literature.

MUSIC 122 Orchestral Music: Seventeenth and Eighteenth Centuries (2) A
Sokol

MUSIC 123 Symphonic Music: Nineteenth Century (2) WSp
Sokol

MUSIC 124 Symphonic Music: Contemporary (2) Sp
Sokol

MUSIC 128 The Concerto (2) A
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, use of musical notation, development of analytical and score-writing techniques, development of aural perception ability. Prerequisite: permission.

MUSIC 185 The Concert Season (4) W
Bergsma
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 316, 317, 318 Music Cultures of the World (5,5,5) A,W,Sp
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 musics of other Afro-American cultures as well as to their African roots.

MUSIC 321 The Role of the Music Critic (2) A
Sokol
The critic's relationship to composer, performer, and listener from writings of ancient Greece to present-day journalistic criticism. Prerequisite: 121 or 122 or 123.

MUSIC 322 Great Conductors (2) A
Sokol
Evolution of conducting leading to the rise of the virtuoso conductor in the nineteenth and twentieth centuries; prominent personalities from Berlioz to Osawa. Prerequisite: 122 or 123 or 124.

MUSIC 329 Chamber Music (2) W
McInnes
Survey of literature for ensembles.

MUSIC 330 Music in the Unit
Contribution of music to the development of American culture.

MUSIC 331 History of Jazz (3) AWSp
Brazli, Garfias, Smith
Development of jazz in the United States, from its beginnings to its present trends.

MUSIC 336 Jazz Arranging (2) 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
Dempster
Survey tracing the development of multimedia musics since 1950 (experimental combinations of music with other art forms in unfamiliar circumstances).

COURSES PRIMARILY FOR MUSIC MAJORS

Permission of undergraduate adviser required for all courses except MUSIC 100.

MUSIC 100 University Singers (1, max. 12)
AWSp
Eichenberger

MUSIC 101 University Symphony Orchestra (1, max. 15) AWSp
Krachmalnick

MUSIC 102 University Band (1, max. 12) WSp
Bissell

MUSIC 103 Chamber Music (1, max. 12) AWSp

MUSIC 104 Piano Ensemble (1, max. 12) AWSp
Gelssmar

MUSIC 105 Brass Ensemble (1, max. 12) WSp
Bissell

MUSIC 106 Woodwind Ensemble (1, max. 12)
AWSp
Grossman, Leuba, McColl, Skowronek, Storch, Welke

MUSIC 107 Opera Workshop (1, max. 12) AWSp
Rosinbum

MUSIC 108 Fundamentals of Electronic Music (2) AWSp
White
Development of proficiency in the use of tape recorders for original recordings, dubbing, and mixing; experience in the setting up and use of the electronic music synthesizer for the composition of electronic music. Each student produces tape-recorded examples of electronic music.

MUSIC 110, 111, 112 First-Year Theory (3,3,3) A,W,Sp
Study of basic musical concepts and terminology through a program of listening, analysis, and keyboard practice. To be taken concurrently with 113, 114, 115.

MUSIC 113, 114, 115 Ear Training (1,1,1) A,W,Sp
To be taken concurrently with 110, 111, 112.

MUSIC 119 Music Fundamentals (2) AWSp
For majors in elementary education.

MUSIC 136 Basic Keyboard (1, max. 6) AWSp
For music majors only.

MUSIC 137, 138, 139 Class Instruction: Voice (1,1,1) A,W,Sp
For music majors only.

MUSIC 140 Vocal Jazz Ensemble (1, max. 6)
AWSp

MUSIC 147 Opera Chorus (1, max. 12) AWSp
Eichenberger

MUSIC 191 Composition (2, max. 6) AWSp
Beale, Benshoof, Bergsma, Dorsey, Kechley, Rahn, 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 Sinfonietta (1, max. 12) AWSp
Bissell

MUSIC 202 Jazz Improvisation (1, max. 6) WSp
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)
AWSp
Dunbar

MUSIC 205 Non-Western Ensemble (1, max. 12)
AWSp
Garfias

MUSIC 206 Jazz Ensemble (1, max. 12) AWSp

MUSIC 207 University Oratorio Chorus (1, max. 12) AWSp
Eichenberger
Choral ensemble that performs major works with orchestra.

MUSIC 208 University Laboratory Band (1, max. 12) AWSp
Cummings
Large ensemble performance practices in the jazz idiom.

MUSIC 209 Recorder Ensemble (1) Sp
Prerequisite: 241.

MUSIC 210, 211, 212 Second-Year Theory (3,3,3) A,W,Sp
Babb, Beale, Dorsey, Kechley, Rahn, Tufts
Practical writing and analytic experience in diatonic and chromatic harmony as it was used during the eighteenth and nineteenth centuries. To be taken concurrently with 213, 214, 215. Prerequisites: 112 and 115.

MUSIC 213, 214, 215 Music After 1750 (3,3,3) A,W,Sp
Irvine, Troy
To be taken concurrently with 210, 211, 212.

MUSIC 216, 217, 218 Introductory Composition (2,2,2) A,W,Sp
Benshoof
For students not majoring in composition. Prerequisite: 112.

MUSIC 220, 221, 222 String Techniques and Pedagogy (2,2,2) A,W,Sp
Jussila
Violin, viola, cello, string bass.

MUSIC 223, 224, 225 String Techniques II (1,1,1) A,W,Sp
Jussila

MUSIC 226, 227, 228 Woodwind Techniques and Pedagogy (2,2,2) A,W,Sp
226: clarinet. 227: flute. 228: double reeds. Sp
Bissell
229: trumpet. 230, 231: lower brass.

MUSIC 232 Percussion Techniques and Pedagogy (1) A
Dunbar

MUSIC 233 Music Theatre Technique (1) A
Rosinbum
Stage deportment and dramatic movement for singers.

MUSIC 236 Secondary Piano (2, max. 6) AWSp
For music majors only.

MUSIC 237 Class Instruction: Voice (2, max. 6) AWSp
For music majors only.

MUSIC 240 Guitar Techniques I (1) AWSp

MUSIC 241 Recorder Techniques (1) W

MUSIC 250 Guitar Techniques II (1) Sp
Prerequisite: 240 or permission.

MUSIC 280 Basic Principles of Conducting (1) Sp
Krachmalnick
Prerequisite: 212, which may be taken concurrently.

MUSIC 291 Composition (2, max. 6) AWSp
Beale, Benshoof, Bergsma, Dorsey, Kechley, Rahn, Smith, Tufts
One half-hour private lesson and one-hour laboratory session per week. Prerequisite: 191.

MUSIC 309 Advanced Music Theatre Technique (1) W
Rosinbum
Dramatic interpretation of musical style as represented by the major opera composers since Mozart. Prerequisite: 233.

MUSIC 310 Modal Counterpoint (3) A
Babb, Rahn
Sixteenth-century style. To be taken concurrently with 313. Prerequisites: 212 and 215.

MUSIC 311 Tonal Counterpoint (2) W
Babb, Beale, Benshoff, Bergsma, Rahn
Basic techniques of Baroque counterpoint and introduction to the fugue. To be taken concurrently with 314. Prerequisites: 212 and 215.

MUSIC 312 Contemporary Idioms (3) Sp
Analytical studies of present-day composition techniques with emphasis on contrapuntal qualities. Prerequisites: 212 and 215.

MUSIC 313, 314 Music Before 1750 (3,3) A,W
Clarke, Harman
313: before 1600. 314: 1600-1750. To be taken concurrently with 310, 311. Prerequisites: 212, 215 for 313; 313 for 314.

MUSIC 323, 324, 325 Accompanying (2,2,2) AW,W,Sp
O'Doan
Study and performance of music of different types and periods for voice or instruments in combination with the piano.

MUSIC 326, 327, 328 Repertoire (2,2,2) A,W,Sp
Elchinger, Hokanson, Kind, Zsigmondy
For applied music majors.

MUSIC 334 Band Arranging (2) W
Prerequisite: 212.

MUSIC 336 Jazz Arranging (2) A
Smith
Writing in jazz style for various instrumental combinations.

MUSIC 337 History of Chamber Music (3) A
McInnes

MUSIC 338 Baroque Ornamentation (2) AWSp
Kind
Survey of musical ornamentation in France, Spain, England, Italy, and Germany from 1600 to 1800, with special reference to the harpsichord. Prerequisite: permission.

MUSIC 340 Music in General Education (3) AW
An orientation to the broad scope of music in schools (K-12), including identification of musical concepts and skills and the development of strategies and evaluation techniques. Prerequisites: EDUC 302, EDPsy 304, and piano and voice competencies.

MUSIC 379 Junior Recital (1) AWSp
For participants in the Bachelor of Music program only.

MUSIC 380, 381, 382 Conducting (1,1,1) A,W,Sp
Elchenberger, Krachmalnick, Sokol
Prerequisite: 280.

MUSIC 391 Composition (2, max. 6) AWSp
Beale, Benshoof, Bergsma, Dorsey, Kechley, Rahn, Smith, Tufts
One half-hour private lesson and one-hour laboratory session each week. Prerequisite: 291.

Courses 400 through 423: Prerequisite: 314.

MUSIC 400 Medieval Music: to 1400 (3) A
Harman
Gregorian chant through Machaut and Landini.

MUSIC 401 Early Renaissance Music: 1400-1525 (3) W
Harman
Dunstable through Josquin.

MUSIC 402 Late Renaissance Secular Music: 1525-1630 (3) A
Harman
The madrigal in Italy, England, and Germany. The Chanson, Jannequin through Lassus.

MUSIC 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, Cabezón, the English virginal school, and Sweelinck.

MUSIC 404 Keyboard Music: 1630-1770 (3) A
Forms and styles: Frescobaldi through J. S. Bach and C. P. E. Bach.

MUSIC 405 Keyboard Music: 1770-1850 (3) W
Irvine
Haydn through Schumann.

MUSIC 406 Keyboard Music: 1850-1920 (3) Sp
Irvine
Liszt through Debussy.

MUSIC 407 Baroque Solo Song (3)
Monody and cantata, Caccini through Handel.

MUSIC 408 The German Lied (3) A
Schubert through Strauss.

MUSIC 409 French Art-Song: 1850 to the Present (3)
Faure through Poulenc.

MUSIC 410 Chamber Music: 1660-1770 (3) W
Harman
Frescobaldi through Bach.

MUSIC 411 Chamber Music: 1770-1830 (3)
Haydn through Schubert.

MUSIC 412 Chamber Music: 1830-1920 (3)
Schumann through Ravel.

MUSIC 413 Orchestral Music: 1620-1760 (3) W
Harman
Corelli through the Mannheim School.

MUSIC 414 Orchestral Music: 1760-1850 (3) A
Irvine
Haydn through Berlioz.

MUSIC 415 Orchestral Music: 1850-1920 (3) W
Irvine
Liszt through Elgar; the National Schools and the Impressionists.

MUSIC 416 Choral Music: 1600-1770 (3) Sp
Harman
Monteverdi through Handel.

MUSIC 417 Choral Music of Bach (3) Sp
The cantatas and larger works. Choral compositions of Bach's immediate predecessors.

MUSIC 418 Choral Music: 1770-1850 (3) A
Large works for chorus and orchestra. Haydn through Berlioz.

MUSIC 419 Choral Music: 1850 to the Present (3) Sp
Selected choral masterpieces. Brahms through Britten.

MUSIC 420 Opera: 1600-1750 (3) Sp

MUSIC 421 Opera: 1750-1850 (3) Sp
Troy
Gluck through Bellini.

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, continents, and centuries.

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
Irvine, 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
Lundquist
The teaching of music and its literature in nonperforming 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
Heinitz, Hokanson, Moore, O'Doan, Weltmann
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
Carlsen
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.

COLLEGE OF ARTS AND SCIENCES

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) AWSp
Eichenberger

MUSIC 451 Madrigal Singers (1, max. 12) AWSp
Kechley

MUSIC 455 Choral Arranging (3) Sp
Dorsey, Kechley
Primarily for choral conductors who need to modify or arrange material to suit the capabilities of specific choral groups and performance situations. Prerequisite: senior standing or permission.

MUSIC 460 Advanced Piano Repertoire (3, max. 9) AWSpS
Hokanson
For piano majors. Examination in depth of more difficult works, by genres and by individual composers. Prerequisites: 326, 327, 328, and permission.

MUSIC 479 Senior Recital (1) AWSp

MUSIC 480 Sinfonietta (1, max. 6) AWSp
Krachmalnick

MUSIC 481 Chamber Music (1, max. 6) AWSp
Prerequisite: graduate standing.

MUSIC 482 Opera Theatre (2, max. 6) AWSp
Krachmalnick; Rosinbum
Preparation for participation in public performance of roles in chamber opera.

MUSIC 483 Collegium Musicum (1, max. 6) AWSp
Kind

MUSIC 484 Contemporary Group (1, max. 6) AWSp
Bergsma, 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) AWSp
Beale, Benshoof, Bergsma, Dempster, Dorsey, Kechley, Rahn, Smith, Tufts
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,W
Rosinbum
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, Bergsma, Kechley, Rahn
501: chant to middle Baroque. 502: high Baroque through nineteenth century. 503: Impressionists to present.

MUSIC 504 Seminar in Medieval Music (3, max. 6) Sp
Harman
Prerequisite: 400.

MUSIC 505 Seminar in Renaissance Music (3, max. 6) A
Harman
Prerequisite: one or more courses from 401, 402, and 403.

MUSIC 506 Seminar in Baroque Music (3, max. 6) W
Prerequisite: one or more courses from 404, 407, 410, 413, 416, 417, or 420.

MUSIC 507 Seminar in Rococo and Pre-Classical Music: 1700-1760 (3, max. 6) Sp
Harman
Prerequisite: one or more courses from 404, 410, 413, 420.

MUSIC 508 Seminar in the Viennese Classical Period: 1760-1830 (3, max. 6) Sp
Prerequisite: one or more courses from 405, 411, 414, 418, or 421.

MUSIC 509 Seminar in Nineteenth-Century Music: 1830-90 (3, max. 6) A
Irvine
Prerequisite: one or more courses from 406, 408, 409, 412, 415, 419, or 422.

MUSIC 510 Seminar in Music Since 1890 (3, max. 6) W
Clarke, Irvine
Prerequisite: one or more courses from 406, 408, 409, 412, 415, 419, 422, or 423.

MUSIC 511 Seminar in Field and Laboratory Methods (3)
Kauffman
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)
Kauffman
Study of methodological procedures in ethnomusicology applied to specific research problems.

MUSIC 513 Historiography (3) W
Prerequisite: 500.

MUSIC 514 Systematic Musicology (3) A
Carlsen
Examination of the principal research literature in the areas of systematic musicology.

MUSIC 515 Medieval Notation: To 1400 (3) Sp
Harman
Gregorian chant through the Mannered School.

MUSIC 516 Renaissance Notation: 1400-1600 (3) W
Harman
Dunstable through De Rore; lute and keyboard tablatures. Prerequisite: 401.

MUSIC 517 Seminar in Musical Styles (3, max. 6) W
Clarke
Investigations into the stylistic criteria for specific composers and groups of composers.

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
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.

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.

MUSIC 521 Selected Topics in Musical Perception (3)
Carlsen
Specialized problems in the aural perception of musical sounds in context. May be repeated for credit. Prerequisite: 438.

MUSIC 522 Contemporary Contrapuntal Technique (3) A
Kechley, Rahn
Study of the art of invention, canon, and fugue in the twentieth century, from both analytic and practical viewpoints.

MUSIC 524 Seminar in Music Education (3) W
Cooper
Special problems in the teaching and supervision of music in the elementary grades. Prerequisite: 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. Prerequisite: one year of teaching experience.

MUSIC 526, 527, 528 History of Theory (3,3,3) A,W,Sp
526: ancient, medieval, early Renaissance. 527: Renaissance, Baroque, early classic. 528: classic, romantic, twentieth century.

MUSIC 530 Seminar in Musical Learning (3, max. 6)
Carlsen
Study of learning research as it relates to nonverbal musical learning. Prerequisite: 438.

MUSIC 532 Opera Direction and Production (4 or 6, max. 12) AWSp
Rosinbum
Practical experience with problems of the opera theatre.

MUSIC 533, 534, 535 Preceptorial Reading in Ethnomusicology (5,5,5) A,W,Sp
Garfias, Kauffman
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)
Kauffman
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: one or more courses from 420, 421, or 422, or permission.

MUSIC 540 History of Music Education (3) W

Jussila
Chronological examination of contributions, events, philosophies, and people that characterize the development of music education in the schools of the United States.

MUSIC 541 Music and Society (3)

Examination of human needs and prototypes of trends in current society and the potential of music to satisfy those needs.

MUSIC 542 Comparative Music Education (3) Sp

Cooper
Comparative examination of the philosophy and practice of music education in the United States and in other countries.

MUSIC 551 Practicum in Music Instruction (3, max. 9) AWSp

Provides experienced teachers with an in-depth experience in curriculum, instructional procedures, and assessment, with the supervision of a faculty member, permitting the student to apply and validate results of investigation in music teaching and learning, performance, and theoretical studies. Prerequisites: teaching experience and permission.

MUSIC 555 Systematic Methods of Musical Research (3) A

Carlson
Introduction to problem identification and definition, hypothesis construction, research design, use of controls, data analysis, and interpretation.

MUSIC 559 Master's Recital (2, max. 4) AWSp

Public performance for students in the Master of Music program.

MUSIC 561 Problems in Music Teaching (3) Sp

Carlson
Study of current problems in music teaching, particularly those relating to curriculum, instructional procedures, and assessment of learning; and derivation of potential theories; the development of strategies for research or solution. Prerequisite: 555 or permission.

MUSIC 580, 581, 582 Advanced Conducting

(2,2,2) A,W,Sp
Krachmalnick

MUSIC 583 Advanced Choral Conducting (3, max. 27) AWSp

Eichenberger

MUSIC 590 Doctoral Recital (3-9, max. 18) AWSp

Public performance for students in the Doctor of Musical Arts program.

MUSIC 591 Graduate Composition (*) AWSp

Beale, Benshoof, Bergsma, Dorsey, Kechley, Rahn, Smith, Tufts

MUSIC 595, 596, 597 Practicum in Systematic Musicology (2,2,2) A,W,Sp

Carlson
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 600 Independent Study or Research (*) AWSp

MUSIC 700 Master's Thesis (*) AWSp

MUSIC 800 Doctoral Dissertation (*) AWSp

MUSIC APPLIED

ADMISSION BY AUDITION

Courses for Undergraduates

Courses 140 through 459 are private instruction primarily for majors not specializing in performance. Also available to qualified nonmajors. Prerequisites: audition and permission.

MUSAP 140, 240, 340, 440 Private Instruction:
Piano (2-3 each, max. 9 each for 140, 240, 340; max. 18 for 440) AWSp

Geissmar, Hokanson, Moore, O'Doan, Rafols, Siki

MUSAP 141, 241, 341, 441 Private Instruction:
Violin-Viola (2-3 each, max. 9 each for 141, 241, 341; max. 18 for 441) AWSp

McInnes, Sokol, Zsigmondy

MUSAP 142, 242, 342, 442 Private Instruction:
Voice (2-3 each, max. 9 each for 142, 242, 342; max. 18 for 442) AWSp

Curtis-Verna, Lishner, Stern, Weltmann

MUSAP 143, 243, 343, 443 Private Instruction:
Violoncello (2-3 each, max. 9 each for 143, 243, 343; max. 18 for 443) AWSp

Heinitz

MUSAP 144, 244, 344, 444 Private Instruction:
Contrabass (2-3 each, max. 9 each for 144, 244, 344; max. 18 for 444) AWSp

Harnett

MUSAP 145, 245, 345, 445 Private Instruction:
Organ (2-3 each, max. 9 each for 145, 245, 345; max. 18 for 445) AWSp

Eichinger

MUSAP 146, 246, 346, 446 Private Instruction:
Flute (2-3 each, max. 9 each for 146, 246, 346; max. 18 for 446) AWSp

Skowronek

MUSAP 147, 247, 347, 447 Private Instruction:
Oboe (2-3 each, max. 9 each for 147, 247, 347; max. 18 for 447) AWSp

Storch

MUSAP 148, 248, 348, 448 Private Instruction:
Clarinet (2-3 each, max. 9 each for 148, 248, 348; max. 18 for 448) AWSp

McColl

MUSAP 149, 249, 349, 449 Private Instruction:
Bassoon (2-3 each, max. 9 each for 149, 249, 349; max. 18 for 449) AWSp

Grossman

MUSAP 150, 250, 350, 450 Private Instruction:
Saxophone (2-3 each, max. 9 each for 150, 250, 350; max. 18 for 450) AWSp

MUSAP 151, 251, 351, 451 Private Instruction:
Horn (2-3 each, max. 9 each for 151, 251, 351; max. 18 for 451) AWSp

Leuba

MUSAP 152, 252, 352, 452 Private Instruction:
Trumpet (2-3 each, max. 9 each for 152, 252, 352; max. 18 for 452) AWSp

Cummings

MUSAP 153, 253, 353, 453 Private Instruction:
Trombone (2-3 each, max. 9 each for 153, 253, 353; max. 18 for 453) AWSp

Dempster

MUSAP 154, 254, 354, 454 Private Instruction:
Tuba (2-3 each, max. 9 each for 154, 254, 354; max. 18 for 454) AWSp

Leuba

MUSAP 155, 255, 355, 455 Private Instruction:
Harp (2-3 each, max. 9 each for 155, 255, 355; max. 18 for 455) AWSp

Vokolek

MUSAP 156, 256, 356, 456 Private Instruction:
Percussion (2-3 each, max. 9 each for 156, 256, 356; max. 18 for 456) AWSp

Dunbar

MUSAP 157, 257, 357, 457 Private Instruction:
Harpichord (2-3 each, max. 9 each for 157, 257, 357; max. 18 for 457) AWSp

Kind

MUSAP 158, 258, 358, 458 Private Instruction:
Viola da Gamba (2-3 each, max. 9 each for 158, 258, 358; max. 18 for 458) AWSp

MUSAP 159, 259, 359, 459 Private Instruction:
Non-Western Instruments (2-3 each, max. 9 each for 159, 259, 359; max. 18 for 459) AWSp

Courses 160 through 578 are for music majors specializing in performance. The 500 courses are for graduate performance majors.

MUSAP 160, 260, 310, 460, 560 Private Instruction:
Piano (3-4 each, max. 12 each for 160, 260, 360; max. 18 for 460; max. 27 for 560) AWSp

Geissmar, Hokanson, Moore, O'Doan, Rafols, Siki

MUSAP 161, 261, 361, 461, 561 Private Instruction:
Violin-Viola (3-4 each, max. 12 each for 161, 261, 361; max. 18 for 461; max. 27 for 561) AWSp

McInnes, Sokol, Zsigmondy

MUSAP 162, 262, 362, 462, 562 Private Instruction:
Voice (3-4 each, max. 12 each for 162, 262, 362; max. 18 for 462; max. 27 for 562) AWSp

Curtis-Verna, Lishner, Stern, Weltmann

MUSAP 163, 263, 363, 463, 563 Private Instruction:
Violoncello (3-4 each, max. 12 each for 163, 263, 363; max. 18 for 463; max. 27 for 563) AWSp

MUSAP 164, 264, 364, 464, 564 Private Instruction:
(3-4 each, max. 12 each for 164, 264, 364; max. 18 for 464; max. 27 for 564) AWSp

Harnett

MUSAP 165, 265, 365, 465, 565 Private Instruction:
Organ (3-4 each, max. 12 each for 165, 265, 365; max. 18 for 465; max. 27 for 565) AWSp

Eichinger

MUSAP 166, 266, 366, 466, 566 Private Instruction:
Flute (3-4 each, max. 12 each for 166, 266, 366; max. 18 for 466; max. 27 for 566) AWSp

Skowronek

MUSAP 167, 267, 367, 467, 567 Private Instruction:
Oboe (3-4 each, max. 12 each for 167, 267, 367; max. 18 for 467; max. 27 for 567) AWSp

Storch

MUSAP 168, 268, 368, 468, 568 Private Instruction:
Clarinet (3-4 each, max. 12 each for 168, 268, 368; max. 18 for 468; max. 27 for 568) AWSp

McColl

MUSAP 169, 269, 369, 469, 569 Private Instruction:
Bassoon (3-4 each, max. 12 each for 169, 269, 369; max. 18 for 469; max. 27 for 569) AWSp

Grossman

MUSAP 170, 270, 370, 470, 570 Private Instruction:
Saxophone (3-4 each, max. 12 each for 170, 270, 370; max. 18 for 470; max. 27 for 570) AWSp

MUSAP 171, 271, 371, 471, 571 Private Instruction:
Horn (3-4 each, max. 12 each for 171, 271, 371; max. 18 for 471; max. 27 for 571) AWSp

Leuba

MUSAP 172, 272, 372, 472, 572 Private Instruction:
Trumpet (3-4 each, max. 12 each for 172, 272, 372; max. 18 for 472; max. 27 for 572) AWSp

Cummings

MUSAP 173, 273, 373, 473, 573 Private Instruction:
Trombone (3-4 each, max. 12 each for 173, 273, 373; max. 18 for 473; max. 27 for 573) AWSp

Dempster

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MUSAP 174, 274, 374, 474, 574 Private Instruction: Tuba (3-4 each, max. 12 each for 174, 274, 374; max. 18 for 474; max. 27 for 574) AWP Leuba

MUSAP 175, 275, 375, 475, 575 Private Instruction: Harp (3-4 each, max. 12 each for 175, 275, 375; max. 18 for 475; max. 27 for 575) AWP Vokolek

MUSAP 176, 276, 376, 476, 576 Private Instruction: Vercussion (3-4 each, max. 12 each for 176, 276, 376; max. 18 for 476; max. 27 for 576) AWP Dunbar

MUSAP 177, 277, 377, 477, 577 Private Instruction: Harpsichord (3-4 each, max. 12 each for 177, 277, 377; max. 18 for 477; max. 27 for 577) AWP Kind

MUSAP 178, 278, 378, 478, 578 Private Instruction: Viola da Gamba (3-4 each, max. 12 each for 178, 278, 378; max. 18 for 478; max. 27 for 578) AWP Heinitz

NEAR EASTERN LANGUAGES AND LITERATURE

Courses for Undergraduates

AKKADIAN

AKKAD 401, 402, 403 Elementary Akkadian (3,3,3) A,W,Sp Clear
Introduction to the Akkadian language (Assyrian and Babylonian). Graded readings in Latin characters from historical, legal, and literary texts. Prerequisites: HEBR or ARAB 203 or equivalent for 401; 401 for 402; 402 for 403. (Offered every third year.)

AKKAD 421, 422, 423 Intermediate Akkadian (3,3,3) A,W,Sp Clear
Readings in Akkadian Gilgamesh and Creation epics, historical descriptions. Introduction to the cuneiform script. Prerequisites: 403 for 421; 421 for 422; 422 for 423. (Offered every third year.)

ARABIC

ARAB 101-102, 103 Elementary Arabic (5-5, 5) A,W,Sp Heer, Zladeh
Intensive study of grammar, with oral and written drill and reading of simple texts.

ARAB 111-112, 113 Eastern Arabic: The Spoken Arabic of Palestine, Syria, Lebanon, and Egypt (5-5, 5) A,W,Sp
Introduces the student to the colloquial language used in the Arab countries of the Eastern Mediterranean region, emphasizing the language of everyday conversation of the educated city dweller. Transliteration into Latin characters used throughout the course.

ARAB 201, 202, 203 Intermediate Arabic (5,5,5) A,W,Sp Heer, Zladeh
Reading of selected texts in literary Arabic, with continuing emphasis on grammar and syntax. Prerequisites: 103 for 201; 201 for 202, 202 for 203.

ARAB 300 Arabic Composition and Syntax (3, max. 9) AWP
Designed to impart to the student an active knowledge of Arabic structure and syntax and to increase his or her vocabulary power through supervised composition, translation into Arabic, and précis of expository writings. Particular emphasis is placed on journalistic articles and editorials. Prerequisite: 203 or equivalent.

ARAB 401 Adab Prose: Jahiz (3) A Heer, MacKay, Zladeh
Readings in early Arabic prose, especially the writings of Jahiz. Prerequisite: 203 or equivalent. (Offered alternate years.)

ings of Jahiz. Prerequisite: 203 or equivalent. (Offered alternate years.)

ARAB 402 Maqamat (Assemblies): Hamadhani, Hariri (3) W MacKay, Zladeh
Reading of several *maqamat* (essays in rhymed prose) of al-Hamadhani and al-Hariri. Examination of the *maqamat* genre as a whole. Prerequisite: 203 or equivalent. (Offered alternate years.)

ARAB 403 Historians: Tabari (3) Sp Heer, MacKay, Zladeh
Readings in Arab historians with particular reference to al-Tabari and his school of historical writing. Prerequisite: 203 or equivalent. (Offered alternate years.)

ARAB 404 Quran and Tafsir (3) A Zladeh
Reading of various sections from the Qur'an with the relevant exegetical writings on religious, philological, and grammatical points. Prerequisite: 203 or equivalent. (Offered alternate years.)

ARAB 405 Hadith and Law (3) W Zladeh
Selected readings from the traditions (*hadith*) of Muhammad, and from works on jurisprudence and law based on the holy texts. Prerequisite: 203 or equivalent. (Offered alternate years.)

ARAB 406 Islamic Political Theorists (3) Sp Zladeh
Readings from the main political theorists: al-Baghdadi, al-Mawardi, and Ibn Khaldun. Prerequisite: 203 or equivalent. (Offered alternate years.)

ARAB 411 Desert Poetry: Pre-Islamic and Umayyad (3) A Heer, MacKay, Zladeh
Reading and analysis of selected poems from pre-Islamic and Umayyad times. Prerequisite: 203 or equivalent. (Offered alternate years.)

ARAB 412 Urban Poetry: The New Abbasid Poetry (3) W Heer, MacKay, Zladeh
Reading of the new poetry of the Abbasid period and studying of the social and political factors that gave rise to it; al-Mutanabbi and al-Ma'arri. Prerequisite: 203 or equivalent. (Offered alternate years.)

ARAB 413 Modern Poetry (3) Sp Heer, Zladeh
Study of the neoclassical poetry of the nineteenth and twentieth centuries, and the development of modern verse. Prerequisite: 203 or equivalent. (Offered alternate years.)

ARAB 414 Islamic Philosophical Literature (3) A Heer
Reading of selected texts by representative Islamic philosophers. Prerequisite: 203 or equivalent. (Offered alternate years.)

ARAB 415 Islamic Theological and Mystical Literature (3) W Heer
Reading of selected texts representative of Islamic theological and mystical schools. Prerequisite: 203 or equivalent. (Offered alternate years.)

ARAB 416 Modern Prose (3) Sp Heer, Zladeh
Selections from modern essays, fiction, and ideological writings. Prerequisite: 203 or equivalent. (Offered alternate years.)

ARAB 490 Supervised Study (1-6, max. 18) AWP
Special work in literary texts for graduates and undergraduates. Prerequisite: 203 or equivalent.

ARAB 499 Undergraduate Research (1-6, max. 18) AWP

ARAMAIC

ARAM 401 Biblical Aramaic (3) A Clear
Introduction to biblical Aramaic (Ezra, Daniel).

Selections from Targumim. Prerequisite: HEBR 203 or equivalent. (Offered alternate years.)

ARAM 411 Aramaic Epigraphy (3) Sp Clear
Readings in the Aramaic Inscriptions and the Elephantine Papyri. Prerequisite: HEBR 203 or equivalent. (Offered alternate years.)

HEBREW

HEBR 101-102, 103 Elementary Hebrew (5-5, 5) A,W,Sp Jacobi
Introduction to Hebrew, emphasizing elements of grammar and reading of various styles found in the Hebrew Bible, post-Biblical and modern works, with some oral practice.

HEBR 111-112, 113 Conversational Hebrew (5-5, 5) A,W,Sp
Introduces the student to the colloquial language used in Israel, with emphasis on the everyday conversation of the educated city dweller. Combined oral-aural and media approach.

HEBR 201, 202, 203 Intermediate Hebrew (5,5,5) A,W,Sp Jacobi
Selections from Biblical prose, Rabbinical texts, medieval and modern prose and poetry with some oral practice. Prerequisites: 103 for 201; 201 for 202; 202 for 203.

HEBR 401, 402, 403 Hebrew Prophecy (3,3,3) A,W,Sp Clear
Readings in the Hebrew prophets. Prerequisites: 203 or permission for 401; 401 for 402; 402 for 403. (Offered alternate years.)

HEBR 404, 405, 406 Hebrew Historiography (3,3,3) AWP Clear
Readings of classical Hebrew prose selected from the historical books of the Bible: Joshua, Judges, Samuel, Kings, Chronicles. Prerequisite: 203 or permission.

HEBR 411, 412, 413 Classical Hebrew Poetry (3,3,3) A,W,Sp Clear
Readings in classical Hebrew poetry: Psalms and Wisdom literature. Prerequisites: 203 or permission for 411; 411 for 412; 412 for 413. (Offered alternate years.)

HEBR 414, 415, 416 Pentateuch (3,3,3) A,W,Sp Clear
Readings in classical Hebrew selected from the books of the Pentateuch/Torah: Genesis, Exodus, Leviticus, Numbers, Deuteronomy. Prerequisite: 203 or permission.

HEBR 421 Advanced Post-Biblical Hebrew: Aggadic Narrative (3) A Jacobi
Advanced readings in the Hebrew medieval narrative, concentrating on the Aggadic 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 Jacobi
Advanced readings in the narrative of the Haskala, leading into the modern period. Oral practice is included. Prerequisite: 203 or equivalent.

HEBR 423 Advanced Post-Biblical Hebrew: Modern Narrative (3) Sp Jacobi
Advanced readings in modern Hebrew narrative, with emphasis on the short narratives of Chaim Nachman Bialik. Oral practice is included. Prerequisite: 203 or equivalent.

HEBR 428 Hebrew Literature of Spain (3) W Jacobi
Readings in classical Hebrew selected from the writings of Jewish scholars in Spain during the years 1000-1500, with emphasis on the background of the period and the literary philosophy of the

time. Selected readings from Jehudah Halevi and Ibn Gabirol are used along with secondary sources. Prerequisite: 203 or permission.

HEBR 429 Bialik's Sefer Aggadah (3) Sp

Jacobi
Readings in the *Sefer Aggadah*, a collection of the literary and legendary elements from the Talmud that has been translated from the original Aramaic into modern Hebrew by Chaim Nachman Bialik. Prerequisite: 203 or permission.

HEBR 431 Canaanite and Hebrew Inscriptions (3) Sp

Clear
Readings in the Canaanite (Phoenician) and Hebrew inscriptions in facsimile. Studies of the development of the Canaanite script and dialects. Prerequisite: 203 or equivalent. (Offered alternate years.)

HEBR 441, 442, 443 Septuagint Studies (3,3,3)

A,W,Sp
Clear
Textual studies in the Greek version of the Bible in comparison with the Hebrew. Prerequisites: ability to read Greek and Hebrew for 441; 441 for 442; 442 for 443. (Offered on demand.)

HEBR 451, 452, 453 Classical Hebrew Liturgy:

Siddr, Mahzor, Haggadah (3,3,3) A,W,Sp
Jacobi
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 Supervised Study (1-6, max. 18) AWSp
Special work in literary texts for graduates and undergraduates. Prerequisite: 203 or equivalent.

HEBR 499 Undergraduate Research (1-6, max. 18) AWSp

PERSIAN

PRSAN 101-102, 103 Elementary Persian (5-5, 5)

A,W,Sp
Loraine
Beginning course in pronunciation, conversation, grammar, and graded reading.

PRSAN 201, 202, 203 Intermediate Persian (5,5,5)

A,W,Sp
Loraine
Introduction to Persian literature, with continuing emphasis on grammar and syntax. Prosody taught, using the numerous short verses in various metres in the *Gulistan* as models. Prerequisites: 103 for 201; 201 for 202; 202 for 203.

PRSAN 401 Sa'di (3) A

Loraine
Selected readings from the *Gulistan*, *Bustan*, and *Diwan*, which represent a high point in classical Persian verse and prose and give great insight into Persian manners and ways of thought. Prerequisite: 203 or equivalent. (Offered alternate years.)

PRSAN 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.)

PRSAN 403 Firdausi (3) Sp

Loraine
Selected readings from the *Shahnama*. The course introduces the particular style and vocabulary of the epic and illustrates the legendary careers of certain well-known heroes. Prerequisite: 203 or equivalent. (Offered alternate years.)

PRSAN 411 Siyasat-nama (3) A

Loraine
The "Book of Government" of Nizam al-Mulk draws on the full range of traditional Persian wisdom and thus links itself to the *Qabusnama* and

the works of Sa'di. Prerequisite: 203 or equivalent. (Offered alternate years.)

PRSAN 412 Rumi (3) W

Loraine
Selected readings from the *Mathnawi* and poems from the *Diwan-i Shams-i Tabriz*. Students are introduced to Rumi's unique style of anecdote, illustration, and didactic. Prerequisite: 203 or equivalent. (Offered alternate years.)

PRSAN 413 Hafiz (3) Sp

Loraine
Selected poems from the *Diwan*. Prerequisite: 203 or equivalent. (Offered alternate years.)

PRSAN 490 Supervised Study (1-6, max. 18)

AWSp
Special work in literary texts for graduates and undergraduates. Prerequisite: 203 or equivalent.

PRSAN 499 Undergraduate Research (1-6, max. 18) AWSp

TURKISH

TKISH 101-102, 103 Elementary Turkish (5-5, 5)

A,W,Sp
Andrews
Introduction to modern Turkish. Pronunciation and conversation, grammar and composition, graded reading. Latin characters used throughout.

TKISH 201, 202, 203 Intermediate Turkish (5,5,5)

A,W,Sp
Andrews
Introduction to modern Turkish literature. Prerequisites: 103 for 201; 201 for 202; 202 for 203.

TKISH 400 Introduction to Ottoman Turkish (3)

A
Andrews
Introduction to Turkish in Arabic characters to cover the peculiar grammatical and syntactical problems of Ottoman. Prerequisite: 203, ARAB 103, or PRSAN 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 402 Early Ottoman Historians (3) W

Andrews
Readings in the early *Tevarih-i Al-i Osman*. Prerequisite: 400. (Offered alternate years.)

TKISH 403 Ottoman Travelers and Geography (3)

Sp
MacKay
Introduction to the geographic literature of Ottoman Turkish: readings from traditional cosmographies, travel journals, sailing instructions (portulans), ambassadorial and secret service reports, etc. Prerequisite: 400. (Offered alternate years.)

TKISH 411 Classical Ottoman Historians (3) A

Andrews
Readings in the high classical narrative histories of Kemal Pasazade, Hoca Sa'duddin and other sixteenth- and seventeenth-century historians. Prerequisite: 400. (Offered alternate years.)

TKISH 412 Ottoman Lyric Poetry (3) W

Andrews
Introduction to classical Ottoman poetry, including rhyme, meter, and rhetoric, through readings in Ottoman lyrics. Prerequisite: 400. (Offered alternate years.)

TKISH 413 Ottoman Epic and Narrative Poetry (3) Sp

Andrews
Readings in major Ottoman epic and narrative poetry. Prerequisite: 400. (Offered alternate years.)

TKISH 490 Supervised Study (1-6, max. 18)

AWSp
Andrews
Special work in literary texts for graduates and undergraduates. Prerequisite: 203 or equivalent.

TKISH 499 Undergraduate Research (1-6, max. 18) AWSp

UGARITIC

UGAR 401, 402, 403 Ugaritic Language and Literature (3,3,3) A,W,Sp

Clear
Readings in the Ugaritic texts from Ras Shamra, Epic, Mythological, and other texts. Prerequisite: intermediate knowledge of a cognate language (Akkadian, Arabic, Aramaic, Hebrew). (Offered every third year.)

NEAR EASTERN COURSES IN ENGLISH

NE 210 Introduction to Islamic Civilization and Culture (5) A

Ziadeh, Staff
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.

NE 220 Ancient Near Eastern Culture (5) W

Clear
Ancient Near Eastern civilizations, with emphasis on the culture and civilization of the Northwest Semites.

NE 230 Themes in Near Eastern Literature (5) Sp

Significant and interesting aspects of Near Eastern culture and society as represented by literary themes. Aspects of Near Eastern life and art such as women, minority groups, mysticism, and modern literature. Content varies by quarter.

NE 420 Islamic Religious Literature in English (3)

Heer
Readings in Islamic theology and mysticism.

NE 422 Islamic Philosophical and Scientific Literature in English (3)

Heer
Readings in philosophy, the physical sciences, and medicine.

NE 430 Classical Islamic Institutions in English (3)

Ziadeh
Readings concerning Islam's principal political, administrative, religious, and educational institutions.

NE 432 Islamic Literature on Jurisprudence and Law in English (3)

Ziadeh
The origins of the *shari'ah*, its development throughout the Islamic period, and the modern reform of this law.

NE 434 Islamic Literary Genres in English (5)

Andrews, Loraine, Ziadeh
Literary genres; literary theory; principal literary authors of Arabic, of Persian, and of Turkish and their works. From the beginnings to the modern period.

NE 450 The City of Cairo: History, Topography, and Monuments (3)

MacKay
Survey of the physical development and the economic and social organization of an Islamic city, as exemplified in the history of Cairo from the first establishment at Fustat to the present day. Consideration of the major styles of Islamic architecture, as represented in existing monuments of Cairo.

NE 451 City of Istanbul: History, Topography, and Monuments (3)

MacKay
Survey of the physical development and the economic and social organization of Istanbul from the first foundation at Byzantium to the present day. Consideration of principal monuments, both Byzantine and Islamic.

NE 490 Supervised Study (1-6, max. 18) AWSp
Special work in Near Eastern studies for graduates and undergraduates.

NE 499 Undergraduate Research (1-6, max. 18) AWSp

COLLEGE OF ARTS AND SCIENCES

Courses for Graduates Only

ARABIC

ARAB 471, 472, 473 Arabic as a Second Near Eastern Language (3,3,3) A,W,Sp

Heer, Zladeh

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 his or her major language. The major language instructor also participates in determining a grade for the course. Prerequisites: above elementary knowledge of one Near Eastern language (not Arabic), permission of major language instructor, and graduate standing.

ARAB 474 Arabic as a Second Near Eastern Language: Second Year (3, max. 9)

Heer, Zladeh

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.

ARAB 600 Independent Study or Research (*) AWSp

HEBREW

HEBR 471, 472, 473 Hebrew as a Second Near Eastern Language (3,3,3) A,W,Sp

Jacobi

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 ARAB 471, 472, and 473, and the prerequisites are analogous.

HEBR 474 Hebrew as a Second Near Eastern Language: Second Year (3, max. 9)

Jacobi

See ARAB 474 for course description. Prerequisites: above elementary knowledge of one Near Eastern language (not Hebrew), elementary knowledge of Hebrew, and graduate standing.

HEBR 600 Independent Study or Research (*) AWSp

NEAR EAST

N E 520 Seminar on Near Eastern Civilization and Thought (3, max. 27)

N E 530 Seminar on Near Eastern Literature (3, max. 27)

Prerequisite: reading knowledge of Arabic, Persian, or Turkish.

N E 600 Independent Study or Research (*) AWSp

N E 700 Master's Thesis (*) AWSp

PERSIAN

PRSAN 471, 472, 473 Persian as a Second Near Eastern Language (3,3,3) A,W,Sp

Loralne

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 ARAB 471, 472, and 473, and the prerequisites are analogous.

PRSAN 474 Persian as a Second Near Eastern Language: Second Year (3, max. 9)

Loralne

See ARAB 474 for course description. Prerequisites: above elementary knowledge of one Near Eastern language (not Persian), elementary knowledge of Persian, and graduate standing.

PRSAN 600 Independent Study or Research (*) AWSp

TURKISH

TKISH 471, 472, 473 Turkish as a Second Near Eastern Language (3,3,3) A,W,Sp

Andrews

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 ARAB 471, 472, and 473, and the prerequisites are analogous.

TKISH 474 Turkish as a Second Near Eastern Language: Second Year (3, max. 9)

Andrews

See ARAB 474 for course description. Prerequisites: above elementary knowledge of one Near Eastern language (not Turkish), elementary knowledge of Turkish, and graduate standing.

TKISH 600 Independent Study or Research (*) AWSp

OCEANOGRAPHY

Courses for Undergraduates

OCEAN 101 Survey of Oceanography (5) AWSpS
Origin and extent of the oceans; nature of the sea bottom; causes and effects of currents and tides; animal and plant life in the sea. Intended for non-majors.

OCEAN 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.

OCEAN 109H 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.

OCEAN 110, 111, 112 Lectures in Oceanography (1,1,1) A,W,Sp
Lectures intended for oceanography majors. Students who might major in oceanography can learn more about the field. May be entered any quarter.

OCEAN 180H Lower-Division Tutorial—Honors (6) S
Research with a departmental program. Prerequisites: College of Arts and Sciences Honors Program and permission.

OCEAN 201 Introduction to Field Oceanography (6)
Introduction to methods of oceanographic field study. Students work in the laboratory and at sea; they must be prepared to go on overnight field trips scheduled on weekends. Routine seagoing operations and basic 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 341, 342 Quantitative Methods in Oceanography I, II (3,3) A,W
Application of mathematical techniques and basic principles of physics, chemistry, geology, and biology to major oceanographic problem areas. 341: mathematical models of biological growth, processes in marine chemistry, wave phenomena. 342: applications of mechanics to marine geology and biology; diffusion and advection in the sea; underwater optics and marine life. Prerequisites: one year of physics and MATH 126 for 341; 341 for 342.

OCEAN 380H Upper-Division Tutorial—Honors (6) S
Research under faculty supervision. Prerequisites: junior standing in College of Arts and Sciences Honors Program and permission.

OCEAN 401, 402 General Physical Oceanography I, II (5,5) AW,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, MATH 126; 401 for 402.

OCEAN 405 General Geological Oceanography (6) ASp
Marine geophysics; 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 GEOL 205.

OCEAN 415 Fundamentals of Underwater Acoustics (3) A
Vibrating strings, bars, and membranes; plane and spherical acoustic waves; transmission and reflection at boundaries. Prerequisites: 402 or 418, MATH 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
Geographic and hydrodynamic aspects of oceanography. Topics: physical properties of seawater; observed distributions of properties and currents; budgets; kinematics; hydrostatics; momentum dynamics of ocean circulation; vorticity dynamics; viscosity; Ekman's studies; eddy fluxes; estuaries. Prerequisites: for 417: MATH 427, which may be taken concurrently, PHYS 223, CHEM 160, or permission; for 418: 417 and MATH 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. Tide 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 (3) Sp
Physical-chemical aspects of high-ionic-strength solutions as related to seawater, kinetics, thermodynamics, and heterogeneous equilibria are included. Prerequisites: 421 and CHEM 350, 351, or permission.

OCEAN 423, 424 Chemical Oceanography Laboratory (3,2) AWSp,W
Laboratory problems in the analytical and physical

chemistry of seawater and marine materials. Prerequisites: for 423: 421, CHEM 221; for 424: 422 and 423; 423 and 424 may be taken concurrently with 421 and 422, respectively.

OCEAN 433 General Biological Oceanography (5) Sp

Marine organisms, their quantitative distribution in time and space and their effect on the sea. Recommended for nonbiologists. Prerequisites: 203 or 401 or 417 and BIOL 101-102, or permission.

OCEAN 434 Biological Oceanography—

Phytoplankton (4) W

Ecological physiology of phytoplankton. Quantitative distribution in time and space of primary producers including benthic plants. Rates of processes. Methods of measurement. Prerequisites: 203, 401, or 417, and 20 credits in biological sciences, or permission.

OCEAN 435 Biological Oceanography—

Zooplankton and Nekton (3) Sp

Ecology of pelagic animals. Distribution in time and space of secondary production in the pelagic realm. Methods of measurement. Zoogeography in the pelagic realm. Prerequisite: 434 or permission.

OCEAN 440 Instrumentation in Oceanography (3-6) Sp

Introduction to the general principles of instrument design, including discussions of sensors, signal processing, telemetry, and recording from the point of view of the experimental scientist. Laboratory work, for variable credit, is offered in the form of projects, preferably practical ones resulting in the completion of a small hardware device.

OCEAN 443 Regional Oceanography (3) Sp

Applications of modern methods to the comprehensive description of selected areas of the 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: Q SCI 281 or permission.

OCEAN 450 Geological Oceanography (6) A

Fundamentals of the seismic reflection and refraction, magnetic, gravity and heat-flow methods are discussed together with marine applications. Data from these geophysical methods is then used in conjunction with petrological and other geological data to investigate (1) the composition, structure, and origin of the oceanic crust and upper mantle, and (2) tectonic processes acting in the earth. Prerequisites: major in geological oceanography or geology, MATH 126, 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

Basin (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 Biogenic Sediments I (3) A

Survey of pelagic organisms found as deep-sea microfossils with regard to their use as paleoecological indicators and their application to correlating radiometrically and paleomagnetically dated sediments. Prerequisite: either 101, 405 or GEOL 103 or 205 or 361, or permission.

OCEAN 455 Biogenic Sediments II (3) W

Detailed survey of geologically important siliceous and calcareous pelagic microfossil taxa with emphasis on their use in the solution of biostratigraphic problems in the history of marine sediments. Prerequisite: 454 or 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: CHEM 160.

OCEAN 460 Field Experience in Oceanography (1-6, max. 6)

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 480H Undergraduate Research—Honors

(6) S

Independent research. Prerequisites: 180H or 380H, and permission.

OCEAN 485 Topics in Oceanography (2)

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.

OCEAN 511, 512, 513 Marine Hydrodynamics I,

II, III (4,4,4) A,W,Sp

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 even-numbered years.)

OCEAN 516 Ocean Circulation (2) W

Hydrodynamic theories concerning origin and characteristics of major ocean currents. Prerequisite: 513. (Offered even-numbered years.)

OCEAN 517 Oceanography of Inshore Waters (5)

Sp

Theories and techniques of investigation and interpretation of conditions existing in inshore waters with particular reference to mixing and flushing and to areas adjacent to the state of Washington; use of dynamic models. Prerequisite: 512. (Offered odd-numbered years.)

OCEAN 518 Seminar on Dynamical

Oceanography (1, max. 9) AWSp

Selected problems of current importance concerning the dynamics of the ocean. Concentrates on those topics that are considered fundamental, of central importance to most of the areas of applications.

OCEAN 519 Interaction of the Sea and

Atmosphere (5) Sp

Interchange of heat, water, and energy; study of budgets and of mechanisms of exchange. Prerequisites: 418, ATM S 462. (Offered even-numbered years.)

OCEAN 520 Seminar (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. 18) 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: CHEM 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, CHEM 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 533 Zooplankton Ecology (3 or 9) S

Identification of plankton animals; evaluation of sampling methods; rate measurements on selected species; work on ecological problems. Prerequisite: permission. (Offered for 9 credits even-numbered years at Friday Harbor Laboratories.)

OCEAN 534 Phytoplankton Ecology (9) S

Contemporary problems in marine phytoplankton investigations. Evaluation of methods used in field and laboratory studies. Prerequisite: permission. (Offered even-numbered years at Friday Harbor Laboratories.)

COLLEGE OF 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 Geostatistics (1-3) AWSp
Lectures and discussions on selected problems in the applications of statistics in earth science. Prerequisite: Q SCI 383.

OCEAN 544 Statistical Models in Oceanography (3) W
Multivariate analysis: regression, trend surface analysis, factor analysis, discriminant functions, and stochastic process models in oceanography. Prerequisite: Q SCI 383 or permission.

OCEAN 548 Topics in Physical Oceanography (1-4, max. 9) AWSp
Lecture series on topics of major importance in physical oceanography.

OCEAN 550 Seminar on Geological Oceanography (*, max. 9) AWSp
Lectures, discussions, and field and laboratory work on selected problems of current interest. Prerequisite: 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)
Analytical techniques and instruments applicable to problems of marine geochemistry. Prerequisite: CHEM 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: CHEM 351 and permission.

OCEAN 556 Advanced Marine Geology (*, max. 9) AWSp
Contemporary problems in 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-wave 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: BIOL 472, FORTRAN, MATH 126, Q SCI 382, or permission.

OCEAN 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 GPHYS 571. Prerequisites: MATH 324, PHYS 323, or equivalents, or permission.

OCEAN 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 GPHYS 573. Prerequisite: permission.

OCEAN 600 Independent Study or Research (*) AWSpS

OCEAN 700 Master's Thesis (*) AWSpS

OCEAN 800 Doctoral Dissertation (*)

PHILOSOPHY

Courses for Undergraduates

PHIL 100 Introduction to Philosophy (5) AWSp
Introduction to major philosophical questions relating to such matters as ethics, the existence of God, the 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 110 Introduction to Social/Ethics (5) AWSp
Examination of such social ideals as liberty, distributive justice, democracy, peace, and human survival. Problems involved in achieving social change are also considered. The number and nature of the problems studied and the works read vary with the instructor.

PHIL 120 Introduction to Logic (5) AWSp
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)
Clatterbaugh
Study of the historical development of selected concepts from science and from the philosophy of science.

PHIL 200 Types of Philosophy (5)
Introductory philosophy. The content of the course is entirely at the discretion of the instructor.

PHIL 201 Practical Reasoning (5)
Thomas
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 206 Philosophy of Feminism (3) W
Philosophical assumptions underlying the feminist movement; the various subtheories within feminism (e.g., socialist feminism, radical feminism, etc.). Offered jointly with WOMEN 206. Not open to students who have taken GIS 106.

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 240 Introduction to Ethics (5)
Mish'alani, 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.

PHIL 250 Introduction to Epistemology (3)
Kirk, 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'alani
Study of Western religious thought. Examination of the problem of evil, of the nature of mysticism, atheism, and theism, and of the relationship between religion and morality.

PHIL 280 Introduction to Philosophical Studies (5, max. 10)
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
Survey of the history of ancient Greek philosophy, emphasizing the origin and development of problems and theories in metaphysics and epistemology. Philosophers discussed are some or all of the following: the pre-Socratics; Socrates, Plato, and Aristotle; the Stoics, Epicureans, and Skeptics; Plotinus.

PHIL 321 History of Medieval Philosophy (5)
Boler
Development of main lines of philosophical thought in the Latin West from 400 to 1400, with emphasis on Augustine, Anselm, Abelard, Aquinas, and Occam. Prerequisite: 320 or permission.

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, Small
Survey of the main problems in philosophical analysis from the English Realist reaction against Idealism to the present.

PHIL 330 History of Ancient Political Philosophy (4)
Key
Political philosophy of fourth- and fifth-century Greece, especially the Sophists, Plato, and Aristotle, and the connection between the political philosophy and the underlying philosophical system of each philosopher. Prerequisite: at least one course in philosophy.

PHIL 331 History of Medieval Political Philosophy (4)
Boler
Political philosophy in the Middle Ages, especially the major figures (Augustine, Aquinas, Occam), with special emphasis on the setting of their political thought in the context of their general philosophical positions. Prerequisite: at least one previous course in philosophy.

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)
Burke, Crocker
Study of the philosophy of Marx and the Marxist tradition with attention to the philosophical method and foundation of Marxism.

PHIL 338 Philosophy of Human Rights (2)
Examination of historical and contemporary arguments for and against the existence of human rights. Prerequisite: one course in philosophy or in society and justice, or junior standing.

PHIL 340 History of Ancient Ethics (3)
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)
Mish'alani
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)
Thomas
Introduction to the philosophy of mind. Various theories of the nature of mind, the relationship between mind and body, the self, memory, the unconscious, introspection, and knowledge of other minds. Prerequisite: one previous philosophy course.

PHIL 370 Intermediate Logic (5) A
Key, Kirk, Lucian
An advanced treatment of sentential logic. Proof theory, model theory, and their interrelations.

PHIL 372 Introduction to Set Theory (5)
Lucian
Historical development and basic concepts of set theory. Set theoretical paradoxes and their proposed solutions.

PHIL 410 Social Philosophy (3)
Examination of some of the philosophical issues that arise in considering such problems as peace, population, environmental degradation, rights, justice, and social change. The emphasis of the course varies from year to year.

PHIL 412 Indian Philosophy (3)
Potter
Historical survey of the major systems and the traditional problems of philosophy in India. Readings in Buddhism, Nyaya, Samkhya, and Vedanta. Prerequisite: 100 or 286 or permission.

PHIL 413 Studies in Indian Philosophy (3, max. 9)
Potter
Study of one or more individual figures or problems in Indian philosophy selected by the instructor. Prerequisite: 412.

PHIL 414 Philosophy of Law (3)
Nature and function of law. Relation of law to morality. Logic of legal concepts. Prerequisite: 110 or 240, or permission.

PHIL 415 Chinese Philosophy (5)
Development of Chinese philosophy from the sixth century B.C. to modern times. Emphasis on Confucianism, Mohism, Taoism, Legalism, the Dialecticians, Buddhism, and Neo-Confucianism; re-evaluation of them in the light of new trends of thought after contact with the West.

PHIL 416 Neo-Confucianism (5)
Systematic study of Neo-Confucianism, its background and development with emphasis on the Rationalistic school of Ch'eng-Chu and the Idealistic school of Lu-Wang. Prerequisite: 415 or permission.

PHIL 417 Indian Philosophy of Religion (3)
Thrasher
Arguments of Hindu, Jain, and naturalistic schools on topics important to religion: the existence of God; God's nature; God's relation to the world; creation; existence and immortality of the soul; transmigration; free will; grace; and moral responsibility. Comparisons with arguments found in Western philosophy. Readings in translation. At least one course in Indian philosophy or Hinduism or Buddhism recommended.

PHIL 418 Indian and Tibetan Buddhist Philosophy (3)
Ruegg
Topics from Buddhist thought, both Sravakayanist and Mahayanist, touching on the following areas: epistemology, theory of liberation, metaphysics and the theory of the Absolute, cosmology, and ethics. Readings in translation. At least one course in Indian philosophy or Hinduism or Buddhism recommended.

PHIL 421 Studies in Medieval Philosophy (3, max. 9)
Boler
Detailed study of an individual figure or problem in medieval philosophy (of the Latin West) selected by the instructor. Prerequisite: 321.

PHIL 422 Studies in Continental Rationalism (3, max. 9)
Clatterbaugh, Marks
Study of the philosophical system, or some part of the philosophical system, of one or more of the major continental Rationalists: Descartes, Spinoza, Leibniz. Prerequisite: 322 or permission.

PHIL 424 American Philosophy (3)
Boler, Potter
Study of several of the major American philosophers: Pierce, Royce, Dewey, Williams, James, C. I. Lewis, Goodman, Quine. Prerequisite: 322 or permission.

PHIL 431 Philosophy of Plato (3)
Cohen, Key
Reading of selected middle and late dialogues. Prerequisite: 320 or permission.

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)
Boler
Examination of the major philosophical positions of Thomas Aquinas in the theory of knowledge, metaphysics, and ethics. Prerequisite: 321 or permission.

PHIL 436 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, Richman
Study of the principles and methods employed by Hume in elaboration of his system of philosophy, comprising his analyses of knowledge, the passions, and morals. Prerequisite: 322 or permission.

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)
Coburn, Richman
Critical examination of the concepts and judgments of value, including an analytical treatment of the notions of good and bad, right and wrong, and obligation. Prerequisite: 240 or permission.

PHIL 443 Philosophy and Linguistics (3)
Lucian, 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 linguistics for philosophy. Offered jointly with LING 443. Prerequisite: permission.

PHIL 445 Philosophy of Art (5)
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)
Mish'alani
Investigation of philosophical questions about literature: What is literature? Why write? Must literature be interpreted? What is interpretation? Literature and ideology; criticism of literature and society.

PHIL 450 Epistemology (3)
Kirk, Marks, Richman
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: 250.

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 456 Metaphysics (3)
Coburn, Dietrichson
Examination of issues and problems that arise in

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connection with such topics as freedom of the will, the nature of persons and personal identity, the existence of God, and universals. The emphases of the course vary from year to year.

PHIL 458 Phenomenology (5)

Burke

The contribution of phenomenology to selected topics in the theory of meaning, philosophy of mind, ontology, and epistemology.

PHIL 460 Philosophy of Science (5)

Clatterbaugh, Crocker

Critical study of different theories about the nature of scientific theory. Topics include the relation of theory to observation, the use of mathematics, how theories change, the requirements for the meaningfulness of a theory, and the relation between theory and methodology.

PHIL 461, 462 Philosophy of Man and Culture I, II (3,3)

Mish'alani

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)

Thomas

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)

Marks

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 (3)

Analyses of basic concepts employed in historical interpretation, and some of the principal philosophers of history such as Plato, Saint Augustine, Hegel, Marx, Spengler, Toynbee.

PHIL 466 Philosophy of the Social Sciences (3)

Crocker

Examination of fundamental issues in the methodology and the interpretation of the social sciences. Particular emphasis on value orientation and objectivity, functionalism, reductionism, and the status of idealized models. Prerequisite: 120 or 260 or 460, or course beyond introductory level in a social science.

PHIL 467 Philosophy of Religion (5)

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

Key, Kirk

Advanced treatment of predicate logic. Proof theory, model theory, and their interrelations.

PHIL 472, 473, 474 Logical Theory I, II, III (3,3,3)

Kirk, Lucian

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) AWSp

Reading of approved philosophical works. The name of the staff member with whom research will be done must be indicated in registration. Prerequisite: permission.

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 in Legal Philosophy (3, max. 12)

PHIL 520 Seminar in Ancient Philosophy (3, max. 12)

Cohen, Key

PHIL 521 Seminar in Medieval Philosophy (3, max. 12)

Boler

PHIL 522 Seminar in Modern Philosophy (3, max. 12)

Clatterbaugh

PHIL 525 Seminar in Nineteenth-Century Philosophy (3, max. 12)

Burke

PHIL 526 Seminar in Recent Philosophy (3, max. 12)

Key, Marks

PHIL 540 Seminar in Ethics (3, max. 12)

Coburn, Key, Richman

PHIL 545 Seminar in the Philosophy of Art (3, max. 12)

PHIL 550 Seminar in Epistemology (3, max. 12)

Cohen, Crocker

PHIL 556 Seminar in Metaphysics (3, max. 12)

Coburn, Cohen

PHIL 560 Seminar in the Philosophy of Science (3, max. 12)

Kirk

PHIL 563 Seminar in the Philosophy of Mind (3, max. 12)

Thomas

Prerequisites: at least two courses related to philosophy of mind or permission.

PHIL 565 Seminar in the Philosophy of History (3, max. 12)

PHIL 567 Seminar in the Philosophy of Religion (3, max. 12)

Dietrichson

PHIL 570 Seminar in Logic (3, max. 12)

Kirk

PHIL 584 Reading in Philosophy (1-4, max. 12) AWSp

Intensive reading in philosophical literature. The name of the staff member with whom research will be done must be indicated in registration. Prerequisite: permission of the graduate adviser.

PHIL 586 Seminar 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 (*) AWSp

Prerequisite: permission of graduate adviser.

PHIL 700 Master's Thesis (*) AWSp

PHIL 800 Doctoral Dissertation (*) AWSp

PHYSICAL AND HEALTH EDUCATION

HEALTH EDUCATION

Courses for Undergraduates

H ED 250 Contemporary Health Concepts (3) AWSp

Investigation of contemporary health problems and the scientific concepts and the knowledge essential to the comprehension and the solution of these problems within society.

H ED 251 Introduction to Health Education (3) ASp

Examines the relationship between human behavior and health outcomes, the knowledge base for health education practice, and the historical context of the health education field. Prerequisite: 250 or permission.

H ED 321 Psychosocial Determinants of Health-Related Behavior (5) A

Study of psychosocial and cultural determinants of change in health-related behavior in the individual. Prerequisites: 251, PSYCH 101, or permission.

H ED 322 Planned Change in Health-Related Behavior (5) W

Study of planned determinants of change in health-related behavior of the individual, group, institution, and community. Prerequisite: 321.

H ED 421 The Group as a Medium of Change in Health-Related Behavior (4) AW

Study of groups as motivational forces and media for change in health-related behavior. Prerequisites: 321, 322.

H ED 422 Concepts of Intervention in Health Education (5) WSp

Examines the scientific and empirical basis of intervention in health education. Prerequisites: 321, 322, 421.

H ED 471 School Health Education (3) ASp

Health needs of the school-age child with emphasis on health-related behavior change through the school environment, health instruction, and health services in elementary and secondary schools. Prerequisite: 20 credits in health education core courses or permission.

H ED 472 Community Health Education (3) A

Study of community health services, health manpower, and consumer health needs and responses to health problems, with emphasis on the role of health education in community health promotion. Prerequisite: 20 credits in health education core courses or permission.

H ED 473 Patient Education in Health Care (3) A

Examines patterns of patient education in health-care systems, patient and health professional roles, and health education needs of patients and health-care consumers. Prerequisite: 20 credits in health education core courses or permission.

H ED 481 Human Sexuality and Education (3) ASp

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 490 Contemporary Perspectives in the

Study of Health-Related Behavior (3) W
Consideration of the ways in which inquiry in health-related behavior can be approached. Prereq-

quisites: 20 credits in health education core courses and biostatistics (e.g., BIOST 472).

H ED 498 Special Studies in Health Education (2-12, max. 16) AWSp
Prerequisite: permission.

H ED 499 Undergraduate Research (3-12, max. 15) AWSp
Prerequisite: permission.

Courses for Graduates Only

H ED 501 History of Health Education (3) A
Origins and impact of significant movements, events, and research that contributed to the development of modern health education in the world, including contemporary trends and predictions.

H ED 502 Correlates of Variability in Health-Related Behavior (4) W
Psychobiological and sociocultural correlates of patterns of variability in health-related behavior.

H ED 503 Seminar in Health Education (3, max. 9)
Prerequisite: permission.

H ED 505 Program Development and Evaluation (3) A
Emphasis on conceptual models, program determinants, organizational variability and reciprocal effects of evaluative techniques in health-related behavior change. Prerequisite: 502 or permission.

H ED 508 Administrative Relationships in the Health Education Program (3) Sp
Decision making, management theory, and interaction programs.

H ED 590 Research Analysis and Design (3) W
Review and analysis of research pertinent to health-related behavior and behavior change, with emphasis on research design, procedures, and interpretation. Prerequisites: 502, 505, and introductory course in statistics.

H ED 600 Independent Study or Research (*) AWSpS

H ED 700 Master's Thesis (*) AWSpS

PHYSICAL EDUCATION

Courses for Undergraduates

PE 201 Meaning and Modification of Movement (2)
Assessment and interpretation of personal movement skill and activity preference. Course designed for nonmajors.

PE 203 Tension Control and Stress Management (3) AWSp
Woods
Recognition and management of residual muscular tension through relaxation; theories, implications, techniques, laboratory, and discussion.

PE 204 Figure and Posture Control (2) ASp
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) AWSp
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: CONJ 317-318.

PE 216 SCUBA Diving (2) AWSpS
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 220 Creative Dance (2) W
Skinner
Understanding of fundamental rhythm concepts and their application in the development of technique and style in contemporary dance forms. Prerequisite: permission.

PE 221 Performance Laboratory—Racket Sports (2) AWSp
Development of personal skill in racket sports with special emphasis on badminton and tennis. Open to majors only.

PE 222 Performance Laboratory—Outdoor Team Sports (2) AWSp
Development of personal skill in selected outdoor team sports. Separate sections emphasize different combinations of sports according to season (soccer-field hockey; Lacrosse-team handball; softball-baseball). Open to majors only.

PE 223 Performance Laboratory—Indoor Team Sports (2) AWSp
Development of personal skill in basketball and volleyball. Open to majors only.

PE 224 Performance Laboratory—Individual Sports (2) AWSp
Development of personal skill in individual sports with emphasis on golf, bowling, and archery. Open to majors only.

PE 225 Survey of American Folk Dance (2)
Folk dance forms characteristic of the United States; traditional dances and emergence of modified forms; performance, analysis, and interpretation.

PE 226 Performance Laboratory—Combative Sports (2) AWSp
Development of personal skill in wrestling or judo. Open to majors only.

PE 227 Performance Laboratory—Track and Field (2) AWSp
Development of personal skill in track or field events. Open to majors only.

PE 228 Performance Laboratory—Gymnastics (2) AWSp
Development of personal skill in gymnastic events. Separate sections emphasize men's and women's events. Open to majors only.

PE 229 Performance Laboratory—Aquatics (2) AWSp
Development of personal skill in aquatics. Emphasis on swimming with introduction to water polo and springboard diving. Open to majors only.

PE 250 Introduction to Movement Analysis (4) AWSp
Lawson
Exemplary topics in the study of human movement, including behavioral, experiential, and interpretive perspectives.

PE 290 Officiating (2) ASp
Techniques of officiating for men: football, basketball, track and field, swimming, tennis, volleyball, softball, and speedball.

PE 292 First Aid and Emergency Care (3) AWSpS
Develops functional first-aid capabilities for people responsible for giving emergency care to the sick or injured. American Red Cross certification may be obtained.

PE 294 Life Saving (2) AWSp
Prerequisite: ability to swim 440 yards (American Red Cross certification possible).

PE 295 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 (4) AW
Processes of social influence and their relationship

to an individual's movement and sport performance. Socialization via sport and socialization into sport roles. Prerequisites: PSYCH 100 and SOC 110. (Last time offered: Winter Quarter 1977.)

PE 302 Movement Activities in Society and Culture (4) ASp
Ingham
Play, dance, games, and sports with reference to groups, roles, values, and interaction. Prerequisite: SOC 110. (Last time offered: Winter Quarter 1977.)

PE 304 Officiating (2, max. 4) AWSp
Techniques of officiating, opportunity for women's national and local ratings.

PE 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.

PE 311 Rhythmic Activities for Small Children (2) Sp
Skinner
Activities suited to the kindergarten and primary child. Educational value, significance in child growth and development, and methods of presentation.

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, utilizing time, space, force, and flow variables as elements of movement organization.

PE 316 Structure of Movement Activities for Children (3) Sp
Analysis of movement activities—early childhood to adolescence. Emphasis on variability and patterning in movement and perceptual skills, activity structure, and factors affecting performance. Prerequisites: 325 and 365.

PE 320 Conditioning and Physical Fitness (2) A
Doolittle
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) AWSp
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 330 Laboratory in Kineoenergetics (2) AW
Hutton
Laboratory experiments on selected problems concerning the physiological, kinesiological, and biomechanical basis of movement behavior. May be taken concurrently with 331 on an optional basis.

PE 331, 332 Human Kineoenergetics (5,5) AW, WSp
Doolittle, 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, ZOOL 118; 119 or 208, B STR 301; 331 for 332.

PE 336 Athletic Training and Conditioning (4) W
Athletic training techniques and procedures for the prevention and care of athletic injuries. Designed for the physical education major or students planning a coaching career. Prerequisites: 331, 332, and certification on first-aid, or permission.

PE 340 Administration of Intramural Sports (3) A

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PE 350 Learning and Movement Performance (5)

AWSp

Purdy

Interrelationships among perceptual mechanisms, individual characteristics and tasks, organizational and situational variables as related to the learning of movement skills. Prerequisite: PSYCH 100.

PE 359 Workshop in Gymnastics (1-3, max. 3) S

Hughes

Lectures, practice, and supervised teaching in gymnastics. Prerequisite: permission.

PE 365 Applied Movement Learning (4) AWSp

Fox

Relationships among goals, content, and process in the teaching of movement skills. Prerequisite: 350.

PE 366 Practicum (1-2, max. 4) AWSp

Hughes, Renick

Prerequisites: 365 and permission.

PE 368 Analysis of Movement Performance (3, max. 12) AWSp

Analysis of efficient and effective movement performance patterns within specific performance contexts.

PE 370 Coaching of Football (2) Sp

Prerequisite: permission.

PE 371 Coaching of Basketball (2) A

Prerequisite: permission.

PE 372 Coaching of Track and Field (2) W

Prerequisite: permission.

PE 373 Coaching of Baseball (2) Sp

Prerequisite: permission.

PE 410 Social Correlates of Movement Forms and Patterns (3) AWSp

Play, dance, games, and sports with reference to groups, roles, values, and interaction. Prerequisites: 250 and SOC 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 emphasis 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 Field Analysis of Motor Development (3)

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. Prerequisites: 332, 350 or permission.

PE 438 Developmental Motor Activities for the Exceptional Child (3) ASp

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) WSp

Problems of organization and conduct. Prerequisites: 365 and 460.

PE 455 Measurement and Evaluation in Physical

Education (4) AW

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)

AW

Lawson

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

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) SpS

Progress and problems in modern programs. Offered jointly with EDC&I 425. Prerequisites: 314, 316.

PE 480 Biomechanics (5) 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

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) WSp

Lawson

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, 498H Special Studies in Physical

Education (2-3, max. 6) AWSpS, AWSpS

Prerequisite: permission.

PE 499, 499H Undergraduate Research (2-3, max. 6)

AWSp, AWSp

Prerequisite: permission.

Courses for Graduates Only

PE 501 Seminar on Human Movement Studies (3, max. 9) AWSp

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)

ASp

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.

tors. 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 (2½) S

Lawson

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 (4) WSp

Renick

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 (4) W

Small

Studies in movement development, focused on analysis of physical growth, motor development, and interrelationships among modifying variables. Prerequisite: 325 or permission.

PE 540 Physiological Bases of Physical

Conditioning (3) A

Doolittle

Investigation of principles of overload, specificity and progression, together with the underlying physiological mechanisms as they relate to physical condition of the organism for movement stress. Prerequisite: 332 or permission.

PE 552 Neural Control Systems of Movement (5)

W

Hutton

Neuroanatomical and neurophysiological mechanism governing skeletal muscle and patterning of movement, including consideration of plasticity and modification of motor control systems. Prerequisite: 332 or permission.

PE 553 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, proprioception, and feedback). Prerequisites: 332, 552, ZOOL 118 or 208, or permission.

PE 562 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 580 Selected Topics in Biomechanics of

Human Movement (3, max. 9) Sp

Miller

Seminar-project course focusing upon a selected topic in the biomechanics of human movement such as models of the body, free-fall conditions in sport, locomotion, body segment parameters or take-off force-time characteristics. Emphasis placed upon retrieval, reading, and discussion of relevant research as well as individual projects and term assignments in conjunction with the topic under consideration and adapted to the student's special interests. Prerequisite: 480 or permission.

PE 590 Research in Human Movement (3) AW

Research procedures appropriate to the solution of human movement problems. Prerequisite: statistics or permission.

PE 591 Research Seminar (3, max. 9) AWSp

Problems and procedures in research unique to specific areas of specialization in human movement study and physical education. Content variable:

physical education programs, kineoenergetics, learning and movement performance, sociocultural correlates of movement, movement experience, and esthetics. No more than 3 credits in any one area. Prerequisites: 590 and permission.

PE 600 Independent Study or Research (*)
AWSps

PE 700 Master's Thesis (*) AWSps

PHYSICS

Courses for Undergraduates

PHYS 101-102, 103 Physics for Teachers (5-5, 5) A,W,Sp
Basic concepts of physics, with particular emphasis on background needed for confident use of the new science-curriculum materials in the schools. Serves general education objectives by simultaneously dealing with historical, philosophical, and humanistic aspects of science. Prerequisites: 101- for -102; -102 for 103.

PHYS 110, 111, 112 General Physics (5,5,5) A,W,Sp
Basic concepts of physics, their origin, and their impact on society and the Western intellectual tradition. Not recommended for students majoring in mathematics, the physical sciences, or engineering. Prerequisites: 110 for 111; 111 for 112.

PHYS 114, 115, 116 General Physics (4,4,4) AWSps, AWSps, AWSps
Concurrent registration in 117, 118, 119 recommended. 114: mechanics and sound. Prerequisites: some working knowledge of trigonometry, one year of high school physics or one quarter of any college-level physical science. 115: heat and electromagnetism. Prerequisite: 114. 116: light and modern physics. Prerequisite: 115.

PHYS 117, 118, 119 General Physics Laboratory (1,1,1) AWSps, AWSps, AWSps
117: mechanics and sound laboratory. Prerequisite: 114 (preferably concurrent). 118: heat and electromagnetism laboratory. Prerequisite: 115 (preferably concurrent). 119: light and modern physics laboratory. Prerequisite: 116 (preferably concurrent).

The courses 121, 122, 123, 131, 132, 133, 221, and 222 together make up the general physics sequence for science and engineering students.

PHYS 121 Mechanics (4) AWSps
Basic principles of mechanics. Prerequisites: one year of high school physics or permission, concurrent or previous MATH 124 or 134.

PHYS 122 Electromagnetism and Oscillatory Motion (4) AWSps
Basic principles of electromagnetism, the mechanics of oscillatory motion. Prerequisites: 121, concurrent or previous MATH 125 or 135.

PHYS 123 Waves (4) AWSps
Electromagnetic waves, optics, and waves in matter. Prerequisites: 122, concurrent or previous MATH 126 or 136.

PHYS 131, 132, 133 General Physics Laboratory (1,1,1) AWS, WSpS, ASps
Experimental topics in physics for science and engineering majors. Prerequisites: 121 (preferably concurrent) for 131; 122 (preferably concurrent) for 132; 123 (preferably concurrent) for 133.

PHYS 205 Concepts of Physical Science (3)
The nature, origin, and use of selected concepts of the physical sciences.

PHYS 207 The Physics of Music (3)
The nature of sound; vibrations; traveling and standing waves; response of the ear to sound; production of musical sounds.

PHYS 210, 211, 212 Intermediate Physics for Teachers and Students in Liberal Arts (5,5,5)
Individualized study of selected topics in basic physics with emphasis on depth of understanding

and development of skills essential to the scientific process. Useful as background for teaching physics at the elementary and middle school levels. Prerequisites: at least two quarters of physics at the 100 level; permission required for 210, 211, 212; 210 strongly recommended to be taken prior to 211.

PHYS 221 Quantum Physics (3) AWSp
Introduction to the physics of atoms, molecules, and nuclei; elementary quantum physics. Prerequisites: 123, concurrent or previous MATH 126 or 136.

PHYS 222 Statistical Physics (3) WSp
Heat, thermodynamics, and the statistical description of matter. Prerequisites: 221, which may be taken concurrently, and MATH 126 or 136.

PHYS 223 Elementary Mathematical Physics (3) Sp
Applications of mathematics to physics, particularly as illustrated by classical mechanics. Prerequisites: 123 and MATH 238.

PHYS 231, 232 Electric Circuits Laboratory (3,3) W,Sp
Basic linear elements in DC, AC, and transient circuits; solid-state and vacuum-tube devices; electrical measurements. Prerequisites: 123, MATH 126 or 136 for 231; 231 for 232.

PHYS 321, 322, 323 Electromagnetism (3,3,3) A,W,Sp
Charges at rest and in motion; dielectric and magnetic media; electromagnetic waves; relativity and electromagnetism; physical optics. Prerequisites: 123, MATH 328, which may be taken concurrently, for 321; 321 and basic computer programming ability for 322; 322 for 323.

PHYS 324, 325 Quantum Mechanics (3,3) A,W
Introduction to nonrelativistic quantum mechanics. Prerequisites: 221, MATH 327 for 324; 324 and basic computer programming ability for 325. MATH 205 or 302 recommended.

PHYS 327 Introduction to Nuclear Physics (3)
Nuclear structure including nuclear reactions, fission, particle accelerators, and nuclear instrumentation; applications of nuclear phenomena in atomic energy and astrophysics. Not open for credit to students who have completed 422. Prerequisite: 221 or permission.

PHYS 331 Optics Laboratory (3) Sp
Optical and spectroscopic measurements. Prerequisite: 323 (preferably concurrent).

PHYS 400 Physics for High School Teachers (10)
Fundamentals of physics and concepts of modern physics essential to the teaching of the PSSC and Project Physics courses. Emphasis on laboratory work and demonstration experiments. Aspects of history and philosophy of science. Primarily for NSF Institute participants. Prerequisite: permission.

PHYS 401, 402, 403; 401H, 402H, 403H Special Problems (*,*,*)
Supervised individual study. Prerequisite: permission.

PHYS 404 Physical Science for Junior High School Teachers (10)
Fundamentals of physical science essential to the teaching of the IPS and ISCS curricula. Emphasis on concept development through laboratory work. Primarily for NSF Institute participants. Prerequisite: permission.

PHYS 405-406 Physical Science for Elementary School Teachers (5-5)
Basic physical science providing background and perspectives needed for teaching the ESS, SAPA, and SCIS. Emphasis is on arithmetical reasoning and model development through laboratory work. Primarily for NSF Institute participants. Prerequisite: permission.

PHYS 407, 408, 409 Physics for Teachers (5,5,5)
Individualized study of selected topics in basic physics with emphasis on depth of understanding and development of skills essential to the scientific

process. Useful as background for teaching physics at secondary school and introductory college levels. Prerequisite: permission for 407, 408, 409; 407 strongly recommended to be taken prior to 408.

PHYS 410 Physical Science for In-service Teachers (1-2, max. 10)
A "hands-on" inquiry-oriented course designed to train in-service teachers in the use of the physical science content of any of several science programs that might be selected by a school or school district. Prerequisite: in-service teacher in cooperating school district or permission.

PHYS 411, 412, 413 Physical Science for Lead Teachers (1-4, max. 4; 1-4, max. 4; 1-4, max. 4)
For preservice and in-service teachers. Extends the physical science content covered in previous courses and helps prepare lead teachers to train their colleagues in the use of the physical science content of any of several science programs that might be selected by a school or school district. Prerequisite: 101-102 or 400 or 404 or 405-406.

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. Prerequisites: 323 and 325, or permission. 425, 426: mathematical techniques of particular use in physics, including partial differential equations. Prerequisites: 323 and 325, or permission for 425; 425 for 426.

PHYS 427 Applications of Physics (1-3, max. 12)
Current applications of physics to problems in the sciences and technology.

PHYS 428 Selected Topics in Physics (1-3, max. 12)

PHYS 431, 432, 433 Modern Physics Laboratory (3,3,3) A,W,Sp
431, 432: measurement in modern atomic, molecular, and solid-state physics. Prerequisite: 30 credits in physics or permission. 433: techniques in nuclear and elementary particle research. Prerequisite: 327 or 422, or permission.

PHYS 434 Application of Computers to Physical Measurement (3)
Laboratory giving specific instruction and experience in interfacing a minicomputer to laboratory equipment. Prerequisite: junior standing or permission.

PHYS 485H, 486H, 487H Senior Honors Seminar (1,1,1) A,W,Sp
Prerequisite: permission.

Courses for Graduates Only

PHYS 505, 506 Analytical Mechanics (3,3) A,W
Topics from mechanics and applications of mathematics to physics.

PHYS 513, 514, 515 Electromagnetism and Relativity (4,4,4) 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;

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solutions of the Schrodinger 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 Schrodinger equation.

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)
Introduction to current research topics for beginning graduate students.

PHYS 530 Physics Colloquium (*)
Prerequisite: permission.

PHYS 531 Seminar on High Energy Physics (*)
Prerequisite: permission.

PHYS 532 Seminar on Atomic Collisions and Spectroscopy (*)
Prerequisite: permission.

PHYS 533 Seminar on Relativistic Astrophysics (*)
Prerequisite: permission.

PHYS 534 Seminar on Magnetic Resonance and Solid-State Physics (*)
Prerequisite: permission.

PHYS 535 Seminar on Nuclear Physics (*)
Prerequisite: permission.

PHYS 536 Seminar on Low Temperature and Solid-State Physics (*)
Prerequisite: permission.

PHYS 537 Seminar on Theoretical Physics (*)
Prerequisite: permission.

PHYS 538 Seminar on Cosmic Ray Physics (*)
Prerequisite: permission.

PHYS 539 Seminar on Problems of Physics Education (*)
Prerequisite: permission.

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.

PHYS 552 Introduction to Cosmic Ray Physics (3)
The nature and cosmological significance of cosmic ray photons and particles. The motion and confinement of particles in the geophysical, interplanetary, and interstellar medium. Theories of the processes involved in the high-energy interaction of cosmic rays, including shower theory. Methods of measurement and current problems. Prerequisite: introductory quantum mechanics.

PHYS 557, 558, 559 High Energy Physics (3,3,3)
High-energy kinematics; phenomenology of high-energy collisions. Second quarter is devoted to strong interactions, and the third quarter discusses weak interactions. Experimental results are emphasized. Prerequisite: 519.

PHYS 560, 561, 562 Theoretical Nuclear Physics (3,3,3)
Nuclear structure, scattering, reactions, and decays in terms of elementary properties of nucleons and current theoretical models. Prerequisite: 519.

PHYS 564, 565 General Relativity (3,3)
General covariance and tensor analysis, the relativistic theory of gravitation as given by Einstein's field equations, experimental tests and their significance, and applications of general relativity, particularly in the areas of astrophysics and cosmology. Prerequisite: 515.

PHYS 566 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 567, 568, 569 Theory of Solids (3,3,3) A,W,S
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 chairperson.

POLITICAL SCIENCE

Courses for Undergraduates

GENERAL

POL S 101 Introduction to Politics (5) AWSp
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.

POL S 201 Introduction to Political Theory (5) AWSp
Philosophical bases of politics and political activity. Theoretical foundations of political analysis.

POL S 202 Introduction to American Politics (5) AWSp
Analysis and evaluation of the values, the institutions, the processes, and the policies of the American political system in the context of contemporary problems. (Formerly 102.)

POL S 203 Introduction to International Relations (5) AWSp
Analysis of the world community, its politics, and government.

POL S 204 Introduction to Comparative Politics (5) AWSp
Analysis of political systems in a comparative framework. Traditional and contemporary approaches to the study of governments and societies in different countries.

POL S 205 Preparatory Seminar in Political Science (5, max. 10) AWSp
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) AWSp
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 activity; urban services and urban politics; the effect of national politics and policies on urban minorities.

POL S 211 The Future of American Minorities (5) AWSp
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) AWSp
Intensive and advanced studies in various aspects of political science. Open only to participants in the departmental Honors program.

POL S 405 Seminar in Politics (5, max. 10)
Intensive reading and research in selected problems or fields of political analysis. Prerequisite: permission.

POL S 483 Environmental Politics and Policy (5) A Lee
Survey of the politics of environmental problem recognition, policy formulation, and implementation. Offered jointly with ENV S 432. Prerequisites: 101 or 102, ENV S 101, or permission.

POL S 499 Individual Conference and Research (2-5, max. 10) AWSp
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) AWSp
Chandler, 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) AWSp
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, socialism, libertarianism, etc.) are discussed. The relationship of radical to "ordinary" politics is explored, as is the more general implication for American society of the radical challenge. Prerequisite: an introductory course in political science.

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 back-

ground in history is desirable. Prerequisite: 101, or permission.

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 1977-1978.)

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 governing, 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 phenomenon. Emphasis on theory construction, with application in the American context. Offered jointly with ECON 452. Prerequisites: ECON 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
Gottfried
Agrarian, labor, professional, business, and ethnic interest in politics; impact on representative institutions and governmental processes. Prerequisite: 101 or permission.

POL S 351: The American Democracy (5) ASp
Bone, Gottfried
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 355: The American Presidency (5)
Rosenberg
The American presidency: its evolution, its occupants, and its place within the American system. Topics include presidential character, war, elections, Watergate, the economy, and the Constitution.

POL S 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, labor, 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. 101 or 202 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 202 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 with the legislature should enroll in the political internship or general studies special projects course. 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 administrative 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 346, 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 nations and adapting to change in established states; bureaucratic development 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 URB P 460. 101 or 202 recommended.

POL S 481: Introduction to Large City Government and Politics (5)
Introduction to contemporary large-city politics. Social, economic, and political trends that have shaped characteristics of large American cities. Distribution and use of economic and political power at national and local levels. Future of large cities and politics of change. 101 or 202 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. Prerequisite: one course in state and local government or permission.

POL S 485: Problems in Urban Political Analysis (5, max. 10) Sp
Meranto
Advanced undergraduate course in urban politics. Opportunity for more independent and intensive analysis of particular problems or lines of inquiry. Prerequisites: 101 or 202 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
Examination of concepts, techniques, and results of research on political behavior.

POL S 491: Political Behavior Methodology (5) W
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 492: Political Rhetoric (5) Sp
Bennett
Ways in which language is used to define political reality and to shape political outcomes. Lectures, readings, and laboratory experiences help students develop analytic frameworks with which to understand the techniques of political persuasion and the power of language in politics.

POL S 495: Psychiatry, Psychology, and Politics (5)
Survey of the contributions of psychiatry, psychoanalysis, and psychology to the understanding and analysis of politics. Background for further work in political psychology and social psychodynamic studies of politics.

POL S 497: Political Internship in State Government (15) AWSp
Restricted to students serving in approved internship programs with state government agencies.

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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 procedures.

POL S 323 International Relations of the Western Hemisphere (5) W
The Monroe Doctrine; Pan-Americanism; special interests in the Caribbean; hemisphere solidarity; the "Good Neighbor" policy; Latin America and World War II; Latin America and the United Nations.

POL S 324 Contemporary International Relations in Europe (5) Sp
Hitchner
European diplomacy and international relations between the two world wars; problems of European integration; contemporary developments.

POL S 328 The United Nations and Specialized Agencies (5) A
The structure and functions of the United Nations and specialized agencies; accomplishments; proposals for strengthening; relations of regional bodies and member states.

POL S 330 Comparative Analysis: Western Europe (5) W
Warwick
Contemporary Sweden and France, plus occasional studies relating to politics and government in other parts of Western Europe, serve as the basis for an introduction to theoretical issues and practical problems involved in comparative political analysis. Prerequisite: 101 or 204; at least 15 credits in social science recommended.

POL S 341 Government and Politics of Canada (5) A
Critical analysis of parliamentary institutions, political parties, and the federal system in Canada. Prerequisite: 101.

POL S 342 Government and Politics of Latin America (5) A
Analysis of the political dynamics of change in Latin America comparing various national approaches to the political problems of modernization, economic development, and social change. Prerequisite: upper-division standing.

POL S 343 Government and Politics of Southeast Asia (5) A
Lev
Analysis of the organization and functioning of government and politics in the countries of Southeast Asia, with attention given to the nature of the social and economic environments that condition them. 101 recommended.

POL S 346 Governments of Western Europe (5) A
Hitchner
Modern government and politics of Great Britain, France, and Germany.

POL S 347 Governments of Eastern Europe (5) W
Paul
Survey of the communist regimes of Poland, Hungary, Czechoslovakia, East Germany, and the Balkans.

POL S 348 The European Community (5) W
Rohn
The movement toward a political union of European states; national, international, and supranational elements in the law and politics of the community.

POL S 349 Socialism and the Intellectual (4) A
Paul
Political and social life in contemporary Eastern Europe as interpreted through films and novels of the "New Wave" artists. Primary focus is on social criticism with topics including bureaucracy, the role of the intellectual, and ideal versus reality in socialist society. Offered jointly with REEU 360.

POL S 408 Problems of Peace and Conflict Resolution (3) W
Study of factors 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 ECON 408. Prerequisite: permission.

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 422 Comparative Socialisms (5) A
Examines variations in the Marxian legacy arising from the attempt to relate socialism to the problems of diverse socioeconomic-political systems. Problems of nonproletarian socialisms. Reaction of socialism to ascriptive movements. Productionist contrasted with distributional socialisms. Socialist theories of the state.

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
Breakdown of traditional society and the problems of building modern political systems.

POL S 432 American Foreign Policy in the Far East (5) W
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.

POL S 439 Government and Politics of Sub-Saharan Africa (5) 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 functions; 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
Cassinelli
Analyses 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
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 Language and Politics I, II (3,3) A,W
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 Wittgen-

stein. 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. Prerequisite: 500 for 501.

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 and Phenomenological Philosophy 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 decisional 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 World Politics (3) W
Modelski
Principles of world politics and problems of world order; war and systemic conflict. Prerequisites: 426 and permission.

POL S 523 Seminar on World Elites (3) Sp
Basic concepts of elite studies. Elitism. Local, national, and global elites. The representativeness, cohesion, and performance of elites. Methods in the study of elites.

POL S 524 World Organizations (3, max. 9) 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 international law. International judicial behavior. Prerequisite: 425 or permission.

POL S 529 Problems of American Foreign Policy (3)
Critical analysis of the historical foundations and contemporary problems of foreign-policy making, with attention given to selected foreign-policy decisions. Prerequisite: 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: 532 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 politics 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 PB PL 534.

POL S 535 International Relations of Modern China (3-5) Sp
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 536 Ethnic Politics and Nationality Formation (3) A
Brass
Seminar concerned with the analysis and theoretical understanding of two interrelated processes: ethnic group persistence and change over time; and the transformation of ethnic groups into politically self-conscious and influential nationalities. The readings and discussions deal with these two processes in the contexts both of developing societies and of advanced industrial societies.

POL S 537 Approaches to East European Politics (3-5) W
Paul
Selected concepts and methodologies useful for the analysis of politics and social structure in the so-

cialist countries of East-Central and Southeastern Europe. Offered jointly with REEU 504. Prerequisite: permission. (Offered alternate years; offered 1975-76.)

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 Politics 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 Problems in South Asian Politics (3) Sp
Brass
Research problems in contemporary Indian politics.

POL S 541 The Soviet Political System (4) A
Reshetar
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
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
Hellmann

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, Gottfried
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
Selected problems in legislative processes and lead-

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ership, state and national. Prerequisite: 451 or equivalent.

POL S 556 Seminar: Questions of Comparative Political Analysis—Africa (3) Sp
Examines political organization in precolonial, colonial, and independent Africa in light of several different theories of political development; questions the utility of these theories and concepts for the study of African politics and develops alternate strategies of meaningful political comparisons.

POL S 562, 563, 564 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 Public Policy and Administration (3) A
Kroll, Miller
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 PB AD 501.

POL S 571 The Administrator and the Policy Process (3) W
Kroll, Miller
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 PB AD 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 relation of leadership to its constituencies and communities. Offered jointly with PB AD 503.

POL S 579 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 PB AD 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 587 Politics of Urban Reform (3) W
Olson
Interpretations of urban reformers at the turn of this century and during the 1960s and 1970s. Examines historical and political science literature on the subject. Prerequisites: graduate student and permission.

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) distributive 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)
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) AWSpS,W or S
L. Beach, Keating, 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 materials; a term paper is required. Not open for credit to students who have taken 100. Prerequisite for 101H: permission of College of Arts and Sciences Honors Program adviser.

PSYCH 102, 102H Psychology as a Natural Science (5) AWSpS,W or Sp
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 Program 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) ASp
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 BIOL 210 recommended.

PSYCH 205 Introduction to Personality and Individual Differences (4) AWSpS
Marlatt, R. Smith
Basic concepts and methods and background 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
Survey of the current literature concerning the development of human sexual behavior. Discussion of physiological and psychological components of human sexuality and its deviations.

PSYCH 213 Introduction to the Logic of Behavioral Science Experimentation (6) AWSpS
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: MATH 101. (Statistics requirement for majors registered in the psychology Bachelor of Arts program.)

PSYCH 217 Introduction to Probability and Statistics for Psychology (4) AWSpS
Curtis, E. Loftus, G. Loftus, M. Smith
Probability theory as a model for scientific inference. Probabilistic variables and experimental outcomes, conditional probability, binomial and related distributions, experiments as samples, statistics and sampling distributions, the normal distribution, problems of estimation from experiments. Prerequisites, MATH 157 or 124, 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 either Honors or distinction programs. Prerequisite: permission of departmental Honors adviser.

PSYCH 218 Statistical Inference in Psychological Research (4) AWSpS
Curtis, 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.

PSYCH 222 Survey of Physiological Psychology (3) AWSp
Douglas, Simpson
Introduction to the brain and how it works. Detailed examination of learning, memory, sleep, the senses, and the emotions. Intended primarily for students who do not intend to specialize in physiological psychology. Prerequisite: major standing in a biological science or either 100 or 101 or 102.

PSYCH 231, 231H Laboratory in Human Performance (5) AWSpS,W or Sp
Donaldson, 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 adviser.

PSYCH 232, 232H Laboratory in Animal Learning (5) AWSpS,W or Sp
Makous, Rose
Lectures and laboratory on selected aspects of animal learning. Operant techniques with the rat are stressed. Prerequisites: 100 or 101 or 102; for 232H, permission of College of Arts and Sciences Honors Program adviser.

PSYCH 233, 233H Laboratory in Animal Behavior (5) AWSpS,W or Sp
Barash
Experience with a variety of animal species and a variety of experimental procedures and instrumen-

tation. Prerequisites: 100 or 101 or 102 and 200 or BIOL 212, or equivalents; for 233H, permission of College of Arts and Sciences Honors Program adviser.

PSYCH 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, American Indian, and Asian groups.

PSYCH 257 Psychology of Sex Differences (3)

Major psychological theories of sex-role development in young children; biological and socialization influences that affect sex differences during adolescence; adult sex-roles, their maintenance, conflict, and new resolutions. Offered jointly with WOMEN 257. Not open for credit to students who have taken GIS 244.

PSYCH 260 Psychological Aspects of Poverty and Affluence (3) Sp

Lumsdaine
Experience of poverty in various United States and world situations; psychological as well as socioeconomic causes of poverty; attitudes and motives of both the poor and the more affluent whose views influence help given and obstacles to improving the lot of the poor; psychological and socioeconomic factors in world hunger and poverty in developing nations. 101 or 345 recommended.

PSYCH 305 Deviant Personality (5) AWSpS

Kohlenberg, Sue
Introduction to the field of psychopathology; analysis of forms, nature, and causes of disorders of behavior and personality. Prerequisite: 10 credits in psychology, including 100 or 101 or 102, or equivalent.

PSYCH 306 Developmental Psychology (5) AWSpS

H. Robinson, Slaby, W. Smith
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.

PSYCH 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 preschool. Prerequisite: 306 or equivalent.

PSYCH 345 Social Psychology (5) AWSpS

Curtis, Feldman-Summers, 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.

PSYCH 350H Research Seminar in Psychology (2, max. 6) AWSpS

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.

PSYCH 355 Survey of Cognitive Psychology (5) AW

L. Beach, Gentner, E. Loftus
Survey of current theory and research in such areas as perception, attention, memory and learning, attitudes, thinking and decision making, and language. For both the student who wishes a survey and the student who intends additional work in any of the above content areas. Prerequisite: 10 credits in psychology, including an introductory course.

PSYCH 357 Psychobiology of Women (3)

Cultural assumptions about, and interaction be-

tween, mind and body and some of the physiological mechanisms that mediate the interaction. Topics include reproductive physiology, psychosocial development, hormones and mental states, developmental sex differences, cultural perspective, ethological arguments, female sexuality, and the effects of the social system and sex roles on women's health care. Offered jointly with WOMEN 357. Not open for credit to students who have taken GIS 357.

PSYCH 361 Laboratory in Social Psychology (5) ASp

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) AW

Bolles, Donaldson
Experimental research and basic theories primarily in animal learning. Prerequisite: 100 or 101 or 102.

PSYCH 403 Motivation (5) AW

Bolles, M. Smith
Theory and research on reinforcement, punishment, frustration, preference, instinctual mechanisms, and other factors controlling animal behavior. Prerequisite: 100 or 101 or 102.

PSYCH 405 Advanced Personality: Theory and Research (5) WSp

Becker, Marlatt
Intensive survey of theoretical concepts and detailed review of experimental methods and experiments in the field of personality. Prerequisite: 205 or equivalent.

PSYCH 406 Instrumentation for Behavioral Scientists (5) W

Pagano
Intensive laboratory course designed to provide basic and advanced training in complex electronic instrumentation in current use by behavioral scientists. Emphasis on psychophysiological recording and biofeedback (skin resistance, finger temperature, EMG, heart rate, etc.) employing research-caliber equipment. Covers basic electricity, test instruments (oscilloscope and digital multimeter), power supplies, amplifiers, digital logic (TTL), and psychophysiological recording. Registration limited to twelve students. Prerequisites: senior standing, high school physics, and permission.

PSYCH 407 History of Psychology (5) W

Bolles
Historical and theoretical background of the basic assumptions of modern psychology, including such doctrines as behaviorism, determinism, and associationism and the men who developed them. Prerequisite: 400 or equivalent.

PSYCH 409 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 ZOOL 409. Prerequisites: 200 or BIOL 210 and 212, or equivalents.

PSYCH 410 Deviant Development (5) ASp

Johnson, 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.

PSYCH 414 Cognitive Development (5) WSp

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 415 Socialization of the Child (5) AW

Slaby, W. Smith
Socialization theory and research relevant to infant

social relationships; development of aggressive and altruistic behaviors; sex-role development; moral development; parent and adult influences; peer influences; media influences; social class and cultural influences. Prerequisite: 306.

PSYCH 416 Animal Behavior (5) 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 ZOOL 409.

PSYCH 418 Primate Social Behavior (5) Sp

J. Lockard
Examination of the social structures and behaviors of New and Old World primates. Prerequisite: 200 or 409 or 416, or ZOOL 409, or equivalents. (Offered alternate years; offered 1977-78.)

PSYCH 419 Behavioral Studies of Zoo Animals (3, max. 6) AWSpS

Barash, J. Lockard, R. Lockard, C. Wilson
Observational studies of social, reproductive, and parental care of zoo animals, many of which are endangered or exotic. Designed to expand basic knowledge of animal behavior and to provide practicum in captive animal maintenance and perpetuation. Provides live-animal educational facilities for undergraduates and training opportunity for biologically oriented graduate students. Offered in cooperation with Woodland Park Zoo for one or two quarters. Prerequisites: 200 or 233, and permission.

PSYCH 421 Neural Basis of Behavior (5) ASp

Simpson
Anatomical and physiological principles involved in the integrative action of the nervous system and the results in behavior of this neural activity. Prerequisites: 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. Prerequisite: 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, light and dark adaptation, distance perception, and binocular interaction. Techniques for the study of vision in human subjects emphasis on correlation of human visual functioning with known optical, biochemical, anatomical, and physiological factors. Offered jointly with P BIO 424. Prerequisite: permission; some background in a physical or biological science is recommended.

PSYCH 425 Surgical and Histological Techniques (5) Sp

Woods
Practicum in basic and advanced surgical and histological techniques used in psychophysiological experimentation. Registration limited to ten students. Prerequisites: 421 and permission. (Offered alternate years; offered 1976-77.)

PSYCH 427 Behavioral Endocrinology (5) W

Woods
Comprehensive survey of the endocrine system and

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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 429 Human Brain-Behavior Relationships I: Introduction (3)

Relian
Review of the structure and function of the human nervous system, especially as related to human abilities of speech, judgment, visuospatial functioning, and emotional control. Review and illustration of specific methods for testing human brain functions. Prerequisite: senior or graduate major standing; some background in biology or physiological psychology desirable.

PSYCH 430 Problems of Assessment in Psychology (3) A

Sax
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 and/or design of some classical vision experiments and completion of original vision experiments. Limited to ten students. Prerequisites: 424 and permission. (Offered alternate years; offered 1976-77.)

PSYCH 439 Group Dynamics (3) W

Fiedler
Theory, empirical research, and methodology in group dynamics. Topics include conformity, social power, leadership, and communication nets. Prerequisite: 345 or equivalent.

PSYCH 440 Environmental Psychology (3) W

Keating
Survey of research and methods of environmental psychology, with special emphasis on developing research strategies to study psychological implications of environmental issues. Prerequisites: 101 or 102, and 345, or equivalent.

PSYCH 441 Perceptual Processes (5) AWSp

Culbert
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 mediational feedback. Prerequisite: 15 credits in psychology.

PSYCH 442 Measurement and Design in Attitude Research (5)

Lumsdaine
Major problems of research design and measurement in studies of attitude formation and change, design of procedures for laboratory and field experiments employing both traditional and more recent approaches to measurement of attitudes, beliefs, etc. Students are required to undertake an attitude-measurement or attitude-change project. Prerequisites: 213 or 218, and 345, or equivalents.

PSYCH 443 Social Psychology of Prejudice (3)

Steele
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.

PSYCH 444 Attitude Change and Social Influence (3) A

Lumsdaine
Processes of attitude change with emphasis placed on message variables in persuasive communication, and results of experiments to measure short-term and longer-term effects on opinion, belief, attitudes, and associated behavior, including effects of both rational and nonrational factors. Objectives include developing skills in interpreting, criticizing, and applying the results of experimental and other studies of attitude change. Prerequisite: 345; 213 or equivalent strongly recommended.

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) A

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) AWSpS

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 1977-78.)

PSYCH 450H Research Seminar in Psychology (2, max. 6) AWSp

Presentations by professors and advanced Honors students concerning the rationale, methods, and progress of their research projects. Required quarterly by all senior Honors and distinction candidates in conjunction with 498 and 499. Meets jointly with 350H. Prerequisites: 231H and 232H or 233H, or equivalents, and permission of departmental Honors adviser.

PSYCH 457 Language Development (3) ASp

Dale, Gentner
First-language acquisition and use by children. Emphasis on theoretical issues and research techniques. Offered jointly with LING 447. Prerequisites: 306 or LING 400, and senior or graduate standing.

PSYCH 461 Human Learning (5)

Donaldson
Discussion of selected topics in the recent theoretical and experimental literature on human learning.

PSYCH 462 Human Memory (5)

Discussion of selected topics in the recent theoretical and experimental literature on human memory.

PSYCH 463 The Pathology of Human Memory (5) Sp

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 impairment 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) W

Hunt
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.

PSYCH 475 Computing in Behavioral Sciences (5) Sp

Hunt, G. Loftus
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 1976-77.)

PSYCH 488 Sociological and Psychological Theories of Sexuality (5) Sp

Blumstein, Schwartz, Wagner
Advanced course on human sexuality covering psychological and sociological theories of sexual identity and life-styles, analysis of present research in sexuality, and generation of new research. Topics include acquisition of sexual identity differences in male and female sexual patterns, sex in relationships, sexual malfunctioning, etc. Paper and research proposal are required. Offered jointly with SOC 488. Prerequisites: 210 or permission, SOC 110, and statistics.

PSYCH 489 Clinical Psychology (3) AWSp

Johnson, R. Smith, 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) AWSpS

P. Lunneborg
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) AWSpS

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) AWSpS

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 departmental 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 (4) A

Fiedler
Problems in person perception; attitude; socializa-

tion; 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 literature 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

Gentner

Cognitive, as opposed to social and personality, 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

Slaby

Survey of theories and empirical literature in the area 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 Advanced Attitude Change Theory (3)

Review of theoretical and experimental work dealing with major concepts and hypotheses about factors influencing attitude and associated behavioral change. Theories are critically evaluated in the light of current research. Prerequisites: 503 or 444, and 508 or 442, or equivalents.

PSYCH 511 Experimental Approaches to Personality (3) Sp

Sarason

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 513 Introduction to Measurement (3) A

Hunt, G. Loftus

Introduction to basic concepts of measurement and probability as applied to the design of psychological experiments. Statistical tests appropriate for simple experimental designs using ordinal, nominal, or interval data. Required of all first-year graduate students in psychology; may be challenged by examination at the beginning of each academic year. Prerequisite: graduate standing or permission.

PSYCH 514-515 Experimental Design (3-3) W,Sp

Edwards

Design of experiments and analysis of experimental data in the behavioral sciences. 514 required of all first-year graduate majors. Prerequisites for 514: elementary statistics and 513, or permission; 514 for 515.

PSYCH 516 Psychometric Techniques (3)

C. Lunneborg

Topics in regression analysis, measurement reliability and validity, and development of models for prediction, selection, and classification.

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. Prerequisites: 515 or equivalent. (Offered alternate years; offered 1976-77.)

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 MATH 391, or permission. (Offered alternate years; offered 1977-78.)

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 standing.

PSYCH 520 Teaching Practicum in Psychology (3)

Discussion of models of excellent teaching in psychology utilizing videotape to allow 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.

PSYCH 523 Cognition (4) Sp

Hunt

Problem solving, concept learning, individual differences in cognition, attention, and pattern recognition. Also, brief discussions of computer simulation and mathematical models of cognitive phenomena. Prerequisites: graduate standing and completion of departmental mathematical and statistical requirement through 514. (Offered alternate years.)

PSYCH 524 Cognitive Approaches to Human Memory (3)

Nelson

Survey of cognitive approaches to human memory. Examination of theories and behavioral data base of the following areas: perceptual memory; short-term memory; acquisition, organization, and retention of information in long-term memory; relation between reinforcement and memory. Prerequisite: 462 or equivalent. (Offered alternate years; offered 1977-78.)

PSYCH 525 Assessment of Intelligence (5) Sp

Perry

The nature of intelligence, issues in the assessment of intelligence, and test construction and evaluation of adequacy of tests. Training in administration, scoring, and interpretation of individual intelligence tests. Required of all clinical and child-clinical psychology graduate majors. Prerequisite: graduate major standing in clinical or child-clinical psychology, or minor standing in child-clinical psychology.

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

Beach

Literature on predecisional diagnosis of environmental states relevant to subsequent decisions; various models for decisions and relevant evidence for decisions. Open to undergraduates with permission. Prerequisite: 218 or equivalent.

PSYCH 532 Factor Analysis and Multivariate Measurement (5)

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; 1977-78.)

PSYCH 535 Human Brain-Behavior Relationships II: Research Findings (3) W

Reitan

Review of significant contributions to knowledge of brain functions as related to higher-level psychological manifestations. Survey of knowledge related to significant content areas as well as the approaches and contributions of significant investigators. Critical evaluation of selected recent publications or manuscripts being considered for publication. Prerequisites: 429 and graduate major standing.

PSYCH 536 Human Brain-Behavior Relationships III: Clinical Applications (3) Sp

Reitan

Interpretations of neuropsychological test results for individual subjects, both in terms of identifying findings that characterize brain lesions as well as deviations that imply adjustment, academic, and behavioral limitations. Selected data sets for individual subjects are distributed to students for study and discussion. Prerequisite: 429; 535 recommended.

PSYCH 540 Seminar in Clinical Psychology (2)

AWSp

Becker, Broedel, Kohlenberg, Marlett, Sarason, Sue, Wagner
May be repeated for credit. Prerequisite: permission.

PSYCH 541 Seminar in Cognitive Processes (2)

AWSp

E. Loftus, G. Loftus, Nelson
May be repeated for credit. Prerequisite: permission.

PSYCH 542 Seminar in Animal Behavior (2)

AWSp

Barash, J. Lockard, R. Lockard
May be repeated for credit. Prerequisite: permission.

PSYCH 543 Seminar in Developmental Psychology (2) AWSp

Gentner, H. Robinson, Slaby

May be repeated for credit. Prerequisite: permission.

PSYCH 544 Seminar in Experimental Psychology (2)

AWSp

May be repeated for credit. Prerequisite: permission.

PSYCH 545 Seminar in Human Learning (2)

AWSp

May be repeated for credit. Prerequisite: permission.

PSYCH 546 Seminar in Learning (2)

Bolles

May be repeated for credit. Prerequisite: permission.

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PSYCH 547 Seminar in Motivation (2) ASp

Bolles
May be repeated for credit. Prerequisite: permission.

PSYCH 548 Seminar in Perceptual Processes (2) Sp

Culbert
May be repeated for credit. Prerequisites: 441 and permission.

PSYCH 549 Seminar in Physiological Psychology (2)

Douglas, Makous, Simpson, M. Smith, Woods
May be repeated for credit. Prerequisite: permission.

PSYCH 550 Seminar in Psycholinguistics (2)

Culbert, Dale, M. Smith
May be repeated for credit. Prerequisites: 447 and permission.

PSYCH 551 Seminar in Psychophysics (2)

May be repeated for credit. Prerequisite: permission.

PSYCH 552 Seminar in Quantitative Techniques (2) WSp

Edwards, C. Lunneborg, Rose
May be repeated for credit. Prerequisite: permission.

PSYCH 553 Seminar in Social Psychology (2)

Curtis, Fiedler, Keating, Lumsdaine, H. Mitchell, Steele
May be repeated for credit. Prerequisite: permission.

PSYCH 554 Seminar in Decision Processes (2) Sp

L. Beach
May be repeated for credit. Prerequisite: permission.

PSYCH 555 Seminar in Programmed Learning (2)

May be repeated for credit. Prerequisite: permission.

PSYCH 560 Seminar (*) AWSp

May be repeated for credit. Prerequisite: permission.

PSYCH 567 Syntactic and Semantic Development (3) Sp

Dale
Advanced study of the patterns of child language, linguistic approaches to characterizing them, and psychological approaches to understanding the nature of development. Includes cross-linguistic comparisons, the relationship of comprehension to production, the cognitive basis for syntax, early semantic systems, and others. Offered jointly with LING 567. Prerequisites: LING 461 and course in child language.

PSYCH 570 Child Clinical Psychology (4) A

Perry
Review of issues and content of child clinical psychology, integration of field experiences with content and research, promotion of student's beginning work in research. Prerequisite: graduate major or minor standing in child clinical psychology; concurrent registration in 597 required.

PSYCH 571 Child Psychopathology and Behavior Change (5) W

Johnson
Major theoretical views of childhood disorders and research literature in these areas. Principal treatment modalities appropriate to children and families. Prerequisite: graduate standing in psychology or permission.

PSYCH 585 Experimental Problems in Clinical Psychology (5) A

Marlatt
Analysis of research and theories of concepts and processes of deviant behavior. Prerequisite: permission.

PSYCH 586 Psychological Approaches to

Rehabilitation (3)
Survey of psychological approaches to the rehabilitation of persons with a variety of types of disabili-

ties with emphasis 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.

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) AWSpS, AWSpS

Zaro
Advanced training the application of clinical psychological testing and interviewing. Required of all second-year graduate majors in the clinical psychology training program. Must be taken in sequence. Prerequisites: 591 and graduate major standing.

PSYCH 594 Advanced Personality Theory (5) A

R. Smith
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.

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: 595 and permission.

PSYCH 597 Field Work in Clinical Psychology (1-5, max. 36) AWSpS

Becker, Broedel, Johnson, Kohlenberg, Marlatt, Perry, Sarason, R. Smith, Sue, Wagner, Zaro
Prerequisites: second-year graduate major standing and permission.

PSYCH 599 Readings in Psychology (*) AWSpS

Selected topics. Prerequisite: permission.

PSYCH 600 Independent Study or Research (*) AWSpS

PSYCH 700 Master's Thesis (*) AWSpS

PSYCH 800 Doctoral Dissertation (*) AWSpS

ROMANCE LANGUAGES AND LITERATURE

Courses in English translation appear at the end of the departmental listing.

ROMANCE LINGUISTICS AND LITERATURE, GENERAL AND COMPARATIVE

Courses for Undergraduates

ROM 401 Introduction to Romance Linguistics (3) AWSpS

Contreras, Hanzell, 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) 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 EDC&I 435. Prerequisites: senior standing and permission.

ROM 490 Senior Essay (2) AWSpS

Contreras, Hanzell, Klausenburger
In consultation with the appropriate faculty, the undergraduate major in Romance linguistics writes an essay on a linguistic problem of his or her choice.

Courses for Graduates Only

ROM 505, 506 Advanced Romance Linguistics (3,3)

Klausenburger
Advanced problems in the phonological, morphological, and syntactical analysis of the Romance languages. Descriptive, comparative, and historical considerations. Prerequisites: FREN 401, 402, or SPAN 400; or FREN or SPAN 541, 542.

ROM 521, 522 Seminar on Romance Linguistics (3,3)

Contreras, Hanzell, Klausenburger
Specific problems in linguistic analysis of the Romance languages. Prerequisites: 401, 402.

ROM 531 Problems in Romance Linguistics (2-5, max. 10)

Contreras, Hanzell, 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, Nostrand
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.

ROM 600 Independent Study or Research (*)

CATALAN

CATA 535 Catalan Language and Literature (3, max. 9)

Field

FRENCH

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) A,W,Sp

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 121 Intensive Elementary French (10) A
Intensive development of French language skills (understanding, speaking, reading, and writing); study of French grammar and culture.

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: 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.

FREN 207 French Literature and Civilization:

The Age of Enlightenment in France (5) A
Ellrich, Keller
Study of aspects of French culture in the eighteenth century as seen in the works of several of the major writers of the period, with emphasis on the crucial place of the eighteenth century in modern culture. Taught in English. Prerequisite: sophomore standing.

FREN 211 Existentialist and Absurdist Literature in Translation (5) Sp

Jones
For the French intellectual movements from 1940 to 1960, literature was a privileged form of expression. This course asks why, and, in general, examines questions of being in existentialist and absurdist writings. Authors include: Sartre, Beuvoir, Camus, Beckett, Ionesco, and Tardieu.

FREN 221 French Expository Prose (5) 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 237 Conversational French (2-8, 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. Prerequisites: 203 or 221 or 222.

FREN 306 Survey of French Literature: 1850 to the Present (3) Sp

From the realists to contemporary writing. Prerequisite: 203 or 221 or 222.

FREN 307 Composition (3) S

For participants in the Foreign Study Program. Compositions on topical subjects of intermediate difficulty relating to the civilization of the French-speaking countries of Europe. Grammar review, as needed. Prerequisites: 222 or college equivalent, and permission.

FREN 327 Advanced Conversation (2, max. 8)

AWSp
Not open to students whose native language is French. Prerequisite: 203 or college equivalent, or placement test.

FREN 337 Conversational French (2-8, max. 8) Sp or S

For participants in the Foreign Study Program. Prerequisite: 222 or college equivalent.

FREN 350 Drama (3)

Generic study of French drama. Prerequisite: 203 or 222, or college equivalent, or placement test.

FREN 351 Poetry (3)

Generic study of French poetry. Prerequisite: 203 or 222, or college equivalent.

FREN 352 Fiction (3)

Generic study of French fiction. Prerequisite: 203 or 222, or college equivalent.

FREN 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 378 The Making of Contemporary France, Studied in French (3) W

Nostrand, Pinkney
Study of the historical origins and subsequent development of nine contemporary problems and characteristics of French government and politics, economy, and society. Offered jointly with HSTEU 378. Prerequisite: 203 or 222 or equivalent.

FREN 390 Supervised Study (2-6, 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)

Hanzell
Linguistic study of the French sound system. Prerequisite: ROM 401 or LING 400.

FREN 401 The Morphological Structure of French (3)

Hanzell
Linguistic study of French morphology. Prerequisite: ROM 401 or LING 400.

FREN 402 The Syntactic Structure of French (3)

Hanzell
Linguistic study of French syntax. Prerequisite: ROM 401 or LING 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: ROM 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, discussion, 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, Worley
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, Worley
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.

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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)

Not open to students whose native language is French. 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

Prerequisite: 306.

FREN 446 Poetry: Twentieth Century (3)

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 (6)

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, Wortley

Prerequisite: 304.

FREN 457 Twentieth-Century Nonfiction (3)

Jones

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 ARTH 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, Wortley

Prerequisite: 304.

FREN 463 Romantic Drama (3)

Prerequisite: 305.

FREN 464 Realist and Naturalist Drama (3)

Prerequisite: 306.

FREN 465 Twentieth-Century Drama (3)

W. Leiner

Prerequisite: 306.

FREN 470 Cinema (5)

Dale

Major films and figures of French cinema from the beginnings to the present.

FREN 474 Linguistics and the Teaching of French (3)

Hanzell

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 Césaire (West Indies), Senghor (Senegal), Damas (Guiana), Camara Laye (French Guinea), B. Dadie (Ivory Coast), Oulougouem and Kourouma (Mali), Oyono and Beti (Cameroun). Readings are in French.

FREN 478 North African Literature of French Expression: 1945-71 (3) Sp

Leiner

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 Seffroui and Driss Chraïbi (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) A,W

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 105 Elementary (5) AW

To prepare graduate students to pass the reading examination required for advanced degrees. Credit is granted only to students who have received no previous credit in French. Students receiving credit in 105 may not later register for credit in 101. Credits earned in 105 may not be applied toward an advanced degree. Prerequisite: graduate standing or permission of the department.

FREN 106 Elementary (5) WSp

Continuation of 105. Students who have received credit for 102 and/or 103 may also receive credit for 106. Credits earned in 106 may not be applied toward an advanced degree. Prerequisite: 105 or permission of the department.

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 interferences. 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 1315. 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)

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)

Christofides, W. Leiner, Wortley

FREN 555 Studies in Eighteenth-Century Nonfiction (3, max. 9)

Ellrich

FREN 556 Studies in Nineteenth-Century Nonfiction (3, max. 9)

FREN 557 Studies in Twentieth-Century Nonfiction (3, max. 9)

Jones, J. Leiner

FREN 561 Studies in Seventeenth-Century Drama (3, max. 9)

W. Leiner, Wortley

FREN 562 Studies in Eighteenth-Century Drama (3, max. 9)

Ellrich

FREN 563 Studies in Nineteenth-Century Drama (3)

Dale

FREN 564 Studies in Twentieth-Century Drama (3, max. 9)
W. Leiner

FREN 565 Studies in French Drama (3, max. 9)
Sp
W. Leiner
Studies in French drama, sixteenth to twentieth centuries.

FREN 570 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 (*)
AWSp

ITALIAN

ITAL 101, 102, 103 Elementary (5,5,5) *A,W,Sp*
Methods and objectives are primarily oral-aural. Oral practice in the language laboratory is required. Prerequisites: for 102: 101 or college equivalent, or placement test; for 103: 102 or college equivalent, or placement test.

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.

ITAL 108 Italian Language and Civilization (3)
Continuation of 107. Students who have received credit for 102 and/or 103 may also receive credit for 108.

ITAL 111, 112, 113 Elementary (5,5,5)
Administered by 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.

ITAL 201, 202, 203 Intermediate (5,5,5) *A,W,Sp*
Intensive practice in speaking, reading, and writing. Functional review of grammar. 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.

ITAL 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.

ITAL 301, 302 Advanced Syntax and Composition (3,3) *A,W*
Prerequisites: 203 or college equivalent or placement test for 301; 301 for 302.

ITAL 303 Italian Stylistics (3) *Sp*
Functional grammar review; creative written and oral composition and reading, with special attention to problems of style. Prerequisite: 302.

ITAL 327 Advanced Conversation (2, max. 8)
AWSp
Not open to students whose native language is Italian. Prerequisite: 203 or college equivalent, or placement test.

ITAL 390 Supervised Study (2-6, max. 20) *AWSp*
Prerequisites: permission of the instructor and the undergraduate Italian adviser.

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 LING 400, or ROM 401, or permission.

ITAL 404, 405, 406 Survey of Italian Literature (3,3,3) *A,W,Sp*
Prerequisite: 203 or college equivalent, or placement test.

ITAL 410, 411, 412 Literature of the Renaissance (3,3,3)
Study of the main currents and writers of the Italian Renaissance—the lyric, drama, epic, and prose as exemplified by such writers as Poliziano, Sannazaro, Guarini, Boiardo, Ariosto, Castiglione, Machiavelli, Guicciardini, and Tasso. Prerequisites: 404, 405, 406.

ITAL 420, 421, 422 Eighteenth-Century Italian Literature (3,3,3)
Pace
420: Arcadia and the melodrama: Metastasio. 421: drama: Goldoni and Alfieri. 422: poetry: Parini, Monti, Foscolo.

ITAL 450 Manzoni and the Romantic Movement (3) *A*
Pace
Study of Manzoni's works, especially the *Promessi Sposi*, as products of Italian romanticism. Prerequisites: 404, 405, 406.

ITAL 451 Leopardi and the Lyric (3) *Sp*
Pace
Reading of the *Canili* 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 470 Cinema Since 1945 (3) *AWSpS*
Dale
Study of the major works and figures in Italian cinema of the postwar period.

ITAL 490 Proseminar in Italian Literature (3-5)
Friedrich
Special studies intended to help the student achieve a mature critical mastery of Italian literature. Required of Italian majors; others by permission.

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, compositions, conversation, and functional grammar. Students with advanced standing in Spanish courses may apply to instructor for permission to enter 301, instead of 201, after 103. Prerequisites: for 201: 103 or equivalent, or permission; for 202: 201; for 203: 202.

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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. 8)

Prerequisite: 203 or equivalent, or permission.

PORT 390 Supervised Study (2-5, max. 20) A,WSp

Prerequisites: permission of the instructor and the undergraduate Portuguese adviser.

PORT 409 Portuguese Phonetics (3)

Phonetic structure of the Portuguese language as spoken in Portugal and Brazil; practice in Portuguese and Brazilian pronunciation. Prerequisite: 4 credits in 327 or equivalent, or permission.

PORT 424, 425, 426 Fiction: 1800-1950 (3,3,3)

A,W,Sp
Romanticism, realism, symbolism, and modernism in Portugal and Brazil. Eca de Queiros, Machado de Assis, twentieth-century novelists. Prerequisites: 304, 305, and 306.

Courses for Graduates Only

PORT 541, 542 History of the Portuguese Language (3,3)

Phonological, morphological, and syntactical development of the Portuguese language from its origin to the present. Prerequisite: ROM 401 or equivalent.

PORT 590 Special Seminar and Conference (1-9, max. 30) A,WSp

Group seminars or individual conferences are scheduled under this number to meet special needs. Prerequisite: permission of graduate program adviser.

PROVENÇAL

PROV 534 Provençal Language and Literature (3) Field

ROMANIAN

RMN 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 ROMN 401, 402, 403.

RMN 404, 405, 406 Advanced Romanian (5,5,5)

Continuation of 401, 402, 403. Offered jointly with ROMN 404, 405, 406. Prerequisite: 403 or permission.

RMN 420, 421 Structure of Romanian (3,3)

Descriptive analysis of the phonological, morphological, syntactical, and lexical structures of modern Romanian. Prerequisite: ROM 401 or permission.

SPANISH

SPAN 101, 102, 103 Elementary (5,5,5)

A,W,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 114 Chicano-Spanish (5) A

Oral and written communication in Chicano-Spanish supplemented by class presentations, lecturers, and films. Main emphasis on the oral manipulation of the Spanish language as used by Chicanos in the various regions of the United States. Readings and written work included, but the focus is on speaking. Not for majors. Prerequisites: some competence in Spanish conversation, freshman or sophomore standing; others by permission.

SPAN 115 Chicano-Spanish (5) W

Oral and written communication in Chicano-Spanish supplemented by class presentations, lecturers, and films. Main emphasis on written expression. Compositions on Chicano themes serve as the basis for class readings, tapes, and speakers. Concentration on development of clear expository style. Not for majors. Prerequisites: some competence in Spanish conversation, freshman or sophomore standing; others by permission.

SPAN 116 Chicano-Spanish (5) Sp

Oral and written communication in Chicano-Spanish supplemented by class presentations, lecturers, and films. Main emphasis on advanced conversational skills and the production of a collection of student writings. This course is more schematic since its development and structure is dependent on the first two courses in the sequence. Not for majors. Prerequisites: some competence in Spanish conversation, freshman or sophomore standing; others by permission.

SPAN 120 Intensive Elementary Spanish (10) A

Intensive development of Spanish language skills (understanding, speaking, reading, and writing); study of Spanish grammar and culture.

SPAN 122 Basic Grammar Review (5)

Administered by the Office of Independent Study. Refresher course that reviews 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 EDC&I 132.

SPAN 201, 202, 203 Intermediate (5,5,5)

A,WSp,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. Func-

tional 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 231 Chicano Expressive Culture (3) WSp Ybarra

The folk and popular traditions of people of Mexican culture, both within the present borders of Mexico and in the United States. Brief survey of the formation of Mexican culture and Mexican character, and the formation of Chicanos as an ethnic group in the United States. Emphasis placed upon customs, beliefs, ritual, arts and crafts, in-group language, folk poetry, and popular literature. Particular attention is paid to the expressive culture created by specific groups: the *vaquero*, the *trasmalador*, the *santero*, the *pachuco*, etc. Independent work and a reading knowledge of Spanish is expected.

SPAN 237 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) A,W,WSp

Prerequisites: for 301: 203 or college equivalent, or placement test; for 302: 301.

SPAN 303 Spanish Stylistics (4) ASp

Functional grammar review; creative written and oral composition and reading with special attention to problems of style. Prerequisite: 302.

SPAN 304 Survey of Spanish Literature: 1140-1498 (3) A

Masterpieces of Spanish literature from origins to 1498. 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 355.

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 political/racial one is examined.

SPAN 327 Advanced Conversation (2, max. 8) A,WSp

Not open to students whose native language is Spanish. Prerequisite: 203 or equivalent, or placement test.

SPAN 331 Themes in Mexican-American Studies (5)

Examination of significant historical and cultural themes of the Mexican-American experience. Crea-

tion of multimedia Chicano educational materials. Prerequisites: 121 and a colloquial speaking knowledge of Spanish.

SPAN 337 Conversational Spanish (2 or 4 or 6) Sp
For participants in the Foreign Study Program. Prerequisites: 203 or equivalent, and permission.

SPAN 350 Drama (3) A
Generic study of Spanish drama. Prerequisites: 203 or college equivalent, or placement test.

SPAN 351 Poetry (3) A
Generic study of Spanish poetry. Prerequisite: 203 or 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 ROM 401 or LING 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
Contreras, Salinero
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 Becquer 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. Preliminary to 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)
Penuelas
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 421 Spanish Medieval Literature: Tenth Through Fourteenth Centuries (3) A or W
Petersen
The first of a two-quarter advanced survey of Spanish and comparative literature. The literary forms of the Iberian Peninsula from the tenth to the fourteenth centuries, including the Spanish national epic, the development of lyric and narrative poetry, and the evolution of romance prose through the reading of principal works (*Jarchas*, *Poema del Cid*, *Los milagros de Nuestra Señora*, *conde Lucanor* and the *Libro de buen amor*) in the original texts, with supplementary reading of secondary materials. Taught in Spanish. Prerequisite: any 300- or 400-level literature course.

SPAN 422 Spanish Medieval Literature: Fifteenth Century (3) W or Sp
Petersen
Principal literary forms of the fifteenth century: narrative poetry (*Romancero viejo*); lyric poetry (*Santillana*, *Mena Manrique*, and the *Cancionero* poets); political and social satire (prose and verse); historiography (Perez de Guzman and Fernando del Pulgar); early prose fiction (novelas de caballerias and novela sentimental) and the *Celestina*. Taught in Spanish. For advanced undergraduate majors and graduate students in Spanish and comparative literature. Prerequisite: any 300- or 400-level literature course.

SPAN 437 Advanced Conversational Spanish (2 or 4 or 6) 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: 1600-1635 (3)
Lope de Vega through Ruiz de Alarcon. Prerequisites: any three of the following: 304, 305, 306, 350, 351, 352.

SPAN 443 Spanish Drama: 1635-81 (3)
Calderon 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-Inclan, Sastre, Lorca, and others. Prerequisites: any three of the following: 304, 305, 306, 350, 351, 352.

SPAN 447 Spanish Theatre Since the Civil War (3)
Anderson
Readings include works of Spain's major dramatists of the postwar period: Sastre, Buero Vallejo, Paso, Jardiel Poncela, etc., as well as appropriate critical and theoretical readings. Special attention given to the social and political context of the theatre in

Spain under the Franco regime. Prerequisites: 304, 305, 306.

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, Penuelas
451: 1700 through the Romantic period. 452: 1850-98. 453: 1898 to the present. Prerequisites: any three of the following: 304, 305, 306, 350, 351, 352.

SPAN 461, 463 Spanish Literature of the Golden Era (3,3)
Shipley
Golden Age and Age of Conflict: poetry and prose fiction in the sixteenth and seventeenth centuries. Tradition, borrowing, innovation in Imperial Spanish literature. Close study of key texts and their social-historical contexts. 461: poetry. 463: prose. Prerequisites: any three of the following: 304, 305, 306, 350, 351, 352.

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
General survey. 481: the colonial period and early years of independence. 482: the middle years of the nineteenth century. 483: the twentieth century. Prerequisites: any three of the following: 304, 305, 306, 350, 351, 352.

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
Leading Romantic and Costumbrista authors (1810-90). Prerequisites: any three of the following: 304, 305, 306, 350, 351, 352.

SPAN 486 The Modernista 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.

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SPAN 492 Spanish Culture From Earlier Times to 1700 (3) ASp

Salinero
Summary of the development of Spanish society and art forms as a background to its literature, from early times up to 1700. Taught in Spanish. Prerequisites: 304, 305, and 306.

SPAN 495 Study in Spain (12) Sp

Anderson
One-quarter study group in Spain. Course content varies from year to year. Prerequisites: command of the Spanish language adequate for academic work at the 400 level and for living in Spain, 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 101. 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 for 102 and/or 103 may also receive credit for 106. Credits in 106 may not be applied toward an advanced degree. Prerequisite: 105 or permission of 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)

Detailed 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)

SPAN 521, 522 The Renaissance in Spain (3,3)

Shipley
Literary creation and the cultural, social, historical context of Spanish literature from *La Celestina* through the sixteenth century. Extensive study of secondary materials, intensive analysis of representative literary texts.

SPAN 541, 542 History of the Spanish Language (3,3) W,Sp

Salinero
Summary of the evolution of Spanish language from the fragmentation of Peninsular Romance to *Cantar de Mio Cid*. The main work consists of analysis of early Castilian texts.

SPAN 553 The Generation of '98 (3)

Penuelas

SPAN 561 Spanish-American Novel From 1940 to the Present (3, max. 9)

SPAN 562 Spanish Literature From 1940 to the Present (3)

Penuelas

SPAN 571 The Modern Essay in Spanish America (3)

SPAN 572 Twentieth-Century Spanish Poetry (3)

Predmore

SPAN 573 Twentieth-Century Spanish-American Poetry (3)

SPAN 575 Literary Criticism (3)

Penuelas

SPAN 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.

SPAN 591 Literary Problems: Middle Ages (3, max. 9)

SPAN 592 Literary Problems: Renaissance (3, max. 9)

SPAN 593 Literary Problems: Golden Age (3, max. 9)

SPAN 594 Literary Problems: Eighteenth Century (3, max. 9)

SPAN 595 Literary Problems: Nineteenth Century (3, max. 9)

SPAN 596 Literary Problems: Twentieth Century (3, max. 9)

SPAN 597 Literary Problems: Spanish-American Colonial Literature (3, max. 9)

SPAN 598 Literary Problems: Latin America (3, max. 9)

SPAN 600 Independent Study or Research (*) AWSp

ROMANCE LANGUAGES AND LITERATURE

ROMAN 700 Master's Thesis (*) AWSp

ROMAN 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

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 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).

FREN 481 Twentieth-Century French Novel in English (3-5)

FREN 482 French Poetry From Baudelaire to the Present (5)

Analysis in English of the major trends and movements in modern French poetry (e.g., symbolism, surrealism, etc.). Textual studies of representative works, from Baudelaire to the poets of the 1950s.

FREN 483 Trends in Twentieth-Century Theatre in English (5)

Study of the evolution of the French theatre from the turn of the century to the present. Special emphasis is given the French theatrical scene since World War II.

FREN 484 Rabelais and Montaigne in English (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.

FREN 485 Racine and Moliere in English (3)

Wortley

FREN 486 Literature of the Enlightenment in English (3)

Ellrich

FREN 487 Nineteenth-Century Fiction in English (3)

Dale

FREN 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

ITAL 318 Italian Literature in English (5)

ITAL 319 The Italian Short Story in English (5)

Friedrich

The short story from the *Novellino* and Boccaccio to modern masters of the form. The translations are studied both as examples of narrative technique and as reflections of particular moments in Italian cultural history. Prerequisite: at least sophomore standing.

ITAL 384 Renaissance Literature of Italy in English (3)

ITAL 481 The Divine Comedy in English (5)

Studies of Dante's *Divine Comedy* in English translation, with consideration of its background and influence.

ROMANCE LITERATURE

ROM 460 The Literature of the Renaissance in English (5)

SPANISH

SPAN 315 Latin-American Authors in English (5)

SPAN 345 Spanish Literature of the Renaissance in English (3)

Shipley

Key works in prose fiction and poetry and drama from *Celestina* (1498) through Cervantes, Quevedo, Calderon. Artistic values and the social-historical context of Renaissance Spain.

SCANDINAVIAN LANGUAGES AND LITERATURE

Courses for Undergraduates

DANISH

DAN 101-102, 103 Elementary Danish (5-5,5)

A,W,Sp

Rossel

Fundamentals of oral and written Danish.

DAN 217 Modern Danish Fiction (3) W

Rossel

The study of a novel by J. P. Jacobsen, Martin A. Hansen, or other modern Danish novelists. Prerequisite: 103 or equivalent.

DAN 218 The Danish Short Story and Fairy Tale (3) A

Rossel

Selected short stories and fairy tales in Danish literature. Prerequisite: 217 or equivalent.

DAN 222 Danish Drama and Film (3) Sp

Rossel

Study of a play by Kaj Munk or Soya and a film by Carl Dreyer. Prerequisites: 217, 218 or equivalent.

DAN 223, 224, 225 Danish Conversation and Composition (2,2,2) A,W,Sp
Rossel
 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
Rossel
 Representative selections from modern Danish fiction or poetry. Literary analysis and grammar.

DAN 350 Danish Ballads (3) W
Conroy, Rossel
 Extensive study of Scandinavian ballads stressing Danish and Faroese traditions, with special reference to origin, transmission, themes, music, and broadside ballads.

DAN 450 History of Danish Literature (3)
Rossel
 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) AWSp
Rossel
 Students with an adequate reading knowledge of Danish pursue in this course a program of study in a selected area of Danish language, literature, or related fields. Conferences with the instructor; reports. Prerequisite: permission.

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) AW,WSp,SpA
Flatin
 Fundamentals of oral and written Norwegian.

NORW 220 The Norwegian Short Story (3) A
Flatin, Sehmsdorf
 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 Hamsun (3) Sp
Flatin, Sehmsdorf
 Study of two novellas by Hamsun. 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, max. 4; 2, max. 4; 2, max. 4) A,W,Sp
Flatin, Sehmsdorf
 Prerequisite: 225 or equivalent.

NORW 350 The Norwegian Short Story (3)
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, Vesaas, 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) AWSp
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) AW,WSp,SpA
Jarvi
 Fundamentals of oral and written Swedish.

SWED 220 Modern Swedish Poetry (3) AW
Jarvi, Warme
 Selected poems by Froding, Lagerkvist, Sodergran, and others. Prerequisite: 103 or equivalent.

SWED 221 The Swedish Short Story (3) WSp
Jarvi, Warme
 Hjalmar Soderberg and his short stories.

SWED 222 Modern Swedish Drama and Film (3) ASp
Jarvi, Warme
 Shorter works of Par Lagerkvist and one film by Ingmar Bergman. Prerequisite: 221 or equivalent.

SWED 223, 224, 225 Swedish Conversation and Composition (2,2,2) A,W,Sp
Jarvi, Warme
 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-tradition. Prerequisite: 222 or equivalent.

SWED 301 Swedish Poetry After 1940 (3) W
Jarvi, Warme
 Selection of poems by such poets as Karl Vennberg, Erik Lindegren, Werner Aspenstrom, Thomas Transtromer, and Harry Martinson. Prerequisite: 300 or equivalent.

SWED 302 The Swedish Contemporary Novel (3) Sp
Jarvi, Warme
 Selected works by Delblanc, Gyllensten, Sara Lidman, and others. Prerequisite: 301 or equivalent.

SWED 303, 304, 305 Advanced Swedish Conversation and Composition (2, max. 4; 2, max. 4; 2, max. 4) A,W,Sp
Jarvi, Warme
 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, Warme
 Introduction to developments in Swedish literature in the 1950s and 1960s through the study of representative poetry, prose, and dramas. Prerequisite: 222 or equivalent.

SWED 351 Hjalmar Bergman (3) W
Jarvi
 Study of a novel and a play by Hjalmar Bergman. Reading in the original. Prerequisite: 350.

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
Jarvi, Warme
 A one-volume history serves as text. Representative literary works from the earliest times to the present are read to supplement the literary historical account and to show the evolution of the thought and form of the various genres. Prerequisite: 222 or equivalent.

SWED 490 Supervised Reading (*, max. 12) AWSp
Jarvi, Warme
 Students with an adequate reading knowledge of Swedish pursue in this course a program of study in a selected area of Swedish language, literature, or related fields. Conferences with the instructor; reports. Prerequisite: 302 or permission.

SCANDINAVIAN COURSES IN ENGLISH

SCAND 100 Introduction to Scandinavian Culture (2 or 2½) AWSpS
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
Rossel
 Introduction to Andersen and his tales, with particular emphasis on what they have to say about man and his world.

SCAND 251 Holberg and His Comedies in English (2)
Rossel
 Holberg and his major dramas, with attention to the comic tradition in the Scandinavian theatre.

SCAND 260, 261 Scandinavian Cinema (3,3) Steene
 Study of major Scandinavian films from the 1920s to the present. Courses may be taken consecutively or independently. CINE 202, 203 recommended.

SCAND 309 The Icelandic Saga in Translation (2 or 2½) SpS
Conroy
 Representative old Icelandic sagas in translation. 2½ credits available Summer Quarter only.

SCAND 310 The Scandinavian Emigrant Novel (2 or 2½)
Flatin, Jarvi, Warme
 The emigrant novel: Bojer, Hauge. 2½ credits available Summer Quarter only.

SCAND 311 Modern Scandinavian Fiction in English (2 or 2½) WS
Flatin, Jarvi, Rossel, Sehmsdorf, Warme
 Representative novels and short stories of Jacobsen, Hamsun, Dinesen, Undset, and Lagerkvist. 2½ credits available Summer Quarter only.

SCAND 330 Scandinavian Mythology (2½ or 3) AS
Sehmsdorf
 Introduction to the study of the mythology of Germanic, and especially the Scandinavian, peoples.

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Emphasis on the source material, particularly the *Poetic Edda* and *Prose Edda*; also historical and archaeological material. 2½ credits available Summer Quarter only.

SCAND 331 The Hero in Scandinavian Tradition (3) W Sehmsdorf

As a continuation of Scandinavian 330, this course explores the exemplary character and quest of the divine and the human hero. Emphasis on the two *Eddas* and the *Volsung* cycle and its derivatives. For comparative 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 Folktale (3) A Sehmsdorf

Study of the Scandinavian folktale as oral literature and as expression of popular beliefs.

SCAND 370 The Vikings (3) Sehmsdorf

Study of the Vikings at home in Scandinavia and abroad, with particular emphasis on their activities as revealed in archaeological finds and in historical and literary sources. Offered jointly with HSTEU 370.

SCAND 380 History of Scandinavia to 1521 (3) A Sehmsdorf

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 HSTEU 380.

SCAND 381 History of Scandinavia to 1809 (3) W Sehmsdorf

Survey of Scandinavian history from 1521 to 1809 with emphasis on the Lutheran Reformation, the Thirty Years War, and the Napoleonic wars. Offered jointly with HSTEU 381.

SCAND 382 History of Scandinavia From 1809 to the Present (3) Sp Sehmsdorf

Survey of Scandinavian history from 1809 to the present with major emphasis on the political, social, cultural, and economic development of the Scandinavian countries. Offered jointly with HSTEU 382.

SCAND 384 Scandinavian Immigrant Culture (3) W Sehmsdorf

Survey of the background of Scandinavian immigration to the United States; Prerequisite: junior or senior standing; 382 recommended.

SCAND 389 Swedenborg and Mysticism (3) SpS Jarvi

Consideration of Swedenborg's major ideas and their influence on European and American culture.

SCAND 390 Kierkegaard (2) Rossel

Discussion of such works as *Either/Or* and *Stages on Life's Way*, as both philosophical and literary works.

SCAND 455 Introduction to Scandinavian Linguistics (3) 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) 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 Flatlin, 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.

SCAND 484 The Films of Ingmar Bergman (3) A Steene

Study of the major films of Ingmar Bergman. Open to majors and nonmajors; 260, 261, and 481 or CINE 201, 202, and 203 recommended.

SCAND 485 Existentialism in Scandinavian Literature (3) A Flatlin

Study of "Kierkegaardian" existentialism in works by major Scandinavian authors such as Ibsen, Jacobsen, Strindberg, Lagerkvist, and Bergman.

SCAND 490 Special Topics (1-5, max. 15) AWSpS Conroy, Flatlin, Jarvi, Rossel, Sehmsdorf, Steene, Warne

Special topics in Scandinavian art, literature, and culture. Course offerings are based on instructor's specialty and student demand.

Courses for Graduates Only

SCAND 500, 501, 502 Old Icelandic (3,3,3) A,W,Sp Conroy

SCAND 506 Ibsen's Early Plays (3) A Flatlin, Steene

SCAND 507 Ibsen's Later Plays (3) W Flatlin, Steene

SCAND 508 The Nineteenth-Century Scandinavian Novel (3) A Rossel, Sehmsdorf, Warne

SCAND 509 The Twentieth-Century Scandinavian Novel (3) W Rossel, Sehmsdorf, Warne

SCAND 510, 511, 512 Strindberg (3,3,3) Jarvi, Steene

SCAND 513 Scandinavian Linguistics (3) Conroy

Selected topics in Scandinavian linguistics.

SCAND 519 Recent Scandinavian Drama (3) 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) Rossel, Steene, Warne

Seminar on the poetry from 1880 to 1930.

SCAND 521 Recent Scandinavian Poetry (3) Sp Rossel, Steene, Warne

Seminar on recent and contemporary poetry from 1930 to the present.

SCAND 522 Scandinavian Romanticism (3) Jarvi, Rossel, Sehmsdorf

Backgrounds: German idealism; organicist concept of history and esthetics; the poet as visionary genius; revolutionary tendencies and political conservatism; folklore and mythology. Genres: lyrical poetry, national epic, the beginnings of the novel.

SCAND 523 Scandinavian Literature and Film (3) Sp Steene

Study of the film adaptations by Sjöström and Stiller of the works of Selma Lagerlöf; a consideration of the film adaptations by Carl Dreyer of such works as Kaj Munk's *Ordet* and H. Soderberg's *Gertrud*; Alf Sjöberg's version of Strindberg's *Miss Julie*. 260 or 261 recommended, but not prerequisites.

SCAND 524 Scandinavian Emigration: History and Literature (3) Sp Conroy

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 (3,3) S,Sp Conroy, Rossel

The study of the main genres in the vernacular, with primary emphasis on the ballads.

SCAND 541 Scandinavian Mythology (3) Sp Sehmsdorf

Seminar on the historical development and special problems in Scandinavian mythology.

SCAND 542 Scandinavian Folklore I: Folk Beliefs (3) A Sehmsdorf

Popular beliefs about the soul, the dead, magic, witchcraft, nature spirits, the agricultural year, as expressed in the oral traditions and customs of Scandinavia.

SCAND 543 Scandinavian Folklore II: Folk Literature (3) W Sehmsdorf

Various forms of Scandinavian folk literature: legends, fictional folktales, proverbs, riddles, folk song, and ballad.

SCAND 600 Independent Study or Research (*) AWSp

SCAND 700 Master's Thesis (*) AWSp

SCAND 800 Doctoral Dissertation (*)

SLAVIC LANGUAGES AND LITERATURE

Courses for Undergraduates

BULGARIAN

BULGR 401, 402, 403 Elementary Bulgarian (5,5,5) A,W,Sp

401, 402: Introduction to Bulgarian phonology and 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: RUSS 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.

CZECH

CZECH 401, 402, 403 Elementary Czech (5,5,5) A,W,Sp

401, 402: Introduction to the essentials of spoken and written Czech. 403: modern Czech prose, leading to a command of the language as a research tool and providing an adequate basis for further study. Prerequisite: RUSS 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, conversation. Limited reading and writing in 401, 402. More extensive reading and writing in 403.

POLISH

POLSH 401, 402, 403 Elementary Polish (5,5,5)

A,W,Sp
Carpenter
401, 402: acquaints the student with the principal morphological and syntactic features of the Polish language through the medium of a basic vocabulary. 403: designed to enlarge the student's general vocabulary by the reading of short texts selected from Polish authors of the nineteenth and twentieth centuries. Prerequisite: RUSS 203 or 210 or 250, or permission.

POLSH 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 nineteenth and twentieth centuries. The course also reinforces the student's basic knowledge of vocabulary, grammatical patterns, and conversation.

POLSH 420 Modern Polish Literature in English (5) W

Carpenter
Major trends in modern Polish literature through an examination of representative works by leading twentieth-century Polish writers. Presents modern Polish literature in a European context, and stresses parallels in philosophy and art. At the same time, the student gains an appreciation of the originality of Polish literature through acquaintance with the peculiar historical and political situation of twentieth-century Poland. Prerequisite: one Slavic literature course or permission. (Offered alternate years; offered 1977-78.)

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 RMN 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 RMN 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 pronunciations, 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.

RUSS 202, 203 Second-Year Russian (5,5) W,Sp

Continuation of 201. Prerequisite: 201 or 115, or permission.

RUSS 210 Accelerated Russian (10) Sp

Continuation of 115. Covers material of 202, 203 in one quarter. Prerequisite: 201 or 115, or permission.

RUSS 221, 222, 223 Russian for Reading and Research (5,5,5)

Provides students who have no previous knowledge of Russian with all the essentials of grammar that they need to read expository prose. During the third quarter students are assigned readings on the basis of their particular interests. Aural-oral and writing skills, while not emphasized, are given some attention.

RUSS 240 Accelerated Scientific Russian (10) S

Introduction to written Russian as a research tool for science students only. Readings in chemistry and physics. Not counted for Russian major language credit.

RUSS 250 Intensive Second-Year Russian (15) S

Continuation of 150. For Summer Quarter students who wish to complete a second 15 credits of Russian. Prerequisite: 150, 103, or permission.

RUSS 301, 302, 303 Intermediate Russian (5,5,5) A,W,Sp

Holdsworth
Oral and writing practice based on Russian prose readings. Intensive review and supplementation of structural knowledge. One hour weekly conducted in English, four hours weekly in Russian. Prerequisite: 203, 210 or 250 or permission.

RUSS 331, 332, 333 Intermediate Russian for Reading and Research (5,5,5) A,W,Sp

For students with a knowledge of the fundamentals of Russian who wish to obtain a greater facility in reading the language. Some grammar review, but primarily readings from recent articles and newspapers. Students are encouraged to begin readings in their own specialties as early as possible. Prerequisites: 203, 223, 250, or equivalent.

RUSS 350 Intensive Third-Year Russian (15) S

Holdsworth
Oral and writing practice based on Russian prose readings. Intensive review and supplementation of structural knowledge of Russian. Prerequisites: 210, 250, or 203.

RUSS 351 Intermediate Russian Phonetics (3)

Systematic exploration and analysis of the Russian sound system, including phonetic transcription and the study of intonational patterns. Special attention is given to instruction in correcting individual pronunciation errors. Taught in Russian. Prerequisites: 203, 210, or 250.

RUSS 352 Intermediate Russian Morphology and Syntax (3) W

Augerot, Coats
Examination of Russian morphology and syntax with emphasis on topics that will help to prepare the student for advanced course in Russian. Prerequisite: 203 or 210 or 250.

RUSS 381 Phonetics in Leningrad (2 or 5) A,W,Sp

Augerot, Coats
Systematic exploration and analysis of the Russian sound system (with its phonetic transcription), including separate phonemes, sound combinations, and modifications in normal speech as well as in intonational patterns. Introductory discussions of pronunciation norms prepare the student for practical reading exercises, which represent the bulk of classwork. Special attention is given to correcting individual pronunciation errors. (2 credits are offered for the six-week Summer Quarter program, 5 credits for the fourteen-week semester program.) Prerequisite: 303.

RUSS 382 Advanced Syntax and Composition in Leningrad (2 or 5) A,W,Sp

Class lectures on Russian syntactic structures are supplemented by active oral drilling and written exercises and compositions. (2 credits are offered for the six-week Summer Quarter program, 5

credits for the fourteen-week semester program.) Prerequisite: 303.

RUSS 383 Conversation in Leningrad (4 or 6) A,W,Sp

Designed to increase active vocabulary, to further the student's control of idiomatic Russian, and to develop all the basic skills of oral expression. Every attempt is made to evoke spontaneous discussion about daily life, including excursions, lectures, and other parts of both the academic and cultural programs in Leningrad. (4 credits are offered for the six-week Summer Quarter program, 6 credits for the fourteen-week semester program.) Prerequisite: 303.

RUSS 384 Soviet Culture in Leningrad (4 or 6) A,W,Sp

Monograph lectures on major Soviet literary figures: two lectures per week on the life and writings of the week's author are followed by one seminar hour devoted to the analysis of texts for characteristic stylistic features and thematic concerns. Summer program has only lectures, no seminar discussion. Also one weekly lecture on education, history, economics, law, art, ethnography, architecture, etc., which are complemented by regular excursions to museums, places of cultural and historical interest, and meetings with Soviet groups. (4 credits are offered for the six-week Summer Quarter program; 6 credits for the fourteen-week semester program.) Prerequisite: 303.

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) A

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 RUSS 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 (2) 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

Augerot, 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 Advanced Russian Reading Skills (5,5)

Advanced course for undergraduate or graduate students consisting of reading and discussion in Russian of a variety of literary texts with the particular aim of expanding reading skills. Class discussions and frequent written essays further develop

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writing skills and serve to activate vocabulary needed for discussing literary texts. A detailed examination of various texts from different historical periods, along with a systematic exploration of the stylistic resources and characteristics of the Russian language. 461 concentrates on artistic literary texts (both poetry and prose), while 463 is directed toward texts from the general humanities and social sciences, including journalism. Both courses are appropriate for students of Russian language, literature, or area studies.

RUSS 470 Special Topics in Russian for Teachers (5) S

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)

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) AWSp

For Slavic majors only. Prerequisite: permission.

SERBO-CROATIAN

SER C 401, 402, 403 Elementary Serbo-Croatian (5,5,5) A,W,Sp

Kapetanac
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: RUSS 203 or 210 or 250, or permission.

SER C 404, 405, 406 Advanced Serbo-Croatian (5,5,5) A,W,Sp

Kapetanac
Continuation of 401, 402, 403 to provide instruction and practice designed to reinforce the basic grasp of the language, and to enlarge both vocabulary and command of grammatical patterns. Prerequisite: 403.

SER C 420 Yugoslav Literature in Its European Context in English (5) Sp

Kapetanac
Examination of the chief works of Yugoslav literature, in English translation, from the sixteenth century to the present. Particular attention is paid to Yugoslav modifications of Renaissance genres as the comedy and pastoral drama; Yugoslav folk poetry and its impact on Romantic movement in Europe; Yugoslav participation in general European movements of nineteenth and twentieth centuries; Yugoslav literature in the postwar period and its original and influential position in Eastern Europe. Prerequisite: some experience in the study of other Slavic or European literatures. (Offered alternate years.)

SLAVIC

SLAV 351 History of the Slavic Languages (5) Sp

Augerot, Haney
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.

SLAV 490 Studies in Slavic Literature (5, max. 15) A or W or Sp or S

Studies in various aspects of Slavic literatures including: Russian, Polish, Czech, Serbian, Croatian, and Bulgarian. Because themes, literatures, and texts vary, the department office should be consulted for information.

SLAV 499 Undergraduate Research (3-5, max. 15) AWSp

For Slavic majors only. Prerequisite: permission.

UKRAINIAN

UKR 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.

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.

RUSS 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.

RUSS 322 Russian Literature and Culture of the Nineteenth Century (5)

Russian literature and culture of the nineteenth century. Discussion centers on literature as an element in Russian culture; however, art, architecture, music, and philosophy are treated as well. Periods covered include romanticism, realism, and the beginnings of socialist criticism.

RUSS 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.

RUSS 420 Early Twentieth-Century Russian Literature in English (5) A

Swayze
Survey of Russian literature from 1900 to 1935.

RUSS 421 Contemporary Russian Literature in English (5) W

Swayze
Survey of Russian literature from 1917 to the present.

RUSS 422 Russian Plays in English (5) Sp

From 1782 to 1948.

RUSS 426 Mid-Nineteenth Century Russian Literature in English (5) A

Survey of major nineteenth-century Russian writers, exclusive of Tolstoy and Dostoevsky. Works by Pushkin, Gogol, Goncharov, Turgenev, and selected others.

RUSS 427 Tolstoy in English (5) W

RUSS 428 Dostoevsky in English (5) Sp

RUSS 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.

RUSS 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*, *Matryona's Home*, *First Circle*, *Cancer Ward*, and *August, 1914*; and *Doctor Zhivago*, *Aerial Ways*, *Letters From Tula*, *I Remember*.

Courses for Graduates Only

RUSSIAN

RUSS 512 Russian Literary Criticism (5) A

Analysis of critical approaches, methods, and lit-

erary values of major Russian literary critics of the nineteenth and twentieth centuries.

RUSS 516 Stylistics and Versification (5) A or W or Sp

Introduction to the stylistic analysis of literary Russian, and its application to the theory and practice of literary criticism. Survey of the history and bibliography of Russian versification studies in the nineteenth and twentieth centuries.

RUSS 520 Seminar on Russian Poetry (5) Sp

Topics in Russian poetry to be selected by the instructor.

RUSS 522 Russian Literature, 1800-1840 (5) A

Representative works, including poetry, prose, and literary criticism, by Alexander Pushkin, his contemporaries, and his immediate predecessors. Illustrates the crucial literary controversies of the day, and gives the student a strong sense of the scope of Russian literature in its most formative period, and varieties of Russian style. Readings cover: the prose of Karamzin, Narezhny, Zagoskin, Pushkin, Lermontov, and the earliest works of Gogol; the poetry of Zhukovsky, Batyushkov, the Decembrists, Pushkin, Baratynsky, and Lermontov; and critical writings by Shishkov, Merzlyakov, Pushkin, Polevoy, Nadezhdin, Belinsky, and a number of lesser figures.

RUSS 524 Russian Literature, 1840-90 (5) W

Russian poetry and prose in the period 1840 to 1890. Short prose works and excerpts from longer works, by Gogol, Turgenev, Leskov, Saltykov-Shchedrin, Pisemsky, Uspensky, Goncharov, and Dostoevsky; poetry by Tyutchev, Fet, and Nekrasov; plays by Gogol and Ostrovsky; and excerpted contemporary critical writings.

RUSS 526 Modern Russian Poetry (5) A or W or Sp

Russian poetry of the twentieth century, including symbolism, acmeism, futurism, and Soviet poetry since 1925.

RUSS 530 Seminar on Russian Prose (5) A

Examination and discussion of Russian masterpieces.

RUSS 533 Chekhov (5) A

Detailed analysis of the plays and short stories of Anton Chekhov in Russian.

RUSS 534 Dostoevsky (5) W

Analysis of the works of Feodor Dostoevsky.

RUSS 535 Tolstoy (5) W

Analysis of the works of Leo Tolstoy.

RUSS 538 Pasternak (5) Sp

Detailed analysis of the poetry and prose of Boris Pasternak in Russian.

RUSS 540 Seminar on Contemporary Russian Literature (5) W

Examination of selected works of poetry, prose, and criticism representative of Russian literature from 1917 to the present. Prerequisite: permission.

RUSS 541 Soviet Prose and Poetry (5) A or W or Sp

Swayze
Study of representative works of prose and poetry in Russian from 1917 to the present.

RUSS 550 Advanced Russian Morphophonology (3) A

Micklesen
Detailed discussion and evaluation of attempts to incorporate both Russian phonology and Russian morphology in modern scientific grammars. 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 developments of

the Russian literary language from the earliest documents to the present. Prerequisite: SLAV 550.

RUSS 556 Readings in the History of the Russian Language (4) Sp

Coats
Readings and grammatical interpretation of selected texts from various periods of development of the Russian language. Prerequisite: 555.

RUSS 565 Russian Eighteenth-Century Literature (5) Sp

Discussion of representative works of poetry, prose, fiction, and criticism in the eighteenth century. Prerequisite: 320 or permission.

RUSS 575 Kievan Literature (5) W

Haney
Analysis of representative works of prose and poetry of Kievan Rus' from the beginning to the end of the thirteenth century. Prerequisite: graduate standing. (Offered alternate years.)

RUSS 576 Muscovite Literature (5) 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 alternate years.)

RUSS 577 Russian Folk Literature (5) A

Haney
Analysis of representative works of the various genres of folk literature including the *byliny*, *skazki*, historical and lyrical songs and the spiritual *sikhli*. Prerequisite: graduate standing. (Offered alternate years.)

RUSS 578 Studies in Kievan Literature (4) W

Haney
Field course for students with a specialization in Kievan literature. Work with primary sources, textual tradition, and bibliography.

RUSS 579 Studies in Muscovite Literature (4) Sp

Haney
Field course for students with a specialization in Muscovite literature. Work with primary sources, textual tradition, and bibliography.

RUSS 588 Pro-Seminar in Russian Literature (5)
Introduction to study of Russian literature, covering bibliographic materials, approaches to literature, and genres.

RUSS 600 Independent Study or Research (*) AWSp

SLAVIC

SLAV 520 Slavic Literary Theory (5) A or W or Sp or S

Kapetanik
Analysis and interpretation of the main texts of the Russian formalist, Prague structuralist, and Tartu structuralist schools of Slavic literary theory of the twentieth century.

SLAV 550 Historical Survey of Common Slavic (5) A

Micklesen
Slavic languages and their geographical and dialectical distribution; Slavic civilization throughout prehistoric and early historic periods; principal phonological and morphological features of Slavic as a subgroup of the Indo-European family of languages. Prerequisite: RUSS 453 or permission.

SLAV 552 History of the East Slavic Languages (3) A

Micklesen
Designed to acquaint majors in Slavic linguistics with the details of the historical development of the phonological and morphological structure of the East Slavic languages. Prerequisite: 550.

SLAV 553 History of the West Slavic Languages (3) W

Micklesen
Designed to acquaint majors in Slavic linguistics with the details of the historical development of the phonological and morphological structure of the West Slavic languages. Prerequisites: 550, 552.

SLAV 554 History of the South Slavic Languages (3) Sp

Micklesen
Designed to acquaint majors in Slavic linguistics with the details of the historical development of the phonological and morphological structure of the South Slavic languages. 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 orthography, 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 linguistics. May be repeated for credit. Prerequisites: 554 and RUSS 551.

SLAVIC LANGUAGES AND LITERATURE

SLAVC 600 Independent Study or Research (*) AWSpS

SLAVC 700 Master's Thesis (*)

SLAVC 800 Doctoral Dissertation (*)

SOCIAL SCIENCE

See also under History

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 JU 310 Non-Field Research in Society and Justice (1-5, max. 15) AWSpS

Individual nonquantitative research, under supervision, on some aspects of society and justice. Prerequisite: majors only.

SO JU 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 JU 320 Field Experience in Society and Justice (1-5, max. 5) AWSpS

Stotland
Participant observation in some public or private agency relevant to the system of justice. Prerequisite: majors only.

SO JU 321 Case Study in the System of Justice (1-4, max. 4) AWSpS

Stotland
Personally follow a felony case through the agencies of the system of justice. Prerequisite: majors only.

SO JU 400 Seminar in Society and Justice (3, max. 6) AWSpS

Seminar in various aspects of the administration of justice. Prerequisite: majors only.

SO JU 450 Special Topics in Society and Justice (1-5, max. 15) AWSp

Stotland
Examination of various current topics or issues concerning the criminal justice system in our society.

SOCIOLOGY

SOC 105 Sociology of Black Americans (5)

Black
Evaluates the sociocultural context of the Black man's environment and consequences of interaction with that environment.

SOC 110 Survey of Sociology (5) AWSp

Human interaction patterns shaped by ecology, social structure, and culture. Communication, family processes, social differentiation, and formal organization as integrative mechanisms. Deviance, adaptation, social change.

SOC 223 Social Statistics (5) AWSp

Costner, McCann, Roberts
Methods and sources for quantitative investigation. Prerequisite: 110.

SOC 240 Introduction to Social Psychology (5) AWSp

Blumstein, Hill, Schmitt
Socialization of the individual; social processes; and interactions of persons in groups. Prerequisites: 110 and PSYCH 100.

SOC 270 Social Problems (5) AWSp

Analysis of the processes of social and personal disorganization and reorganization in relation to poverty, crime, suicide, family disorganization, mental disorders, and similar social problems. Prerequisite: 110.

SOC 271 Introduction to the Sociology of Deviance (5)

Bainbridge, Weis
Examination of deviance, deviant behavior, and social control. Deviance as a social process; types of deviant behavior (e.g., suicide, mental illness, drug use, crime, "sexual deviance," delinquency); theories of deviance and deviant behavior; nature and social organization of societal reactions; and social and legal policy issues.

SOC 330 Human Ecology (5) W

Campbell
Factors and forces that determine the distribution of people and institutions. Prerequisite: 110.

SOC 331 Population Analysis (5)

Campbell, Guest
Population growth and distribution, population composition, population theory, urbanization. Determinants and consequences of fertility and mortality trends and migration in economically developed and underdeveloped areas. Prerequisite: 110.

SOC 345 Collective Behavior (5) W

Larsen
Behavior of large numbers in crowds, masses, publics, and social movements where institutional definitions for joint action are minimal and the collectivity seeks to define new patterns of collective action. Prerequisite: 240 or permission.

SOC 346 Group Processes (5) Sp

Cook, Schmitt
Systematic analysis of social processes in small groups, including conformity, deviance, cooperation, competition, coalition formation, status and role differentiation, inequality, communication, and authority and power. A variety of methods of research are considered: field studies, field-experiments, laboratory studies, and the simulation of social processes. Prerequisite: 240 or equivalent.

SOC 347 Socialization (5)

Hill
How social systems control the behavior of their constituent groups, and persons, through the socialization process, sanctions, power, allocation of status and rewards. Prerequisite: 110.

SOC 352 The Family (5) AWSp

Barth, Schwartz
The family as a social institution; personality development within the family; marriage adjustment; changing family patterns; disorganization and reorganization. Prerequisite: 110.

SOC 354 The Comparative Study of Societies (3) Sp

van den Berghe
Entire societies at various levels of technological complexity are compared to explore problems of their development and structural organization. Both historical and contemporary, and Western and non-Western societies are examined. Offered jointly with ANTH 354. Prerequisite: 110 or ANTH 202.

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SOC 361 Age and Sex Differentiation (3)

Physiological and social bases of age and sex differentiation in human societies. The implications of age and sex distinctions for kinship, economic, and political structures. The relationship between age, sex, and other bases of social inequality. Prerequisite: 110.

SOC 362 Race Relations (5) AWSp

Barth, Black, Lee

Interracial contacts and conflicts. Prerequisite: 110.

SOC 364 Women in the Social Structure (5) A or Sp

Bose

Focus is on women's work roles, both in the labor force and in the home. Other institutions examined include women in political organizations, religion, education, and law. Selected groups of women with compounded problems are included: Black women, lesbians, older women, women on welfare. In all cases the structural, ideological, and historical determinants of women's position are examined. Prerequisites: 110 and junior or senior standing.

SOC 365 Urban Community (5)

Barth, Bose, Guest, Lee

Comparative and analytic study of organization and activities of urban groups. Prerequisite: 110.

SOC 366 Bureaucracy in Society (3)

Gross

The coming of organizational societies; causes of bureaucracy; informal relations and work groups; ideologies; authority and the division of labor; social change in bureaucracies; the "faceless" bureaucrat in relationship to client needs; comparative organizations; complex organizations as settings for research.

SOC 371 Criminology (5) AWSp

Schrag, Weis

Factors associated with crime and delinquency. Criminological theories. Survey of correctional facilities and programs. Visits to agencies and institutions. Prerequisite: 110.

SOC 410 History of Sociological Thought (5)

Campbell, Roth

Contributions of individual theorists (from Comte to the present) to a coherent body of testable hypotheses; emphasis on cumulative development of concepts and principles, emergence of sociology as a science, probable future developments. Prerequisite: 110.

SOC 411 Selected Topics in History of Sociological Thought (5)

Campbell, Roth

Specific areas or eras in the history of sociological thought. Emphasis on the development of sociological theory in relation to the intellectual and social setting of the time. Topics change from quarter to quarter, but always are selected from Western sociological thought from 1700 to the present. Some topics are: the development of concepts of order in sociological thought; conflict theories; the development of action theory in sociology; German sociology; Marx, Weber, and Simmel.

SOC 414 Theory Construction (5)

Costner, Schrag

Logical structure of sociological theories; the role of concepts, relations between variables, and operationalization in constructing and testing theoretical formations. Prerequisite: 20 credits in social sciences.

SOC 415 Theory of Social Organization (5)

Wager

State and usages of theory in social organization; importance of linkage between theory and methodology; major features of social organization demonstrated by intensive examination of representative theories of social organization with particular focus on complex forms. Prerequisite: 110.

SOC 420 Methods of Sociological Research (5)

Roberts

General survey of the principal methods of research used in sociology, and of special issues and problems in methodology. Prerequisite: 223 or equivalent.

SOC 421 Methodology: Case Studies and Interviewing (3)

Prerequisites: 223 and 420.

SOC 422 General Methodological Strategies (3)

Wager

Introduction to the varied strategies of research in sociology. These strategies include laboratory and field experimentation, statistical studies, surveys, field observations, historical and comparative studies, mathematical modeling, and computer simulation. Prerequisite: 223.

SOC 424 Statistical Inference (5) A

Roberts

Application of statistical methods to the analysis of sociological data.

SOC 426 Methodology: Quantitative Techniques in Sociology (3)

McCann

Measures of relationships among variables and among attributes; calculation techniques; application to typical sociological problems; interpretation. Prerequisite: 223 or 424.

SOC 427 Statistical Classification and Measurement (3)

Blalock, Costner

Application of statistical principles and methods to problems of classification and measurement in social research. Prerequisites: 426, 428, 429.

SOC 428-429 Principles of Study Design (3-3)

W, Sp

Costner

Study design from problem formulation to the analysis and interpretation of data. Prerequisite: 223.

SOC 430 Human Ecology (5)

Campbell

Factors and forces that determine the distribution of people and institutions. Not open to students who have taken 330. Senior majors and graduate students only. Prerequisite: 110.

SOC 431 Population Analysis (5)

McCann

Population growth and distribution, population composition, population theory, urbanization. Determinants and consequences of fertility and mortality trends and migration in ecologically developed and underdeveloped areas. Not open to students who have taken 331. Senior majors and graduate students only. Prerequisite: 110.

SOC 433 Demographic Methods (3) W

McCann, Preston

Basic procedures for measuring human population growth and structure, including rate construction, standardization, and life table analysis. An introduction to population projections; indirect measurement procedures, and the formal analysis of population growth. Prerequisites: 110 and 223.

SOC 440 Primary Interaction and Personal Behavior (5)

Hill

Social sources of cooperative motives; social basis of the self; nature of primary groups; institutional roles; exceptional and unconventional roles; methodology. Prerequisite: 240 or equivalent.

SOC 442 Public Opinion (3)

Larsen

The nature of public opinion; formation and measurement of public opinion; the operation of public opinion polls. Prerequisite: 240 or equivalent.

SOC 443 Mass Communication (5) Sp

Larsen

Control, structure, and functioning of mass media of communications as a force in social life; methods of research. Prerequisite: 240 or equivalent.

SOC 444 Theory and Research in Social Exchange (3) W

Emerson

Drawing upon behavioral psychology, economics, and anthropology, social structure and social process as a form of exchange are examined. Emphasis is placed upon theory formation concerning social power and reward structures that differ sharply

from perfectly competitive markets. Prerequisite: 240.

SOC 445 Social Movements (3)

Bainbridge

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)

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, Wager

Origins and developments of major social institutions. Sociology of economic structure, political organization, religion, education, recreation, and other institutionalized patterns. Prerequisite: 110.

SOC 451 Theory and Process of Social Change (5)

Hechter, Wager

Basic trends in American life; frames of reference for analysis of social change; forces causing social change. Prerequisite: 15 credits in social 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)

Review and analysis of empirical research in courtship and marriage, marital adjustment, and specific areas of marriage and family life. Prerequisites: 223 and 352.

SOC 454 Social Change in Pre-Industrial Societies (5)

Chirot, Hechter

Theories and evidence concerning social change in preindustrial societies. Topics include: the Neolithic Revolution, rise and fall of classical empires, development of Western European feudalism, and rise of the modern world-system in the sixteenth century. Last part of course deals with theories of modernization and development in contemporary developing societies, but not in contemporary developing societies. Prerequisite: junior standing.

SOC 455 Social Change in Industrial Societies (5)

Chirot, Hechter

Theories and evidence concerning social change in industrial societies, with major emphasis on Britain, France, and the United States from about 1780 to the present day. Topics include: economic development, the development of class consciousness, national development, and imperialism. Texts include nineteenth-century theories of industrialization plus contemporary research on these themes. Prerequisites: junior standing and 25 credits in social sciences.

SOC 456 Political Sociology (3)

Roth

Bases of political legitimacy; modern and traditional structures of domination: theories of democracy, authoritarianism, and totalitarianism; relationship to social classes, status groups, and economic organization. Prerequisite: 110.

SOC 457 Sociology of Religion (5)

Roth

The relations between religion, polity, economy, and social structure; in particular, the political, economic, and social impact of religious beliefs and organizations, as well as the social determination of these beliefs and organizations; the rise of secularism, the rationalization of modern life, and the emergence of political quasi-religions.

SOC 458 Institutional Forms and Processes (5)

Process of institutionalization and the general nature of institutions; relationship of 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 Berghe

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, Bose

Analysis of societal organization based on sex, age, residence, occupation, community, class, caste, and race. Prerequisite: 110.

SOC 462 Comparative Race and Ethnic Relations (3)
van den Berghe

Race and ethnicity are examined as factors of social differentiation in a number of Western and non-Western societies in Europe, Africa, Asia, and the Americas. Prerequisites: 110, 362.

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)

Wager

Changing focus of field; cultural variation, work, and the worker; technology, society, and the evolution of industrial forms; types and forms of industrial organizations; industrial organizations as social and technical systems; issues of control, process, and change; the individual in social and technical systems. 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)

Bose

Frameworks for study of occupations and professions; occupational structure and mobility in American society and relation to adult socialization and career development; occupational and professional associations and society. Prerequisites: 240 and 15 credits in social sciences.

SOC 469 Balkan Societies (3) Sp

Chiot

Examination of the roots of Balkan social problems (economic backwardness, minority-group conflicts, peasant problem), the failure of pre-1945 attempts to solve these problems, and the post-1945 Communist attempts at solution. Particular emphasis placed upon Bulgaria and Albania. Prerequisite: at least one introductory social science course.

SOC 472 Juvenile Delinquency (5)

Costner, Weis

Factors in delinquency, juvenile courts. Programs of treatment and prevention. Prerequisite: 371 or equivalent.

SOC 473 Corrections (5)

Schrag, Weis

Social control of crime. Police, courts, institutions, and correctional agencies for adult offenders. Indi-

vidual and group therapies. Captive communities. Prerequisite: 371 or equivalent.

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.

SOC 488 Sociological and Psychological Theories of Sexuality (5) Sp

Blumstein, Schwartz, Wagner

Advanced course on human sexuality covering psychological and sociological theories of sexual identity and life-styles, analysis of present research in sexuality, and generation of new research. Topics include acquisition of sexual identity differences in male and female sexual patterns, sex in relationships, sexual malfunctioning, etc. Paper and research proposal are required. Offered jointly with PSYCH 488. Prerequisites: 110, PSYCH 210 or permission, and statistics.

SOC 496H, 497H, 498H Senior Seminar (3 or 5, 3 or 5, 3 or 5) A,W,Sp

Blumstein

Exploration of selected sociological problems with emphasis on research experience and the interpretation of data. For sociology majors only; primarily for Honors students. Prerequisites: senior standing and permission.

SOC 499 Undergraduate Independent Study or Research (2-5, max. 15) AWSp

Open only to qualified undergraduate students by permission.

Courses for Graduates Only

SOC 501, 502, 503 Research Frontiers in Sociology (3,3,3)

Review and analysis of research strategic requirements and opportunities in and between major fields of sociology. Required 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 approach; 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 consequences of population patterns, to delimit areas where current knowledge is deficient; to begin instilling the analytic skills required to advance knowledge in the area.

SOC 514 Current Theories in Social Psychology (3) A

Blumstein, Schmitt

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, Weis

Survey of current research on deviant behavior and mechanisms of social control; definitions and forms of deviant behavior, causal analysis, and legal or other methods of social control. Prerequisite: graduate standing.

SOC 518 Social Stratifications (3) W

Bose

Intensive preparation in theoretical, methodological, and substantive topics in social stratification.

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 familiarize graduate students with basic perspective in the area of political sociology and social change, which is an examination field for the Ph.D., with some classical works and some exemplary empirical studies of recent date.

SOC 521, 522 Seminar on Methods of Sociological Research (3,3)

Prerequisites: 223 and 420, or equivalents.

SOC 526 Causal Approach to Theory Building and Data Analysis (3)

Blalock

Theory construction and testing from a causal models perspective. One-way causation (recursive models); implications for data analysis, path analysis, standardized versus unstandardized measures. Feedback models and simultaneous-equation systems: identification problems, estimation in over-identified models, difference 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 527 Measurement of Basic Sociological Concepts (3)

Blalock

Seminar focuses on general types of conceptualization and measurement problems in sociology, using major concepts as illustrations of basic issues. A causal approach to measurement is employed to deal with problems of indirect measurement, differing levels of generality, and cross-level measurement problems involving structural-effects models and aggregation and disaggregation. Consequences of crude measurement for data analyses are explored. Prerequisite: 524; 426 recommended.

SOC 528 Seminar on Selected Statistical Problems in Social Research (3)

Costner

Prerequisite: 426.

SOC 529 Multiple Indicators in Social Measurement (3) W

Costner

Use of multiple indicators (e.g., repeated measures, alternate measures, multiple observers) in estimating the reliability, assessing the validity, and analyzing conceptual and indicator problems in social measurement. Implications of constant measurement error, random measurement error, and correlated measurement error for research conclusions. Traditional reliability theory and structural equation models in the analysis of multiple indicator data. Prerequisites: 426 and 524.

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.

SOC 532 Research Methods in Human Ecology (3)

Analysis of community structure, segregation, and other spatial phenomena. Measures of migration, intercity relations, and diversity. General problems of measuring ecological associations. Prerequisite: 330 or 430.

SOC 533 Research Methods in Demography (3)

Measures of population composition, fertility, and mortality. Life table analysis, standardization procedures, population projects and estimates. Prerequisite: 331 or 431.

SOC 539 Selected Topics in Demography and Ecology (3, max. 9)

Preston

Specialized problems in demography or ecology are covered; for example, migration, fertility, mortality, language, race and ethnic relations, metropolitan

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community. See quarterly announcement for specific problem to be covered.

SOC 540, 541 Seminar in Social Interaction (3,3)

Schmitt

Evaluation of studies in social interaction. Analyzes types of interaction, interaction models, and such major variables as roles, self-conception, and the influence of norms.

SOC 542 Selected Topics in Group Processes (3)

Cook

Theories, methodology, and studies in the area of small-group research. May be repeated for credit. Prerequisite: permission for nonmajors.

SOC 543 Communications Seminar (3)

Larsen

Sociological research in mass communication. Emphasis on the role of groups in providing norms and networks in the flow of information and influence from the mass media. Prerequisite: 443 or equivalent.

SOC 544 Seminar on Social Power (3)

Emerson

Examination of basic principles concerning power, influence, and authority in small groups, organizations, and communities. Prerequisites: 240, 415, and 460.

SOC 545 Methods of Experimental Analysis in Social Research (3)

Schmitt

Application of the method of experimental analysis to problems in sociology and social psychology.

SOC 546 Seminar on Symbolic Interaction (3) W

Blumstein

Focuses each year on several key areas in, and related to, the symbolic interactionist perspective (e.g., language, the self, the dramaturgic perspective, ethnomethodology, attribution theory, etc.). Prerequisite: permission for nonmajors.

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 in 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 in Complex Organizations (3,3) W,Sp

Gross, Wager

Research training in industrial sociology. Readings and field projects. Prerequisite: 465 or equivalent.

SOC 569 Social and Cultural Change: Africa (3, max. 9)

Ottenberg, van den Berghe, Winans

Urbanization, stratification, technology, education, social and religious movements, and cultural pluralism in contemporary Africa. Offered jointly with ANTH 569. Prerequisite: graduate standing in a social science department.

SOC 571 Correctional Communities (3)

Schrag

Prisons and juvenile reformatories as communities. Prerequisites: 371 and 473.

SOC 572 Analysis of Criminal Careers (3)

Personal and social factors in criminal maturation and reformation. Prerequisites: 371 and 473, or equivalents.

SOC 573 Crime Prevention (3)

Critical consideration of programs for delinquency prevention. Prerequisites: 371 and 472.

SOC 574 Seminar on Methods of Criminological Research (3)

Schrag

Provides training in the technical analysis of published research in criminology; designs and processes studies in parole prediction, prediction of prison adjustment, and prediction of treatment effect.

SOC 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 (*)

AWSp

SOC 700 Master's Thesis (*) AWSp

SOC 800 Doctoral Dissertation (*)

SPEECH COMMUNICATION

Courses for Undergraduates

SPCH 102 Speech, the Individual, and Society (5)

AWSp

Introductory survey course that provides a basic understanding of human speech communication. Covers three major areas: (1) the nature of human communication, including models, principles, settings; (2) nonverbal communication; and (3) approaches to and functions of, human communication, including persuasion, interpersonal communication, argument, propaganda, free speech.

SPCH 103 Basic Principles of Oral Communication (5) AWSp

Stewart

Introductory course in interpersonal communication. Emphasizes analyzing and experiencing communication variables affecting human relationships, such as person perception, feedback, idea development, nonverbal cues. Focus is on informal communication settings. Credit may not be received for both 103 and 203.

SPCH 140 Oral Interpretation of Literature (5)

AWSp

Post

Introduction to the study of imaginative literature through the medium of oral performance. Analysis and interpretation of verse, prose, and drama.

SPCH 203 Principles of Oral Communication (3)

AWSp

Theory and practice of interpersonal communication in instructional settings. Designed to prepare prospective teachers to employ communication effectively as a medium of teaching and learning, to create a classroom communication environment in which interaction is open and productive, and to guide students toward desirable communication behavior. Recommended for all teacher candidates. Credit may not be received for both 103 and 203.

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.

SPCH 222 Speech Communication 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 240 Critical Approaches to Oral Interpretation (3)

Relating oral interpretation performance and literary criticism. Critical study and performance of contemporary verse, prose, and drama. Prerequisite: 140.

SPCH 270 Introduction to Empirical Research in Speech Communication (5) ASp

Basic research principles in speech-communication science; survey of substantive research findings. Prerequisite: 103.

SPCH 305 Perspectives on Language in Speech Communication (5)

Stewart

Introduction to the study of language and meaning, and survey of three influential modern approaches: the semantic- general-semantic, behavioral, and analytic philosophical. Relates theories of language and meaning to the study of speech communication.

SPCH 308 Humanistic Approaches to Interpersonal Communication (5) W

Stewart

Exploration of several humanistic approaches to interpersonal speech communication, emphasizing the theorists' philosophical orientations.

SPCH 310 The Rhetorical Tradition in Western Thought (5) A

Shadow

Analysis of the major theories that prescribe and describe the use of symbols to change attitudes and behavior. Principal emphasis is placed upon defining the nature and scope of rhetoric and upon analyzing the art's underlying assumptions about man as a user of symbols. Some background in history, philosophy, and literature is desirable. Prerequisite: junior standing or permission.

SPCH 320 Public Speaking (5) A

Practice in preparation and presentation of a variety of types of public speeches based on study of their structure and form; emphasis on organization and delivery. Prerequisite: 220 or permission.

SPCH 329 Rhetoric of Social and Political Movements (5) Sp

Bosmajian

Inquiry into the rhetoric of social and political movements; emphasis on investigation of persuasive discourse; examination of the nonverbal symbols of persuasion.

SPCH 334 Essentials of Argument (5) AWSp

Argument as a technique in the investigation of social problems; evidence, proof, refutation, persuasion; training in argumentative speaking.

SPCH 335 Methods of Debate (3)

Introduction to debate as a method of advocacy with study and practice of its more important forms. (Not offered 1976-78.)

SPCH 339 Forensic Studies (1-3, max. 9)

Discussion of selected public questions before audiences on and off campus. No more than 3 credits may be earned in one year, and these should normally be distributed through at least two consecutive quarters. Prerequisite: permission. (Not offered 1976-78.)

SPCH 345 Ensemble Oral Interpretation (3)

Potentials for ensemble oral interpretation in the three major genres of imaginative works of literature. Includes study in the theory and techniques of Chamber Theatre and Readers Theatre. Prerequisite: 140.

SPCH 347 Oral Interpretation of Nonfiction Prose (3)

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.

SPCH 349 Readers Theatre (2, max. 10) AWSp

Post

Preparation and public presentation of programs of literary works. Prerequisites: 140 and permission.

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 and the interpersonal communication goals and processes of small instructional discussion groups, particularly those used in 102. Emphasis is on each class member's practical application of the insights derived. Prerequisites: 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 373 Principles of Group Discussion (5) AWSp

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 203, or permission.

SPCH 400 Theoretical Backgrounds in Speech Communication (3) W
Nilsen

Speech viewed as a form of individual and social behavior, with emphasis on the function of symbols in speech communication in informal and societal settings. The development of speech as a field of study, and its contemporary emphases.

SPCH 421 Advanced Speech Composition (5) W
Nyquist

Preparation and delivery of public speeches, with emphasis on style, thought organization, and proof. Analysis of model speeches. Prerequisite: 220, or permission.

SPCH 424 Rhetorical Perspective in Revolutionary Documents (5) A
Campbell

Rhetorical investigation of selected major writings. Examines the rhetorical dimension in the progress of ideas through analysis of revolutionary documents as persuasive works. Relates principal revolutions in Western thought to contemporary controversy. Examines *Rights of Man*, *Communist Manifesto*, *The Origin of Species*, etc.

SPCH 425 American Public Address (5) A
Baskerville

Historical and critical study of principal speakers and speeches and of their relationship to American political, social, and intellectual life. Oratory of the American Revolution; the "Golden Age" of American oratory; debates on ratification of the federal Constitution, the slavery question, Reconstruction, woman suffrage, populism, imperialism. Lectures, discussions, and readings.

SPCH 426 American Public Address (5) Sp
Baskerville

Historical and critical study of principal speakers and speeches and of their relationship to American political, social, and intellectual life. The public lecture—Lyceum to Chautauqua; academic addresses; the progressive era; League of Nations debate; polemics of the New Deal era; isolationism versus one world; the cold war era; controversy over civil rights. 425 recommended.

SPCH 428 British Public Address (5) W
Campbell

Blend of historical and critical analysis of significant speeches and speakers and of their relationship to British social, political, and religious life. Course provides historical overview of the major periods of British oratory and of the unique role of the oration in each as a means of exhortation and advocacy.

SPCH 440 Oral Interpretation of Poetry (3) W
Nyquist

Study of forms of verse through analysis and oral presentation. Prerequisite: 140.

SPCH 442 Oral Interpretation of Fiction (3) A
Nyquist

Analysis and 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 (3) A

Development of understanding of the content and the form of selected Elizabethan plays by relating literary analysis and performance. Plays by Shakespeare, Marlowe, Kyd, Jonson, and Webster are included. Prerequisite: 140.

SPCH 455 Communication in Children's Environments (4) W
Booth

Study of the communication capacity of children with emphasis on the analysis of the communication process in formal and informal learning environments. Includes examination of communication-based educational approaches and instructional strategies.

SPCH 456 Communication in Youth Environments (4) W
Booth, Nyquist

Study of the communication process in youth environments with a primary focus on formal and informal learning. Includes critical analysis of communication in contemporary instructional settings, and the development of communication strategies for teaching and learning.

SPCH 457 Debate and Discussion Problems in High School and College (2½) S

Evaluation of debate and discussion in high school and college and consideration of methods of directing; specific consideration of debate questions in current use; bibliographies, analyses, and briefs.

SPCH 471 Persuasion (3) Sp

Analysis of the ways in which beliefs, values, attitudes, and behavior are deliberately influenced through communication.

SPCH 472 Empirical Approaches to Interpersonal Communication (5) AW
Arundale, D'Angelo

Examination of major theoretic positions and empirical research findings in current speech communication literature on interpersonal influence. Emphasis on the insights that such theory and research provides on human speech-communication behavior in common interpersonal situations.

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.

SPCH 476 Models and Theories in Speech Communication (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.

SPCH 499 Undergraduate Research (1-3, max. 15) AWSps

Prerequisite: permission.

Courses for Graduates Only

SPCH 501 Introduction to Graduate Research in Speech Communication (3) A

SPCH 521 Studies in Greek and Roman Rhetoric (5) A

Development of the Greek tradition in rhetorical

theory, criticism, and pedagogy from Homer to Augustine; analysis of the contributions of major figures and works to that tradition.

SPCH 522 Studies in Medieval and Renaissance Rhetoric (5) W

Critical analysis of selected persons, works, and topics related to the development of rhetorical theory during the Middle Ages and the Renaissance. Prerequisite: 521 or permission. (Offered alternate years; offered 1977-78.)

SPCH 523 Studies in Modern Rhetoric (5) W
Campbell

Critical analysis of writings on rhetoric by Cox, Wilson, Bacon, Campbell, Blair, Whately, and others.

SPCH 524 Studies in Contemporary Rhetoric (5) Sp
Nilsen

Critical analysis of theories of rhetoric from early twentieth century. Influences on theory; rhetoric and related disciplines.

SPCH 525 Rhetorical Criticism (5) W
Baskerville

History and method of rhetorical criticism. Application of critical standards to notable British and American speeches. Prerequisite: 424 or 425 or 426 or 428.

SPCH 540 History of Oral Interpretation (3)

Critical analysis of writings by Sheridan, Walker, Rush, Delarte, Bell, Curry, Emerson, and others.

SPCH 543 Studies in Theories of Performance and Criticism (3)

Analysis of performance theories as expressed in the writings of oral interpreters and literary critics.

SPCH 550 Problems and Methods in Speech Pedagogy (3) A

Philosophical, curricular, and methodological problems of speech instruction. (Offered alternate years; offered 1976-77.)

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

Application of methodology and design principles to research problems in speech communication. Prerequisite: 577- for -578.

SPCH 590 Seminar in Theory of Speech Communication (2, max. 6) A

SPCH 592 Seminar in Public Address (2, max. 6) W

SPCH 593 Seminar in Rhetorical Theory (2, max. 6) Sp

SPCH 594 Seminar in Oral Interpretation (2, max. 6) Sp

SPCH 595 Seminar in Speech Pedagogy (2, max. 6) Sp

SPCH 597 Seminar in Interpersonal Communications (2, max. 6) ASp

Examination of experimental literature on selected topics. Subject to change from year to year; topics include conflict resolution, information processing, communication networks, feedback systems, audience composition research, communication effects. Prerequisite: permission.

SPCH 598 Small Group Discussion and Communication (2) AW

Prerequisite: 501 or equivalent.

SPCH 600 Independent Study or Research (*) AWSp

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SPCH 700 Master's Thesis (*) AWSp

SPCH 800 Doctoral Dissertation (*)

SPEECH AND HEARING SCIENCES

Courses for Undergraduates

SPHSC 100 Voice and Articulation Improvement (3) AWSp

The nature of the process of voice production and of the sound system of standard American speech. Questions of speech standards, regional and social dialects, and voice quality are considered. Special laboratory work available to students with significant voice or pronunciation problems. (Formerly SPCH 100.)

SPHSC 101 Applied Phonetics (2) AWSp

For students with special concerns in the area of pronunciation and articulation. Not open to those who have had 300 or 302. (Formerly SPCH 101.)

SPHSC 111 Standard and Nonstandard American Speech: Theory and Applications (2, max. 4) AWSp
A wide variety of American speech patterns or dialects is studied in terms of their phonetic, phonological, sociolinguistic, and psycholinguistic characteristics. Study of standard and nonstandard American speech patterns is supplemented by readings in phonetics, phonology, sociolinguistics. Students analyze their own patterns and develop appropriate phonetic skills if desired. Especially useful for foreign students and minority students from nonstandard speech communities. Prerequisite: permission. (Formerly SPCH 111.)

SPHSC 250 Introduction to Communication Disorders (3) ASp

Orients the student to the field of human communication and its disorders and to a basic classification system. Required of all students majoring in speech and hearing sciences. (Formerly SPCH 250.)

SPHSC 300 Speech Science (5) AWSpS

Bennett, Tiffany, Watkin
Study of the basic physiological and acoustical attributes of speech. (Formerly SPCH 300.)

SPHSC 301 Anatomy of the Speech Mechanism (3) AWSpS

Palmer
Structure and function of the organs concerned with phonation and articulation. (Formerly SPCH 301.)

SPHSC 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. Three lectures and two laboratories per week. Prerequisite: 301 or permission. (Formerly SPCH 302.)

SPHSC 303 Applied Analysis of Language Behavior (3) AW

Watkin
Application of linguistic analysis techniques to the language behavior of speech-disordered persons. Prerequisite: LING 200 or permission.

SPHSC 307 Speech and Language Development (3) WSp

Study of the normal acquisition of speech and language in children. Prerequisite: 250, 302, 303, or permission. (Formerly SPCH 303.)

SPHSC 310 Introduction to Hearing Science (5) AWSpS

Sparks, Weber
Introduction to acoustic properties of simple and complex sounds; description of normal audition; elementary structure and function of the hearing mechanism. (Formerly SPCH 310.)

SPHSC 311 Speech Science: Speech Production (5) WSpS

Watkin
Concentrated study of the physiological, acoustical, and perceptual aspects of speech production. Examples and laboratory work directed toward students with interests in speech pathology and audiology.

For majors only. Prerequisites: 301 and 310; 310 may be taken concurrently.

SPHSC 315 Survey of Hearing Impairment (3) ASp

Thompson, Wilson, Yantis
Causes of hearing impairment and their psychological, social, and educational/vocational effects on the individual. Prerequisite: 310.

SPHSC 330 Disorders of Articulation (3) ASp

Prather
Nature, etiology, and treatment. Prerequisites: 250, 302, and 307. (Formerly SPCH 330.)

SPHSC 332 Introduction to Evaluation and Interviewing (4) ASp

Study of materials and procedures used in the evaluation of speech disorders. Prerequisites: 307 and 330. (Formerly SPCH 332.)

SPHSC 348 Survey of Communication Disorders (3)

For students not intending to concentrate in speech pathology or audiology. (Formerly SPCH 348.)

SPHSC 350 Methods of Clinical Management (4) AWSpS

Till
Principles and procedures for planning effective management of speech disorders. Prerequisites: 330, 332, and permission. (Formerly SPCH 350.)

SPHSC 351 Practicum in Speech Pathology (1-4, max. 6) AWSpS

Till
Laboratory experience. Total undergraduate credits in 351 and 391 together cannot exceed 20; students are encouraged to take 4 to 6 credits of 351 over a two- or three-quarter sequence. Prerequisites: 332, 350, and permission. (Formerly SPCH 351.)

SPHSC 370 Basic Audiometry (5) WSp

Introduction to the theory and practice of the assessment of hearing function, including standard pure-tone audiometry, speech audiometry, and basic impedance audiometry. Two hours of laboratory required each week. Class size limited to twenty-five students. Prerequisites: 315 and permission. (Formerly SPCH 371.)

SPHSC 380 Introduction to Aural Rehabilitation (3) WS

Wilson
Principles and methods of speech reading, auditory training, and speech conservation. Enrollment limited to forty students. Prerequisite: 315 and permission. (Formerly SPCH 390.)

SPHSC 391 Practicum in Audiology (2, max. 10) AWSpS

Lablak, Schultz
Supervised practicum in audiological assessment (section A) and aural rehabilitation (section B) of children and adults. Total undergraduate credits in 351 and 391 together cannot exceed 20 credits. Prerequisites: 350 and permission, plus 370 for section A and 380 for section B.

SPHSC 401 Neural Bases of Speech and Language (3) ASp

Flowers
Introduction to the neuroanatomical and neurophysiological bases of motor speech production and language processes. Anatomy laboratory visits. Prerequisite: 301 or permission.

SPHSC 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. (Formerly SPCH 402.)

SPHSC 410 Psychology and Physiology of Audition (4) W

Sparks
Qualitative and quantitative description of physiological and perceptual auditory analysis. Two hours of laboratory per week required. Prerequisite: 310 or permission.

SPHSC 420 Instrumentation for Speech and Hearing Science (3) A

Sparks, Weber
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. (Formerly SPCH 420.)

SPHSC 430 Nature of Stuttering (3) ASp

Prins
Major theories of stuttering are studied in light of research concerning the characteristics of stutterers and their symptoms. Prerequisite: 250 or permission. (Formerly SPCH 430.)

SPHSC 431 Language Disorders of Children (3) ASp

Consideration of descriptions and theories, both historical and contemporary, of disordered language in children and related problems. Prerequisites: 250, 303, and 307. (Formerly SPCH 331.)

SPHSC 449 Special Studies in Speech Pathology and Audiology (1-6, max. 15) AWSpS

Intensive study of selected special problems in speech pathology and audiology. Prerequisite: permission. (Formerly SPCH 449.)

SPHSC 450 Treatment of Stuttering (3) W

Prins
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. (Formerly SPCH 450.)

SPHSC 451 Speech Pathology-Audiology Practicum in the Schools (1-10, max. 10) AWSpS

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. (Formerly SPCH 451.)

SPHSC 452 Rehabilitation Medicine Information in Speech Pathology (3) A

Beukelman
Orientation information for speech pathology and audiology students on rehabilitation principles and techniques. Lecture and clinical observation in all areas of rehabilitation, emphasizing cooperation and coordination of various professions in rehabilitation. Offered jointly with REHAB 479. (Formerly SPCH 452.)

SPHSC 454 Voice Disorders (3) WS

Palmer
Etiology, evaluation, and treatment. Prerequisites: 250 and 301. (Formerly SPCH 454.)

SPHSC 470 Survey of Audiological Assessment (3) A

Thompson, Yantis
General review of methods, techniques, and instruments used in the measurement of auditory function designed for majors in speech pathology, speech science, and special education. Not open to audiology majors except by permission. Review of research literature. Prerequisite: 370 or permission. (Formerly SPCH 570.)

SPHSC 479 Pediatric Audiology (3) Sp

Thompson
Assessment of auditory disorders in infants and young children. Emphasis on behavioral and electrophysiological techniques and on the role of the audiologist in the clinical management of the young hearing-impaired child. Prerequisite: 370 or permission. (Formerly SPCH 579.)

SPHSC 484 Hearing Conservation for Children (3) SpS

Wilson
Planning and execution of identification and educational programs relative to hearing-impaired infants and children of preschool and school ages. Prerequisite: 370 or permission. (Formerly SPCH 494.)

SPHSC 499 Undergraduate Research (1-5, max. 15) AWSpS

Prerequisite: permission. (Formerly SPCH 499.)

Courses for Graduates Only

SPHSC 502 Advanced Anatomy of Speech and Hearing Structures (2) AWSp*Palmer*

Directed individual dissection and study of selected anatomic structures of the speech or hearing mechanisms. Prerequisites: 301 and permission. (Formerly SPCH 502.)

SPHSC 503 Current Issues in Speech Science (3, max. 9)

Application of experimental methods to research in speech science. (Formerly SPCH 503.)

SPHSC 504 Research Methods in Speech and Hearing Science (3) WS*Prather, Watkin*

Introduction to empirical methods in the speech and hearing sciences.

SPHSC 510 Physiological Acoustics (3) W*Sparks*

Study of pertinent literature and experimental techniques incident to the scientific study of the normal and abnormal auditory system. Prerequisites: 410 and familiarity with algebra and trigonometry. (Offered alternate years.) (Formerly SPCH 526.)

SPHSC 511 Psychoacoustics (3) SpW*Sparks*

Review of significant literature and theory pertinent to normal auditory sensitivity, pitch, loudness, and other attributes of auditory sensation. Prerequisites: 410 or permission, familiarity with intermediate mathematics (105 or equivalent). (Offered alternate years.) (Formerly SPCH 527.)

SPHSC 514 Speech Physiology (3) A*Abbs, Watkin*

Study of the physiological parameters of speech production. Prerequisites: 310, 311, or permission. (Formerly SPCH 414.)

SPHSC 515 Speech Acoustics (3) W*Bennett, Minifie*

Study of the acoustical correlates of the distinctive parameters of speech. Prerequisites: 310, 311, or permission.

SPHSC 516 Speech Perception (3) Sp*Bennett*

Study of the perceptual and linguistic parameters of speech perception. Prerequisites: 310, 311 or permission.

SPHSC 519 Seminar in Speech Science (2, max. 6)*(Formerly SPCH 519.)***SPHSC 520 Advanced Instrumentation for Speech and Hearing Sciences (3) Sp***Sparks*

Design and use of electronic and electro-acoustic devices in the speech and hearing sciences. Four hours of laboratory required each week. Prerequisite: 420. (Formerly SPCH 520.)

SPHSC 530 Maxillofacial Bases of Speech Disorders (3) WS*Palmer*

Includes cleft palate and dental abnormalities. Prerequisite: 301 or permission.

SPHSC 531 Neurogenic Disorders of Speech and Language (3) AW*Flowers*

Includes aphasia, apraxia of speech, and dysarthria. Prerequisite: 401 or permission.

SPHSC 532 Evaluation and Treatment of Neurogenic Speech and Language Disorders (3) WSp*Flowers*

Principles and procedures of evaluation and treatment. Prerequisite: 531 or permission.

SPHSC 535 Psychological Factors in Communication Disorders (2)

Prerequisite: PSYCH 305 or permission. (Formerly SPCH 535.)

SPHSC 536 Evaluation of Communication Disorders in Children (5) AWSpS

Approaches and experience in differential diagnosis

of speech and language disorders in children. Two hours of laboratory required per week. Class size limited. Prerequisites: 332 and permission. (Formerly SPCH 536.)

SPHSC 551 Advanced Practicum in Speech Pathology (1-9, max. 10) AWSpS

Laboratory experience. Prerequisites: 351 and permission. (Formerly SPCH 551.)

SPHSC 552 Clinical Management of Stuttering (4) WS*Nichols, Prins*

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. (Formerly SPCH 552.)

SPHSC 555 Externship in Speech and Hearing Sciences (9) AWSpS

Practicum experience in speech pathology or audiology in an established professional center. Twenty hours per week must be free for this placement late in the student's master's level program. Prerequisites: 150 hours of supervised practicum and permission.

SPHSC 560 Research Methods in Clinical Management of Childhood Language Disorders (3)

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: 307 and permission. (Formerly SPCH 560.)

SPHSC 561 Language of Normal Children (3)

Advanced study of language acquisition and use by normal children, with emphasis on behavioral, semantic, grammatical, and syntactic aspects. Tools employed in study of early language development are presented. Two hours of laboratory required each week. Class size limited. Prerequisites: 307 and 560 or equivalent, and permission. (Formerly SPCH 561.)

SPHSC 562 Evaluation and Management of Language Disorders of Children (4) AW

Procedures and tools used in evaluating the language skills of children are presented along with parent interviewing techniques and professional reporting methods. Three hours of practicum each week in an interdisciplinary clinic are required. Class size limited. Prerequisites: 303, 307, 431, and permission. (Formerly SPCH 562.)

SPHSC 563 Clinical Management of Language Disorders of Children (2-3, max. 10) AWSpS

Laboratory experience. Prerequisites: 431, 562, and permission.

SPHSC 564 Clinical Evaluation of Language Disorders of Children (3-4, max. 10) AWSpS

Laboratory experience. Prerequisites: 536, 562, and permission.

SPHSC 565 Classroom Management of Language Behaviors (1-9, max. 10) AWSpS*Rieke*

Methodology and supervised experience in management of language behaviors in a preschool class setting. Prerequisites: 562 and permission.

SPHSC 566 Seminar in Language Development and Disorders (2, max. 6)

Prerequisites: 307, 431, 562. (Formerly SPCH 566.)

SPHSC 569 Seminar in Speech Pathology (2, max. 6) AWSpS

(Formerly SPCH 569.)

SPHSC 570-571 Assessment of Auditory Dysfunction I, II (4-4) AW*Yantis*

Utilization of acoustic variables in the evaluation of abnormal hearing. Critical analysis of the literature. Concurrent registration in 591 required. Prerequisite: 370 or equivalent.

SPHSC 572 Impedance Audiometry (3) A*Wilson, Yantis*

Instrumentation and approaches to evaluation of auditory function through determination of impedance characteristics, including tympanometry. Prerequisite: 370 or equivalent. (Also offered alternate Summer quarters.)

SPHSC 573 Electrophysiologic Assessment of Auditory Function (3) A*Weber*

Consideration of electrophysiologic techniques that may be used to evaluate the normal and disordered auditory system. Outside laboratory required. Prerequisite: 310 or permission. (Offered alternate years.)

SPHSC 574 Speech Audiometry (2) W*Thompson*

Use of speech stimuli in predicting general communicative functioning and in making differential diagnosis of the auditory system. Prerequisite: 370. (Offered alternate years.)

SPHSC 575 Medical Background for Audiology (2) A*Snyder*

Diseases and injuries of the ear resulting in reduced audition. Prerequisite: 315 or permission. (Formerly SPCH 575.)

SPHSC 580 Advanced Aural Rehabilitation (3) Sp*Wilson*

Survey and study of the pertinent research literature in speech reading, auditory training, and speech conservation for the auditorily handicapped. Prerequisite: 380 or permission. (Formerly SPCH 596.)

SPHSC 581 Management of Hearing-Impaired Children (3) S

Management of hearing-impaired children, including identification of target behaviors and methods for modification such as individualized therapy programs and parent and teacher involvement.

SPHSC 582 Hearing Aid Application (5) Sp*Yantis*

Study of acoustic amplification and pertinent audiological techniques. Prerequisites: 370 and 380, or permission. (Formerly SPCH 598.)

SPHSC 584 Industrial and Community Hearing Conservation (3) W*Yantis*

Psychophysiological effects of environmental noise on man. Techniques of noise measurement and attenuation, including the planning of hearing conservation programs in industry and in the community. Prerequisite: 570-571 or permission. (Offered alternate years.) (Formerly SPCH 574.)

SPHSC 589 Seminar in Audiology (2) AWSpS

Prerequisite: permission. (Formerly SPCH 599.)

SPHSC 591 Advanced Practicum in Audiology (2, max. 10) AWSp*Labiak, Shultz*

Prerequisite: forty hours of practicum. (Formerly SPCH 591.)

SPHSC 596 Experimental Design in Speech and Hearing Sciences (3) Sp

Applications of basic statistical procedures to investigation of specific problems in the communication sciences. Prerequisites: 504, course in statistics, or permission. (Offered alternate Spring quarters.) (Formerly SPCH 505.)

SPHSC 599 Research Practicum (2, max. 12) AWSpS

Supervised laboratory experience in experimental approaches to problems in speech and hearing sciences. Prerequisite: permission.

SPHSC 600 Independent Study or Research (*) AWSpS**SPHSC 700 Master's Thesis (*) AWSpS****SPHSC 800 Doctoral Dissertation (*) AWSpS**

WOMEN STUDIES

Courses for Undergraduates

WOMEN 200 Introduction to Women Studies (5) AWSpS

Interdisciplinary course introducing women studies through lectures, readings, and discussions, drawing selectively from the College of Arts and Sciences and including the following fields: anthropology, art history, economics, history, law, literature, psychology, and sociology.

WOMEN 206 Philosophy of Feminism (3) W
Philosophical assumptions underlying the feminist movement; the various subtheories within feminism (e.g., socialist feminism, radical feminism, etc.). Offered jointly with PHIL 206. Not open to students who have taken GIS 106.

WOMEN 257 Psychology of Sex Differences (3)
Major psychological theories of sex-role development in young children; biological and socialization influences that affect sex differences during adolescence; adult sex-roles, their maintenance, conflict, and new resolutions. Offered jointly with PSYCH 257. Not open for credit to students who have taken GIS 244.

WOMEN 290 Special Topics in Women Studies (2-5, max. 15) AWSpS
Offered occasionally by visitors or resident faculty.

WOMEN 310 Women and the Law (5) AWSpS
Introduction to the legal process, focusing on the status of women and the law; the legal status of single and married women, the rationale of protective legislation, and the effect of the legal changes such as the Civil Rights Act of 1964 and Equal Rights Amendments. Study of current cases on abortion, child care, tax laws, and Social Security benefits. Not open to students who have taken GIS 355.

WOMEN 353 Anthropological Studies of Women (3) W Jacobs
Cross-cultural, comparative survey of the varieties of women's cultural experiences, status, and roles. In addition, the anthropological theories used to account for women's status and roles in various cultures are examined in light of methods used to collect and interpret data. Offered jointly with ANTH 353. Prerequisite: ANTH 202 or permission.

WOMEN 357 Psychobiology of Women (3)
Cultural assumptions about, and interaction between, mind and body and some of the physiological mechanisms that mediate the interaction. Topics include reproductive physiology, psychosexual development, hormones and mental states, developmental sex differences, cultural perspectives, ethological arguments, female sexuality, and the effects of the social system and sex roles on women's health care. Offered jointly with PSYCH 357. Not open for credit to students who have taken GIS 357.

WOMEN 400 Senior Seminar in Women Studies (3) Sp
Part of the senior thesis requirement in Women Studies. Affords students an opportunity to share research knowledge and experience with their peers, under faculty supervision. The thesis should be completed by the end of the course. Must be taken concurrently with G ST 493. Prerequisites: senior standing and General Studies majors concentrating on Women Studies, and permission.

WOMEN 404 Women and the Cinematic Imagination (5, max. 15) AWSp Murphy
Examines women's roles in film and the current body of criticism assessing the history of women in the cinema. Topics, which vary each quarter, include: Women in Foreign Films, The Actress and the Director, and Films by Women, among others. Offered jointly with CINE 404. Prerequisites: CINE 201, 202, 203, or permission.

WOMEN 490 Special Topics in Women Studies (2-5, max. 15) AWSpS
Offered occasionally by visitors or resident faculty. Primarily for upper-division and graduate students.

WOMEN 499 Undergraduate Research (1-5, max. 10) AWSpS
Prerequisite: permission.

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 Martin
Elementary human physiology. For nonmajors. Credit is not given for 118 if credit has previously been given for 208.

ZOOL 119 Elementary Physiology Laboratory (1) A Martin
Specifically for physical education majors. May be taken by others only with permission. Prerequisite: 118 taken concurrently.

ZOOL 208 Elementary Human Physiology (5) Sp Griffiths
Each organ system is described and its function 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 220 Diversity in Animals (5) WS
Morphological, functional, and ecological diversity within the major phyla of animals. Prerequisite: BIOL 211.

ZOOL 301 Introductory Physiology (4) Olsen, Riddiford, Truman
Fundamentals of physiology: biochemistry of cell constituents, environment of the cell, bioenergetics, intermediary metabolism, membranes, control mechanism. Laboratory project required. Prerequisites: chemistry through organic, one year of college physics, 10 credits in biological sciences.

ZOOL 330 Natural History of Marine Invertebrates (5) SpS Kohn, Paine
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 Snyder
Field and laboratory course on the classification, ecology, adaptations, and natural history of fishes, amphibians, reptiles, birds, and mammals. Students may be required to share a portion of the transportation costs of field trips. Prerequisite: permission.

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: BIOL 212.

ZOOL 409 Ethology (3) W Orians
Perception, nervous integration, movement, motivation, instinct, learning, and social behavior in animals, with emphasis on their evolution and selective significance. Offered jointly with PSYCH 409. Prerequisite: 212 or PSYCH 200, or equivalent.

ZOOL 410 Ethology and Ecology Laboratory (1-4) Sp Orians, Paine
Field projects on foraging and social behavior, species interactions and structure of terrestrial and marine communities, including special student research problems. Students may be required to share a portion of the costs of transportation. Prerequisite: permission.

ZOOL 423 Protozoology (5)
Introduction to protozoa exclusive of parasites, with emphasis on morphology (including fine structure and function), ecology, taxonomy, and life histories. Prerequisite: 20 credits in biological sciences or permission; BIOL 401 recommended.

ZOOL 428 General Physiology of Excitable Tissues (3) Willows
Simple and complex ionic equilibria, electrical properties of membranes; active and passive membrane responses. Impulse generation and conduction; electrical and chemical synapses; structure of muscle, and mechanical, thermal, chemical, and electrical aspects of contraction. Prerequisite: 301.

ZOOL 429 General Physiology of Excitable Tissues Laboratory (2) Willows
Laboratory work to demonstrate the basic properties of nerve and the electrical and mechanical characteristics of muscle. This is followed by experiments with diverse species that emphasize less-well-known nerve, muscle, and synaptic phenomena. Training is given in the use of intracellular and extracellular stimulating and recording methods and other basic electrophysiological techniques. Prerequisites: 428, taken concurrently, and permission.

ZOOL 430 Marine Zoology (8) SpS Kozloff
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. Offered at Friday Harbor Laboratories Autumn and Spring quarters. Concurrent registration in BOT 445 required at Friday Harbor. Prerequisites: 20 credits in biological sciences and upper-division standing.

ZOOL 432 Marine Invertebrate Zoology (9) SpS
Morphology and phylogeny of marine invertebrates. Offered at Friday Harbor Laboratories. Not open to students who have had 433, 434. Prerequisite: BIOL 212.

ZOOL 433, 434 Invertebrate Zoology (5,5) A, W Ills, Kohn, Kozloff
Morphology and phylogeny of invertebrates exclusive of terrestrial arthropods. Not open to students who have had 432. Prerequisites: BIOL 212; 433 for 434.

ZOOL 435 Parasitology (5) Osterud
General course covering the principles of parasitism and the major groups of animal parasites. Prerequisite: 20 credits in biological sciences or permission.

ZOOL 438 Comparative Endocrinology (3) W Gorbman
Hormonal integration of living processes at all levels in animals: cells, organs, organisms, populations. Prerequisites: one year of biology; histology and organic chemistry recommended.

ZOOL 439 Comparative Endocrinology Laboratory (2) Sp Gorbman
Appropriate experiments to accompany and enlarge on material presented in 438. Prerequisites: 438 and permission.

ZOOL 444 Entomology (3) Sp Edwards
Biology of terrestrial 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.

ZOOL 445 Entomology Laboratory (2) Sp

Edwards
Structure and function of arthropods, with emphasis on insects. Field studies and taxonomy of important insect groups. Students may be required to share a portion of the transportation costs of field trips. Prerequisites: concurrent registration in 444 and permission.

ZOOL 448 Concepts of Nervous System Function (3)

Palka
Broad examination of integrative mechanisms in central nervous system function, with emphasis on sensory processing, plasticity, and control of behavior. Examples are taken from a variety of animal groups.

ZOOL 449 Concepts of Nervous System Function Laboratory (2)

Palka
Experiments to accompany material presented in 448. Prerequisites: 448 and permission.

ZOOL 453-454 Comparative Anatomy of Chordates (5-5) A,W

Snyder
Morphology and phylogeny of the chordates; structure, function, and evolution of vertebrate organ systems. Prerequisite: BIOL 212.

ZOOL 456 Developmental Biology of Animals (5) AWSp

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 Winter and Spring quarter courses emphasize experimental aspects and the use of live material in the laboratory. Prerequisite: BIOL 212. Prior completion of ZOOL 301 recommended for the Winter and Spring quarter courses.

ZOOL 457 Methods and Problems in Development (3)

Lecture course in experimental embryology focusing on modern approaches to developmental problems and emphasizing their analysis at a biochemical level. Selected topics are covered in two lectures each week. Readings from primary sources are assigned in conjunction with lecture material, to be discussed in a discussion section once weekly. Prerequisites: 456 and permission.

ZOOL 458 Vertebrate Physiology (5)

Martin, Olsen
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.

ZOOL 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.

ZOOL 464 Natural History of Birds (5) Sp

Rohwer
Field, lecture, and laboratory study of birds framed in biological theory rather than taxonomy. Breeding systems, brood parasitism, appearance, molt, migration, orientation, social behavior, song, and flight are emphasized. Includes Saturday and weekend field trips for which students are required to share a portion of transportation costs. Prerequisites: BIOL 210, 211, 212 or equivalent, and permission.

ZOOL 465 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: BIOL 212 and permission. (Offered alternate years.)

ZOOL 468 Comparative Physiology (5) Sp

Martin, Olsen, Trueman
Osmotic and ionic regulation, respiration, circulation, and excretion, with special emphasis on the variety of means with which animals solve common problems. Prerequisite: 301.

ZOOL 469 Reproductive Endocrinology (3) Sp

Gorbman
Regulation of the processes of mammalian reproduction. Integration of reproduction with environmental features through behavioral and metabolic adjustments; its structural and functional evolutionary adaptive aspects. Endocrine modulation of the reproductive process and its demographic implications. Prerequisite: one year of college-level biology.

ZOOL 470 Concepts and Issues (5)

Zoological concepts, their current and potential applications to cultural dilemmas and frontiers. Prerequisite: advanced standing.

ZOOL 475 Zoogeography (3) A

Schoener
Present and past distribution of animals and plants, both aquatic and terrestrial, especially as determined by ecological factors. Prerequisites: BIOL 210, 211, 212, or equivalent.

ZOOL 479 Environmental Physiology (5) Sp

Martin
Relationship of vertebrate and invertebrate physiology to physical factors in the environment. Prerequisites: 301 or equivalent, invertebrate or vertebrate zoology, one year of college physics, chemistry through organic; 400-level physiology course recommended.

ZOOL 490 Undergraduate Seminar (3, max. 6)

Supervised reading and group discussion on selected concepts of zoology. Prerequisites: 20 credits in zoology and permission.

ZOOL 491 Topics in Zoological Research (1, max. 3)

Undergraduate seminar on research problems currently under investigation by department faculty members. Includes discussions and laboratory demonstrations of aims, techniques, and results of zoological research. Prerequisites: upper-division standing and permission.

ZOOL 496 Special Problems in Zoology (1-5, max. 15) AWSps

Prerequisites: 30 credits in zoology and permission.

Courses for Graduates Only

ZOOL 506 Topics in Experimental Embryology (2, max. 6)

Seminars and discussions of aspects of growth of special current interest. Prerequisite: permission.

ZOOL 509 Topics in Animal Behavior (1-3, max. 9) AWSp

Orlans, Rohwer
Detailed consideration of topics in behavioral integration, communication, and social organization. Prerequisite: 409 or PSYCH 409 or equivalent.

ZOOL 517 Comparative Developmental Physiology (6 or 9)

Whiteley
The topics of oogenesis, fertilization, and differentiation of invertebrates are considered from the point of view of biosyntheses, permeability, and metabolic changes, acquisition of specific biochemical properties and physical mechanisms of developmental processes. The laboratory deals comparatively with a variety of marine invertebrates. 9 credits available at Friday Harbor Laboratories only. Prerequisite: permission.

ZOOL 520, 521, 522 Seminar (1,1,1) A,W,Sp

Farner

ZOOL 528 Advanced Topics in Physiology (1-3, max. 15)

Bakken, Edwards, Laird, Riddiford, Schubiger
Advanced considerations in physiology with emphasis on recent developments. Prerequisite: at least one 400-level course in physiology.

ZOOL 533 Advanced Invertebrate Zoology (9) SpS

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.

ZOOL 534 Topics in Advanced Invertebrate Zoology (3 or 6 or 9)

Illg, Kohn, Kozloff
Advanced considerations in morphology, ecology, phylogeny of invertebrates, emphasizing current developments. 9 credits available at Friday Harbor Laboratories only. Prerequisite: permission.

ZOOL 536 Comparative Invertebrate Embryology (9) 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 (9) 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, Riddiford, 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, BIOL 212 or equivalent, or permission.

ZOOL 568 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

Edmondson, Kohn, Orlans, Palne
Graduate seminar on modern problems in ecology. Prerequisites: BIOL 472 or equivalent, and permission.

ZOOL 574 Ecology of Marine Communities (3)

Palne
Lecture course emphasizing the ecological structure and functioning of marine communities. Topics include population interactions and dynamics, distributional patterns, bioenergetics, stability, and species diversity. Prerequisites: BIOL 472 or equivalent, and permission.

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)

Orlans
Strategies of reproduction, habitat selection, foraging and spacing; theory of competition and predator-prey interactions; niche theory and community structure. Prerequisites: BIOL 472 or equivalent, and permission.

ZOOL 579 Population and Community Ecology (3) A

Schoener
Population dynamics, resource partitioning, niche, and community diversity, mainly from a theoretical point of view. Prerequisites: two quarters of calculus, BIOL 472 or equivalent, and permission.

SCHOOL OF BUSINESS ADMINISTRATION

ZOOL 581 Systematic Zoology (5)

Illg
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, photomicrography. Methodologies are applied to analyses of special problems selected by students. Prerequisite: permission.

ZOOL 600 Independent Study or Research (*)

AWSpS

ZOOL 700 Master's Thesis (*) AWSpS

ZOOL 800 Doctoral Dissertation (*) AWSpS

SCHOOL AND GRADUATE SCHOOL OF BUSINESS ADMINISTRATION

ACCOUNTING

Courses for Undergraduates

ACCTG 210 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 Introduction to 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 planning, decision making, and control. Concentrates on types of economic decision making in enterprises and on accounting information useful to enterprise managers. Prerequisite: 220.

ACCTG 301 Intermediate Accounting I (3)
Concepts and principles of financial accounting. Analysis of controversies and problems related to the measurement of enterprise income. Prerequisite: 230.

ACCTG 302 Intermediate Accounting II (3)
Continuation of 301. Prerequisite: 301.

ACCTG 303 Advanced Accounting (3)
Theory and problems in accounting for ownership equities in corporations and partnerships. Financial statement analysis and internal measurement of business performance. Prerequisite: 302.

ACCTG 311 Cost Accounting (3)
Introduction to the theory of cost accounting; job order, process, and standard cost systems; overhead accounting; problems in accumulation and allocation of costs; decision making with cost data. Prerequisite: 301.

ACCTG 371 Auditing or Industrial Internship (2)
One quarter's internship with a certified public accounting firm, industrial organization, or government agency. Prerequisite: prior departmental approval.

ACCTG 375 Topics in Financial Reporting (4)
Critical examination of the uses and limitations of general purpose financial statements that have been prepared in accordance with generally accepted

accounting principles. Prerequisite: 230; not open to accounting majors.

ACCTG 401 Federal Income Tax Factors in Business Decisions (3)

Service course recommended for the junior year for the schools of Business Administration. May also be taken by MBA students for graduate credit. Prerequisite: 230.

ACCTG 411 Auditing Standards and Principles (3)

Intensive introduction to the attest function in society today. The environment, the process, and the report of the public auditor are analyzed. Potential extensions of the attest function are examined. Prerequisites: 303, 311.

ACCTG 421 Federal Income Tax (5)

Comprehensive development of individual and corporation income tax. Includes concepts of income, deductions, nontaxable exchanges, tax basis, and capital asset transactions. Prerequisite: 303 or permission.

ACCTG 430 Introduction to Information Systems (3)

Study of the concepts of information systems in administrative organizations and the processes of analyzing and designing systems, with an emphasis on those using computer facilities. Includes sufficient study of computer systems to understand their present and future impact on information systems and to evaluate proposals for computerization of existing systems. Prerequisites: 230 and QMETH 200.

ACCTG 440 Accounting Systems (3)

Concepts and methodology of computerized information systems analysis and design, and a study of the management of the information function. Introduction to COBOL. Advanced study of computer equipment and its impact on systems. Prerequisite: 430.

ACCTG 450 Special Tax Problems (3)

Development of basic principles of federal income taxation applicable to partnerships, estates, and trusts, corporate reorganization, gifts, and estates; consideration of foreign taxes, Social Security taxes, and appeals procedure. Prerequisite: 421.

ACCTG 460 Advanced Cost Accounting (3)

Advance analysis of cost and management accounting problems; special applications of cost accounting techniques for management planning and control; current developments in cost accounting. Prerequisite: 311.

ACCTG 470 Case Studies in Auditing (4)

Application of the theory, standards, and principles to a simulated audit engagement. Guest lecturers discuss the broad-ranging audit involvement. Prerequisite: 411.

ACCTG 475 Administrative Controls (3)

Use of budgetary, statistical, and accounting information in planning operations and achieving planned objectives through control. Prerequisites: 230 and QMETH 201.

ACCTG 480 Fund Accounting (3)

Fund and budgetary accounting as applied to public sector organizations, such as governments, foundations, hospitals, and colleges. Prerequisite: 303.

ACCTG 485 Consolidated Financial Statements (3)

Accounting for parent-subsidiary and branch relationships; mergers; foreign exchange. Prerequisite: 303.

ACCTG 490 Advanced Problems (3)

Intensive study of accounting principles, procedures, and financial reporting, principally through consideration of C.P.A. examination problems. Prerequisites: 311, 411, 421, 480.

ACCTG 495 Advanced Accounting Theory (3)

Theory of accounting related to income measurement, 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.

Courses for Graduates Only

ACCTG 500 Financial Accounting (3)

Introduction to concepts and procedures underlying determination and presentation of information for financial decisions by investors and other decision makers outside the business enterprise. Study of problems of valuation, income determination, and financial reporting.

ACCTG 501 Managerial Accounting (3)

Study of the generation and the use of accounting information within the firm for purposes of planning and controlling operations. Topics covered include cost concepts, responsibility accounting systems, cost control, and the use of accounting information in short- and long-term management decision problems. Prerequisite: 500.

ACCTG 510 Concepts in Accounting Measurements (3)

An intensive study of accounting principles underlying financial statements, the measurement of income, the valuation of assets, and accounting for corporate stock equities. Emphasis is placed on the uses and limitations of accounting data, including analysis and interpretation of financial statements. Prerequisite: 500, 501, or permission.

ACCTG 511 Concept in Accounting Measurements (3)

Identifying and measuring attributes of resources of the firm relevant to management decisions. Topics covered include: developing standards, budgets and plans; formal planning models; decision analysis; control analysis; and information analysis. Prerequisite: 500, 501, or permission.

ACCTG 520 Seminar on Financial Accounting (3)
Critical examination of alternative approaches to the study and the 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.

ACCTG 521 Seminar on 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. Prerequisite: 520 or permission.

ACCTG 522 Seminar on Cost Accounting (3)
Critical examination of theories of cost and managerial accounting. Differentiation of objectives of managerial and financial accounting; joint costs, absorption, direct, standard, and distribution costing; techniques of analysis of data, including differential cost analysis.

ACCTG 540 Seminar 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.

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 information systems, management control systems, and the expansion of the reporting function. Outside project includes an audit of an actual company selected by students.

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 Financial Control Systems (3)

Design and administration of formal information systems to aid the planning and control process in large organizations; formulation of divisional financial goals and control criteria; measurement of divisional performance and problems of goal congruence; administration of new investment programs. Prerequisites: 501 and A ORG 550 or 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 departmental faculty and occasional distinguished visiting faculty. For doctoral students only.

ACCTG 600 Independent Study or Research (*)

ADMINISTRATION

ADMIN 510 Integrative Administration (15) S

Johnson

Includes materials basic to the study and analysis of administration in organizations: organization theory and administrative behavior; resource allocation, accounting, and financial control; systems operation and analysis; marketing; and governmental-societal framework. Faculty team-teaching 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 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 440 Organization Theory (3)

Studies of concepts of power, authority, 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.

A ORG 441 Advanced Organization Theory (3)

Deals with current research, measuring organizational effectiveness, planning, leadership patterns, current problems, developments in related disciplines. Prerequisite: 440.

A ORG 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 and in taking action; includes specific personal, social, and organizational aspects; case discussion, instrumental exercises, and analysis of concepts and conceptual schemes. Offered on credit/no credit basis only.

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. Offered on credit/no credit basis only.

A ORG 463 Administrative Behavior (4)

Studies practice and theory in formal organizations through selected readings and actual cases. Emphasizes 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. Offered on credit/no credit basis only. Prerequisite: either 460 or HRSYS 301.

A ORG 464 Racial, Ethnic, and Cultural Factors in Administration (4)

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. Offered on credit/no credit basis only. 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. Offered on credit/no credit basis only. 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 theories in other fields, such as behavioral science and economics, are related to business organization and management theory. Prerequisite: permission.

A ORG 560 Seminar in Organization Design (3) W

Those who design organizations in business firms, or other organizations, have available to them certain alternative patterns from which they may choose. Each is thought to be contingent upon current conditions outside the organization, or current conditions inside the organization, or the stage of evolution or growth in which the organization exists. The seminar examines these alternative patterns, asking which structure is likely to be most productive. Prerequisite: permission.

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 ACCTG 571-572 for description.

A ORG 575 Human Aspects of Administration (3)

Examines administration process with a primary focus on organizational behavior. Develops the basic contributions of social science and other sources in the formulation of administrative-organizational conceptual schemes. 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 own and others' behavior and of the consequences of that behavior, using the vehicle of the T- (for training) group—an unstructured, agendaless small group that focuses on the "here and now" actions, 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. Offered on credit/no credit basis only. 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 into general theory. Prerequisite: permission.

A ORG 581 Seminar in Advanced Organizational Behavior (3)

Analysis and examination in depth of human behavior in the organizational setting; research, theory, and practice and their impact on individual or group behavior. In different quarters one topic such as leadership, motivation, interpersonal communication, small-group dynamics, etc., is covered. Prerequisite: permission.

A ORG 584 Theory and Practice in Organization Development (3)

Provides a conceptual understanding of organization development and some practice in developing applicable skills. Inquires into such matters as the history of organization development, conditions for successful application, organization diagnosis, client-consultant relationships, the action research model, team building, intergroup conflict resolution, and 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 600 Independent Study or Research (*)
Prerequisite: permission.

BUSINESS ADMINISTRATION

B A 500 Integrative Course in Business Administration I (15) A

Includes introductory material from accounting, quantitative methods, business economics, administrative theory and organizational behavior. Taught by a team of faculty members and presented in a

related and integrated form as a total package. Offered on credit/no credit basis only. Open to first-year M.B.A. students only.

B A 501 Integrative Course in Business Administration II (15) W

Includes material in business economics, quantitative methods, marketing, finance, operations and systems analysis, and public policy. Taught by a team of faculty members, and presentation of material follows format of 500. Open to first-year M.B.A. students only. Offered on credit/no credit basis only. Prerequisite: 500.

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: QMETH 200 and permission.

B A 700 Master's Thesis (*) AWSp

B A 800 Doctoral Dissertation (*)

BUSINESS ADMINISTRATION RESEARCH METHODS

BA RM 500 Statistical Methods I (4)

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. Prerequisite: QMETH 500 or equivalent.

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 of variance and 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, or permission.

BA RM 511 Applied Econometrics II (3)

Continuation of 510. Hypothesis testing, distributed lags, serial correlation models, simultaneous equation models. Prerequisite: 510.

BA RM 520 Behavioral Research Methods—Theory and Design (3)

Philosophy of science, development of scientific method, and meaning of behavioral research. Historical perspective of scientific investigation and the evaluation of research. The development of theory and its relationship to research. Various strategies and designs in behavioral research. Prerequisites: 500 and 501, or permission.

BA RM 521 Behavioral Research Methods—Approaches and Applications (3)

Considers alternative research approaches, such as laboratory and field experimentation, simulation, and surveys, with data-gathering techniques appropriate for each approach. It is primarily concerned with developing alternative approaches to research problems and with discussing specific applications. It builds upon a background of specific statistical tools and techniques and an understanding of theory development and research design. 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: ECON 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: ECON 200 and 201.

B ECN 439 Business Forecasting (4)

Analysis of basic variations affecting general business conditions as a background for business and investment decisions; appraisal of proposals for controlling cycles and of forecasting techniques. Prerequisites: 301 and QMETH 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.

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. Prerequisite: 500.

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 QMETH 500, and permission.

B ECN 513 Forecasting the Economic Environment of the Firm (3)

Survey, evaluation, and synthesis of techniques available to forecast supply and demand conditions at the macro and industry levels. Emphasis on understanding macro forecasts and converting them to industry forecasts. Prerequisite: 501.

B ECN 520 Seminar on Monetary and Fiscal Policy (3)

Exploration of the recent and current literature in the area of monetary and income theory and an examination of monetary and fiscal policy problems in the area of domestic finance. Prerequisites: 500, 501.

B ECN 524 Input-Output Analysis (3)

Application of input-output techniques to the analysis and forecast of industrial and regional markets and production requirements. Input-output as general applications of forecasting of economic growth impact analysis and policy simulation in the context of national, international, and regional linkages. Prerequisites: 500, 501.

B ECN 526 Industry Structure and Performance (3)

Market structure, conduct, and performance; mergers and diversification; price and nonprice patterns of firm behavior. Prerequisite: 500.

B ECN 571-572 Research Reports (3-3)

See ACCTG 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: 500.

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

BG&S 101 Business: An Introductory Analysis (5)

The nature and role of American business in modern society, its growth, structure, organization, and relationship to environment. Business firms, their objectives, functions, and management. Problems of organization, decision making, controls, investment in business, and related aspects. Career opportunities in business.

BG&S 200 Introduction to Law (5)

Legal institutions and processes; law as a system of social thought and behavior and a frame of order within which rival claims are resolved and compromised; legal reasoning; law as a process of protecting and facilitating voluntary arrangements in a business society. Prerequisite: sophomore standing or above.

BG&S 310 Legal Aspects of Business and Public Policy (5)

Legal questions involved in government and institutions including government regulation of competition, 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)

Principles of the law of property, sales, negotiable instruments, and security transactions. Prerequisite: 200.

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 497 Behavioral Science and the Study of Business (3) Asp

Demonstrates the applicability of behavioral concepts to the role of business. Among the aspects of human behavior studied are: man as an evolved species; ethology (comparative animal behavior) and its meaning to human self-understanding; culture and personality; the advent of civilizations, their types and histories; the origins of industrialism and its growth; the place of American society in Western civilization and the contemporary world; the interplay between American can industry and the consumer, with special attention to the economic impact of fashions in taste. Prerequisite: junior or senior standing.

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 540 Cultural Change and Modernization (3)

Intensive analyses of specific cases of culture change around the world. The emphasis is on economic development and modernization with special attention to 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 ACCTG 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 macrobusiness 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.

BG&S 599 Doctoral Seminar on Business, Government, and Society (3)

Study and research in advanced topics of business, government, and society. Generally concerned with unpublished areas of research and conducted by visiting professors and departmental faculty. May be repeated for credit. Prerequisite: permission.

BG&S 600 Independent Study or Research (*)

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 on problem analysis, the decision-making process, administration and control, and continuous reappraisal of policies and objectives. This course integrates and builds upon the work of the core curriculum. Entry card required. Prerequisites: senior standing or above and FIN 350, MKTG 301, OPSYS 301, and HRSYS 301 or A ORG 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. Entry card required. Prerequisites: senior standing or above and FIN 350, MKTG 301, OPSYS 301 and HRSYS 301 or A ORG 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 FIN 350, MKTG 301, OPSYS 301 and HRSYS 301, or A ORG 460, or permission.

B POL 499 Undergraduate Research (3, max. 9)

Prerequisite: permission.

Courses for Graduates Only

B POL 509 Policy Decisions in Business and Non-Business Institutions (3)

Analysis of policy problems faced by managers in business, government, and nonprofit institutions. Determination of organizational product/service objectives, development of operating policies and methods to achieve objectives at a satisfactory cost to the consumer and to society. Designing organizational structures, provision of executive personnel to fit the organization's goals and operating methods. Prerequisites: second year in M.B.A. program or final stages of other graduate programs.

B POL 510 Strategic Planning in Larger Corporations (3)

Similar to 509 and can be taken instead of 509. Brings together in one course students who plan careers in larger regional, national, and international business corporations; or in firms that serve such corporations (accounting, law, engineering, consulting).

B POL 530 Entrepreneurship (3)

Entrepreneurship, both in the form of establishment of new independent businesses owned largely by those who manage them and 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 545 Field Projects and Experience Exercises in General Management (3)

Case writing in on-going organizations, analysis and recommendations on real policy problems in corporations or other institutions, and management games or simulations specifically designed according to the public policy area of courses. Prerequisite: 509 or 510.

B POL 571-572 Research Reports (3-3)

See ACCTG 571-572 for description.

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 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.

B POL 600 Independent Study or Research (*)

Prerequisite: permission.

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: B ECN 300.

FIN 420 Financial Markets (4)

Analysis of the structure and functions of the

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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: B ECN 301.

FIN 423 Banking and the Financial System (4)
Role of banks and nonbank financial institutions in the financial system; asset choices of banks and nonbank financial institutions; problems in the management of financial institutions with emphasis on commercial banks. Prerequisites: 350, 420.

FIN 427 International Finance (4)
Asset choice and institutional operations in international finance; foreign exchange problems; the impact of international financial problems and operations on business; short-term and long-term international financing. Prerequisite: B ECN 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 ACCTG 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 QMETH 201.

FIN 460 Investments (4)
Introduction to the nature, problems, and process of evaluating particular securities and portfolio construction and administration. Special attention is directed to the risk and rate of return aspects of particular securities, 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. Prerequisites: B ECN 500, 501; ACCTG 500, 501.

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 U D 515 and URB P 553. Prerequisite: 502, U D 505, URB P 552, or 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: B ECN 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: 520 and B ECN 500, 501.

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 B ECN 501.

FIN 550 Advanced Business Finance (3)
Systematic coverage of the theory of financial management. Application of quantitative analysis to the investment, financial structure, and dividend policies of the firm. Prerequisite: 502.

FIN 551 Problems in Business Finance (3)
The application of financial principles and techniques to problems in financial management. Topics include cash management, credit management, problems in short-term and long-term financing, and capital budgeting. Prerequisite: 502.

FIN 552 Seminar 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: 502, 550.

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. Prerequisite: 502 or 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. Prerequisite: 560.

FIN 571-572 Research Reports (3-3)
See ACCTG 571-572 for description.

FIN 599 Doctoral Seminar in Finance (3)
Study and research in advanced topics of finance. The seminar is generally concerned with unpublished areas of research and is conducted by visiting professors and departmental faculty. May be repeated for credit. For doctoral students or by permission. Prerequisites: for Autumn Quarter, 560; for Winter Quarter, 599 and 550; for Spring Quarter, 599 taken Autumn Quarter and Winter Quarter and BA RM 510 or equivalent.

FIN 600 Independent Study or Research (*)

HUMAN RESOURCE SYSTEMS

Courses for Undergraduates

HRSYS 301 Personnel Systems and Industrial Relations (3)
The recruitment, selection, utilization, and development of human resources, with special emphasis on union-management relations and relevant behavioral science research.

HRSYS 443 Staffing (4)
Includes manpower planning, recruitment, testing, selection, placement orientation, training, 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 program, collective bargaining, and contribution of personnel department to the organization. Prerequisite: permission.

HRSYS 530 Personnel Systems and the Behavioral Science (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 ACCTG 571-572 for description.

HRSYS 599 Doctoral Seminar in Personnel and Industrial Relations (3)
Study and research in advanced topics of personnel and industrial relations. The seminar is generally concerned with unpublished areas of research and is conducted by visiting professors and departmental faculty. For doctoral students only. May be repeated for credit. Prerequisite: permission.

HRSYS 600 Independent Study or Research (*)
Prerequisite: permission.

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 industrial 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 nontariff 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 tactics; 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 480 Multinational Operations Management (4)

Case studies in foreign operations management: planning international objectives and strategies; developing multinational company structures and executives; adapting administrative practices and operating policies to international diversities. Prerequisite: 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 confront 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; integrations of the different national subsystems; normative deductions. Prerequisites: 515 and permission.

I BUS 571-572 Research Reports (3-3)

See ACCTG 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 firms are located. Limited to students who have the approval of a program adviser and a faculty member who has agreed to direct their work in accordance with a definite program of studies. Prerequisite: permission.

I BUS 599 Doctoral Seminar in International Business (3)

Study and research in advanced topics of international business. The seminar is generally concerned with unpublished areas of research and is conducted by visiting professors and departmental faculty. May be repeated for credit. For doctoral students only. Prerequisite: permission.

I BUS 600 Independent Study or Research (*)**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: ECON 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 B ECN 300.

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. 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. 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; QMETH 201 recommended.

MKTG 420 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 studies. Prerequisite: 301.

MKTG 430 Measurement and Analysis of Marketing Data (4)

Application of various analytical methods in marketing research, including multivariate techniques (e.g., multiple regression, factor analysis, and multidimensional scaling). Includes field and laboratory experimentation and various examples of applications and available computer programs. Designed for students with interest in empirical marketing analysis. Prerequisites: 301 and QMETH 201, or equivalent.

MKTG 440 Analytical Models in Marketing (4) AW

Johansson, MacLachlan, Moinpour

Application of various management science models and selected computer programs to marketing problem areas, such as advertising budgeting, media planning, brand switching, forecasting, and market stimulation. The applications also include stochastic models, Bayesian approaches, and linear programming. Prerequisites: 301, QMETH 350, or equivalent.

MKTG 490 Special Topics and Issues in Marketing (4, max. 8)

Emphasis on contemporary topics and issues in marketing: marketing in nonprofit organizations, marketing of services, marketing in the public sector, and marketing in an economy of scarcity. Ordinarily only one topic area is addressed in any one quarter. Course content reflects contemporary developments and the current interests of instructors and students. Prerequisite: 301.

MKTG 491 Cases in Marketing Management (4)

Analysis of managerial marketing cases involving market trends, marketing research, product planning, distribution channels, pricing, promotion, and social trends. Prerequisite: 301.

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 marketing 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 512 Promotion Management (3)

Management of advertising and personal selling and their integration with other elements of the marketing mix. The communication process, situation analysis, determining promotional mix and the budget, media selection, management of personal selling resources, stimulating reseller promotional support, measurement and evaluation of promotional effectiveness, and social and economic considerations. Prerequisite: 500.

MKTG 514 Marketing Research (3)

Methods and applications of marketing research incorporating analytical procedures and relevant concepts from behavioral and quantitative sciences: problem definition, research design, questionnaire construction, sampling, and data analysis. Introduction of new developments in multivariate techniques of data analysis, laboratory and field experimentation, and demand analysis in both business and public environments. Prerequisites: 500, QMETH 500.

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 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 QMETH 500, and permission.

MKTG 522 Advanced Marketing Concepts (3)

The interdisciplinary exchange of ideas related to

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marketing is studied. The marketing theories and evolving concepts of marketing and management are critically appraised. Prerequisites: 520 or 521, and permission.

MKTG 525 Seminar in Consumer Behavior (3)
Analysis of current research in consumer behavior. Topics include consumer decision-making processes, models of buyer behavior, and contributions from the behavioral sciences. Prerequisites: 500 and permission.

MKTG 555 Social Political Marketing (3)
Exploration and application of marketing concepts and techniques to noncommercial and public exchange relationships. Marketing of social goods as well as the social performance of marketing and emphasized along with political and value dimensions of the subject. Prerequisite: 500; nonbusiness graduate students may be admitted without 500 if they have completed equivalent graduate work in another discipline.

MKTG 571-572 Research Reports (3-3)
See ACCTG 571-572 for description.

MKTG 599 Doctoral Seminar in Marketing (3)
Study and research in advanced topics of marketing. The seminar is generally concerned with unpublished areas of research and is conducted by visiting professors and 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

OPSY 301 Principles of Operations Analysis (3)
Fundamentals of systems management and the techniques used in the analysis and control of operating systems. Background of management decision making and 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: QMETH 200, 201, or permission.

OPSY 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.

OPSY 441 Systems Theory and Design (4)
Planning and design of systems, including analytical techniques particularly suited to systems design (e.g., systems dynamics, continuous-flow computer simulation models, systems analysis, and network analysis). Analysis of organizations as complex systems, emphasizing the interactions between management decisions and information feedback. Prerequisite: 301 or permission.

OPSY 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.

OPSY 443 Scheduling and Inventory Systems (4)
Analysis of alternative scheduling and inventory systems of emphasis on application of mathematical models and computer simulation. Includes effective utilization of inventory resources, inventory systems, distribution systems, aggregate forecasting and scheduling, network planning methods, job shop scheduling, and sequencing operations. Prerequisite: 301 or permission.

OPSY 499 Undergraduate Research (3, max. 9)
Prerequisite: permission.

Courses for Graduates Only

OPSY 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: QMETH 500 and permission.

OPSY 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.

OPSY 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.

OPSY 571-572 Research Reports (3-3)
See ACCTG 571-572 for description.

OPSY 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 an 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.

OPSY 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 QMETH 510, and permission.

OPSY 585 Systems Analysis Models (3)
Study of elements and structure of system analysis models. Examination of systems analysis in public sector, of complex organizations, and in environmental affairs. Emphasis on quantitative, computer-oriented forms of analysis. Prerequisite: permission.

OPSY 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.

OPSY 600 Independent Study or Research (*)
Prerequisite: permission.

QUANTITATIVE METHODS

PROBABILITY AND STATISTICS

Courses for Undergraduates

QMETH 201 Statistical Analysis (4)
Survey of statistical techniques useful in guiding

business decisions: introduction to probability, decision making, correlation, and regression. Prerequisites: 200 and MATH 157.

QMETH 401 Statistical Methods for Business Research (4)
Sampling distributions, estimation, tests of hypotheses, simple nonparametric methods, elements of statistical decision theory. Prerequisite: 201.

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.

Courses for Graduates Only

Students interested in probability and statistics are also urged to consider BA RM 500 and 501.

QMETH 500 Probability and Statistics (3)
Introduction to statistical concepts that are basic to the business decision-making process. Probability theory, descriptive methods, tests of hypothesis, choice of models. Prerequisite: MATH 157 or equivalent.

QMETH 520 Applied Multivariate Analysis (4)
Exploration and inference using linear models. Advanced treatment of simple and multiple regression, use of dummy variables, analysis of covariance, and selection of variables to be included in the equation. Prerequisite: 500. (Formerly 521.)

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; 520 or equivalent strongly recommended.

QMETH 540 Statistical Decision Theory (4)
Application of utility theory and probability theory to decision making under conditions of uncertainty. Emphasis on Bayesian methods—prior-to-posterior, preposterior analysis, design of optimal experiments. Prerequisite: 500 or equivalent. (Formerly 516.)

OPERATIONS RESEARCH AND COMPUTER METHODS

Courses for Undergraduates

QMETH 200 Computer Programming (2)
Introduction to computer programming using the BASIC language and "canned" programs. Applications to business problems. (Not recommended for students with credit for ENGR 141 or MATH 114.)

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 MATH 157.

QMETH 404 Computer Programming for Business (4)
Programming techniques and languages for solution of quantitative 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 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 application. 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 510 Quantitative Methods (3).
Survey of operations research techniques for business problem solving. Emphasis on linear programming and general mathematical programming techniques. Prerequisites: 350, MATH 157, or equivalent.

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 MATH 407.

QMETH 552 Stochastic Models in Operations Research (4)

Optimal decision making in an uncertain environment; probabilistic dynamic programming, including finite horizon and unbounded horizon models, Markov chain models, inventory models, and waiting line models. Not open for credit to students who have taken 451. Prerequisite: 510 or 450 or MATH 407.

QMETH 560 Research Seminar in Operations Research (4, max. 8)

Intensive study into operations research techniques relevant to business analysis. Selected topics include: extensions of linear programming, solution of large systems, stochastic processes, dynamic programming, discrete programming, and network models. Prerequisites: 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 or equivalent.

QMETH 571-572 Research Reports (3-3)
See ACCTG 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: 570, B A 513, 515.

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

R INS 310 Fundamentals of Risk and Insurance (5)

Introduction to principles of insurance. Economic and social contributions of insurance. Evaluation of loss exposures faced in business and personal situations. Planning to use insurance intelligently in dealing with loss exposures. Analysis of alternative methods. Prerequisite: junior standing.

R INS 420 Analysis of Insurer Operations (4)

Study of basic operations common to all types of insurance companies. Emphasis on analysis and decision making as applied to different insurance company operating problems. Prerequisite: 310.

R INS 480 Risk Control (4)

Control of nonmarket risks as a managerial function. Evaluation of alternative courses of action. Influence of competitive pressures and regulation of the insurance industry. Prerequisite: 310.

R INS 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, materials 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 ACCTG 571-572 for description.

TRANS 600 Independent Study or Research (*)
Prerequisite: permission.

URBAN DEVELOPMENT

Courses for Undergraduates

U D 310 Introduction to Urban Development (4)
Introduction to real estate markets, investment, appraisal, accessibility concepts, urban history, urban research, and related topics. Offered jointly with URB P 350.

U D 320 Legal Aspects of Urban Development (3)
Legal aspects of modern land utilization including the urban plan, zoning, and private and public ownership—with preliminary discussion of the nature of property and a brief survey of real property law. Offered jointly with URB P 381.

U D 395 Private Investment in Urban Development (4)

Emphasizes the role of the private sector in urban development; valuation and investment theory; techniques of investment analysis and capital allocation. Offered jointly with URB P 351.

U D 400 Introduction to Urban Planning (3) AWSps

Hancock, Norton, Shinn, Wolfe
History, principles, theories of city growth and planning. Emphasis on city structure as a physical monument to contemporary culture. Present urban problems and remedial action. Offered jointly with URB P 400. Prerequisite: 310 or URB P 340.

U D 405 Urban Development Location Determinants (4)

Practical workshop on empirical methods to conduct and evaluate locational studies. Offered jointly with URB P 452.

U D 451 Housing (3) W

Grey, Ludwig, Rabinowitz
Survey of housing and redevelopment problems, theories, standards, and practice. Development of public policies, finance, technological considerations, social factors, and priorities. Offered jointly with URB P 451. Prerequisite: 400 or URB P 400.

U D 496 Research in Urban Development (3)
Workshop in problems of multivariate prediction. Application and critical evaluation of multiple regression, factor analysis, and case analysis techniques.

Courses for Graduates Only

U D 505 Survey of Urban Development (3)
Topical survey of urban development. Objective to

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provide substantive information, methodology, theory, and base for additional courses and seminars in area. Topics include urban economy and determinants of land use, capital investment in urban development, land tenure, urban functions and public sector, urban development policy and strategy. Offered jointly with URB P 552. Prerequisite: permission.

UD 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 FIN 515 and URB P 553. Prerequisite: 505, URB P 552, or permission.

UD 525 Seminar in Urban Development Location Determinants (3)

Advanced workshop on empirical methods to conduct and evaluate locational studies. Offered jointly with URB P 554. Prerequisite: one of the following: 505, 515, URB P 552, 553, FIN 515, or permission.

UD 550 Benefit-Cost Analysis Applied to Urban Development (3) Sp

Seyfried
Practical application of benefit-cost methodology to the decision-making process for urban development. In a "workshop" format, benefit-cost analysis procedures are applied to urban development projects or programs, including urban renewal as defined by legislation. Theory or methodology is utilized as necessary to determine objectives to identify and to measure benefits and costs, and to specify decision criteria in terms of the public interest. Offered jointly with URB P 550.

UD 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. Allocation processes applied to land use. Offered jointly with URB P 551.

UD 571-572 Research Reports (3-3)

See ACCTG 571-572 for description.

UD 595 Urban Development Problems (3)

For advanced graduate students concerned with contemporary problems of urban development, including problem identification and measurement, research methodology, and techniques; historical and cultural aspects, social indicators. Prerequisites: 510, 515, and permission.

UD 600 Independent Study or Research (*)

Prerequisite: permission.

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COMMUNITY DENTISTRY

COM D 400 Introduction to Community Dentistry (1) A

Guild
Introduction to the social, political, and economic aspects of the health-care delivery system.

COM D 411 Altering Human Behavior in Dentistry (3) Sp

Weinstein
Social aspects of dental health-care delivery systems in the United States and elsewhere.

COM D 421 Treating Special Populations: I. Dental Care for the Disabled (2) WS

Milgrom
Core course designed to provide instruction al-

lowing students to attain knowledge and skills basic to the motivation for, and clinical competence in, the treatment of the disabled dental patient. Includes the special health, social, and economic problems of the disabled population; general medical characteristics and orofacial manifestations of the more prevalent disabilities; treatment planning and management techniques for the disabled; optimum use of auxiliaries; modifications in dental treatment and home care necessitated by specific disabilities. Prerequisite: third-year standing or permission.

COM D 432 Practicum in Implementing Self and Peer Assessment in Dental Practice (2) AS

Milgrom
Provides information on methods to improve the quality of care and to practice skills in self-assessment, evaluation of patient satisfaction, and continuing education. Lecture, panel discussion, and practical exercises. Offered on credit/no credit basis only.

COM D 449 Directed Studies in Community Dentistry (*) AWSp

Students and faculty with common academic interests pursue them together within the curriculum by means of independent study and a tutorial student-faculty relationship. Prerequisites: permission of class adviser and instructor.

COM D 497 Directed Studies in Community Dentistry (*) AWSp

Permits students and faculty who have common academic interests to pursue them together within the curriculum by means of independent study and a tutorial student-faculty relationship. Prerequisites: permission of class adviser and instructor.

DENTAL HYGIENE

D HYG 304, 305, 306 Fundamentals of Dental Hygiene Practice (2,2,2) A,W,Sp

Study of dental hygiene practice that enables the student to gain knowledge of techniques and materials while developing sensitivity to the oral health needs of patients. Prerequisites: 304 for 305; 305 for 306.

D HYG 354, 355, 356 Clinical Dental Hygiene Practice I (3,3,3) A,W,Sp

Clinical application of diagnostic, preventive, and therapeutic procedures utilized in patient care by a dental hygienist. Prerequisites: 354 for 355; 355 for 356.

D HYG 360 Clinical Dental Hygiene Practice I (6) S

Continuation of 306, 356. Prerequisites: 306, 356, and permission.

D HYG 401 Professional Interactions (3) AWSp

Presents the principles of behavior management, human territoriality, interpersonal communications, and conflict management, with emphasis on the application of these principles to interpersonal relationships within dental practice. Course format is student directed. The students work together, operating within the guidelines of group process, to explore interpersonal conflicts, their solutions, alternatives, and consequences. Assertiveness is encouraged. Techniques for job interviewing, employer/employee negotiations, and contracting are presented to promote professional self-actualization. Offered on credit/no credit basis only.

D HYG 402 Community Dental Health (3) AWSp

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.

D HYG 403 Principles of Dental Health Education (2) AWSp

Presentation and analysis of current principles of dental health and disease, with emphasis in the areas of plaque control, nutrition, teaching materials, and techniques.

D HYG 404 Field Practice (2) AWSp

Application of dental health principles and practices to field experience in the educational system. Includes experience in the dynamics of the interrelationships between health professional and other school personnel.

D HYG 407, 408, 409 Dental Hygiene in General and Specialty Practice (3,3,3) A,W,Sp

Study of dental hygiene practice, with special emphasis on principles of patient management, office management and interpersonal communication, adaptations of procedure for special need patients, career responsibilities, and the legal aspects of dental hygiene practice. Prerequisites: 306; 407 for 408; 408 for 409.

D HYG 449 Directed Studies in Dental Hygiene (*) max. 14 AWSps

Students and faculty who have common academic interests pursue them together within the curriculum by means of independent study and a tutorial student-faculty relationship. Offered on credit/no credit basis only. Prerequisites: permission of the class adviser and the instructor.

D HYG 456 Community Dental Hygiene Practice (1-6, max. 6) WSpS

Application of dental health principles and practices in hospitals or special community clinics. Care is delivered to include population not normally present in student's University practice. Offered on credit/no credit basis only.

D HYG 457, 458, 459 Clinical Dental Hygiene Practice II (3,3,3) A,W,Sp

Clinical application of diagnostic, preventive, and therapeutic procedures utilized in patient care by a dental hygienist, with special emphasis on patient management, adaptation of procedures for special-needs patients, office management and personal communication, proficiency achievements in all dental hygiene skills, and initial opportunity to pursue special channels of interests relating to dental hygiene practice. Prerequisites: 356; 457 for 458; 458 for 459.

D HYG 460 Clinical Dental Hygiene Practice II (6) S

Continuation of 409, 459. Prerequisites: 409, 459, and permission.

D HYG 465 Advanced Clinical Dental Hygiene Practice (2 or 4, max. 8) AWSps

Advanced instrumentation and clinical procedures for certificated dental hygienists. Seminars and clinical experience. Prerequisites: certificate in dental hygiene from an accredited program and permission.

D HYG 480 Restorative Dentistry for Dental Auxiliary Educators (2) S

Designed for the purpose of developing dental auxiliary faculty persons skilled in performing and teaching the following restorative procedures: utilization of rubber dam; placement and removal of matrix and wedge; polishing of amalgam restorations; application of cavity liners, bases, and varnish; placement of temporary crowns and restorations. Clinical experience with patients is required. Prerequisites: certificate in dental hygiene and a valid license to practice dental hygiene, or a valid certificate in dental assisting; experience as a dental auxiliary educator or pursuing education for a teaching position. Others selected after review of credentials and with permission of instructor.

D HYG 481 Restorative Dentistry for Dental Hygiene Educators (3) S

Designed for the purpose of developing dental auxiliary faculty persons skilled in performing and teaching the following procedures: condensing and carving of amalgam restorations; placement and finishing of tooth-colored restorative materials. Clinical experience with patients is required. Prerequisites: 480, certificate in dental hygiene, and a valid license to practice dental hygiene; experience as a dental auxiliary educator or pursuing education for a teaching position. Others selected after review of credentials and with permission of instructor.

D HYG 482 Local Anesthesia for Dental Hygiene Educators (3) S

Comprehensive course designed for the purpose of

developing dental hygiene faculty persons skilled in performing and teaching techniques of field and nerve-block anesthesia. Topics include head and neck anatomy, anesthetic pharmacology, pain physiology, prevention and management of anesthetic complications and emergencies as well as techniques administration. Clinical experience with patients is required. Prerequisites: certificate in dental hygiene and a valid license to practice dental hygiene; experience as a dental hygiene educator or pursuing education for a teaching position. Others selected after review of credentials and with permission of instructor.

D HYG 491 Seminar in Dental Hygiene (2) AWSp
Study of professional education, accreditation, legislation, organization, and literature. Responsibilities of the dental hygienist to the community.

D HYG 492 Readings in Current Literature in Dental Hygiene and Preventive Dentistry (2) AWSpS
Discussion of reported readings and survey of background material, with emphasis on dental research and its application to dental health education.

D HYG 493 Problems in Dental Hygiene (2-4) AWSpS
Problems for study directed toward increased understanding in the selected field of practice. Presentation of research suitable for publication. Prerequisite: permission.

D HYG 494 Principles of Teaching in Dental Hygiene (2) AWSpS
Application of principles of learning to teaching methods and techniques effective in dental hygiene, with opportunity for course planning, demonstration, and practice teaching.

D HYG 497 Directed Studies in Dental Hygiene (*, max. 14) AWSpS
Elective course based on student interest in special areas of preventive dentistry or dental hygiene education. The course allows independent study and a tutorial student-faculty relationship. Offered on credit/no credit basis only. Prerequisites: permission of class adviser and instructor.

D HYG 501 Introduction to Dental Hygiene Procedures (1) AWSp
Clinical course for freshman dental students, including objectives, techniques, and procedures for performing oral prophylaxis, with application of these procedures to patient treatment and preventive control programs.

D HYG 551 Introduction to Dental Hygiene Procedures (1) AWSp
See 501 for course description.

DENTISTRY

Courses for Undergraduates

DENT 400 Principles of Preventive Dentistry (2) A
Nature of dental plaque and its role in dental disease. Methods of detecting, quantifying, and controlling dental plaque. Epidemiology of dental caries and the role of fluorides in prevention. Patient-education procedures. Offered on credit/no credit basis only.

DENT 401 Human Growth and Development (2) Sp
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.

DENT 432, 433, 434 Team (1,1,1) A,W,Sp
Strand
Dental students skilled in four-handed, sit-down

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. Offered on credit/no credit basis only.

DENT 435 Vertical Group (1) AWSp
Small groups, with representation from each dental and dental hygiene class, meet together in weekly seminar sessions to discuss patients assigned them. In this vertical group setting, treatment plans are formed and treatment duties are delegated to appropriate group members.

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 familiarization with School of Dentistry policies related to treatment of patients.

DENT 480 Dental Auxiliary Utilization Clinic (1) AW
Dental auxiliary utilization clinic experience in the fourth year involves application and refinement of principles learned earlier in the curriculum. Students are assigned to perform clinical care with the aid of an auxiliary. Special emphasis on the manner in which the task is carried out (i.e., the operator's position, the patient's position, effective instrument exchange, sequential use of instruments, coordinated activity of rubber dam application and washed field procedures, and preplanning of procedures, use of time, and schedule development). Prerequisites: successful completion of 420 and 421.

DENT 481 TEAM Clinic (3) AWSp
Competent students are involved in clinical activities applying new unacquired skills of managing auxiliaries, an expanded-function practice, and patient problems. Tasks, delegated to trained auxiliaries to perform, are evaluated by the students. A student has this intense clinical experience one time only through the year, occurring Autumn, Winter, or Spring quarter. Not all fourth-year students are able to participate. Offered on credit/no credit basis only. Prerequisites: successful completion of 432, 433.

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.

DENT 491, 492 Fieldwork in Applied Principles of Dental Care for the Disabled (3,3) AWSpS,AWSpS
Koch, Wells
Structured fieldwork and seminars provide the opportunity to develop concepts and procedures in teaching, testing, and evaluating the effectiveness of preventive dentistry to the disabled. Prerequisites for 491: 400, 410, junior or senior dental students; senior dental hygiene students by permission. Prerequisites for 492: 491, junior or senior dental students; senior dental hygiene students by permission.

DENT 497 Extramurals (*) AWSpS
Extramural programs arranged to provide dental students, at varying levels of their education, with opportunities to treat a wide variety of patients in the delivery systems and geographic locations in which they may eventually practice.

Courses for Graduate and Certificate Dental Students Only

These courses include subject material applicable to all phases of dentistry, and they may be applied toward the major requirement for the degree of Master of Science in Dentistry.

DENT 520 Biostatistics and Research Design (3) A

Dworkin, Nicholls
Lectures and programmed instruction in basic biostatistics, emphasizing the integration of statistics with research design and including measures of central tendency, regression, correlation, Chi-square, and comparison of samples.

DENT 560 Dental Photography (2)

Freehe
Designed to provide the student with sufficient knowledge and experience for him to select and use correct photographic equipment for photographing patients (facial and interoral). Casts, instruments, X-rays, charts, and objects.

DENT 700 Master's Thesis (*)

ENDODONTICS

ENDO 410 Introduction to Endodontics (2) Sp

Naikin
Lecture course dealing with the differential diagnosis and the treatment of pulp pathosis and associated periapical pathosis.

ENDO 420 Endodontics (1) W

Naikin
Lecture course dealing with diagnosis and treatment of impact injuries to teeth; treatment of endodontic emergencies; surgical management of endodontic problems.

ENDO 421 Clinical Management of Endodontic Treatment Problems (1) Sp

Naikin, Oswald
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 (*)

Naikin
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 (0-1-1) AWSp

The student is required to complete endodontic treatment of anterior, premolar, and molar teeth.

ENDO 471 Endodontic Technique (4) A

Naikin, Oswald
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 480 Advanced Clinical Endodontics (0-1-1) AWSp

In addition to conservative treatment of several endodontic cases, the student performs periapical surgery for one case.

ENDO 481 Honors Course in Endodontics (2) WSp

Bryant, Kobata
Advanced clinical work in the use of gutta percha techniques in molar therapy, in surgical procedures, and in bleaching. Available to selected students. Prerequisites: 410, 471, 420, 421, 470.

ENDO 497 Directed Studies in Endodontics (*) 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. Prerequisite: permission of class adviser and instructor.

Courses for Graduates Only

ENDO 501 Advanced Endodontic Diagnosis and Treatment (2) A

Harrington, Naikin
Current concepts are presented and discussed re-

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lating to the diagnosis and treatment of pulpal and periapical pathology. Criteria for evaluation of success or failure of root canal therapy are presented.

ENDO 504 Advanced Endodontic Treatment Planning (2) W

Harrington, Naikin

Diagnosis and treatment of acute symptoms of dental origin, surgical endodontic therapy, traumatic dental injuries, and the relationship between periodontal and pulpal pathology, including differential diagnosis and appropriate treatment planning are discussed.

ENDO 525 Physiologic Bases of Dental Science (3) W

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 P BIO 506. Prerequisite: permission. (Offered alternate years; offered 1978.)

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. (Offered alternate years; offered 1977.)

ENDO 531 Restoration of Endodontically Treated Teeth (3) AWSp

Lowe, Straub, Van Hassel

Clinical instruction in the various post and pin techniques used to restore endodontically treated teeth to normal function. (Four hours clinic, one hour lecture per week.)

ENDO 535 Microbiological Aspects of Endodontic Therapy (2)

Naikin

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. (Offered Spring Quarter 1977.)

ENDO 546, 547, 548 Clinical Endodontics (3,4,4)

Harrington, Naikin

The clinical diagnosis and treatment of the pulpless tooth.

ENDO 549, 550, 551 Clinical Endodontics (3,4,4)

Harrington, Naikin

The clinical diagnosis and treatment of the pulpless tooth. Prerequisites: 546, 547, 548.

ENDO 576, 577, 578 Endodontic Seminar (2,2,2)

Harrington, Naikin

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, Naikin, Van Hassel

Continuous weekly seminar devoted to review of endodontic and related literature and to discussion of research methods. Prerequisites: 576, 577, 578.

ENDO 582, 583, 584 Treatment Planning Seminar (2,2,2)

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)

Naikin

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, Naikin

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 (*)

Harrington, Naikin, 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 pathogenic 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) W

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, dental 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) Sp

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: PATH 310.

ORALB 407 General and Oral Pathology for Dental Hygienists (4) A

Morgan

Study of diseases and abnormalities of the hard and soft tissues of the oral cavity and pathologic processes that underlie disease, including inflammation, neoplasia, cellular alterations. An attempt is made to correlate the gross, functional, and biochemical alterations. Required course for dental hygiene students.

ORALB 410 Oral Pathology (5) Sp

Survey of the diseases of the oral-facial regions in lecture and laboratory sessions. Among the conditions discussed are diseases of teeth and their supporting structures and diseases of the oral and paraoral soft tissues and bones. Considerable effort is expended in developing an understanding of the abnormal processes. Correlations between clinical findings, etiologic factors, and histopathologic fea-

tures 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 (*) AWSpS

See COM D 449 for course description.

ORALB 449 Undergraduate Research Topics in Oral Biology (*) AWSpS

Individual research on topics selected in collaboration with a faculty member. Prerequisite: permission.

ORALB 497 Directed Studies in Oral Biology (*) AWSpS

Selected readings and seminars on a topic chosen by individual arrangement in collaboration with a faculty member. Open to undergraduates, as well as to dental and dental hygiene students. May be repeated for credit. Prerequisites: permission of class adviser and instructor.

ORALB 498 Undergraduate Research Topics in Oral Biology (*) AWSpS

Individual research on topics selected in collaboration with a faculty member. Open to undergraduates, as well as to dental and dental hygiene students. May be repeated for credit. 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. 10) AWSpS

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 oral cavity and related areas, and to correlate these with the clinical findings. Each student is responsible for the grossing of specimens and the preparation of histology reports. Primarily designed for students with 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 Stomatology (5)

Diseases of the oral cavity and jaw are first presented just as the practitioner encounters it—detailed clinical picture (i.e., the complaint together with the clinical signs and symptoms). When pertinent, laboratory tests and procedures deemed relevant and essential to establishing a diagnosis are 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) AWSp

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 545 with discussion of the biological processes of tooth formation, mastication, deglutition, sensation, and the perception of oral stimuli. Consideration of oral manifestation of systemic conditions, oral microbiology and plaque biology, 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, paper 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.)

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., BIOL 212) or human biology (e.g., B STR 330) recommended. (Offered alternate years.)

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.)

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 nonexocrine secretion (e.g., of collagen, plasma proteins, thyroglobulins, insulin, etc.). Prerequisites: BIOC 406 or its equivalent and permission; BIOL 581 recommended. (Offered alternate years.)

ORALB 600 Independent Study or Research (*) AWSpS

Laboratory projects and/or conferences with individual faculty members designed to acquaint the student with research projects currently in progress within the department. Prerequisite: permission.

ORALB 700 Master's Thesis (*)

ORALB 800 Doctoral Dissertation (*)

ORAL DIAGNOSIS AND TREATMENT PLANNING

ODTP 400 Introduction to Clinical Procedures (3) A

Orientation to dental examination procedures, with appropriate clinical participation by the student.

ODTP 401 Principles of Nutrition (1) Sp

Principles of nutrition applied to dental practice.

ODTP 410 Introduction to Oral Diagnosis (1) A

Principles involved in integrating and evaluating diagnostic criteria for arriving at a treatment plan are covered and applied to actual clinical examples.

ODTP 411 Internal Medicine (4,2) WSp

ODTP 412 Oral Medicine Clinic (1) W

Patton, Soltero, Sommers, Truelove
Clinical seminars in which the student is exposed to patients with oral diseases, including pain, lesions, and tumors. Patients are presented for evaluation, diagnosis, and discussion of therapy.

ODTP 413 Advanced Radiographic Interpretation (1) A

Patton, Soltero, Sommers, 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 420 Oral Medicine (2) W

Fundamental procedures in oral diagnosis; preparation for advanced instruction.

ODTP 425 Hospital Dentistry (1) Sp

Anderson
Introductory course presenting hospital procedures and protocol and specific patient types. Prerequisite for 485.

ODTP 430 Physical Medicine Clinical Conference (1) A

Clinical course in which patients with dental treatment needs and complicating medical problems are presented. Medical history, physical findings, and laboratory tests are evaluated. Student participation through patient presentation and group discussion required. Prerequisite: 411.

ODTP 431 Oral Medicine Clinical Conference (1) W

Clinical conference restricted to patients presenting unusual symptoms of pain, oral lesions, or jaw dysfunctions. Participation in discussion required.

ODTP 432 Radiographic Interpretation Clinical Conference (1) Sp

Patton, Soltero, Somers, Truelove
Clinical conference devoted to the presentation of the radiographic findings of patients with oral dis-

ease; discussion of the radiographic appearance and variations in manifestation of the cases; student participation through question, answer, and discussion.

ODTP 450 X-ray Techniques and Interpretation (3) A

Biophysical, clinical, and interpretative aspects of dental X-ray procedures, with practical application in the completion of acceptable full-mouth surveys on patients.

ODTP 470 Clinical Oral Diagnosis and Treatment Planning (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 480 Advanced Clinical Oral Diagnosis and Treatment Planning (2-1) 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.

ODTP 485 Hospital Dentistry (1-1-1) AWSp

Clinical experience that puts into practice the material presented in 425. The student is involved in hospital procedures and protocol and in dental care of the hospital patient. Offered on credit/no credit basis only. Prerequisite: 425.

ODTP 497 Directed Studies in Oral Diagnosis (*) AWSpS

Anderson, Hansen, Patten, Rothwell, Soltero, Sommers, Truelove
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.

ORAL MEDICINE

Courses for Graduates Only

ORALM 500 Advanced Diagnostic Techniques (3) A

Truelove
Advanced diagnostic procedures used to identify oral and perioral diseases. Included are in-depth discussions of history analysis, methods for psychological 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)

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 (*, max. 33) AWSpS

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 (*, max. 16) AWSpS

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

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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. 12) AWSp

Truelove
Seminar analyzes the recent literature concerning the area of oral medicine, diagnosis, and therapy for oral disease.

ORALM 580 Advanced Radiographic Techniques (2) W

Truelove
Seminar and clinic concerning radiographic procedures necessary for visualization of soft and hard tissue structures of the maxilla, sinuses, temporomandibular joint, and mandible and soft tissue structures approximating the oral cavity. Emphasis placed on extraoral and special techniques.

ORALM 585 Advanced Radiographic Interpretation (3) Sp

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 non-surgical treatment of oral disease, develops a protocol, and, after faculty approval, completes the project.

ORAL SURGERY

O S 400 Introduction to Dental Emergencies and Techniques of Local Anesthesia (2) Sp

Development of the symptomatic treatment of dental emergencies, especially those emergencies that could be considered life threatening. Some instruction is given in the classical manner on the diagnosis of dental emergencies, such as syncope, hysteria, anaphylactic shock, and cardiopulmonary arrest. 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.

O S 410 Dental Sedation and Pain Control (2) W

An approach to the patient with respect to minimizing the discomfort of the dental procedures. Every form of sedation, from vocal reassurance through intravenous sedation, is included. Emphasis on specific drugs that have a high level of safety; practical experience with intravenous and nitrous oxide techniques; and sophisticated methods of the treatment of emergencies, especially intravenous sedation.

O S 430 Oral Surgery (3-3-3) AWSp

Theory and practice of major and minor oral surgery, 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.

O S 497 Directed Studies in Oral Surgery (*)

Selected reading and tutoring in dental pain control. Prerequisites: permission of class adviser and instructor.

Courses for Graduates Only

O S 500, 501, 502 Oral Surgery Seminar (2,2,2)

A.W.Sp
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.

O S 520, 521, 522 Literature Review (2,2,2)

A.W.Sp
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 participant presents a seminar on topics in oral surgery based on a review of the literature.

O S 540, 541, 542 Advanced Oral Surgery Clinic (3,3,3) A.W.Sp

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, vermillionectomy, peripheral neurectomy, vestibular extension, removal of hyperplastic tissue, exostosis, torus, foreign body, supernumerary impacted teeth, and other procedures are included.

O S 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.

O S 560 Dental Sedation (2) ASp

Bloomquist
For graduates of the various dental specialties on the theory, application, and techniques of dental sedation. All forms of sedation, including oral, intramuscular, intravenous, and inhalation, are covered. Clinical experience is provided in the second half of the quarter. Prerequisite: dental graduate students only.

O S 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

ORTHO 410 Minor Tooth Movement (1) Sp

Van Ness
Prerequisite: PEDO 460.

ORTHO 449 Directed Studies in Orthodontics (*) AWSp

See COM D 449 for course description.

ORTHO 497 Directed Studies in Orthodontics (*) AWSp

Permits students and faculty who have common academic interests to pursue them together within the curriculum by means of independent study and a tutorial student-faculty relationship. Prerequisites: permission of class adviser and instructor.

Courses for Graduates Only

ORTHO 500, 501, 502, 503, 504, 505, 506 Orthodontics Seminar (2,*,*,*,*,*,*)

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.

ORTHO 510 Principles of Personality Development (2) A

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.

ORTHO 511, 512, 513, 514 Orthodontic Theory (2,2,2,2) A.W.Sp.S

Joondeph, Little, Riedel
A four-quarter lecture-seminar sequence dealing with interpretation and application of orthodontic principles and concepts. Pertinent literature, research findings, and current orthodontic theory are analyzed in depth. Prerequisite: permission.

ORTHO 518 Scientific Methodology in Dental Research (2) Sp

Review of the scientific method. Evaluation of dental literature. Discussion of proposed master's degree research projects. Procedure in scientific writing. Formulation and discussion of hypothetical research projects related to orthodontics.

ORTHO 520 Roentgenographic Cephalometry (2) A

Basic principles, history, and techniques of roentgenographic cephalometry.

ORTHO 540 Orofacial Biology (4, max. 12) AWSp

Comprehensive evaluation seminar of the literature relative to the growth and development of the craniofacial complex. Anthropology, embryology, morphogenesis, genetics, and anatomy are integrated to give the student an appreciation of facial development. Outside reading assignments by the student are discussed and critiqued during the seminar discussion. Prerequisites: concurrent enrollment in 500 and 520, or permission.

ORTHO 546, 547, 548, 549, 550, 551, 552 Clinical Orthodontics (4,*,*,*,*,*,*)

Techniques of construction and manipulation of the edgewise arch mechanism; application of the techniques in the treatment of malocclusion. Treatment of patients begins in the second quarter. Each course is prerequisite to the following course.

ORTHO 560 Surgical Orthodontic Diagnosis and Treatment Planning (3) AWSpS

McNeill
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.

ORTHO 582 Orthodontic Diagnosis and Treatment Planning for the Adult Dental Patient (3) AWSpS

Riedel, Van Ness
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.

ORTHO 600 Independent Study or Research (*) Prerequisite: permission.

PEDODONTICS

PEDO 420, 421 Pedodontics (1,1) A.W

Emotional development of the child and its implications in pedodontic procedures. Space maintenance, the interception of incipient malocclusion, and clinical management of oral habits.

PEDO 460 Pediatric Dentistry (2) W
Principles of pediatric dentistry with orthodontic minor tooth movement.

PEDO 461 Introduction to Clinical Pediatric Dentistry (2) Sp
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) AWSp
Diagnosis and examination of the child patient. Restorative procedures in primary and mixed dentitions.

PEDO 480 Advanced Clinical Pedodontics (1-1-1) AWSp
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 497 Directed Study in Pedodontics (*) AWSp
Barriga, Domoto, Lewis, Peterson, Wagner
Comprehensive treatment of the disabled child in the hospital environment; the role of the pediatric dental patient in general practice; and orthodontic diagnosis and treatment planning in the mixed-dentition patient. Prerequisite: senior dental student.

Courses for Graduates Only

PEDO 500, 501, 502, 503, 504, 505 Pedodontics Seminar (2,2,2,2,2,2) Law
Seminar on problems of tooth formation, development, calcification, and eruption in the child. Management of clinical problems of tooth development; operative procedures, pulp therapy, treatment planning, and the consideration of emotional factors in pedodontic practice.

PEDO 546, 547, 548, 549, 550, 551, 552, 553, 554, 555, 556 Clinical Pedodontics (*,*,*,*,*,*,*,*)
Advanced clinical pediatric dentistry involved with the care of the normal or well child, or the physically, mentally, socially, or emotionally handicapped child.

PEDO 580-581, 582, 583 Dental Care for the Handicapped Child (*,*,*,*) W,Sp,S,A
Rolla
Seminar clinic concentrating on the diagnosis and the management of dental care for the handicapped child. Emphasis on the interaction of physical, intellectual, emotional, and social developmental patterns and processes.

PEDO 600 Independent Study or Research (*)
Prerequisite: permission.

PERIODONTICS

PERIO 400 Introduction to Periodontics (1) S Ogilvie
Introduction to periodontology. Designed to provide the student with understanding of the clinical, histopathologic, and radiographic features of the various periodontal diseases.

PERIO 410 Basic Periodontal Therapy (1) A
Introduction to periodontal therapy: examination, treatment planning, initial therapy. Prerequisite: 400.

PERIO 411, 412 Introduction to Periodontal Therapy (1,1) W,Sp
Lecture. See also 461, 462. Prerequisites: 410 for 411; 411 for 412.

PERIO 420 Periodontal Therapy (1) A
Advanced periodontal therapy techniques for the surgical management of the patient with advanced periodontal disease. Indications and contraindications for such therapy and the integration of surgical treatment into an overall treatment plan for the patient. Prerequisites: 410, 411, 412.

PERIO 449 Directed Studies in Periodontics (*) AWSp
See COM D 449 for course description.

PERIO 460 Basic Periodontal Instrumentation (1) A
Combined lecture and clinical experience in diagnosis, treatment planning, and performance of non-surgical and elementary surgical procedures. The indication for, application of, and technical performance of, various procedures and their integration into dental practice are discussed. Prerequisite: 400.

PERIO 461, 462 Introduction to Periodontal Therapy (1,1) W,Sp
Combined lecture and clinical experience in diagnosis, treatment planning, and performance of non-surgical and elementary surgical procedures. The indication for, application of, and technical performance of various procedures and their integration into dental practice are discussed. Prerequisite: 460 for 461.

PERIO 470, 471, 472 Clinical Periodontics (1,1,1) A,W,Sp
Treatment of periodontal disease. Emphasis on diagnosis, treatment planning, and nonsurgical treatment procedures. Prerequisites: 460, 461, 462.

PERIO 480 General Practice Periodontics (2-1-1) AWSp
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. Prerequisites: 470, 471, 472.

PERIO 491-492-493 Senior Periodontics Elective (2-2-2) A,W,Sp
Gartrell
Clinic-seminar experience for selected fourth-year dental students that allows for clinical independence and individual responsibility in periodontal treatment and case analysis. Substitutes for 480. Prerequisites: 420, 470, 471, 472.

PERIO 497 Directed Studies in Periodontics (*) AWSp
Permits students and faculty who have common academic interests to pursue them together within the curriculum by means of independent study and a tutorial student-faculty relationship. Prerequisites: permission of class adviser and instructor.

Courses for Graduates Only

PERIO 530 Hospital Periodontics (2) AWSpS
Prepares graduate students in periodontics to practice in hospital situations. Experience in operating with nitrous oxide analgesia, general anesthesia, and intravenous premedication is offered. Hospital procedures for treating outpatients 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)
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 baccalaureate degree and pass a preclinical examination.

PERIO 546, 547, 548, 549, 550, 551, 552 Clinical Periodontics (2-6, 2-6, 2-6, 2-6, 2-6, 2-6)
Clinical experience in diagnosis and treatment of periodontal disease.

PERIO 560 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 Periodontal Case Management (1, max. 3)
Schlager
Didactic presentation of clinical periodontics to provide a comprehensive view of the field and a grasp of modern therapeutics.

PERIO 570 Review of Current Literature (2)
Ammons, Gartrell
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 Biology of the Periodontium (2-2-2) AWSp
Intensive and in-depth examination of the physiology and biology of the periodontium. Prerequisite: permission.

PERIO 577 Review of Literature (2, max. 14)
Gartrell
Continuous weekly seminar devoted to review of periodontic and related literature and the discussion of teaching methods and philosophy of teaching and treatment.

PERIO 582 Periodontic Treatment Planning Seminars (1, max. 7)
Schlager
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)
Schlager
Weekly seminar utilizing the case review method and dealing with the treatment of moderate to advanced periodontal disease.

PERIO 586 Longitudinal Evaluation of Periodontal Therapy (2) AWSpS
Gartrell
In-depth examination of the progress of a case from the time of initial therapy, which may go back ten to fifteen years, and its ongoing progression until the most recent maintenance visits to determine: (1) the efficacy of method, (2) the demands made upon the patient, and (3) the temporal effect of therapy and survival.

PERIO 591 Clinical Practice Teaching (*) Ammons
Supervised experience in teaching clinical periodontics to undergraduate dental students. Prerequisites: 546, 547, 548, 576, 577, 578.

PERIO 592 Prescription Surgery (1-1-1) AWSp Ammons
Clinical course in periodontal surgery in which specific surgical procedures are performed by graduate students on a prescription basis for patients undergoing therapy in the undergraduate dental clinic. Designed to expose the student to a wider spectrum of patients and to stimulate an environment in which the student can encounter the problems in communication and patient management that occur in the private sector between a referring dentist and the specialist. Prerequisites: 561, 585.

PERIO 599 Pathology of the Periodontium and Contiguous Structures (3) W
Clagett, Engel, Page
Seminar covers in depth the tissue alterations noted in periodontal disease and the concepts of the nature of the underlying lesion. Prerequisites: PATH 445 and 500, or permission.

PERIO 600 Independent Study or Research (*)
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) Sp
Frank
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

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ical management of immediate denture patients (typical and overdenture).

PROS 421 Special Topics in Prosthodontics (1) Sp
Lecture describing and illustrating the following topics: relining procedure, management of difficult patients, maxillofacial prostheses, and quality-control problems in private practice.

PROS 449 Directed Studies in Prosthodontics (*)
See COM D 449 for course description.

PROS 460 Introductory Complete Denture Prosthodontics (6) A

Lord
Lecture-clinical course dealing with the basic principles of complete denture fabrication as well as the diagnosis and treatment of a completely edentulous patient.

PROS 461 Complete Denture Prosthodontics (1-1) WSp

Clinical course that uses the didactic material presented in 460. The student manages a second complete-denture patient during Winter Quarter with less supervision than in 460. 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 Prosthodontics (1-2-1) AWSp
Clinical course involving the diagnosis and management of completely edentulous and partially edentulous patients. Removable partial dentures and immediate dentures are fabricated. In addition, follow-up care is provided for patients previously treated.

PROS 480 Clinical Prosthodontic Maintenance (1-1) AWSp

Clinic involving the relining or rebasing of dentures previously made at the University of Washington.

PROS 497 Directed Studies in Prosthodontics (*) 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

Smith, 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

Smith, 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

Smith, 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.

PROS 563 Obturators and Speech Appliances (2) AWSpS

Beder
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) AWSpS

Beder
Seminar-laboratory course devoted to the theories and principles in the fabrication of somatoprostheses; 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,Sp

Bolender, Swoope
Supervised experience in teaching clinical prosthodontics to the undergraduate dental student.

PROS 568 Obturators and Speech Appliances (2) AWSpS

Beder
Clinical application of 563. Patients requiring the fabrication of obturators and speech appliances are treated.

PROS 569 Definitive and Adjunctive Maxillofacial Appliances (2) AWSpS

Beder
Clinical application of 564. Patients requiring the fabrication of a variety of special appliances are treated.

PROS 571 Prosthodontics Seminar (2, max. 12)

Bolender, Smith, Swoope
Continuous weekly seminar devoted to the review of prosthodontic and related literature.

PROS 574 Prosthodontic Visual Aids (2) S

Bolender, Smith
Review of literature. Prerequisite: permission.

PROS 578 Prosthodontic Technique Practice Teaching (1) AWSp

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) SpS

Swoope, Wands
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. 16) AWSpS

Smith, Swoope
Continuation of 560, 561, 562. Seminar-clinical course covering recent and advanced phases of prosthodontics.

PROS 600 Independent Study or Research (*) AWSpS

Smith, Swoope
Prerequisite: permission.

RESTORATIVE DENTISTRY

RES D 400, 401, 402 Oral Anatomy (2,2,2)

A,W,Sp
Canfield
Detailed study of the human oral and paraoral structures from the standpoint of form and function, with attention given to systematized nomenclature. Study of the determinants of occlusion and instruction in the examination and the modification of the occlusal patterns of an individual patient.

RES D 403, 404 Restorative Dentistry Lecture (1,1) W,Sp

Moller
Instruction in the use of various materials for the restoration of diseased or missing parts of the natural dentition. Background information relates to the operations performed in 454. Prerequisites: 450, 451.

RES D 410 Dental Anatomy (3) W

Hodson, Stoddard
Lecture and laboratory with focus on the nomenclature and morphology of human dentition. Recognition and reproduction of characteristics of individual teeth of importance in restorative and dental hygiene procedures. For dental hygienists.

RES D 411 Restorative Dentistry Technic (3) Sp

Stoddard
Lecture-laboratory course offering experience in instrumentation and manipulation of restorative materials. Special emphasis on dental amalgam and composite resin restorations. For dental hygienists. Prerequisite: 410.

RES D 412 Restorative Dentistry Technic (3) A

Stoddard
Lecture and laboratory with experience in instrumentation and manipulation of restorative materials. Special emphasis on restoration of the proximal surface with amalgam and acid-etch resin restoration. For dental hygienists. Prerequisites: 410, 411.

RES D 413 Restorative Dentistry Technic (3) W

Stoddard
Lecture and laboratory with experience in instrumentation and manipulation of restorative materials and with special emphasis on procedures for the child patient. For dental hygienists. Prerequisite: 412.

RES D 415 Restorative Dentistry Lecture (1) A

Powell
Basic background information and instruction for restoration of teeth utilizing principles of fixed partial dentures. The instruction is used to perform practice operations in 460. Prerequisites: 404, 455.

RES D 416 Restorative Dentistry Lecture (1) W

Powell
Basic background information and instruction for the restoration of teeth utilizing principles of fixed partial dentures and restorative dentistry. The instruction is used to perform basic practice operations in 461. Prerequisites: 415, 460.

RES D 417 Restorative Dentistry Lecture (1) Sp

Powell
Background information for beginning of clinical practice and working on patients in restorative dentistry. Prerequisites: 416, 461.

RES D 420, 421, 422 Restorative Dentistry (1,1,1) A,W,Sp

Warnick
Lecture series closely related to 470, providing a means of communication with the class regarding clinic 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

Morrison, Yuodelis
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 COM D 449 for course description.

RES D 450 Dental Materials (2) A

Nicholls
Physical and chemical properties of dental materials.

RES D 451, 452, 453 Oral Anatomy Laboratory (2,2,2) A,W,Sp

Canfield
Detailed study of the human oral and paraoral 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 Laboratory (3,3) W,Sp

Moller
Provides preclinical experience in basic restorative principles and procedures that are fundamental to restorative dentistry. Operations involve amalgam, composite, and cast gold restorations.

RES D 460 Restorative Dentistry Laboratory (3) A

Powell
Provides preclinical experience in basic restorative principles, particularly those in fixed partial dentures. Operations involving extra coronal preparations and materials used are covered. Prerequisites: 404, 455.

RES D 461 Restorative Dentistry Laboratory (5) W

Powell
Provides preclinical experience in basic restorative principles, including both restorative and fixed partial denture operations. Prerequisites: 415, 460.

RES D 462 Restorative Dentistry Clinic (5) Sp

Powell
Students begin treatment of patients in restorative dentistry. Operations are selected and screened in relation to the student's ability. Prerequisites: 416, 461.

RES D 463 Preclinical Analysis and Adjustment of Occlusion (2) A

Warnick, Staff
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) AWSp

Morrison, Staff
Designed to provide training in the fundamental procedures required to restore teeth that have been damaged by caries or trauma. Instruction also includes the restoration of missing teeth with short span fixed prostheses and the treatment of occlusal discrepancies that may relate to these discrepancies.

RES D 480 Clinical Practice (3-3-3) AWSp

Morrison, Wills, Staff
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 anteriors, with fixed restorations. Prerequisite: 470.

RES D 497 Directed Studies in Restorative Dentistry (*) AWSp

Permits students and faculty who have common academic interests to pursue them together within the curriculum by means of independent study and a tutorial student-faculty relationship. 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) AWSpS

Yuodelis, Staff
Clinical course to provide experience in diagnosis and treatment of patients requiring restorative procedures from single restorations to complex oral rehabilitative methods. Special emphasis is directed toward the integration of periodontics and occlusion as they relate to restorative dentistry.

RES D 570 Review of Literature Seminar (2, max. 6) AWSp

Morrison, 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) Stibbs

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) Stibbs

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 581 Comprehensive Treatment Planning (4) Sp

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.

RES D 587 Masticatory Functional Analysis and Occlusal Adjustment (2) A

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.

RES D 588 Seminar in Occlusion (2) A

Yuodelis
Nine weekly 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.

RES D 589 Masticatory Functional Analysis and Occlusal Adjustment (2) W

Yuodelis
Continuation of 588. Prerequisite: 587 or 588.

RES D 590 Gnathology (2) AWSp

Yuodelis, Staff
Ten seven-hour lecture/laboratory/clinical sessions in the study of gnathological principles and procedures as they pertain to the treatment of comprehensive cases assigned to the students. Use and application of several fully 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 (*) AWSpS

Yuodelis
Investigative program in one of the clinical sciences, under the direction of one of the departmental faculty.

COLLEGE OF EDUCATION

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)

Ostrander
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 450 Workshop: Educational Administration Processes (1-6, max. 6) AWSpS

Reality-based materials and activities are used in a workshop situation: students have the opportunity to develop materials and share resources in a variety of current topic areas such as: selection of teachers, evaluation of teachers, supervisory techniques, administration of negotiated agreements, improvement of organizational climates, business management procedures, planning processes, evaluation of school programs, school-community relationships, functioning of teachers and administrative teams.

EDADM 499 Undergraduate Research (*)

For undergraduates. Registration must be accompanied by a study prospectus on a special form provided by the Office of Educational Administration, endorsed by the faculty adviser most appropriate for the project proposed and the instructor, and the form must be filed in the 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, Bolton
Theory of the process of supervising school personnel, including an analysis of the techniques of supervision, theory of leadership and group process, interpersonal relations, and evaluation of teacher effectiveness. Prerequisites: 527, master's degree in educational administration, or equivalent.

EDADM 527 Educational Administration and Supervision (3)

Anderson, Bolton
Emphasizes the human elements of educational administration, including such topics as leadership, selection and orientation of personnel, small-group processes, staff utilization, administering the curric-

COLLEGE OF EDUCATION

ulum, supervision and control processes, differences and conflict. Prerequisite: graduate standing.

EDADM 528 Educational Administration and Supervision (3)

Andrews, Ostrander

Theoretical bases and practical integration of schools within the social/environmental context. Topics include schools as complex organizations, schools as open systems interacting with other open systems, power, and consensus mechanisms. Prerequisite: graduate standing.

EDADM 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 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 532 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 are studied through use of cases and simulated situations. Prerequisite: master's degree in educational administration or equivalent.

EDADM 533 Seminar in Administration: School Buildings (3)

Schneider

Survey of problems and issues faced by educational administrators that are impacting on educational facilities. Directed readings and informal discussion of the people, processes, programming, planning, and evaluation of ways and means of accommodating changes due to identifiable problems and issues. Prerequisite: master's degree 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, Johnson, 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, Bolton, Johnson, 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

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. Prerequisites: 528, master's degree in educational administration or equivalent, or consent of instructor.

EDADM 539 The Law and Education (3)

Ostrander

Examination of court cases associated with the rights of individuals and groups in educational organizations. Attention is given to the understanding of administrative due process requirements and to the growing body of administrative law affecting student and personnel management. Prerequisite: master's degree 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 550 Workshop in Educational Administration (2-6)

Workshop focuses on current problems facing educational administration. Topics may include personnel management, supervision of personnel, professional negotiations, selection and planning procedures, power relationships, school-community relationships.

EDADM 563 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 599 Independent Studies in Education (*)

Independent studies or readings of specialized aspects of education. Registration must be accompanied by a study prospectus endorsed by the appropriate faculty adviser for the work proposed, and which, with permission of the instructor, must be filed with the Office of Educational Administration in the College of Education. Prerequisite: permission.

EDADM 600 Independent Study or Research (*)

Registration must be accompanied by a study prospectus endorsed by the appropriate faculty adviser for the work proposed and must be filed with Office of Educational Administration in the College of Education. A report or paper setting forth the results of the investigation is required. Prerequisite: permission.

EDUCATIONAL CURRICULUM AND INSTRUCTION

EDC&I 132 Spanish for the Elementary School (5)
Practice in the basic language skills is combined with demonstration and analysis of methods and techniques appropriate to the Foreign Languages in Elementary Schools program. Emphasis is given to the language structures and vocabulary that normally occur in elementary school Spanish. Offered jointly with SPAN 128.

EDC&I 269 Education of Black Americans (3)

Banks

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.

EDC&I 300 Industrial Education: Sketching and Technical Drawing (3)

Baily

Freehand sketching; orthographic projection; pictorial representation; dimensioning; lettering; working drawing and blueprint reading.

EDC&I 301 Industrial Education: Sketching and Technical Drawing (3)

Baily

Developmental drawing; sheet metal layout drawing; revolutions, mechanical perspective-angular; mechanical perspective-parallel. Prerequisite: 300 or permission.

EDC&I 302 Industrial Education: Home Planning (4)

Baily

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.

EDC&I 303 Industrial Education: Fundamentals of Woodwork (3)

Baily

Hand-tool processes; elementary machine operations; methods of assembling and fastening; simple wood finishing.

EDC&I 304-305 Industrial Education: Woodworking Technology (3-2)

Baily

Design, construction, and finishing of projects in wood, involving machine operations. Prerequisites: 303 for 304-; 304- for -305.

EDC&I 306 Industrial Education: General Shop (5)

Baily

Introduction to industrial education; the common tools, materials, processes, and products of industry.

EDC&I 307 Industrial Education: Tools and Materials (2)

Baily

Sources, specifications, and costs of shop materials and equipment. Care, repair, and sharpening of hand and machine tools.

EDC&I 308 Special Problems in Industrial Education (1-5, max. 5)

Baily

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.

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.

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 orthographic; working drawings and print reading.

EDC&I 313 Industrial Education: Basic Woodworking for Occupational Therapists (3)

Baily
Hand-tool processes, elementary machine operations, safety practices, problem solving and planning, methods of assembling and fastening, simple wood finishing.

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; BG&S 101 and 200; ACCTG 210 and 220; ECON 200 and 201.

EDC&I 315 The Teaching of Business Education: Typewriting, Shorthand, Office Practice, and Transcription (4)

Briggs, Brown, Frerichs
Prerequisite: EDPSY 304.

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 317 Art in Childhood Education (3)

AWSpS
Raven
Provides the general elementary student with a theoretical and practical background for teaching art to children. Prerequisites: HUM 201 and admission to the Teacher Certification Program.

EDC&I 318 Drama in Childhood Education (3)

AWSpS
Siks
Provides the student with a theoretical and practical introductory background of fundamentals for teaching drama to children as a creative process and mode of learning. Prerequisites: HUM 201 and admission to the Teacher Certification Program.

EDC&I 319 Music in Childhood Education (3)

AWSpS
Cooper
Provides the student with a theoretical and practical introductory background to the fundamentals of music and for teaching music to children as a creative process and mode of learning. Prerequisites: HUM 201 and admission to the Teacher Certification Program.

EDC&I 320 Organization of School Programs in Communication Disorders (3)

Study of the organization and management of school programs designed to alleviate disorders of communication, K-12. Special emphasis on field experiences. Open only to majors in communication disorders. Prerequisites: EDPSY 304, SPHSC 350 and 351, or 391.

EDC&I 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 H EC 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)

Elementary, junior high, and senior high emphases. Prerequisites: EDPSY 304 and demonstration of language proficiency.

EDC&I 333, 334, 335 The Teaching of Spanish: Secondary Emphasis, Elementary and Junior High School Emphasis, Elementary Emphasis (3,3,3)

Friedrich
Prerequisite to teaching practicum. Elementary and junior high, and secondary emphases. Prerequisites: 329, EDPSY 304, and demonstration of language proficiency.

EDC&I 336 The Teaching of German in Secondary Schools (3)

Rabura
Prerequisites: 329, EDPSY 304, GERM 303, or permission.

EDC&I 337 The Teaching of German in Elementary Schools (3)

Rabura
Objectives and methods of the FLES (Foreign Languages in Elementary Schools) program. Prerequisites: 329, EDPSY 304, GERM 303, or permission.

EDC&I 338 The Teaching of Russian (2)

Augerot
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)

Study of the stages of development in the art of the young child as expressed through his creative and mental growth.

EDC&I 341 The Teaching of Art in the Secondary School (3)

For majors in secondary art education planning to teach on the junior or senior high school level. Prerequisite: EDPSY 304.

EDC&I 342 Art in the Elementary 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)

Hirabayashi, Krening
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)

Hirabayashi, Krening
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, Krening
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. Prerequisite: EDPSY 304 or permission.

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. Prerequisite: EDPSY 304, or permission.

EDC&I 350 Program Planning in Early Childhood Education (3)

Hirabayashi, Krening
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.) Prerequisite: EDPSY 304 or permission.

EDC&I 355 Language Arts in the Elementary School (3)

Krening, Settles
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)

McElroy, 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

Booth
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)

McDade
For teachers in high schools and junior colleges, or for education students taking first or second areas in journalism. Prerequisites: EDPSY 304, CMU 321 and 325, or permission.

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EDC&I 360 Reading in the Elementary School (3)
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, Kaltsounis
 Basic course in the planning and teaching of social studies in the elementary school. Prerequisites: EDPSY 304 and GEOG 100.

EDC&I 366 The Teaching of Social Studies in Secondary Schools (3)
Gulse
 Application of educational principles and methods to the teaching of social studies on the junior and senior high school levels. Prerequisite: EDPSY 304.

EDC&I 370 Science in the Elementary School (3)
Olstad, Smith
 Basic course in the teaching of science in the elementary school with special emphasis on the nature of science as a process of inquiry. Prerequisite: EDPSY 304 and 5 credits in an approved laboratory natural science course (biology, chemistry, physics).

EDC&I 371 Teaching Science in the Secondary School (3)
Olstad
 Basic course in the teaching of science in the secondary school with special emphasis on the nature of science as a process of inquiry. Prerequisite: EDPSY 304.

EDC&I 372 The Teaching of Biology (2)
Olsen
 Prerequisites: 371, EDPSY 304, and 25 credits in biology.

EDC&I 373 The Teaching of Chemistry (3)
Ritter
 Prerequisites: 371, EDPSY 304, and at least 20 credits in college chemistry.

EDC&I 375 Mathematics in the Elementary School (3)
Beal, 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 MATH 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, MATH 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, MATH 412, or equivalent.

EDC&I 378 Teaching Mathematics in the Secondary School (3)
Beal, Kersh
 Basic course in the teaching of mathematics in the secondary school for preservice teachers. Prerequisite: EDPSY 304 or permission.

EDC&I 400 Selection and Organization of Occupational and Industrial Education Subject Matter (3)
Bally
 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)
Bally
 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)
Bally
 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)
Bally
 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)
Bally
 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)
Bally
 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)
Bally
 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.

EDC&I 407 Organization and Administration of Industrial Education (3)
Bally
 Types of programs of vocational-industrial education and industrial arts; organization and administration of these programs, the relationships between them, and their place in public school programs.

EDC&I 408 Current Problems in Vocational and Industrial Arts Education (3)
Bally
 Study of the current events and problems in industrial education and their application in the field.

EDC&I 409 Improvement of Teaching: Industrial Education (3)
Bally
 Analysis of the types of teaching instructional materials and evaluation devices used in industrial education, with emphasis on the improvement of existing methods and techniques.

EDC&I 410 Field Experience in Industrial Practices (2-10, max. 10)
Bally
 Study of the problems of industry such as employment practices, job requirements, materials handling and processing, plant organization and management that would assist industrial arts teachers interpret industrial practices. Prerequisites: teaching experience in industrial education and permission.

EDC&I 411 Principles and Problems in Distributive Education (3)
 Concerned with improvement of instruction, maintenance of high standards in work stations, and special techniques used by experienced coordinators in the solution of common problems. (Offered Summer Quarter only.)

EDC&I 412 Selection and Organization of Distributive Education Subject Matter (3)
 Problems, techniques, and procedures in the selec-

tion and organization of teaching content for distributive education. Prerequisite: permission.

EDC&I 413 Coordination of Comparative Education Programs (3)
 Stresses fundamentals, records and reports, the use of advisory committees, course titles, qualifications, coordinating activities, course content, and work training stations.

EDC&I 414 Distributive Education: Post-Secondary Level (3)
Bally
 History and development of midmanagement distributive education programs, organization, and framework. Eight principal elements covering all aspects of the program, including type of students served, qualifications of the instructors, curriculum, research, and coordination aspects. (Offered Summer Quarter only.)

EDC&I 415 Materials and Methods of Teaching Typewriting (3)
Briggs, Brown, Frerichs
 Procedures and materials for developing skills 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, Brown, Frerichs
 Objectives and content of office practice and general clerical practice courses; plans for organizing classes and methods of teaching specific machines and subject matter; laboratory study of new inventions in office machines.

EDC&I 417 Materials and Methods of Teaching Gregg Shorthand and Transcription (3)
Briggs, Brown, Frerichs
 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, Brown, Frerichs
 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, Brown, Frerichs
 Techniques of teaching bookkeeping and general business subjects; relationship to the curriculum; standards to be achieved; content and organization of the subject matter; tests and teaching materials; new trends in the field; motivational devices; visual aids.

EDC&I 420 Principles of Safety Education (3)
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 423 Workshop in Instructional Improvement: Industrial Education (2-6)
 Individual or group study projects on the improvement of instruction in industrial education.

EDC&I 425 Programs in Elementary Physical Education (3) SpS
 Progress and problems in modern programs. Offered jointly with PE 478. Prerequisites: 324, PE 314, 316.

EDC&I 428 Organization and Supervision of Post-Secondary Distributive Education (3)
Development of supervisory personnel for community colleges and technical vocational schools to initiate, operate, and administer postsecondary mid-management programs.

EDC&I 429 Field Studies in Home Economics Education (3, max. 6)

Granberg

Field-oriented course to provide the opportunity for home economics education students to work on jobs that use wage-earning knowledge and skills related to home economics. After the work experience, each student develops curriculum and teaching strategies applicable for use in teaching wage-earning units of courses. Prerequisite: permission.

EDC&I 435 The Teaching of Foreign Literature (3)

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 ROM 475. Prerequisites: senior standing and permission.

EDC&I 438 Improvement of Teaching: Latin (3)

Examination and evaluation of the various methods of teaching Latin; audiovisual aids; testing materials; textbooks; relation of Latin to other languages; Latin derivatives in English vocabulary. Offered jointly with LAT 475.

EDC&I 439 Caesar for High School Teachers (3)

Read

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 LAT 476. (Offered Summer Quarter only.)

EDC&I 441 Improvement of Teaching: Art Appreciation in the Schools (3)

Survey of the history of art to promote an appreciation of the nation's cultural heritage; designed for teachers at all levels of instruction and subject matter areas. (1) Development of content in sequential or unit plan studies to incorporate art history in general studies curricula. (2) Development of methods and preparation of materials for classroom presentation. Illustrated lectures. Prerequisite: teaching experience.

EDC&I 443 Improvement of Teaching: Elementary School Music (3)

Advanced studies in the teaching of music in the elementary school. Prerequisite: teaching experience.

EDC&I 445 Theory and Practice of Kindergarten and Primary Teaching (3)

Hirabayashi, Krening

Systematic treatment of the content; teaching processes, and learning resources appropriate to kindergarten and primary education with particular emphasis on current research and developments. Prerequisite: EDPSY 304 or permission.

EDC&I 453 Teaching the Bilingual-Bicultural Chicano Child in the Elementary School (3) WSp

Educational needs of the elementary school Chicano child and the ways in which these needs can be met. The differences between the metropolitan, the rural, and the migrant Chicano with emphasis on the educational difficulties the Chicano faces in all three settings. A major component of the course is bilingual education-research findings and special programs, materials, and methodologies. Prerequisite: concurrent registration in EDUC 302.

EDC&I 454 Chicano Studies in the Secondary School (3) WSp

Provides prospective secondary school teachers with the knowledge and skill to integrate Chicano studies into the curricular offerings of the secondary school. Students are exposed to the cultural contributions of the Chicano to the American culture and study the historical, social, and linguistic factors affecting the education of the Chicano. Emphasis on methods and resources for teaching Chicano studies as a separate subject or as an element integrated in existing courses. Prerequisite: concurrent registration in EDUC 302.

EDC&I 455 The Language Arts: Instructional Problems and Practices in the Elementary School (3)

Settles

Study of important and recent research in elementary school language arts and consideration of its practical 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)

McDade

Advanced course in teaching high school journalism. For experienced publications advisers. No credit if 358 has been taken.

EDC&I 460 The Teaching of Reading (3)

Monson, Sebesta

Improvement of teaching reading in the elementary school, including comprehension and decoding, reading in the content fields, motivation of voluntary reading. Prerequisite: teaching experience or prior course work in the teaching of reading.

EDC&I 461 Materials for Teaching Reading (3)

Monson

Designed to provide acquaintance with materials used in the teaching of reading. Basal readers, materials from content areas, recreational reading materials, and supplementary practice materials are examined, as are the organization of learning centers and other schemes for teaching reading. Prerequisite: one prior course in the teaching of reading.

EDC&I 462 Reading in the Secondary School (3)

Fea

Teaching of reading in the secondary schools, including vocabulary development, comprehension, speed reading in the content fields, and organization of reading programs at the secondary level. Prerequisite: teaching experience or concurrent internship.

EDC&I 464 The Indian Child and His Education (5)

Bill

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 Practice (3)

Banks, Jarolimek, Kaltsounts

Stresses curriculum patterns, instructional procedures, resource materials, and the selection of content in social studies. For elementary and junior high school teachers. Prerequisite: teaching experience.

EDC&I 466 Social Studies Education: Secondary School Programs and Practices (3)

Guise

Stresses curriculum patterns, instructional procedures, resource materials, and a selection of content in social studies for junior and senior high school teachers. Prerequisite: teaching experience.

EDC&I 467 Geography in the Social Studies Curriculum (3)

Discussion of the concepts and content of geography essential to effective social studies curricula. Offered jointly with GEOG 467.

EDC&I 468 Workshop in Instructional Improvement: Social Studies (2-6)

Individual or group study projects on the improvement of instruction in social studies.

EDC&I 469 Educating the Black Inner-City Child (3)

Banks, Hurd

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 (2-6)

Individual or group study projects on the improvement of instruction in science.

EDC&I 474 Multi-Ethnic Studies: Methods, Content, and Materials (3)

Banks

Designed to help preservice and inservice teachers identify content and materials and devise methods for implementing ethnic studies programs and for incorporating ethnic content into regular K-12 social studies, language arts, and humanities curricula. Special attention is given to teaching about American Indians, Mexican Americans, Black Americans, Asian Americans, Puerto Rican Americans, and white ethnic groups. Prerequisite: admission to Teacher Education Program or teaching experience.

EDC&I 475 Improvement of Teaching: Elementary School Mathematics (3)

Beal, Kersh

Designed for elementary teachers (grades K-6). Emphasis is placed on the contributions of research to the improvement of the teaching of mathematics in the elementary school. Prerequisite: teaching experience.

EDC&I 476 Improvement of Teaching: Junior High School Mathematics (5)

Exploration of some modern mathematical concepts for the purpose of improving the teaching of junior high school mathematics. Prerequisite: MATH 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)

Study of selected areas of mathematics. Designed for the improvement of teachers of mathematics. Offered jointly with MATH 497.

EDC&I 479 Workshop in Instructional Improvement: Mathematics (2-6)

Individual or group study projects on the improvement of instruction in mathematics.

EDC&I 480 Introduction to Learning Resources in Teaching (3)

Driscoll, Hawk, Torkelson

Factors influencing the selection and use of audiovisual resources in instruction.

EDC&I 482 Still Photography in Education (3)

Driscoll

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.

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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)

Hawk
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)

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 CMU 459.

EDC&I 489 Television Production Workshop for Teachers (5)

Godfrey
Working in University studios, under laboratory conditions involving production on-camera methods, teachers learn to present instructional subject matter through television. Especially for those who expect to work with television as instructors or as supervisors of school-oriented television activities. Open to nonmajors; not open to graduate students in communications or to students with credit for CMU 361. Offered jointly with CMU 463.

EDC&I 494 Workshop in Improvement of Curriculum (1-15, max. 15)

Stresses the application of procedures for curriculum development, maintenance, and evaluation. Individuals taking this workshop have opportunities to develop and perfect strategies for program development and have occasions to utilize the strategies in master plan and materials preparation for simulated or real school situations. Specific focus of workshop is determined by instructor or by arrangement with district. Prerequisite: permission.

EDC&I 495 Improvement of Teaching (3)

To help teachers (1) understand the physical, psychological, emotional, and social needs of children; (2) adapt instruction to the needs of children; (3) select the approaches and instructional resources that will provide the soundest learning experiences; and (4) appraise themselves and their work. (Offered only by special arrangement with school districts.)

EDC&I 496 Workshop in Instructional Improvement (2-6, max. 6)

Individual or group study projects on the improvement of instruction.

EDC&I 499 Undergraduate Research (2-5, max. 5)

For undergraduates. Registration must be accompanied 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 514 Coordination and Supervision of Cooperative Office Education Programs (3) SW

Briggs, Brown, Frerichs
Practices and procedures in the initiation and sequential development of cooperative office education programs. Relevant techniques in coordinating, supervising, and evaluating cooperative office education programs; review of research studies, surveys, and reports; state requirements; preparation of proposals; analysis and evaluation of techniques of recruitment, selection, placement, training, and follow-up; assessment of skills and knowledge required for job clusters. Prerequisites: one year of teaching experience in office occupations and valid state vocational certificate.

EDC&I 515 Seminar in Business Education (3)

Briggs, Brown, Frerichs
Analysis of selected problems in business education; current research in business education; evaluation of work experience programs; developments in vocational business education. Prerequisites: 415, 418, 419.

EDC&I 520 Current Models in Early Childhood Education (3)

Hirabayashi, Krening
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)

Hirabayashi, Krening
Study of issues currently facing the field of early childhood education, emphasizing the rationale, impact, and management of child-care programs. Relationship of local child-care programs to state and federal agencies is included. Prerequisite: 520 or permission.

EDC&I 522 Practicum in the Training of Early Childhood Instructional Personnel (3)

Hirabayashi, Krening
Directed experience in educational training conducted in the field. Design and implementation of a training program for early childhood education instructional personnel. Prerequisites: graduate standing and permission.

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 530 Seminar in Analysis of Approaches for Teaching Reading (3) AWS

Monson, Sebesta
Designed to aid experienced teachers who possess background in the teaching of reading, this course

presents a variety of approaches with implications of research for analyzing the effectiveness of individualized reading, individually guided instruction, eclectic methodology, and others. Evaluation of pupil performance included. Prerequisites: teaching experience and a basic course in the teaching of reading.

EDC&I 531 Seminar: Analysis of Reading Materials (3) SpS

Monson, Sebesta
Students formulate and apply criteria for assessing materials, with emphasis on linguistic, cultural, and psychological factors; instruction effectiveness, interest level; and educational objectives. Prerequisites: teaching experience and one basic course in the teaching of reading.

EDC&I 532 Seminar in Research in Reading (3)

Monson, Sebesta
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 533 Seminar: Conducting Research in Reading (3, max. 6) SpS

Monson, Sebesta
Students design and conduct original research studies in the field of reading. Emphasis on research rationale, choice of productive research types, and reporting of research results and implications. Prerequisite: 532.

EDC&I 534 Seminar in the Reading of Literature (3)

Monson
Reading of literature and its effect on reading skills, language development, social values, and literary judgment of 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 of young adults.

EDC&I 535 Seminar: Conducting Research in Response to Literature (3, max. 6) SpS

Monson, Sebesta
Students design, conduct, and interpret original research studies in the field of reading literature within the context of the school curriculum. Emphasis on the analysis of literary content and structure and the relationship of those qualities to the literary experience. Prerequisite: 534.

EDC&I 556 Elementary School Curriculum (3)

Foster, Hunkins, Settles
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)

Gulse
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)

Gulse, Hunkins
Intensive study of the basic principles and procedures utilized in the development of curricula. Prerequisite: teaching practicum.

EDC&I 561 Seminar in Language Arts (3)

Study of recent research in language structure with special attention to research pertaining to the

teaching of language skills: aural, 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.

EDC&I 563 Current Issues in Language Arts Education (1, max. 6)

Discussion of problems and issues of current interest and importance in language arts education.

EDC&I 565 Seminar in Social Studies Education: Elementary Emphasis (3)

Gulise, Jarolimek, Katsounis

Intensive study of the social studies curriculum, with particular emphasis on current literature and research. Prerequisite: 465 or equivalent.

EDC&I 566 Seminar in Social Studies Education: Secondary Emphasis (3)

Gulise, Jarolimek

Intensive study of the social studies curriculum, with particular emphasis on current literature and research. Prerequisite: 466 or equivalent.

EDC&I 567 Current Issues in Social Studies Education (1, max. 6)

Katsounis

Discussion of problems and issues of current interest and importance in social studies education.

EDC&I 569 Educating Ethnic Minority Youths (4) Sp

Banks

Intensive analysis and review of the research and curricular programs related to the social, psychological, and political factors that influence the school experiences of ethnic minority youths. Special attention given to instructional and curricular programs for Afro-American, American Indian, Mexican-American, Puerto Rican-American, and Asian-American students. Prerequisite: successful completion of 464, 469, or 474, or permission.

EDC&I 570 Seminar in Science Education: Elementary Emphasis (3)

Olstad

Investigation of curriculum and instruction in science at elementary school levels, with particular emphasis on current literature and research. Prerequisite: 470 or equivalent.

EDC&I 571 Seminar in Science Education: Secondary Emphasis (3)

Olstad

Investigation of curriculum and instruction in science at secondary school levels, with particular emphasis on current literature and research. Prerequisite: 471 or equivalent.

EDC&I 572 Current Issues in Science Education (1, max. 6)

Olstad, Smith

Discussion of topics and problems of current interest and importance in science education. Prerequisite: graduate standing.

EDC&I 575 Seminar in Mathematics Education: Elementary Emphasis (3)

Kersh

Investigation of curriculum and instruction in mathematics at the elementary school level; review of research and preparation of proposals. Prerequisite: 475 or equivalent.

EDC&I 576 Seminar in Mathematics Education: Secondary Emphasis (3)

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.

EDC&I 577 Current Issues in Mathematics Education (1, max. 6)

Kersh

Discussion of problems and issues of current interest and importance in mathematics education.

EDC&I 580 Seminar in Learning Resources (3)

Driscoll, Torkelson

Advanced analysis of learning resources, instructional communications, and technology. Prerequisite: 480 or permission.

EDC&I 581 Management of Learning Resources Programs (3)

Hawk

Study of factors affecting management of educational programs involving production, storage, distribution, and use of visual and auditory materials and equipment. Prerequisite: 480 or permission.

EDC&I 582 Learning Resources Systems of Instruction (3)

Torkelson

Study of the "systems" approach to instruction and the orchestration of relevant components, techniques, and arrangements (e.g., logistics, instructional space and facilities, computer-assisted instruction).

EDC&I 583 Learning Resources and Learning Domains (5)

Driscoll

Research and relevant literature concerning visual and auditory stimuli as these relate to learning domains (affective, perceptual-motor, cognitive).

EDC&I 585 Seminar: International and Cross-Cultural Education (3)

Driscoll

Treats selected instructional problems, innovation strategies, and the management of learning resources in various emerging countries.

EDC&I 587 Practicum in Learning Resources (3)

Driscoll, Hawk, Torkelson

Design and production of visual and auditory materials for teaching. Prerequisite: 480 or equivalent.

EDC&I 589 Doctoral Seminar in Learning Resources (3)

Torkelson

For doctoral majors in learning resources, concentrating on contemporary research in the field, and on candidate's individual project and postdoctoral research plans.

EDC&I 590 Seminar in Elementary Education (3)

Foster, Settles

Exploration of the philosophy, history, purposes, curriculum, methods, school organization, and evaluation in elementary education, with emphasis on individual research. Prerequisites: elementary school teaching experience, 556, and EDPsy 520.

EDC&I 592 Seminar in Secondary Education (3)

Johnson

Research and study of secondary education. Primary focus on factors involving change in secondary school curriculum and organization. Prerequisite: 557 or 558.

EDC&I 593 Seminar in Curriculum: Theory and Practice (3)

Gulise, Hunkins

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.

EDC&I 594 Seminar in Curriculum: Issues, Systems, Models (3)

Hunkins

Emphasis, from a systems and futuristic view, on the current approaches to curriculum, curriculum innovation, and major educational issues as they affect curricular activity. Prerequisites: 559 and teaching experience.

EDC&I 595 Seminar in Analysis of Teaching (3)

Gulise

Exploration of the various media and types including psychological, sociological, and philosophical factors. Particular emphasis is given to research related to the variables involved in teaching. Prerequisites: EDPsy 520 and teaching experience.

EDC&I 596 Seminar in Strategies of Instruction (3)

Gulise

Exploration of the various media and types of organization relevant to the implementation of strategies based on theoretical models. Prerequisite: 595.

EDC&I 597 Curriculum Evaluation Seminar (3, max. 6) WSP

Kersh, Smith

Offered each year as a two-quarter sequence. The first quarter focuses on the evaluator's roles, evaluation theory and models, and selected curricular evaluations. Examples are drawn from the several disciplines commonly offered in the elementary and secondary schools. In the second quarter, students are expected to identify an evaluation problem and to develop an evaluation design that can be implemented as a practical solution to the problem. Prerequisite: permission.

EDC&I 598 Internship in Curriculum (3-9, max. 9)

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.

EDC&I 599 Independent Studies in Education (*)

Independent studies or readings of specialized aspects of education. Registration must be accompanied by a study prospectus endorsed by the appropriate faculty 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.

EDC&I 600 Independent Study and Research (*)

Registration must be accompanied by a study prospectus endorsed by the appropriate faculty adviser for the work proposed and must be filed with the Office of Educational Curriculum and Instruction in the College of Education. A report or paper setting forth the results of the investigation is required. Prerequisite: permission.

EDUCATIONAL POLICY STUDIES

EDEPS 444 Constitutional Freedom and American Education (3-6, max. 6) S

Morris

Emphasis on the principles, processes, and content of constitutional law in an effort to provide new insights and new tools with which school administrators and teachers may examine questions involving political and civil rights in the United States, especially as these affect the conduct of education. Specific topics on constitutional 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 LAW 444. Satisfactory/not satisfactory option available to nonlaw students only.

EDEPS 458 History of American Education to 1865 (5)

Burgess

Development of American education in cultural context; colonial period, influence of Enlightenment, and common school movement. Offered jointly with HSTAA 458.

EDEPS 459 History of American Education Since 1865 (5)

Burgess

Development of American education in cultural context; progressive education, recent criticism, continuing issues and trends. Offered jointly with HSTAA 459.

EDEPS 479 Crucial Issues in Education (3)

Kerr, Staff

Designed to consider in some detail certain of the

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most significant and critical problems of educational policy. Prerequisite: admission to the Teacher Certification Program or permission.

EDEPS 492 History of European Education Through the Reformation (3)

Development of European education in cultural context: Greece, Rome, Middle Ages, Renaissance, and Reformation.

EDEPS 493 History of European Education Since the Reformation (3)

Madsen
Development of European education in cultural context: pedagogical reformers, national systems, and recent trends.

EDEPS 496 Comparative Education (3)

Legters
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)

Kerr
Systematic consideration of the structure and function of educational policies and problems of research and evaluation of those policies. Includes survey of resources for description of particular types of policies.

EDEPS 502 Sociology of Education (3)

Jarolimiek
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.

EDEPS 503 History of Educational Thought (3)

Burgess, Madsen
Study of educational theory and practice in Western culture.

EDEPS 504 Philosophy of Education (3)

Kerr, Tostberg
Philosophy of education considered as a study of the conceptual basis for educational policy and practice. Emphasis on relationships between enduring educational problems and fundamental philosophic issues; concepts that feature centrally in educational discourse; and conceptual analysis as a means for clarifying decisions regarding educational policy and practice.

EDEPS 510 Seminar in Educational Sociology (3)

Application of sociological principles to school problems; individual problems and investigations. For teachers, administrators, and those using educational sociology as a field for advanced degrees.

EDEPS 571, 572, 573 Public and Educational Policy Issues in the Development of Human Talent (3,3,3) A,W,Sp

Wolffe
Higher education and the nation's human re-

sources; trends, future projections, policy issues, and national and personal goals in the relations between education and the utilization of professional and specialized personnel. Offered jointly with PB PL 571, 572, 573. Prerequisite: permission.

EDEPS 580 Seminar: Research 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: 504 and permission.

EDEPS 583 Seminar: Research in Educational Sociology (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)

Kerr, Tostberg
Intensive study of the writings of selected contemporary philosophers of education. Prerequisite: graduate standing.

EDEPS 588 Analysis of Educational Concepts (3)

Tostberg
Study of the application of linguistic analysis to the discourse of education. Prerequisites: 587 and permission.

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 organizational and curricular changes. Special attention is given to nine American universities in the twentieth century: Berkeley, Chicago, Columbia, Cornell, Harvard, Michigan, Stanford, Wisconsin, and Yale.

EDEPS 599 Independent Studies in Education (*)

Independent studies or readings of specialized aspects of education. Registration must be accompanied by a study prospectus endorsed by the appropriate faculty adviser for the work proposed, and with permission of the instructor, must be filed with the Office of Educational Policy Studies. Prerequisite: permission.

EDEPS 600 Independent Study or Research (*)

Registration must be accompanied by a study prospectus endorsed by the appropriate faculty adviser for the work proposed and must be filed with the Office of Educational Policy Studies in the College of Education. A report or paper setting forth the results of the investigation is required.

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EDPSY 304 Educational Psychology (5)

Brown, Nolen
Basic undergraduate course in psychology concerned with the study of human learning in the educational setting. Learning motivation, technology, the cognitive process, human development and socialization, the affective processes and attitudes change, and classroom management 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)

Abbott, Brown, Mizokawa, 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)

Gray, McCartin, Mizokawa
Study of perceptual-motor, language, and overall cognitive development in children from birth through primary school age. Basic learning processes and guidelines for the assessment of developmental status 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.

EDPSY 402 Childhood Socialization and School Practice (3)

Evans, McCartin
Study of the development of personal-social behavior from the preschool through the preadolescent years. 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, McCartin
Overview of the adolescent period, especially for persons engaged in the helping professions—concerned with junior, senior, and early-college school years. Focus is on crucial developmental processes and patterns as well as contemporary research and theoretical perspectives about adolescence. Selected educational issues and problems associated with adolescence in Western culture are also examined. Prerequisite: 304 or equivalent.

EDPSY 404 Language in Early Childhood Development and Education (3) SpS

Nolen
Review and critical examination of theories of language acquisition and their psychological implications for developing cognition. Emphases include a survey of language growth from the fields of linguistics, psychology, and sociology and combining these disciplines into the service of studying individual language development from the points of view of educational attainment and social relationships. Perspective extends from the broad sweep of theory to specific aspects of language as product and determiners in children's socialization and educational performance. Skills in interpretation of methodological issues and theoretical assumptions entailed in current early childhood language teaching and testing programs also are included. Prerequisite: 304 or equivalent; 400, 403, and PSYCH 414 recommended.

EDPSY 407 Teaching the Gifted Child (3)

Freehill
The role of the teacher and the school in the identification and development of the special abilities and talents of gifted children. Prerequisite: teaching experience.

EDPSY 408 Mental Hygiene for Teachers and Administrators (3)

Bashey, W. Brown, Lawrence, Mizokawa, 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)

Nolen
Experience in, and study of, analysis of difficulties in school subjects with special reference to language

arts and mathematics. Experience in, and study of, appropriate remedial instruction. Analysis and instruction that is considered both feasible and practical for the teacher working with individuals or with a group.

EDPSY 425 Reading Disability; Remedial Techniques (3)
Nolen, Thalberg

Evaluation of methods for diagnosing and minimizing reading retardation. Descriptions of in-class and clinical procedures supplemented by classroom observations. Prerequisite: EDC&I 360 or equivalent.

EDPSY 447 Principles of Guidance (3)
Lavelle

Study of guidance programs in elementary and secondary schools. Attention is given the roles of specialists with emphasis on the role of the classroom teacher in school guidance programs. This course is designed for teachers, administrators, and prospective teachers. Prospective counseling specialists should see 553.

EDPSY 449 Laboratory in Educational Psychology (2-6, max. 6)

Special studies for counselors, teachers, administrators, and others concerned with student personnel and psychological services in schools and colleges. The course focuses on special topics that have either local or contemporary significance. (Not offered every year; check current *Time Schedule*.)

EDPSY 490 Basic Educational Statistics (3)

Abbott, Klockars, Peckham, Sax
Measures of central tendency and variability, point and interval estimation, linear correlation, hypothesis testing.

EDPSY 499 Undergraduate Research (*)

For undergraduates. Registration must be accompanied by a study prospectus on a special form provided by the Office of Educational Psychology, 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 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: approved plan of study and permission of the instructor must be filed in the Office of Educational Psychology in the College of Education.

EDPSY 501 Seminar in Concepts and Problem Solving (3)

Fea, Gray
The psychology of children's thinking. Course 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)

Fea
The psychology of children's thinking. Course emphasizes study of research results in critical thinking and creative thinking with application to classroom learning situations. Prerequisite: permission.

EDPSY 503 Psychology of Reading (3)

Fea, Nolen
Reading and perception, word recognition, concept development and meaning in reading; psychology of reading interests and skills. Prerequisite: permission.

EDPSY 504 Verbal Instruction (3)

Fea, Mizokawa, Nolen
Study of linguistics and the psychological implications of classroom and learning. Prerequisite: permission.

EDPSY 506 Instructional Theory (3)

Brown, Fea, Mizokawa
Examination of the contribution of learning psy-

chology to teaching, with emphasis upon instructional design and the evaluation of selected elements in instructional strategies. Prerequisite: 521. Offered alternate years; check quarterly *Time Schedule*.

EDPSY 507 Reading Disability: Etiology and Diagnosis—Practicum (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—Practicum (2-6, max. 12)

Practicum in supervising, counseling, group counseling, diagnostic activities, and remedial reading therapy. Prerequisites: advanced graduate standing and permission.

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. Check *Time Schedule* for subject listings, which vary from quarter to quarter.

EDPSY 511 Seminar in Applied Educational Psychology (1, max. 6)

Bashey, Fenner, Forster, Lavelle, Lawrence
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)

Abbott, Klockars, Peckham, Sax
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
Advanced seminar on selected topics concerned with human development and socialization processes. Emphasis placed upon empirical research and its theoretical underpinnings in such areas as cognitive development, moral development and education, self-concept development, and related concerns. Prerequisite: permission.

EDPSY 516 Seminar in Learning and Thinking (3, max. 15)

Fea, Mizokawa, Nolen
Seminar in the psychology of learning language and language learning. Each seminar is offered with predesignated emphasis in one of the following topics: linguistics, phonology, pragmatics, psycholinguistics, semantics. Prerequisite: permission.

EDPSY 520 Advanced Educational Psychology—Learning (3)

Evans, McCartin, Mizokawa
Systematic examination of current research about human learning and instructional psychology, including the study of motivation, human abilities, and learning, the learning process, and performance assessment. Prerequisite: 304 or equivalent.

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.

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: 541, and permission.

EDPSY 541 Group Tests in Counseling (5)

Forster, Lawrence
Emphasis on the utilization of objective measures in counseling. Prerequisite: 490 or equivalent.

EDPSY 542 Career Development (3)

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)
Forster, Lawrence

Self-directed, shared learning experiences for persons in preparation for eventual work in certain helping professions such as teaching, counseling, nursing, agency work. The scope of inquiry includes how people spend time, particularly in work and leisure time, and how the professional helping role is related to helping persons confront the problems associated with work. Prerequisite: permission.

EDPSY 544 Counseling (5)

Brammer, Lavelle
Emphasis on the theory and practice of student counseling.

EDPSY 545 Practicum in Counseling (3-6, max. 6)

Bashey, Brammer, Brown, Fenner, Forster, Lavelle, Lawrence, 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. Prerequisite: permission.

EDPSY 548 Educational Implications of Personality Theory (5)

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)

Brammer
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)

Brammer
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.

COLLEGE OF EDUCATION

EDPSY 561 Group Process Laboratory (3)
Bashey, Brammer, Brown, Fenner, Forster, Lavelle, Lawrence
Experience in small-group process. Collateral discussions of process and independent study. Prerequisite: permission.

EDPSY 564 Practicum in School Psychology (1-6, max. 6)
Brown, Gray
Practicum 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)
Brammer, Freehill, Gray, 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)
Bashey, Brown, Freehill
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 I (1, max. 3)
R. Brown, Gray, Freehill, McCartin, Meacham, Nolen, Olch, Thalberg
Seminar in current issues in professional psychology. Limited to master's degree students in school 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.

EDPSY 591 Methods of Educational Research (3)
Abbott, Klockars, Mizokawa, Peckham, Sax
Introduction to educational research. Primary focus on hypothesis development, experimental design, use of controls, data analysis and interpretation. Prerequisites: 308, 490, and permission.

EDPSY 592 Advanced Educational Measurements (3)
Sax
Theory of measurement; an examination of assumptions involved in test theory, errors of measurement, factors affecting reliability and validity, and problems of weighting. Taught with PSYCH 430. Prerequisites: 308, 490, and permission.

EDPSY 593 Experimental Design and Analysis (5)
Klockars, Peckham
Experimental design with emphasis on the analysis of variance. Prerequisites: 490 or equivalent, and 591.

EDPSY 594 Advanced Correlational Techniques (5)
Abbott, Klockars
Multivariate analysis, including regression and multiple correlation; matrix algebra; factor analysis. Prerequisite: 490 or equivalent.

EDPSY 595 Measurement and Evaluation Practices in Early Childhood Development and Education (3)SpS
Evans
Review and critical examination of measurement strategies and evaluation procedures in contemporary settings for early childhood development and education. Emphases include a study of early childhood education evaluation research, established and experimental measurement techniques, and the problems of measurement and evaluation unique to young children. Skills in the interpretation of measurements and the design of evaluation studies in early education. Prerequisite: 308 or equivalent; 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.

HIGHER EDUCATION

EDHED 430 Higher Education and the Ethnic Minority (3) A
Morishima
Designed to provide the student with information on special problems in higher education (e.g., access, areas of study, financial ability, etc.) faced by the nonwhite ethnic minority student. Special emphasis is given to the commonality of experience among the four groups. Additional emphasis placed on major differences.

EDHED 496 Community College Programs and Problems (1-6, max. 12)
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 adviser most appropriate for the project proposed and the instructor, and the form must be filed in the Office of Higher Education in the College of Education. Students developing studies under this rubric should be advised that a report or a paper setting forth the results of their investigations should be regarded as a basic part of the program.

EDHED 501 Occupational Programs in Higher Education (3)
Schill
Analysis of occupational preparation programs in institutions of higher education, industry, business, and governmental agencies, with emphasis on methods of determining content, on processes for evaluation, and on research.

EDHED 502 College Instruction (3)
Relian
Analysis of various instructional modes, media, and instruments, with emphasis on current research findings and methodology.

EDHED 503 The Community College (3)
Study of the history and development, the roles, the objective, and the organization of the community college and of the problems and the issues confronting the two-year college.

EDHED 504 Academic Freedom and Tenure (3)
Sp
Williams
Historical analysis of academic freedom and tenure issues, leading to the development and defense of individual positions on the present and future status of these issues. Special attention to the impact of collective bargaining on academic freedom and tenure.

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 several kinds of institutions, the composition and character of student bodies and

faculty, and the state coordination of colleges and universities.

EDHED 506 History of American Higher Education (3)
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 environing 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 alike or different in their approaches to curriculum, teaching, research, service, management, and governance.

EDHED 512 People and the Outcomes of Higher Education (3) Sp
Cope, Williams
Analysis of literature on the people associated with higher education and the outcomes they achieve. The known characteristics of students, professors, and administrators and the ways in which they do or do not change while in association with each other. Outcomes are conceptualized in terms of personal development, the growth of knowledge, and impacts on the environing society attributable to higher education.

EDHED 520 Seminar in the Administration of Community Colleges (3)
For students preparing for administrative positions in community colleges. Principles and practices in 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)
Relian
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)

Field study and experience in college teaching and administration, planned by the College of Education in cooperation 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, devoted to the mutual consideration of research in this field. May be repeated with permission of the adviser.

EDHED 554 Seminar in the Administration of Colleges and Universities (3)

Cope
Study of the internal administration and organization of four-year colleges and universities with emphases on practice and theory. Instruction largely by the case or problem method.

EDHED 559 Seminar in Higher Education (3)

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)

Morishima
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 600 Independent Study or Research (*)

Registration must be accompanied by a study prospectus endorsed by the appropriate faculty adviser for the work proposed and must be filed with the Office of Higher Education in the College of Education. A report or paper setting forth the results of the investigation is required. Prerequisite: permission.

SPECIAL EDUCATION

EDSPE 403 Education of the Emotionally Disturbed (3)

Neel
Analysis of major theoretical approaches to the education of emotionally disturbed children. Adaptation of various approaches to various educational settings.

EDSPE 404 Exceptional Children (3)

Ryckman, Scranton
Atypical children studied from the point of view of the classroom teacher.

EDSPE 409 Mental Retardation (3)

Lovitt, Ryckman
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)

Neel, Ryckman
Analysis of major theoretical approaches to the study of children with learning disabilities. Adaptation of various approaches to various educational settings.

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 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 para-professionals working with families of handicapped children enrolled in special education or integrated programs.

EDSPE 433 History, Education, and Guidance of the Deaf (3)

Lowenbraun, Scroggs
Consideration of problems of the deaf from social, economic, and educational point of view; history of deaf education.

EDSPE 435 Principles and Practice of Manual English (3)

Petersen
Nature of manual communication is introduced with an identification of its specific modes: sign language, signed English, simultaneous method, finger spelling, and manual English. Discussions center on the linguistic structure of signs, the psycholinguistic effects of signs on young children, and a review of the pertinent literature. Laboratory sessions emphasize manual English.

EDSPE 475 Recreation and Leisure Activities for the Handicapped (3) AWS

Acquaints the student with the philosophy of specialized recreation and leisure activities for the handicapped: community, state, and national organizations providing leisure activities; adaptive devices and how to organize various activities; and the need to integrate and coordinate recreation, education, and service organizations working with the handicapped. Observation, practical experience, guest speakers, films, and lectures. Experience or at least an interest in working with the handicapped is beneficial.

EDSPE 496 Workshop in Special Education (1-9, max. 15)

Demonstration, observation, and/or participation with groups of handicapped children in laboratory or controlled classroom settings.

EDSPE 499 Undergraduate Research (2-5, max. 5)

For undergraduates. Registration must be accompanied by a study prospectus on a special form provided by the Office of Special Education, endorsed by the faculty adviser most appropriate for the project proposed and the instructor, and the form must be filed in the Office of Special Education in the College of Education. Students developing studies under this rubric should be advised that a report or a paper setting forth the results of their investigations should be regarded as a basic part of the program.

EDSPE 500 Field Study (3-6, max. 6)

Individual study of an educational problem in the field under the direction of a faculty member. Prerequisites: approved plan of study and permission of the instructor must be filed in the Office of Special Education in the College of Education.

EDSPE 502 Instructional Modifications for the Education of the Mildly Handicapped (3)

In-depth analysis and application of several modifications of instructional techniques necessary for the education of the mildly handicapped. (Formerly 402.)

EDSPE 504 Seminar in Educating the Socially and Emotionally Disturbed (3)

Neel
Advanced-level seminar that analyzes the classical and contemporary research in the intervention of behavior disorders; reviews intervention procedures

applied in a variety of classroom administrative organizations, and prepares a scholarly manuscript for dissemination.

EDSPE 505 Educating the Mentally Retarded (3)

Scranton
Basic course for students preparing to teach the severely mentally retarded; organization of programs, curriculum planning, and instructional procedures and materials. (Formerly 405.)

EDSPE 506 Internship in Special Education (2-10, max. 10)

Supervised experiences in special education for advanced students. Ordinarily reserved for post-master's students. Prerequisite: permission.

EDSPE 507 Education of Severely Retarded Individuals With Multiple Handicaps (3)

Scranton
Basic course for students preparing to teach the moderately to severely retarded individual and the multiple-handicapped individual. Includes community resources, implementation of instructional techniques and modification of materials for these students.

EDSPE 508 Administration of Special Education (3)

Neel
Research and trends in administrative organization, programs, personnel assignments, and instructional groupings for the education of exceptional children as these relate to the total school program, pupil personnel services, community agency services, and state and federal legislation.

EDSPE 509 Seminar in Mental Retardation (3)

Affleck
Interdisciplinary approach to the advanced study of selected research topics in mental retardation. Designed for teachers, psychologists, social workers, and related professional personnel.

EDSPE 510 Behavioral Measurement and Management in the Classroom (3)

Lovitt
Response measurement in the classroom; use of data analysis for instructional decisions and behavior management; instructional programming for handicapped children. (Formerly 412.)

EDSPE 511 Individual Assessment and Modification Strategies in Special Education (3)

Lovitt
Exploration of variables affecting the academic and behavioral performance of exceptional children. Assessment and establishment of instructional programs and procedures.

EDSPE 512 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. (Formerly 516.)

EDSPE 513 Clinical Appraisal of Exceptional Children (3)

Ryckman
Diagnostic instruments used in the clinical appraisal of exceptional children. Theoretical considerations are used to buttress practical experiences in appraisal related to intervention.

EDSPE 514 Fundamentals of Reading for Handicapped Children (3)

Preservice course. Emphasis on basic prereading and reading skills, such as phonics and structural analysis, specifically for the handicapped child. Acquisition of comprehension skills by the handicapped also presented. Diagnosis of reading problems; published materials appropriate for handicapped; material modification. (Formerly 406.)

EDSPE 515 Problems and Issues in Special Education (3, max. 9)

Affleck, Lowenbraun, Scroggs
Intensive examination of the issues pertinent to all of special education, such as legislation, interdisciplinary function, and the role of special education

COLLEGE OF ENGINEERING

in general education and placement practices. Prerequisite: permission.

EDSPE 516 Developing Instructional Materials for Exceptional Children (3)

Scranton
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: 512.

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: EDPSY 490 and 591 or equivalent, or permission.

EDPSE 518 Seminar in Special Education Research (1, max. 3)

Affleck, Haring
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. 12) A

Edgar, Haring, Hayden
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; auditory training.

EDSPE 531 The Teaching of Language to the Deaf (6)

Scroggs
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, Scroggs
Principles and methods of teaching the following subjects to deaf children at the primary and intermediate levels: (1) reading, (2) arithmetic, (3) social studies, (4) science. Covers use of visual aids in classes for the deaf.

EDSPE 540 Seminar in the Education of Children With Learning Disabilities (3) SpS

Neel
In-depth analysis of empirical findings in the specialty of learning disabilities with focus on the synthesis of research findings and their application to educational environment. A paper suitable for publication required. Prerequisite: course in learning theory, introductory course in learning disabilities, or permission.

EDSPE 565 Seminar: Early Childhood Education for the Handicapped (3) W

Edgar
Advanced seminar on early childhood education for the handicapped. Historical and current research from appropriate specialties in special education reviewed; research from related fields is reviewed in terms of its application to the education of young handicapped children.

EDSPE 599 Independent Studies in Education (*)
Independent studies or readings of specialized aspects of education. Registration must be accompanied by a study prospectus endorsed by the appropriate faculty adviser for the work proposed, and, with permission of the 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 prospectus endorsed by the appropriate faculty adviser for the work proposed and must be filed with the Office of Special Education in the College of Education. A report or paper setting forth the results of the investigation is required.

INDEPENDENT STUDY, RESEARCH, AND FIELD EXPERIENCES

(Teaching Practicum)

EDUC 301 Introductory Practicum in Community Service Activity (3)

Dimmitt
Opportunity is provided for initial tutoring and teaching experiences in a specific community service organization, placement made according to participant interests and needs. Approximately sixty hours of participation on a prearranged schedule plus scheduled seminars are required. Prerequisites: application during quarter prior to participation and permission.

EDUC 302 Introductory Practicum in Classroom Teaching and Management (3-6, max. 9)

Briggs, Dimmitt
Opportunity is provided for initial participation experience in classroom teaching and management. Assignment is for twenty hours per credit in a specific school situation, level as requested. Scheduled seminars required. Prerequisite: application during quarter prior to participation, and permission.

EDUC 401 Practicum in Community Service Activity (3-18)

Dimmitt
Opportunity is provided for tutoring and teaching experiences in a specific community service organization, placement made according to participant interests and needs. Approximately twenty hours of participation on a predetermined schedule plus scheduled seminars are required for each credit earned. Participants wishing to utilize community service experience to satisfy, in part, certification requirements should make arrangements prior to enrollment with the director of field experiences. Prerequisites: application during quarter prior to participation and permission.

EDUC 402 Practicum in Classroom Teaching and Management: Early Childhood, Kindergarten, Primary (Through Grade 3) (5-36)

Dimmitt
Teaching practicum is completed in an assigned school. A full day, from 8:00 a.m. to 4:00 p.m., must be left free for this assignment. Placement is made by the director of field experiences. Prerequisites: EDPSY 304, 308, and permission. (20 credits required for certification.)

EDUC 403 Practicum in Classroom Teaching and Management: Intermediate Grades, Middle School (5-36)

Dimmitt
Teaching practicum is completed in an assigned school. A full day, from 8:00 a.m. to 4:00 p.m., must be left free for this assignment. Placement is made by the director of field experiences. Prerequisites: EDPSY 304, 308, and permission. (20 credits required for certification.)

EDUC 404 Practicum in Classroom Teaching and Management: Secondary School (5-36) (Grades 7-12)

Dimmitt
Teaching practicum is completed in an assigned school. A full day, from 8:00 a.m. to 4:00 p.m., must be left free for this assignment. Placement is made by the director of field experiences. Prerequisites: EDPSY 304, 308, and permission. (20 credits required for certification.)

EDUC 501 Advanced Practicum in Community Service Activity (3-18)

Dimmitt
Opportunity is provided postbaccalaureate students with selective, in-depth participation, and teaching experiences in a specific community service organization. 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 502 Advanced Practicum in Classroom Teaching and Management (3-18)

Dimmitt
Designed to provide experienced teachers with selective, in-depth classroom participation experiences. Activities include, for example, specialized reading instruction, assessment of learning disabilities, remedial or specialized teaching, experimental approaches to learning, etc. Participants wishing to use the advanced teaching practicum to satisfy, in part, graduate program requirements should make such arrangements prior to enrollment with their adviser and the director of field experiences. Prerequisites: application during quarter prior to participation and permission.

EDUC 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 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 graduate students who have completed the master's degree or the equivalent or Candidate-level graduate students. Premaster students initiating doctoral dissertation research should register for 600. 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) AWSpS

Messer
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: technique of freehand and instrument drawing; development of orthographic view relationships; reading and interpreting draw-

ings; design drawing; selected topics in applied 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.

ENGR 130 Techniques of Communication (3)
AWSp
White
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
Campbell
Solution of problems in engineering measurements, statistics, probability, and unit systems. Design of experiments. Collection of data in several laboratories in the college. MATH 124 recommended.

ENGR 141 Introductory FORTRAN Programming (4) AWSpS
Dunn
Language of FORTRAN applied to engineering problems. Flow charts, problem organization, and basic computer statements. Introductory problems solved on CDC 6400. Prerequisite: MATH 124, which may be taken concurrently, or permission.

ENGR 150 Introduction to Design (2) WSp
Chalk
Design groups of three to five students attack problems assigned to give students as authentic an experience in engineering as possible. Lectures, discussions, and reading focus on the design process steps such as defining the problem, thinking creatively, generating alternative solutions, and communicating final solutions. Open to nonengineering students.

ENGINEERING SCIENCES

ENGR 170 Fundamentals of Materials Science (4)
AWSpS
Polonis
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, electrical, and chemical properties. For advanced freshmen and sophomores. Prerequisite: CHEM 150.

ENGR 171 Materials Science Laboratory (1)
AWSpS
Experiments in materials science designed to illustrate fundamentals related to the structure and the properties of engineering materials; optical microscopy, X-ray diffraction, mechanical properties, electrical conductivity, crystal growth, solid-state reactions. Prerequisite: 170 or concurrent registration.

ENGR 180 Engineering Statics (4) AWSpS
Alexander
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: MATH 125; which may be taken concurrently.

ENGR 190 Introduction to Logical System Design (3) AWSp
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 sequences of operations or decisions. 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) AWSpS
Clark
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: MATH 126.

ENGR 240 Introduction to Continuum Mechanics (4) AWSpS
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 drawn primarily from the areas of fluid mechanics and solid mechanics. Prerequisites: MATH 126 and PHYS 121.

ENGR 260 Thermodynamics (4) AWSpS
Depew
Introduction to the basic principles of thermodynamics, from a predominantly macroscopic point of view. Development of the basic laws of thermodynamics, together with this illustration by application to energy transformations and state changes in engineering problems. Prerequisites: MATH 126, 100-level physics and chemistry courses.

ELECTIVES

ENGR 110 Career Planning I (1) AW
Guidon
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
Macariny
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 251 Principles of Electronic Applications (4) AWSpS
Energy and information in electrical systems; DC circuits; circuit models for electronic devices; integrated circuits in basic analog and digital applications such as amplifiers, gates, counters. Includes two self-contained laboratory projects. Prerequisites: PHYS 122 and MATH 126, which may be taken concurrently.

ENGR 270 Air-Water Interface Transportation Vehicles (3) WSp
Bollard
The force system acting on air-water interface and land vehicles and their resulting mechanics 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
Polonis
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 Energy Controversies (3) ASP
Albrecht, Garlid
Description and analysis of crucial questions, non-technical and technical, concerning 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 310 Social Constraints on Engineering Design (3) WS
Bereano, Evans
Examines cases of engineering designs and identifies ways in which social goals affect engineering design decisions. As part of this examination, social values and public policy issues that generate design criteria are explored. Appropriate course for students from any discipline. Offered on credit/no credit basis only. Offered jointly with SMT 310. Prerequisite: junior standing or permission.

ENGR 341 Computer Applications of Numerical Methods (3) AWSpS
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. Prerequisites: 141 or equivalent and MATH 238, which may be taken concurrently.

ENGR 345 Advanced Topics in Digital Computing (3) AWSpS
Redeker
The concept of the higher level language. Advanced FORTRAN techniques used to construct an interpreter, including the full set of FORTRAN IV statements, the machine-dependent features of the CDC 6400, real and integer binumber conversion stuffing and unstuffing, object-time formatting, 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.

ENGR 346 Assembly Language Programming (3)
AWSpS
Redeker
The central processor assembler language, COM-PASS, of the CDC 6400 computer, including program structure and organization, COMPASS language instructions, pseudoinstruction, and macro-programming 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.

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.

COLLEGE OF ENGINEERING

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) AWSpS

ENGR 499 Special Projects in Engineering (1-3, max. 6) AWSpS

AERONAUTICS AND ASTRONAUTICS

Courses for Undergraduates

A A 300 Aerodynamics I (3) A
Decher, Ganzer, Joppa, Rae
Aerodynamics as applied to the problems of performance and stability and control of vehicles in the atmosphere. Prerequisite: junior standing or permission.

A A 301, 302 Aerodynamics II, III (3,3) W,Sp
Decher, Ganzer, Joppa, Rae
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. Prerequisites: MATH 238 for 301, ENGR 260 recommended; 301 for 302.

A A 311 Flight Mechanics (3) W
Kevoorkian, Ness, Vagners
Review of kinematics and particle dynamics. Dynamics of systems of particles. Gravitational field of the earth. Keplerian motion. Application to orbital transfer problems. Rigid-body dynamics. Application to constrained rigid bodies and flight mechanics. Prerequisite: ENGR 230.

A A 312 Aeroelasticity (3) Sp
Bollard, Fyfe, Ness
Vibration theory. Characteristics of single and multidegree of freedom linear systems with forced inputs. Approximate methods for determining principal frequencies and mode shapes. Application to simple aeroelastic problems. Prerequisite: 311.

A A 320, 321, 322 Junior Laboratory I, II, III (2,2,2) A,W,Sp
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, Holsapple, Parmerter
Development of the equations of elasticity, viscoelasticity, and plasticity. Plane stress, plane strain; torsion, bending, and stability of rods and beams; virtual work, potential energy, Castigliano's theorem; statically indeterminate structures; bending of plates and shells. Prerequisite: 331 for 332; ENGR 240 recommended.

A A 370 Introduction to Applied Analysis (3) Sp
Pearson, Street
Advanced calculus, from applications point of view. Review of ordinary differential equations. Finite differences. Fourier series and integrals. Laplace transformation. Bessel functions, Legendre polynomials. Review of vector analysis. Line, surface, and volume integrals. Prerequisite: MATH 238.

A A 400, 401, 402 Gas Dynamics I, II, III (3,3,3) A,W,Sp
Christiansen, Rae, Russell
Review of thermodynamics. Introduction to kinetic theory and statistical mechanics. One-dimensional gas dynamics, one-dimensional wave motion, waves in supersonic flow, flow in ducts and wind tunnels. Measurements in fluid dynamics. Inviscid equations of motion, incompressible potential flows, vortex flows, small perturbation flows, bodies of revolution, similarity laws. Transonic flow, hypersonic

flow, method of characteristics. Equations with viscosity and heat conductivity. Boundary layer flows. Prerequisite: 302 or permission.

A A 410, 411, 412 Aircraft Design I, II, III (3,3,3) A,W,Sp
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, loads analysis, structural design of components. Prerequisites: 302 for 410; 410 for 411; 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: CHEM 140, ENGR 260, or permission.

A A 430 Matrix Structural Analysis (3) A
Dill, Holsapple
Redundant force method of analysis of statically indeterminate structures. Direct stiffness method. Introduction to the finite element method. Applications to trusses, beams, frames, shear panels, and plane stress. Prerequisite: 332.

A A 431 Plates and Shells (3) W
Dill, Holsapple, Parmerter
Introduction to the theory of plates and shells. Membrane theory of shells of revolution, cylindrical, and conical shells. Axisymmetric bending of shells of revolution. Stability of structures. Prerequisite: 332.

A A 432 Structural Design (3) Sp
Bollard, Dill, Holsapple, Parmerter
Design of aircraft structural components. Methods of preliminary design. Arrangement of members. Selection of materials and member sizes. Practical design of selected components. Prerequisite: 331.

A A 440, 441, 442 Flight Mechanics I, II, III (3,3,3) A,W,Sp
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; 440 for 441; 441 for 442.

A A 450, 451, 452 Space Mechanics I, II, III (3,3,3) A,W,Sp
Kevoorkian, Vagners
Review of kinematics. Review of particle dynamics. Dynamics of a system of particles. Stability of motion. Rigid-body motion. Universal law of gravitation. The two-body problem. Orbit transfer problems. Linearized orbit investigations. Effect of air drag on orbits. Variation of parameters for continuous orbit perturbation. Planetary potentials. Change of orbit elements due to oblateness. Elementary three-particle problem. Rigid-body motion of space vehicles. Elements of orbit determination. MATH 238 recommended.

A A 460, 461, 462 Propulsion I, II, III (3,3,3) A,W,Sp
Decher, Oates
Study of the aerodynamics and the chemistry of rockets. Rocket vehicles, staging. Introduction to space propulsion. Air-breathing engines as propulsion systems. Turbojets, turbopumps, turboprops, ramjets, hybrid engines. Aerodynamics of gas-tur-

bine engine components. Piston engine-propeller performance. Prerequisites: 302 and ENGR 260.

A A 470 Analytical Problems in Aeronautics (3) A
Dill, Pearson, Street
Numerical methods for algebraic and differential equations. Transforms. Introduction to perturbations, eigenvalues, nonlinearities. Probability and statistics. Variational idea. Prerequisite: MATH 238.

A A 480 Systems Dynamics (3) A
Bollard, Dill, Fyfe
Equations of motion and solutions for selected problems; natural frequencies and mode shapes; response of simple systems to applied loads. Prerequisite: senior standing.

A A 481 Elementary Aeroelasticity (3) W
Bollard
Discussion of aeroelastic problems in aircraft design; elementary development of static and dynamic aeroelastic problems. Prerequisite: 480.

A A 482 Aeronautical Acoustics (3) Sp
Fyfe
Noise generated by boundary layers, jets, rockets, sonic booms, propeller and helicopter blades. Atmospheric propagation, acoustically excited structures, acoustic fatigue. Noise suppression, damping of jet-excited structures. Assessment of aircraft noise. Prerequisite: senior standing.

A A 499 Special Projects (2-5, max. 10) AWSp
Investigation on a special project by the student under the supervision of a faculty member. Prerequisite: senior standing.

Courses for Graduates Only

A A 501, 502, 503 Physical Gas Dynamics I, II, III (3,3,3) W,Sp,A
Christiansen, Hertzberg, Street
Chemical thermodynamics; thermodynamic properties derived from quantum statistical mechanics, reacting gas mixtures. Introduction to nonequilibrium physics and fluid flow with application to a variety of research and development areas such as high-temperature aspects of energy systems and gas lasers. Problems in vibrational relaxation, chemical kinetics, radiative transfer, molecular transport, and kinetic theory. Each topic alternates between introductory physics and application. 503 is a post-master's course with 502, or equivalent, as a prerequisite. Sequence will be offered beginning Winter Quarters 1978 and 1979.

A A 504 Fluid Mechanics I (3) A
Christiansen, Decher, Oates, Russell, Street
Review of thermodynamics; vectors and dyads. Derivation of the Navier-Stokes equations, stream functions and potential functions; integrals of the equations of motion. Boundary conditions and discontinuity surfaces in fluids. Exact solutions. Dimensional analysis. Highly viscous flows. Prerequisite: 567, which may be taken concurrently.

A A 505, 506 Fluid Mechanics II, III (3,3) W,Sp
Christiansen, Decher, Oates, Russell, Street
Sound waves, surface waves. Ideal incompressible and compressible flows; transonic flow, hypersonic flow, combustion, super fluids. Prerequisite: 504 or equivalent. Sequence will be offered beginning Winter Quarters 1977 and 1979.

A A 507, 508, 509 Aerodynamics of Viscous Fluids I, II, III (3,3,3) W,Sp,A
Oates, Russell, Street
Introduction to viscous flow. Exact solutions of the laminar equations of motion; approximate equations; exact solutions for laminar boundary layers; approximate methods for general laminar boundary layers. The phenomena of turbulence, transition prediction, Reynolds stresses, turbulent boundary layer equations; free turbulent flows; approximate methods for turbulent boundary layers. Special topics. 509 is a post-master's course, with 508, or equivalent, as a prerequisite. Sequence will be offered beginning Winter quarters 1977 and 1978.

A A 511 Unsteady Aerodynamics (3) W
Oscillating airfoils at subsonic and supersonic

speeds; consideration of wings and bodies in unsteady flow. (Offered odd-numbered years.)

A A 513 Gas Laser Theory and Practice (3) Sp
Christiansen, Hertzberg, Russell

Study of the physics and fluid mechanics of high-power 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 thermodynamics, and the interaction of optical radiation with matter are part of the study topics. Due to the relationship of the subject matter to the energy problems, applications of high-power lasers also are emphasized.

A A 516, 517 Stability and Control I, II (3,3) W,Sp
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.

A A 518 Stability and Control III (3) A

Ganzer, Joppa
Study of recent work in stability and control of aircraft, with special attention to handling qualities. Prerequisite: 516 or permission.

A A 523 Special Topics in Fluid Physics (3) AWSp

A A 524, 525, 526 Aerodynamics of Aircraft Gas Turbine Engines I, II, III (3,3,3) W,Sp,A
Decher, 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 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.)

A A 529 Space Propulsion (3) A
Decher, Oates

Physics, nucleonics, and heat transfer of nuclear heated rockets. Electrothermal, electromagnetic, and electrostatic thrusters. Prerequisite: permission. (Offered odd-numbered years.)

A A 530, 531, 532 Mechanics of Solids I, II, III (3,3,3) A,W,Sp

Bollard, Dill, Fyfe, Holsapple, Parmerter
Linear theory of elasticity, viscoelasticity, and plasticity. Variational and extremum theorems. Three-dimensional problems. Plane stress. Plane strain. Wave propagation in solids.

A A 535 Analysis of Shells (3) Sp
Dill, Parmerter

Nonlinear equations of thin shells. Solution of the linearized equations for shells of revolution and other shapes. Buckling of shells. Postbuckling deformation of shells.

A A 540, 541 Finite Element Analysis I, II (3,3) W,Sp

Dill, Holsapple
Finite element methods applied to elasticity, plasticity, and viscoelasticity. Hybrid and mixed methods. Two- and three-dimensional problems. Plates and shells.

A A 545 Bioastronautics (3) Sp
Bollard

Study of the application of the principles of engineering science to specific biosystems; to acquaint the student with the principles of structure and function of the human organism.

A A 547 Engineering Aspects of the Fluid Mechanics of the Human Body (3) W
Oates

Engineering background to the many flow regimes

existing in the human body. Specific examples of flow problems such as cardiovascular, bronchial, microcapillary, urethral, etc. Offered jointly with BIOEN 547.

A A 553 Vibrations of Aerospace Systems (3) W
Bollard, Dill, Fyfe

Natural frequencies and modes of vibrations of linear systems; forced vibrations and motion dependent forces; Lagrange's equations and Hamilton's principle; matrix methods for discrete and continuous systems; nonlinear oscillations, parametric oscillations.

A A 555 Special Topics in Aerospace Systems (3) AWSp

A A 556 Aeroelasticity (3) Sp
Bollard, Dill

Concept of functional diagrams and aeroelastic operators; quasi-static lifting-surface deformations and stability; control surface effectiveness; nonstationary lifting-surface deformations and stability; general dynamics of aerodynamic, structural, and control system interactions. Prerequisites: 481, 553.

A A 560 Optimization in Dynamic Systems (3) W
Vagners

Review of parameter optimization, extrema of real functions, constraints and accessory conditions, neighboring optimal solutions, Lagrange multipliers. Dynamic optimization, problems of Mayer, Bolza, and Lagrange, necessary conditions, path constraints, corner conditions, Pontryagin's minimum principle. Extremal fields, sufficiency conditions. Hamilton-Jacobi theory, dynamic programming, singular arcs, distributed parameter systems. Elements of differential games. Emphasis on problem formulation and motivation of mathematical ideas rather than rigorous mathematical development.

A A 561 Techniques of Nonlinear Optimization (3) Sp
Vagners

Selected computational techniques; advanced linear programming, duality and Lagrange multipliers in linear and nonlinear programming, search techniques, penalty techniques, gradient techniques, dynamic programming, neighboring extremal methods.

A A 562, 563, 564 Methods of Partial Differential Equations I, II, III (3,3,3) A,W,Sp
Kevorkian

First-order partial differential equations; characteristics, conservation laws, shocks, applications to geometrical optics and Hamilton-Jacobi theory. Elliptic equations: fundamental solution, Green's function, conformal mapping, boundary-value problems. Parabolic equations. Hyperbolic equations: characteristics, shocks, examples from fluid dynamics, approximate methods. Post-master's sequence. Prerequisite: 569. (Offered odd-numbered years.)

A A 567 Analysis in Engineering I (3) A

Algebra and calculus of vector and tensor fields. Linear mappings, matrices, finite dimensional eigenvalue problems. Curvilinear coordinates. Complex variables, contour integration, conformal mappings.

A A 568 Analysis in Engineering II (3) W

Survey of properties and practical techniques for ordinary differential equations. Series expansions. Eigenvalue problems. Laplace transforms and applications. Variational methods. Asymptotic expansions. Perturbations, regular and singular. Difference equations. Numerical procedures.

A A 569 Partial Differential Equations (3) Sp
Kevorkian, Pearson

Properties of diffusion, wave, and Laplace-type equations. Initial and boundary value problems. Series expansions, transform methods. Singularities, Green's functions. Classification of second-order equations; theory and applications of method of characteristics. Numerical techniques. Offered jointly with MATH 569. Prerequisite: 568 or MATH 428.

A A 571 Principles of Dynamics (3) A
Fyfe, Kevorkian, Vagners

Review of rigid-body dynamics; calculus of varia-

tions. Lagrangian mechanics. The canonical equations of Hamilton; canonical transformations. Hamilton-Jacobi theorem; Hamiltonian perturbation theory. Periodic and quasi-periodic motion. Stability of dynamical systems; resonance in dynamical systems.

A A 575 Thermo- and Electrodynamics of Continua (3) W
Dill, Holsapple

General formulation of the fundamental concepts of motion, stress, energy, and electromagnetism for a continuum. General equations of conservation of mass, balance of momentum, balance of energy. Phenomenological theory of thermodynamics. Maxwell's electromagnetic field theory. Elastic and viscous materials.

A A 576, 577, 578 Perturbation Theory I, II, III (3,3,3) A,W,Sp
Kevorkian

Basic concepts of asymptotic expansions with applications to linear partial differential equations. Singular perturbations: matched asymptotic expansions, boundary layers, shock-layers, uniformly valid solutions, the method of multiple scales, weakly nonlinear wave propagation problems and resonance phenomena, nonlinear wave propagation in fluid, solid, and particle mechanics. Post-master's sequence. (Offered even-numbered years.)

A A 580 General Theory of Continuous Media (3) Sp
Dill, Holsapple

General continuum theory of mechanics and thermodynamics of materials. Theory of materials with fading memory. Rate independent materials. 575 recommended.

A A 583 Special Topics in Solid Mechanics (3) AWSp

A A 584, 585, 586 Approximate and Numerical Analysis I, II, III (3,3,3) A,W,Sp
Pearson, Street

Approximation theory, curve-fitting. Numerical differentiation and integration. Linear and nonlinear algebraic equation systems. Ordinary differential equation methods. Asymptotic expansions. Perturbation methods. Matrix iterative techniques. Numerical methods for elliptic, parabolic, hyperbolic partial differential equations. Variational methods. Eigenvalue problems. Nonlinearities. Applications to practical problems in fluid flow, stress analysis, acoustics, electromagnetism. Prerequisites: 567, 568, 569. (Offered odd-numbered years.)

A A 587, 588, 589 Techniques of Applied Analysis I, II, III (3,3,3) A,W,Sp
Pearson, Street

Review of complex variable. Series expansions, contour integration, generating functions, conformal mapping. Differential equations in the complex plane. Special functions. Asymptotic methods (saddle point, stationary phase, WKB, and others). Fourier and related transforms. Radiation condition; signal propagation, singular inversions. Green's functions. Applications to problems in engineering and physics. Integral equations. Wiener-Hopf and other special techniques. Post-master's sequence. Prerequisites: 567, 568, 569 or equivalent. (Offered even-numbered years.)

A A 590 Special Topics in Applied Analysis (3) AWSp

A A 594 Waves in Geophysics and Engineering (3) Sp
Fyfe

Examination of the fundamental concepts and mathematical descriptions of wave propagation; group and phase velocity, dispersion, effects of boundaries, normal mode and progressive wave descriptions; waves in elastic solids, acoustic waves, electromagnetic waves; sources of waves; waves in inhomogeneous media; applications to acoustics, seismology, and earthquake engineering. Offered jointly with CESM 594 and GPHYS 594.

A A 599 Special Projects (1-5, max. 15) AWSp
Investigation on a special project by the student under the supervision of a faculty member.

COLLEGE OF ENGINEERING

- A A 600 Independent Study or Research (*)
AWSp
- A A 700 Master's Thesis (*) AWSp
- A A 800 Doctoral Dissertation (*)

BIOENGINEERING

See Interschool or Intercollege Programs.

CHEMICAL ENGINEERING

Courses for Undergraduates

CH E 198 Career Planning II (1) Sp
Professional field of chemical engineering is defined and illustrated by examples chosen from industry. Careers in this profession are evaluated.

CH E 200 Introduction to Chemical Engineering (3) Sp
The engineering design process: conception, analysis, detailed process and equipment design, operation; familiarization with the techniques of design. Prerequisite: sophomore standing or permission.

CH E 310 Material and Energy Balances (4) A
Chemical and physical process calculations: steady and unsteady state material and energy balances with specific examples in vapor-liquid contact operations and multiphase extraction, and introductory thermochemistry.

CH E 326 Chemical Engineering Thermodynamics (4) W
Phase equilibria and chemical equilibria in multi-component systems; theories of solution; chemical reaction analysis. Prerequisite: ENGR 260 or CHEM 456, which may be taken concurrently.

CH E 330 Transport Processes I (4) W
Diffusive transport of momentum, heat and mass; general aspects of fluid flow; the Navier-Stokes equations; one-dimensional flow with engineering applications.

CH E 340 Transport Processes II (4) Sp
Heat transfer, basic principles, and applications. Conduction, convection, and radiation. Prerequisite: 330.

CH E 387 Industrial Waste Management (3) W
David
Application of chemical engineering concepts to industrial-waste management and to the analysis of constraints and criteria encountered in such application. Includes design of biological and physical control systems, as well as nontreatment alternatives. Prerequisite: permission.

CH E 410 Computer Analysis of Chemical Processes (1 or 2, max. 4) AWSp
Students study a chemical process of their choice and use an existing computer program to calculate the mass and energy balances for that process. A student can take the course for two credits only if he wishes to write a computer program subroutine for a piece of equipment that is not now included in the standard program.

CH E 435 Transport Processes III (4) A
Mass transfer, basic principles, and applications to equipment design. Physical separation processes. Prerequisite: 340.

CH E 436 Chemical Engineering Laboratory I (3) A
Lectures on statistical analysis of data, instrumentation, and report writing; laboratory experiments on transport phenomena and the analog computer. Emphasis on experimental methods and report writing. Prerequisite: 340.

CH E 437 Chemical Engineering Laboratory II (3) W
Continuation of 436. Laboratory investigation of chemical engineering principles applied to equipment design with emphasis on heat transfer and mass transfer operations. Prerequisite: 436.

CH E 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 E E 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) A
Chemical and physical properties of cellulose, lignin, hemicellulose, and extractives; wood as a raw material for the chemical industry. Prerequisite: CHEM 102 or 232, or permission.

CH E 471 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: CHEM 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 (5) 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 BIOEN 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; continuous contact and stagewise operations; characteristics of contact equipment.

CH E 543, 544 Fluid Turbulence (3,3) A,W
Gessner
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 M E 543, 544. Prerequisite: 6 credits in graduate fluid mechanics. (Offered Autumn Quarter in odd-numbered years, Winter Quarter in even-numbered years.)

CH E 555 Interfacial Phenomena (4) Sp
Berg
Surface tension, capillary statics, wetting and spreading phenomena; thermodynamics of capillary systems, 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 (3) Sp
Hoffman
Preparation, stabilization, properties and destruction of important colloidal materials. The theory and structure of the electrical double layer, electrokinetics. Includes selected case studies pertinent to air and water pollution, biological fluids, industrial processes, home cooking.

CH E 564 Fundamentals of Chemical Kinetics (3) Sp
Krieger
Modern approach to chemical reaction rates as a particle encounter on a potential energy surface. Emphasis on fast reactions and highly energetic reactions resulting in production of excited states. Mathematical techniques for modeling kinetic systems as well as modern experimental techniques for elucidating rate coefficients and mechanisms. Coupling of transport processes and reaction rates, photochemical kinetics, intermolecular energy transfer, free radical and chain reaction kinetics. Importance of rate processes in systems such as lasers or plasmas, catalytic reactors, and biological systems. Prerequisite: 525.

CH E 565 Kinetics and Catalysis (3) Sp
Johanson
Homogeneous and heterogeneous systems with emphasis on chemical engineering principles applied to industrial reactor design. Prerequisite: 525.

CH E 570 Chemistry of High Polymers (3, max. 6) Sp
Allan
Fundamentals of high polymer chemistry, including kinetics of addition and condensation polymerization, the determination of average molecular weights and chain length distributions, solution properties and the relationship between molecular structure and plastic film and fiber properties of various polymers. Prerequisite: an undergraduate sequence in organic chemistry.

CH E 571 Cellulose and Lignin (3) W

Sarkonen
Chemistry and technology of cellulose, lignin, and related substances. Preview of the chemistry of conversion of wood to pulp, paper, and by-products. Prerequisite: 470.

CH E 575 Nonlinear Analysis in Chemical Engineering (3) Sp

Finlayson
Comparison of numerical techniques: similarity, perturbation, finite difference, Galerkin, orthogonal collocation methods as applied to nonlinear chemical engineering problems.

CH E 578 Environmental Protection in the Pulp and Paper Industry (2) Sp

Hrutford
Nature and sources of air and water pollution in the pulp and paper industry. Methods to remove pollutants from aqueous and gaseous effluents. Reduction of effluent volume by recycling of water and chemicals and by the manufacture of by-products. Novel pulping and bleaching techniques to reduce the formation of pollutants. Offered jointly with FOR W 578. Available to seniors. Prerequisites: 470, 471, or permission. (Offered alternate years; offered 1977-78.)

CH E 580 Topics in Chemical Engineering Design (3, max. 9) W

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. Prerequisites: undergraduate chemical engineering design, admission to chemical engineering nonthesis master's program, or permission.

CH E 599 Current Topics in Chemical Engineering (1-3, max. 12)

Readings or lectures and discussions of topics of current interest in the field of chemical engineering. Subject matter changes from year to year. Prerequisite: permission.

CH E 600 Independent Study or Research (*) AWSp

CH E 700 Master's Thesis (*) AWSp

CH E 800 Doctoral Dissertation (*)

CIVIL ENGINEERING

CORE COURSES

Courses for Undergraduates

CIVE 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.

CIVE 316 Geometronics (4) AWSpS

Colcord, Veress
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: ENGR 141 or permission and 18 credits in mathematics.

CIVE 320 Transportation Engineering I (4) AWSp

Hoag, McNeese
Geometric design of horizontal and vertical alignment of transportation systems. Also construction features of quantities, mass diagrams, and economic analysis. Includes an overview of transportation engineering, planning, traffic, and safety. Prerequisite: upper-division standing in civil engineering.

CIVE 342 Fluid Mechanics I (4) AWSpS

Neece
Elementary mechanics of incompressible fluids.

Hydrostatics. Continuity, energy, and momentum equations. Introduction to potential flow. Resistance phenomena for laminar and turbulent flows. Dynamic similitude. Prerequisite: upper-division standing in civil engineering.

CIVE 345 Hydraulic Engineering (4) ASp

Richey
Extension and application of fluid mechanics principles to hydraulic engineering problems. Diffusion and mixing processes, surface-water and ground-water hydrology, open channel flow, pipeline systems, turbomachinery. Prerequisite: 342.

CIVE 350 Environmental Engineering (4) AWSpS

Bogan, Seabloom
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 sewerage and drainage systems. Prerequisite: 342, which may be taken concurrently, or permission.

CIVE 363 Constructional Materials (4) AWS

Miller
General treatment of physical and mechanical properties and engineering behavior of metallic and nonmetallic materials. Steel, aluminum, concrete, wood. Laboratory testing, instrumentation, and investigation into macrobehavior. Correlation with microstructure and various aspects of materials science. Prerequisite: 393.

CIVE 366 Soils Engineering (4) AWSp

Sherif
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.

CIVE 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.

CIVE 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.

CIVE 390 Environmental Systems Planning (4) ASp

The systems approach. Topics selected from the acquisition and the use of data in the planning process, decision theory, regional demographic forecasting. Examples stressing environmental aspects in various fields of civil engineering practice. Prerequisite: junior standing.

CIVE 393 Mechanics of Materials II (4) AWSpS

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

Hoag, Horwood
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 505 Economic Analysis of Public Works (3) A

Hoag, Horwood
The use of benefit-cost ratio, rate of return, and maximization of benefits as criteria in project justifi-

cation, cost allocation, and selection among engineering alternatives in the design and construction of public works.

CIVE 506 Probabilistic Design Theory (3) Sp

Brown
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)

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; process of public decision making. Offered jointly with SMT 540, 541, 542, and PB PL 540, 541, 542. Prerequisites: permission for 540; 540 for 541; 541 for 542.

CIVE 543 Marine Technology Affairs I (3) W

Wenk
Case studies in marine legislation, fishery conventions, coastal pollution, oil and gas extraction, environmental observations, planning for international exploration of the sea, federal organizations, etc., to identify 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

Wenk
Class-generated group research on a contemporary marine issue in Washington State leading to specific policy proposals. Prerequisite: 543.

CIVE 700 Master's Thesis (*) AWSpS

CIVE 800 Doctoral Dissertation (*)

STRUCTURAL ENGINEERING AND ENGINEERING MECHANICS

Courses for Undergraduates

CESM 431 Seismology and Earthquake Engineering (3) A

Evans, Hartz, Merchant, Smith
Presents an overview of earthquake processes and details of the characteristics of destructive ground motion; illustrates the effects of such motion on engineering structures; reviews current practice in estimating earthquake hazards for important structures such as nuclear power plants. Offered jointly with GPHYS 431. Prerequisite: MATH 238 or permission.

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. Laboratory investigation into microbehavior. Metallurgy of fracture and fatigue. Prerequisite: CIVE 363.

CESM 467 Soil Mechanics II (3) A

Meesse
Fundamental principles of soil mechanics, with emphasis on problems involving plastic equilibrium and seepage forces. Prerequisite: CIVE 366.

CESM 470 Advanced Mechanics of Materials I (3) ASp

General theory of torsion and bending of straight and curved beams; beams on elastic foundations and beam-columns. Prerequisite: CIVE 393 or permission.

CESM 472 Stability and Plastic Analysis (3) Sp

Elements of structural stability and plastic analysis.

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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 incremental loading and geometry changes. Prerequisite: CIVE 380.

CESM 477 Structural Design Through Model Studies (3) W

Albrecht, Matlock

Theory of models, dimensional analysis, direct model analysis; studies employing specific materials, techniques of testing and measurement. Offered jointly with ARCH 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 AASHTO 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) JWSp

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, Matlock, Mittel

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

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) AW

Clanton

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, Matlock

Structural behavior and design of reinforced brick, tile, and unit concrete masonry structures. Offered jointly with ARCH 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: ENGR 230, 240, CIVE 342 or A A 300, or permission.

CESM 498 Special Topics: Structures and Mechanics (1-5, max. 12) AWSps

Special topics in civil engineering offered as course with lecture and/or laboratory. May be repeated for credit. A maximum of 6 credits may be applied toward an undergraduate degree. Prerequisite: permission of department Chairperson.

CESM 499 Special Projects: Structures and Mechanics (1-5, max. 12) AWSps

Individual undergraduate research projects. May be repeated for credit. A maximum of 6 credits may be applied toward an undergraduate degree. Prerequisite: permission of department Chairperson.

Courses for Graduates Only

CESM 520 Seminar (1, max. 6) AWSp

Prerequisite: permission of thesis supervisor.

CESM 566 Engineering Properties of Clay (3) A

Sherif

Shear strength, consolidation characteristics, structural concepts, rheological behavior, and related properties of clay. Prerequisite: CIVE 366.

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 MATH 324, or permission.

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.

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.

CESM 571 Advanced Mechanics of Materials II (3) A

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

Theory of elastic stability of columns, frames, and arches. Introduction to inelastic stability. Buckling of frameworks. Lateral and torsional buckling of beams. Stability of plates and shells. Prerequisite: 470 or permission.

CESM 573 Structural Mechanics I (3) A

Ellas, 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

Ellas, Evans, Hartz

Dynamic response of structures using mode superposition and matrix methods. Lumped and distributed parameter systems. Application to earthquake, moving and blast loads. Approximate and numerical methods. Prerequisite: 573 or permission.

CESM 575 Structural Mechanics III (3) A

Ellas, 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

Ellas

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

Ellas, 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

Vasarhelyi

Experimental determination of strain under static and dynamic loads; mechanical, optical, and elec-

trical 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

Vasarhelyi

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

Vasarhelyi

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

Vasarhelyi

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

Matlock

Advanced topics in the design of reinforced and prestressed concrete structures. Design of cast-in-place and precast statically indeterminate prestressed concrete structures. Design of prestressed concrete flat plate structures. 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 metal structures. Failure of structures and structural members. Prerequisite: graduate standing in civil engineering.

CESM 587 Advanced Design of Steel Structures (3) Sp

Vasarhelyi

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

Matlock

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

Matlock

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

Hartz

Fundamental principles governing the static or dynamic response of suspended structures, transmission lines, tall stacks, and other flexible structures subject to deflection, overturning, or oscillation as a result of wind action. Prerequisite: graduate standing in engineering.

CESM 591 Theory of Elasticity I (3) Sp

Ellas, Evans, Hartz

Elementary formulation of linear elasticity using indicial notation. Use of Airy stress function for solution of plane elasticity problems in rectangular and polar coordinates. Saint Venant's theory of torsion. Elementary treatment of thermal stress problems. Energy methods. Prerequisite: graduate standing in engineering.

CESM 592 Theory of Elasticity II (3) A

Eltas, 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: A A 530 or M E 551, or permission.

CESM 593 Theory of Elasticity III (3) W

Eltas, Evans, Hartz

Further topics in elasticity theory, including the Muskhelishvili method for plane elastostatics, integral transforms, contact problems, and finite elastic deformations. Prerequisites: 592 and A A 580. (Offered even-numbered years.)

CESM 594 Waves in Geophysics and Engineering (3) Sp

Fyfe

Examination of the fundamental concepts and mathematical descriptions of wave propagation; group and phase velocity, dispersion, effects of boundaries, normal mode and progressive wave descriptions; waves in elastic solids, acoustic waves, electromagnetic waves; sources of waves; waves in inhomogeneous media; applications to acoustics, seismology, and earthquake engineering. Offered jointly with A A 594 and GPHYS 594.

CESM 599 Special Topics: Structures and Mechanics (2-5, max. 15) AWSpS

Prerequisites: permission of instructor and department Chairperson.

CESM 600 Independent Study or Research: Structures and Mechanics (*) AWSpS

TRANSPORTATION, CONSTRUCTION, AND GEOMETRONICS ENGINEERING

Courses for Undergraduates

CETC 310 Forest Highway Location and Design (5) Sp

Hoag, McNeese

Reconnaissance, preliminary, and location surveys for forest highways. Earthwork computations, with and without use of electronic computers. Testing of road construction materials and subgrade soils. Design of roadway elements. Not to be taken for credit by civil engineering majors. Prerequisites: ENGR 161 and MATH 125.

CETC 401 Highway and Traffic Engineering Functions (3) S

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 PRECEDENCE techniques.

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

Sawhill

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) A

Colcord, Veress

Geometrical characteristics of photographs. Planning and control considerations for mapping. Theory of stereoscopy, parallax measurement, interior and exterior orientation. Photogrammetric instrumentation (production of maps, orthophotos, and cross sections.) Evaluation of accuracies and error sources. Prerequisite: CIVE 316 or permission.

CETC 4171 Cadastral Surveys (3) WS

Colcord

Boundaries; the system of public lands; adverse and riparian rights; subdivision design and site planning. Professional ethics and expert witness testimony.

CETC 418 Engineering Control Surveys (3) SpS

Colcord

Specifications. Application of plane coordinate projections (Lambert, UTM). Electronic distance measurement, precise traverse planning and analysis. Control for engineering and photogrammetric projects, including geodetic sections, altimetry, and solar and stellar azimuth observations. Prerequisite: CIVE 316.

CETC 421 Transportation Engineering II (3) A

Terrel

Design, construction, and performance of the physical elements of transportation facilities. Topics may include site location, drainage, roadbed, airfield pavement, railways, waterways, pipelines, and other design components of transportation systems. Prerequisite: senior or graduate standing in civil engineering.

CETC 424 Pavement Design (3) W

Terrel

Current and developing procedures for the structural thickness design of pavements. Bituminous and concrete pavements for highways, airports, and special heavy loading. Elastic layered systems, slab theory. Performance evaluation for maintenance and overlay design. Prerequisite: senior or graduate standing in civil engineering. (Formerly CESM 424.)

CDTC 425 Introduction to Urban Transportation (3) A

Horwood

Identification of the framework, central concepts, constraints, and issues of urban transportation planning. Offered jointly with URB P 430.

CETC 498 Special Topics: Transportation, Construction, and Geometronics (1-5, max. 12) AWSpS

Special topics in civil engineering offered as course with lecture and/or laboratory. May be repeated for credit. A maximum of 6 credits may be applied toward an undergraduate degree. Prerequisite: permission of department Chairman.

CETC 499 Special Projects: Transportation, Construction, and Geometronics (1-5, max. 12) AWSpS

Individual undergraduate research projects. May be repeated for credit. A maximum of 6 credits may be applied toward an undergraduate degree. Prerequisite: permission of department Chairman.

Courses for Graduates Only

CETC 500 Transportation Safety—Introduction Seminar (2) W

Sawhill

General review of all aspects of transportation safety, reflecting federal, state, and local safety programs; motor vehicle and driver administration, enforcement, courts, traffic engineering, insurance, and public support. Prerequisite: graduate standing or permission.

CETC 502 Transportation Safety—Highway Design and Traffic Control (3) S

Sawhill

Review of roadway and intersection design elements as related to accident rates. The role of traffic-control devices, illumination, and traffic characteristics in highway safety. A review of research and identification of future research needs. Prerequisite: senior or graduate standing.

CETC 506 Construction Administration (3) Sp

Hoag

Administration and management of construction operations from the viewpoint of the contractor. Forms of ownership; organization; staffing, planning, and control; bidding; contracts; bonding; insurance; project cost accounting; labor law; labor relations; project safety. Prerequisite: graduate standing or permission.

CETC 510 Traffic Engineering—Analysis (3) A

Sawhill

Measurement and evaluation of characteristics of vehicular volume, speed, travel time, delays, and travel desirability. Parking studies and computer analysis of traffic engineering studies. Prerequisite: 410 or permission.

CETC 511 Traffic Engineering—Administration and Safety (2) W

Sawhill

Comprehensive review of Uniform Vehicle Code and manuals on uniform vehicle control devices. Warrants and uses of signs, signals, markings, and channelization. Traffic engineering administration, federal, state, county, and municipal. Prerequisite: 410 or permission.

CETC 512 Urban Traffic Planning (3) Sp

Sawhill

General review of studies and data associated with planning and preliminary design for access facilities serving downtown areas and special generators, such as shopping centers, universities, stadiums, parking structures, etc. An urban design team project course. Prerequisite: senior or graduate standing in engineering or urban planning.

CETC 513 Highway and Traffic Engineering—Geometric Design (3) Sp

Sawhill

Factors and elements in the geometric design of arterials, freeways, intersections, interchanges, and parking facilities. Special design studies and reports. Prerequisite: senior or graduate standing in engineering.

CETC 515 Stereo-Photogrammetry (3) W

Veress

Theory of orientation; mathematical concept of relative and absolute orientation for vertical and convergent photography. Error propagation and corrections. Accuracy element of orientation. Critical surfaces. Standard residual Y-parallaxes. Prerequisites: 415, 530.

CETC 516 Analytical Photogrammetry (3) W

Veress

Basic principle of analytical photogrammetry. Stereo comparators and the analytical plotter. Reduction of plate coordinates. Perspective. Collinearity, coplanarity, space coordinate systems, transformations. Space intersection and resection and their adjustments. Solutions using high-speed electronic computers. Prerequisites: 415, 530.

CETC 518 Aerial Triangulation (3) Sp

Veress

Radial aerotriangulation; instrumental aerial triangulation by independent pairs, aeropolygon, aeroleveling and independent geodetic control methods.

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Semianalytical aerotriangulation. Mathematical strip and block adjustment. Analytical aerotriangulation methods. Prerequisites: 515, 516.

CETC 520 Seminar (1, max. 6) AWSp
Prerequisite: permission of thesis supervisor.

CETC 522 Methodology of Transportation Systems Analysis (3)
Application of the systems approach and historical approaches to transportation planning problems. Basic transportation system relations. Characteristics of supply/demand equilibrium problems for auto and transit. Transportation systems evaluation, philosophy, and methodologies. Prerequisite: graduate standing or permission.

CETC 523 Transportation Systems, Representation, Structure, and Interrelationships (3) W
Nihan
Basic concepts in modeling transportation demand and technology. Modeling the spatial structure of transportation systems. Network equilibrium relationships for automobile and transit. Prerequisite: 522 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 Land Use Planning Models (3) A
Schneider
Review of theoretical basis of several existing models used to forecast urban growth patterns and their associated land use, transportation, and energy requirements. Model validation studies in relation to empirical studies of urban growth and change. Environmental implications of alternative urban growth patterns. Offered jointly with URB P 530.

CETC 526 Transportation Studies, Model Calibration, and Network Flow (3) Sp
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 Urban Region Geocoding and Geoprocessing (3) S
Horwood, Staff
Automated urban geographic base file development for spatial coordinate and nominal code identification of street-address-related records. The utility of geocoded data for research, planning, and administration. Geoprocessing systems development, operation, and management. Relationships to United States and foreign census applications. Offered jointly with GEOG 527 and URB P 527.

CETC 528 Automated Mapping and Graphing (3) W
Youngmann
Computer applications to statistical and areal analysis. Laboratory problems adapted to specialized interests of students. Offered jointly with GEOG 528 and URB P 528. Prerequisites: 527, basic statistics, or permission.

CETC 529 Information Systems Applications to Urban and Regional Analysis (3) Sp
Horwood, Staff
Logical design of information systems for analysis, policy development, planning, and plan monitoring in the context of land-use planning, environmental studies, land-resource management, and general public agency planning purposes. Data confidentiality considerations, case studies, and critical analyses of current information systems programs. Offered jointly with GEOG 529 and URB P 529. Prerequisite: graduate standing.

CETC 530 Adjustment Computations (4) A
Veress
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; astronomic determination for Laplace stations; computations of geodetic position; introduction to satellite and EDM 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 URB P 934. Prerequisites: 425, URB P 400, or permission.

CETC 537 Electronic Surveying (4) W
Veress
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 565 Remote Sensing of Environment (3) W
Colcord
Use of aerial photographs, multispectral and IR imagery, and other sensors for object evaluation and environment studies (satellite and aerial image acquisitions). Factors in system and target signature evaluation and analysis. Prerequisite: permission.

CETC 599 Special Topics: Transportation, Construction, and Geometronics (2-S, max. 15) AWSpS
Prerequisites: permission of instructor and department Chairperson.

CETC 600. Independent Study or Research (*)
AWSpS

WATER AND AIR RESOURCES

Courses for Undergraduates

CEWA 434 Ecological Effects of Waste Water (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 FISH 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 FISH 435. Prerequisites: upper-division or graduate standing, organic chemistry, and some background in any of the following: general physiology, cell biology, biochemistry, chemical biology, sanitary engineering.

CEWA 441 Intermediate Fluid Mechanics (3) A
Richey
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 backgrounds. 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 motion, elementary tidal theory; applications illustrated by laboratory experiments and selected case histories. Offered jointly with OENG 444. Prerequisite: CIVE 342.

CEWA 445 Hydraulic 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 computer in analyzing such conditions. Prerequisite: CIVE 345.

CEWA 446 Analysis Techniques for Groundwater Flow (3) W
Burges
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 analogy techniques developed during the course. Prerequisite: CIVE 342 or equivalent.

CEWA 447 Physical Hydrology (3) A
Burges
Global water picture, data sources and data homogeneity, precipitation, evapotranspiration, flow to wells, hydrographs, storm and snowmelt runoff, streamflow routing, 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
Strausser
The transportation of water by gravity flow. Analysis and design of canals, transitions, energy dissipators, and similar structures. Analysis of surface profiles and effect of nonlinear alignment on flow. Design-oriented problems in open-channel hydraulics. Prerequisite: CIVE 345.

CEWA 450 Man and the Pollution of His Environment (3 or 5) ASp
Burges, 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 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
Bogan, Seabloom
Introduction to the theory and the practice of planning and design of urban water supply, sewerage, solid wastes, and drainage collection systems. Evaluation of service areas and service requirements and their relationships to urban and regional plan-

ning 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 456 The Chemistry of Natural Water Systems (3) Asp

Spyridakis
Principles of chemical equilibrium relevant to natural water systems; the nature and effect of chemical interactions of 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 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

Charlson
The analytical and physical chemistry of trace atmospheric constituents, both natural and man-made. Lecture and laboratory. Prerequisite: CHEM 160 or equivalent.

CEWA 461 Air Resources Engineering I (3) Asp

Rossano
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 466 Air Pollution Control (4) W

Pilat
Overall approach for controlling air pollution. Definition of the problem, including identification of air pollutants, atmospheric dilution capacity, emission sources, and 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 nonsengineering 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 roles of urban and industrial planning and of collection and transportation aspects in solid-waste production and disposal are discussed, especially as related to community location and planning and to methods of hauling and controlling wastes concentration and utilization.

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, max. 12) AWSpS

Special topics in civil engineering offered as course with lecture and/or laboratory. May be repeated for credit. A maximum of 6 credits may be applied toward an undergraduate degree. Prerequisite: permission of department Chairperson.

CEWA 499 Special Projects—Water and Air Resources (1-5, max. 12) AWSpS

Individual undergraduate research projects. May be repeated for credit. A maximum of 6 credits may be applied toward an undergraduate degree. Prerequisite: permission of department Chairperson.

Courses for Graduates Only

CEWA 520 Seminar (1, max. 6) AWSp

Required of all graduate students in the Water and Air Resources Division each quarter.

CEWA 525 Seminar in Atmospheric Problems Associated With Air Pollution (2) W

Badgley, Charlson, Harrison
Seminar for both engineers and atmospheric scientists in the atmospheric problems related to air pollution. A wide variety of topics is covered. Faculty lectures and student participation. Offered jointly with ATM S 525. Prerequisite: ATM S 301 or permission.

CEWA 528 Acoustics of Environmental Noise (4) A

Chalupnik, Merchant
Measurement and evaluation of environmental noise. Covers mathematical, physical, and psychological aspects of community noise; sources, scales for rating, propagation, and control of noise. Laboratory demonstration of lecture principles. Offered jointly with M E 528. Prerequisite: permission.

CEWA 541 Hydrodynamics in Water Quality (3) A

Nece
Theoretical, field study, and laboratory model approaches to mixing, diffusion, thermal effects, and stratified flow in problems of concern to water resources engineers. Offered jointly with O ENG 544. Prerequisite: CIVE 342 or permission.

CEWA 542 Hydrodynamics I (3) W

Nece
Fundamentals of fluid potential motion. Two- and three-dimensional flow examples, including free surface flows. Conformal mapping, other solution techniques. Prerequisite: CIVE 342 or equivalent.

CEWA 543 Hydrodynamics II (3) Sp

Nece
Fundamentals of the flow of a real fluid. Viscous flows; the Navier-Stokes equations, and some exact solutions. Boundary layer theory. Introduction to turbulence and diffusion. Prerequisite: 542 or permission.

CEWA 544 Coastal Hydraulics (3) Sp

Hartz, Richey
Nonlinear water waves and structural loadings analyzed by stream function theory; random waves and structural responses analyzed by time series techniques. Offered jointly with O ENG 544. Prerequisite: familiarity with linear wave theory.

CEWA 547 Advanced Hydrology (3) W

Burges
Detailed treatment of statistical methods used in hydrologic analysis. Stochastic hydrology, detailed examination and use of a deterministic watershed model (Stanford Watershed Model). Economic aspects of hydrologic design. Prerequisite: graduate standing or permission.

CEWA 550 Biological Waste Treatment (3) W

Carlson
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.

CEWA 551 Sanitary Engineering Unit Operations (3) W

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 bioenvironmental 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

Carlson
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

COLLEGE OF ENGINEERING

in water resource development and management; water policies, programs, and administration; use relationships and conflicts; considerations for regional water resource systems.

CEWA 558 Water Quality Management (3) W *Mar*

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 usages. Prerequisites: 434, 456, or permission.

CEWA 559 Water Resources System Management (3) Sp *Burges, Mar*

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. Prerequisites: 557, 558, or permission.

CEWA 560 Topics in Environmental Health (3) W *Rossano*

Introduction to human biology, including physiology, epidemiology, and toxicology. Study of contemporary environmental health problems and practices as they relate to radiological health, solid-waste disposal, food- and water-borne diseases, occupational health, biometeorology, and bioengineering.

CEWA 562 Air Resources Engineering II (3) W *Rossano*

Study in depth of the major sources of air pollution, including analysis of flow diagrams, raw materials, off-streams, pollution control facilities, and environmental impact. Field trips to representative plants; trip reports and term paper. Prerequisite: 461 or permission.

CEWA 563 Air Resources Management (3) Sp *Rossano*

The atmosphere as a vital natural resource. Clean-air strategies. Administrative and legal aspects of air conservation; air quality criteria and standards; controversial issues; design of area-wide surveys; long-range planning. Prerequisite: 461 or permission.

CEWA 564 Aerosol Science and Technology I (3) W *Charlson, aggoner*

Topics related to suspended particulate matter in a gaseous medium. Statistics, mechanics, and physical chemistry of aerosols. Particular reference to particulate matter in air, to experimental methods, Brownian movement, diffusion, coagulation, and light scattering. Prerequisite: permission.

CEWA 565 Aerosol Science and Technology II (3) Sp *Charlson, Waggoner*

Sequel to 564; focusing on current research with regard to atmospheric aerosols. Prerequisite: permission.

CEWA 566 Control of Gaseous Air Pollutants (3) A *Pilat*

Principles and designs of the physical and chemical processes employed in the removal of gaseous pollutants. Use of absorption towers (packed and spray), adsorption beds, and flame incinerators for controlling gaseous air-pollutant emissions. Discussion of the various processes for controlling emissions of sulfur oxides and nitrogen oxides from stationary sources. Case studies of actual gaseous air-pollutant control systems on sources such as coal-fired power plants, copper smelters, pulp mills, aluminum refineries, etc. Prerequisite: MATH 238 or permission.

CEWA 567 Control of Particulate Air Pollutants (3) W *Pilat*

Principles and designs of processes used to control the emissions of particulate air pollutants. Use of settling chambers, cyclones, filters, wet scrubbers, and electrostatic precipitators for controlling emissions of aerosol particles. Case studies of particu-

late air-pollutant control systems on emissions from kraft pulp mills, sulfite pulp mills, hog fuel boilers, coal-fired boilers, aluminum refineries, etc. Discussion of particulate control pilot plant studies conducted by the University of Washington, EVA, etc. Prerequisite: MATH 238 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 *Carlson, Hammer*

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-state management and for urban planners and business administration majors. Prerequisite: 470.

CEWA 599 Special Topics: Water and Air Resources (2-5, max. 15) AWSpS

Prerequisites: permission of instructor and department Chairperson.

CEWA 600 Independent Study or Research—Water and Air Resources (*) AWSpS

COMPUTER SCIENCE

See Interschool or Intercollege Programs.

ELECTRICAL ENGINEERING

Courses for Undergraduates

E E 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: MATH 125, which may be taken concurrently.

E E 231 Introduction to Electrical Circuits and Systems (4) AWSpS

Introduction to the basic principles of modern circuits and systems theory and the use of digital computer techniques in circuit analysis. Coverage includes resistors, sources, and simple circuits, resistance networks; capacitors and inductors, first-order circuits; second- and higher-order circuits; solutions of linear differential equations representing equilibrium equations of networks by time-domain techniques. Prerequisites: PHYS 122, MATH 126.

E E 299 Special Topics in Electrical Engineering (1-5) AWSpS

New and experimental approaches to basic electrical engineering. May include design and construction projects. Prerequisite: permission of department Chairperson.

E E 306 Elements of Electrical Engineering (3-6) AWSpS

For nonmajors, an introduction to electrical engineering with self-paced units. The 3-credit course is contained in eight units and six laboratories. The first three units and three laboratories cover background; dealing with the basic rules, active and passive elements and their ideal models used in the remainder of the course. The laboratories concentrate on the operation and application of the more frequently used electronic instruments (e.g., oscillo-

scope and vacuum tube voltmeter). The next two units and two laboratories deal with semiconductor diodes and transistors, their theory and operation. The three units and one laboratory, which complete the 3-credit course, cover electronic amplifiers, op amps, and feedback circuits. Up to 3 additional credits are available. 1 credit for two units and two laboratories, which is a basic introduction to electrical machinery (required for mechanical engineering students). 1 credit for two units and one laboratory, which details digital logic circuits and AM/FM modulation. A final credit for two units and two laboratories, which go further into electronic instrumentation. This portion can be tailored to student's individual interests, such as thermocouples, strain gauges, bridges. Lectures are given covering 4 credits. The last 2 credits do not have lectures, but are covered by lecture notes and consultation with instructor. Prerequisites: PHYS 122, MATH 126, or permission.

E E 310 Electronics Laboratory I (3) AWSpS

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.

E E 312 Electrophysics Laboratory (3) AWSpS

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.

E E 331 Circuits and Systems I (4) AWSpS

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: PHYS 122, MATH 238.

E E 333 Circuits and Systems II (4) AWSpS

Continuation of 331. System functions, complex frequency, and pole-zero properties. The sinusoidal steady-state. Energy and power. Frequency response of systems. Fourier series and introduction to Fourier integral transform. Prerequisite: 331.

E E 335 Linear Systems Analysis (3) ASP

Analysis of linear systems using Fourier series, the Fourier integral, Laplace transforms, and the convolution integral. Fourier series expansion of periodic signals. Response of linear systems to periodic nonsinusoidal inputs. The Fourier transform and its inverse. The impulse response, the convolution integral, and linear time-invariant systems. Response of linear systems to a periodic input. One-sided and two-sided Laplace transforms, inverse Laplace transform. Response via the Laplace transform system transfer function. Frequency response. Prerequisite: 333 or permission. (Formerly 441.)

E E 338 Energy Transmission (4) A

Lumped and distributed circuits. Steady-state and transient waves on low-loss lines. Traveling waves on dissipative lines. Natural oscillations, standing waves, and resonance. Laboratory techniques. Prerequisite: 333.

E E 343 Introduction to Electromechanical Energy Conversion (5) WSp

Fields and forces associated with the interaction of circuits in a relative motion. Analysis of lumped parameter electromechanical devices and systems. Energy conversion and power flow. Includes a weekly three-hour laboratory. Prerequisite: 381.

E E 351 Electronics (4) AWSpS

Semiconductor device characteristics and circuit models; integrated circuits used for basic digital and analog applications, such as counters, amplifiers, and comparators. Prerequisites: PHYS 122, MATH 238.

E E 353 Analog Electronic Circuits (4) AWSpS
Application of semiconductor devices and semiconductor integrated circuits to analog electronic sys-

tems. Emphasis on frequency response, amplification, feedback and power amplification. Prerequisites: 310, 333, and 351.

EE E 354 Analog Electronic Circuits Laboratory (1) A WSps
Three-hour laboratory each week. To be taken concurrently with 353.

EE E 371 Fundamentals of Computer Operation (4) A WSps
Organization and operating principles of digital computers. Representation of information, processor components, machine operation, and data transfers. Relation of computer design to programming and computer applications. Prerequisite: 351.

EE E 381 Electrophysics I (4) A WSps
Electromagnetic fields and polarization; Maxwell's equations and electromagnetic waves in linear media. Energy conversion; flux linkages, and electromechanical systems. Particle-probability-density waves, and atoms. Prerequisites: PHYS 123, MATH 238.

EE E 383 Electrophysics II (4) A WSps
Propagation of electromagnetic, elastic, and particle-probability-density waves in homogeneous and periodic regions. Elements of statistical mechanics. Electromagnetic properties of materials; polarization, charge transport, p-n junctions. Prerequisite: 381.

EE E 399 Special Topics in Electrical Engineering (1-5) A WSps
New and experimental approaches to current electrical engineering problems. May include design and construction projects. Prerequisite: permission of department Chairperson.

EE E 411 Introductory Network Synthesis (3) A
Network representations in the complex frequency domain, realizability criteria for driving-point and transfer functions, canonical forms, and application of the digital computer in synthesis procedures. Prerequisites: 333 and senior standing.

EE E 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: ENGR 141 and senior standing.

EE E 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 techniques, and hypothesis testing with applications to engineering systems. Prerequisite: 333 or permission.

EE E 418 Introductory Communication Theory (3) Sp
Techniques of digital and analog communications; modulation coding, and noise. Examples of practical communication systems and channels, channel capacity. Prerequisites: 417 and 335 or permission.

EE E 421 Electroacoustics (4) A
Fundamentals of acoustics and the electroacoustical aspects of electromechanical systems. Characteristics of transducers. Synthesis of systems. Includes laboratory to be arranged. Prerequisite: 383 or permission.

EE E 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 E 436 Medical Instrumentation (3) W
Moritz
Introductory course, with laboratory, in the appli-

cation of instrumentation to medicine. Topics include transducers, preamplifiers, amplifiers, recorders, and special electronics as used for clinical diagnosis and patient monitoring. Offered jointly with BIOEN 436. Prerequisites: some knowledge of human physiology and electronics or instrumentation and permission.

EE E 439 Applied Electronic Design (3) A WSps
Laboratory-oriented course in applied digital and analog circuit design. Stressed 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 E 442 Introduction to Discrete Time Systems and Digital Filters (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. Prerequisite: 335 or permission.

DE E 445 Nonlinear Systems Analysis (4) A
Dynamic analysis of nonlinear circuits and of other simple systems. Exact methods, graphical methods, approximate methods, including linearization and numerical and analog computer solutions. Stability. Forced vibrations. Prerequisite: 333 or permission.

EE E 446 Control System Analysis I (4) A WSps
Linear servomechanism theory and design principles. Pole-zero analysis, stability of feedback systems by root-locus and real-frequency response methods. Design methods of Bode and Nichols. Introduction to advanced topics in automatic control theory. Prerequisite: 335 or permission.

EE E 447 Control System Analysis II (3) Sp
State-space formulation of multivariable feedback control system problems. Dynamic performance, including stability evaluation, by vector-matrix methods. Application of discrete time methods of feedback control problems. Elements of nonlinear feedback system analysis including state-space methods, Lyapunov stability theory, and describing functions. Prerequisite: 446 or permission.

EE E 449 Electrical Machinery (5) A
Polyphase circuits and classical theory of rotating electrical machines and transformers for electrical utility and industrial applications. Synchronous machines, induction machines, and d-c machines. Single-phase and polyphase transformer connections. Operating characteristics, loss mechanisms, thermal characteristics, and principles of rating. Steady-state and transient behavior. Includes one three-hour laboratory per week. Prerequisites: 333 and 381.

EE E 454 Power System Analysis (4) W
Polyphase circuits in balanced and unbalanced cases. Symmetrical and related components. System impedances. Fault computations. Load flow computations. System stability in steady-state and transient cases. Introduction to economic operation of power systems. Prerequisites: 333, 381.

EE E 460 Wave Effects in Bio-Materials (3) Sp
Ultrasound, electromagnetic, and optical wave effects in biological materials. Applications to biomedical uses in diagnosis, therapy, and surgery. Prerequisite: 381 or other course in wave propagation as approved by instructor. Offered jointly with BIOEN 460.

EE E 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 CH E 461. Prerequisite: senior standing in engineering or permission.

EE E 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 propagation medium by passive (radiometric) and active (scattering, acoustic sounding) techniques, ionosphere, and magnetosphere. Prerequisite: 383 or permission.

EE E 468 Applied Optics (4) W
Fundamentals of optical image formation, data processing, holography, interferometry, laser principles, optical detection, material interactions, scattering, and fiber optics. Prerequisite: 383.

EE E 469 Boundary Value Problems and Wave Fundamentals (4) A
Wave propagation in varying types of material media of practical importance, including ionized, lossy, layered, anisotropic. Techniques for the solution of boundary value problems, including wave guides and other passive elements of microwave systems. Emphasis on electromagnetics problem-solving methods, together with their relevance to modern optics, bioengineering, and radio science. Prerequisite: 383; senior standing recommended.

EE E 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 C SCI 472. Prerequisite: 478.

EE E 473 Wave Shaping (5) A W
Generation and transmission of special waveforms, including pulses, square waves, and linear ramps; clipping, clamping, and d-c restoration; astable, monostable, and bistable multivibrators; applications to analog and digital systems. Includes one four-hour laboratory on alternate weeks. Prerequisites: 333 and 354.

EE E 475 Digital Systems (4) W 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 E 476 Logical Design of Digital Devices (3) W Sp
Number theory of formal and informal systems, translation, error detection characteristics. Arithmetic operations. Boolean algebra, algebraic manipulation and simplification. Topological methods. Switching and logic applications. Analysis and synthesis of sequential logic, minimization criteria. Systems design. Prerequisite: upper-division standing.

EE E 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: ENGR 341.

EE E 478 Computer Organization and Machine Language Programming (4) A Sp
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 C SCI 578. Prerequisite: ENGR 346 or equivalent.

EE E 481 Fundamentals of Microwaves (4) Sp
Microwave circuit elements, waveguides and resonators; microwave measurement techniques; beam-type and solid-state amplifiers. Microwave system concepts; microwave integrated circuit. Includes one three-hour laboratory per week. Prerequisites: 383, 353, and 354.

EE E 485 Semiconductor Devices (4) A W
Physics of p-n junctions and semiconductor surfaces; operating principles of various semicon-

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ductor 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, servomotors, synchros, gyroscopes, and fluid-power devices. Experimental determination of dynamic parameters, and behavior of closed-loop systems. Two three-hour laboratories per week. Prerequisite: 446, which may be taken concurrently, or permission.

E E 499 Special Projects (2-5, max. 10) AWSps

Assigned construction or design projects carried out under the supervision of the instructor. Prerequisite: permission of department Chairperson.

Courses for Graduates Only

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) A

Lytle, Martin
Probability theory; discrete and continuous random variables; stochastic process. 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

Lytle, Martin
Review of stochastic processes. Communication system models. Channel noise and capacity. Optimum detection, modulation and coding, convolutional coders and decoders. Typical channels, random and fading channels. Waveform communication, optimum filters. Prerequisite: 505 or equivalent.

E E 508 Random Processes—Engineering Applications (3) W

Lytle, Martin
Modeling and analysis of random processes encountered in engineering applications. Stationarity and ergodicity. Harmonic analysis, power spectral densities, Karhunen-Loeve expansions. Poisson, Gaussian, and Markov processes. Stochastic integrals and differential equations. Prerequisite: 505 or permission.

E E 509 Engineering Applications of Linear Graphs (3) W

Anderson
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

Damborg, Lytle, Martin
Mathematical foundations for system theory are presented from an engineering viewpoint. Topics include set theory, functions and inverse functions, metric spaces, finite dimensional linear spaces, linear operators on finite dimensional spaces. Applications to engineering systems are stressed. Prerequisite: graduate standing or permission.

E E 511 Principles of Network Synthesis (3) W

Lewis
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: 335 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 minimax search; gradient search; method of Davidson, Fletcher, and Powell; method of conjugate gradients; elements of quadratic and geometric programming; applications to engineering systems. Prerequisite: 510 or permission.

E E 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 C SCI 518. Prerequisite: graduate standing 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 nonlinear least squares techniques; 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. Offered jointly with PC BS 519.

E E 520 Spectral Analysis Techniques (3) W

Martin
Estimation of spectral densities for single and multiple time series. Basic theory for nonparametric estimation of spectral density, cross-spectral density and coherency for stationary time series, real and complex spectrum techniques. Bispectrum. Digital filtering techniques. Aliasing, prewhitening. Choice of lag windows and data windows. Use of the fast Fourier transform in spectral estimation and computation of correlation functions. The parametric autoregressive spectral density estimate for single and multiple stationary time series. Spectral analysis of nonstationary random processes. Robustness in spectral analysis. Prerequisite: 505, 508, or 519 or equivalent, or permission.

E E 525 Acoustics in Engineering I (3) W

Chalupnik, Harris, Ishimaru, Merchant, Sigelmann
Acoustic wave transmission, reflection, refraction, and diffraction in solids, liquids, and gases. Includes review of continuum mechanics and examples from electromechanical systems. Offered jointly with M E 525. Prerequisite: graduate standing in electrical or mechanical engineering, or permission.

E E 521 Acoustics in Engineering II (3) Sp

Auth, Chalupnik, Harris, Merchant, 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 M E 526. Prerequisite: 525 or permission.

E E 529 Optical Electronics (4) A

Auth
Radiation coupling to microsystems. Theory of laser oscillation. Tensor formulation of optical constants. Nonlinear optics and parametric amplifiers. Electro-optic and acousto-optic modulation. Photodetectors. Modern applications. Prerequisite: 383 or equivalent.

E E 530 Electromagnetic Properties of Materials (4) W

Auth, Bjorkstam, Yee
Matrix formulation of quantum theory, perturbation theory, Dirac matrix formulation of quantum theory, Dirac notation. Semiclassical theory of the interaction between electromagnetic radiation and matter. Lattice vibrations and specific heat. Dielectric and magnetic properties of materials. Prerequisite: 383 or permission.

E E 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.

E E 532 Engineering Quantum Electrodynamics (4) Sp

Bjorkstam, Yee
Electromagnetic field quantization; coherent and incoherent states of the radiation field. Fully quantum theory of the interaction between electromagnetic radiation and matter. Quantum theory of the laser. Photon counting, correlation and noise. Parametric conversion; Raman and Brillouin scattering. Prerequisite: 530 or permission.

E E 533 Advanced Semiconductor Devices (3) W

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.)

E E 535 Digital Integrated Circuits (3) Sp

Head
Analysis and design of digital integrated circuits. Emphasis on MOS and bipolar LSI technology and devices including static and dynamic MOS and TTL bipolar logic. Circuits include basic logic elements, shift registers, memories, microprocessors, and programmed logic arrays. Prerequisite: 485 or permission.

E E 537 Electronic Amplification Devices and Applications (3) W

Helms, Reynolds
Present state-of-the-art linear amplification devices and circuits are reviewed and foreseeable future developments anticipated, with the objective of providing a timely introduction to analog circuit design at the graduate level. Focus is on both the internal design and operation of integrated devices to prompt understanding of limitations, and the application of standardized modules to electronic systems design. Prerequisite: graduate standing or permission.

EE 538 Topics in Electronic Circuit Design (1-5)

AW
Gulford
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) AWSp
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

Bergseth, 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) W

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 adequate enrollment develops prior to close of advance registration.)

EE 547 Neural Communication and Control in Biological Systems (3) W

Pinter
Conveys quantitative knowledge of the means by which electrochemical events generate, modulate, and demodulate neuronal signals and noise, and the manner in which these signals interact in the nervous system. The constraints placed on transmission of information in the nervous system are discussed, together with pertinent examples, such as the visual system. Prerequisite: advanced graduate standing or permission.

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

Bergseth
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. Prerequisites: 454 and 446 or 545.

EE 570 Antenna Theory (3) A

Peden, Reynolds, Swarm
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; eigen values, and boundary value problems applied to wave guide, 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, Watson transform, 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 media, Wiener-Hopf techniques, fluctuations and coherence, and moving sources and media. Applications to radio wave propagation and optics. Prerequisite: 573 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 sciences, bioengineering, and ocean engineering. Prerequisite: graduate standing or permission.

EE 576, 577 Information Theory and Coding I, II (3,3) W,Sp

Lytle, 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 579 Radio Propagation (3) Sp

Helm, Reynolds, Swarm
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

Alexandro, Hsu, Pinter
Performance measure and minimization techniques; continuous and discrete random processes in control systems; optimal design of systems having stochastic signals and noise; application of the Wiener-Hopf method to control system design; the Wiener-Kalman filter and its application in stochastic control systems. Prerequisites: 505, 545, 584.

EE 583 Nonlinear Control Systems (4) Sp

Noges
Dynamic analysis of nonlinear control systems. Analytical, graphical, numerical, and simulation techniques for solving nonlinear control system problems. Lyapunov functions, phase space and describing functions. Introduction to contractions mapping methods. Prerequisites: 545, 584.

EE 584 Continuous and Discrete State Variable Methods (3) AW

Alexandro, 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 timesystems; 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

Alexandro, 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, stability of sampled-data systems, digital compensation of sampled-data systems. Prerequisites: 545, 584.

EE 586 Digital Computer Applications and Communications I (3) A

Golde, Holden, Johnson
Theory and practice of number systems, logical analysis, digital computer system organization. Numeric and nonnumeric techniques and processes. Algorithmic and heuristic applications by various representative languages. Prerequisites: 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) A

Johnson
Analysis and synthesis of digital systems from logical models. Time-independent and sequential logic, multifunction logic. Boolean matrix synthesis, partitioning, weighting, cellular implementation. Threshold logic theory. Evaluation of various analysis and synthesis methods in logical systems. Prerequisite: 588.

EE 590 Advanced Topics in Digital Computers (2-5, max. 15) AWSp

Golde, Holden, Johnson, Zick
Lectures or discussions of topics of current interest in the field of digital computers. Subject matter may vary from year to year. Prerequisite: permission.

EE 591 Advanced Topics in Network Theory (2-6, max. 6) Sp

Lewis
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

Lytle, 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, etc. May be repeated for credit by permission. Prerequisite: permission.

EE 599 Selected Topics in Electrical Engineering (*) AWSpS

Prerequisite: permission of department Chairperson.

EE 600 Independent Study or Research (*) AWSpS**EE 700 Master's Thesis (*) AWSpS****EE 800 Doctoral Dissertation (*) AWSpS****HUMANISTIC-SOCIAL STUDIES****Courses for Undergraduates****HSS 300 Practice in Technical Reporting (1)**

Souther, White
Application of the fundamentals of technical reporting to the specific reporting activity of students who are enrolled in a laboratory, project, or other designated course in the College of Engineering.

HSS 301 Creating the Future (5) ASP

Douthwaite, White
Examines the concept of alternative individual and

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societal futures and the opportunities for creating them. Several aspects of thinking about alternative futures are considered, including the determinants and nature of change, notions of time, the perception of present reality and development of visions of the future, and the implications of alternative values and assumptions. A number of scenarios for the future are explored, and several methods of forecasting investigated. Offered jointly with SMT 301.

HSS 304 Introduction to Scientific and Technical Communication for Foreign Students (4)

Trimble
Scientific and technical writing and reading for foreign students well grounded in oral English. Concentration on (1) application of rhetorical concepts most frequently 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 ENGL 304.

HSS 305 Scientific and Technical Report Writing for Foreign Students (4)

Trimble
Application of the problem-solving approach to scientific and technical writing. Concentration on (1) 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 ENGL 305. Prerequisite: 304 or ENGL 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 320 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)

Elliott, White
Selected literary figures and works of Western civilization in the Middle Ages and the Renaissance.

HSS 401 Scientific and Technical Writing (4) A

Souther
Principles and practices of writing to communicate scientific and technical information to a variety of readers, including the expert, the general scientific and technical reader, the manager, and the general public. Students write a variety of assignments directed at communicating with each of these distinctive groups of readers.

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. Prerequisite: 401 or permission.

HSS 403 Managing Technical Publication (4) Sp

Souther, White
Responsibilities and practice in managing publications units for the communication of scientific and technical information. Prerequisite: 402 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.

MSS 408 Preparing Proposals and Environmental Impact Statements (3) W

Souther, White
Preparing proposals and environmental impact statements for scientific, technical, and community projects: examination of established guidelines and preliminary steps; planning, organizing, writing, and submitting the documents, with emphasis on writing for the decision-making process. Prerequisite: upper-division standing or permission.

HSS 409 Writing for Publication (3) Sp

Souther, White
Writing for professional and trade periodicals in science, engineering, and technology: examination of the publication process, including the roles of author, editor, and reviewer; selecting the appropriate periodical; organizing and writing the article. Prerequisite: upper-division standing or permission.

HSS 410 Contemporary Political and Social Problems (3)

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: 1750-1950 (5)

Botling
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)

Botling
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
Overview of 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. Prerequisite: 420 or 421 or permission.

HSS 425 Technology in Developing Countries (5)

Botling
Analyzes the alterations in societies of the developing countries resulting from the impact of technology on them, focusing on social change, values, and institutions. Treats in general the phenomenon of technological transfer.

HSS 431 Human Rights and the Governmental Process (3)

Higbee
Analysis of governmental actions (particularly anti-discrimination 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)

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 the 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 offered currently 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 CER E 442.

HSS 465 Aesthetic Value and Technology (3)

AWSp Elliott
The role of esthetics in a technological world. Prerequisite: upper-division standing.

HSS 471 Introduction to the Folktale Among Literate Peoples (3)

Skeels
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 ENGL 415.

HSS 472 Introduction to American Folklore (5)

Skeels
Study of different kinds of folklore inherited from America's past, and to be found in America today. The cultivation of an awareness of authentic folklore and how to collect it. Offered jointly with ENGL 416.

HSS 480 Science Fiction and Fantasy: Prophecy and Symbol (3)

Steels, 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 Chairperson.

HSS 499 Special Topics (1-5, max. 10)

Special topics in humanities and social sciences to be offered occasionally by permanent or visiting faculty. May be repeated for credit.

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 301 Metal Casting (2) 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) ASP *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) WSP *Anderson*

Introduction to basic machining methods used in metal processing; fundamental concepts of machine tools, layout methods, and measuring tools. Primarily for students majoring in industrial education or industrial design. Lecture and laboratory.

M E 304 Manufacturing Processes (3) 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 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 313 Engineering Operations Research (4) WSP *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 315 Statistical Analysis of Engineering Measurements (3) AW *Roberts*

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 317 Work Systems Design (4) AW *Drul*

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: HSS 300.

M E 320 Thermodynamics (4) AWSp *Walbler*

Introduction to classical macroscopic thermodynamics, including development of the basic laws applicable to energy transformations, with reference to engineering applications. Prerequisites: MATH 126 and CHEM 140, or permission.

M E 323 Thermodynamics and Heat Transfer (4) AWSp *Depew*

Application of thermodynamic principles to power and refrigeration cycles. Study of reacting and non-reacting mixtures, chemical reactions, phase and chemical equilibria. Applications to combustion and fuel cells. Prerequisite: 320 or ENGR 260.

M E 331 Introduction to Heat Transfer (4) AWSp *McFeron*

Study of heat transfer by conduction, radiation, and convection; elementary heat-exchanger design. Prerequisites: 320 or ENGR 260, and 333 or CIVE 342, or permission.

M E 333 Introduction to Fluid Mechanics (4) AWSp *Gessner*

Introduction to the basic fluid laws and their appli-

cation. Conservation equations, dynamic similarity, potential flow, boundary layer concepts, effects of friction, compressible flow, fluid machinery, measurement techniques. Prerequisites: 320 or ENGR 260, and MATH 238.

M E 342 Industrial Materials and Processes (3) Sp *Ford*

Properties, mechanics, and behavior of materials to provide a logical basis for material selection in design. Lecture and laboratory. Prerequisite: junior standing in industrial design or permission. (Offered odd-numbered years.)

M E 343 Behavior of Engineering Materials (4) AWSp *Mills*

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; ENGR 170 recommended.

M E 351 Human Factors in Design (3) W *Drul*

Engineering considerations of the abilities and limitations of the human operator in the design of industrial systems and components. Functional, psychological, physiological, and environmental aspects.

M E 352 Introduction to Mechanics of Solids (3) AWSp *Sherrer*

Development of relationships among loads, stresses, and deformations, in the elastic behavior of machine or structural elements in tension, bending, or torsion. Prerequisites: MATH 126 and ENGR 180.

M E 353 Machine Design Analysis (4) AWSp *Kielling*

Analysis, design, and selection of mechanical sub-systems and elements, such as gears, linkages, cams, 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: ENGR 180 and MATH 126.

M E 373 Dynamic Systems Analysis (4) AWSp *Jorgensen*

Introduction to modeling and analysis of physical systems involving energy storage and transfer, by lumped-parameter linear elements. Response and stability of linear systems. Generalized impedance concepts and source equivalents. Prerequisites: MATH 238 and ENGR 180.

M E 374 Analytical Methods in Engineering (3) A *Baltse*

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. (Formerly 464.)

M E 394 Design Seminar (1) AWSp *Love*

Intended to consider topics and ideas that lead the student to the formulation of a design project 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 *Wolak*

Cutting and noncutting processes for material removal in the shaping of manufactured products. Study of forces and of power consumption in the various processes, and 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 fundamentals and forms (galvanic, crevice, pitting, stress corrosion, erosion, hydrogen and leaching). Principles of design, materials selection, cathodic protection and surface treatments (coatings, carburizing, nitriding and plating) applied to reduce corrosion. Failure analysis applied to case studies.

M E 408 Manufacturing Optimization (3) AWS *Anderson, Drul, Ford, Holt*

Design and optimization of manufacturing systems. Computer-assisted manufacture. Sensing and control methods for efficient use of automation. Managing the automated factory. Tool and production planning. Laboratory exercises and applications in local industrial plants. Prerequisite: 304 or permission.

M E 410 Engineering Administration (3) AWSp *Drul*

Overview of the operations of an industrial organization, interrelationship of functions, and fundamental principles of management that lead toward effective coordination and control. Lectures and case studies in industry.

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 *Drul*

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 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 419 Work Environment Design (3) WSP *Drul*

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.

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 422 Microscopic Thermodynamics (4) W *Roberts*

Introduction to kinetic theory and statistical thermodynamics. A preliminary treatment of transport phenomena, mathematical probability statistics and relevant mathematical procedures. Prerequisite: 320 or ENGR 260. (Offered odd-numbered years.)

M E 425 Air Conditioning (3) Sp *Kippenhan*

Theory and practice in the field of heating, ventilating, and air conditioning, including psychrometry, 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

COLLEGE OF ENGINEERING

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
Fundamentals 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 ENGR 260.

M E 432 Gas Dynamics (3) Sp

Childs
Dynamic and thermodynamic relationships for the flow of a gas. Application of thermodynamic processes involving nozzles, diffusers, compressors, and turbines. Prerequisites: 320 or ENGR 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

Walbler
Planning and interpreting engineering experiments on prime movers, refrigerators, and other thermal equipment. Design and operation of complete multicomponent 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) W

Wolok
Mechanics of deformable bodies; transformation 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 460 Kinematics and Linkage Design (3) W

Kielling
Synthesis of linkage-type mechanisms, using graphical and computer methods. Prerequisite: senior standing in engineering, 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

Sherrer
Application of the principles of dynamics to selected engineering problems, such as suspension systems, gyroscopes, electromechanical devices. Includes introduction to energy methods and wave propagation in fluids and solids. Prerequisites: 365 or ENGR 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) A

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

Ballse
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 socioeconomic 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 Engine Principles (3) ASP

Guldon
Study of Otto and Diesel cycles; fuels, carburetion, ignition, combustion, and engine performance characteristics. Prerequisite: 323 or permission.

M E 482 Internal Combustion Engine Applications (4) W

Firey
Principles of engine selection and design to meet load requirements, economic requirements, and emission regulations. Prerequisite: 481 or permission.

M E 490 Naval Architecture (3) A

Adee
Theory of naval architecture; ship's lines, hydrostatic curves, intact and damaged stability, launching. Offered jointly with O ENG 490. Prerequisite: junior standing in engineering or permission.

M E 491 Naval Architecture (3) W

Adee
Theory of naval architecture; strength, A.B.S. rules, water waves, ship and platform motions. Offered jointly with O ENG 491. Prerequisite: junior standing in engineering or permission.

M E 492 Naval Architecture (3) Sp

Adee
Theory of naval architecture; dimensional analysis, resistance model testing, propellers, steering. Offered jointly with O ENG 492. Prerequisite: junior standing in engineering or permission.

M E 495 Mechanical Engineering Design (3) AWSp

Love
Design laboratory involving the identification and synthesis of engineering factors to plan and achieve specific project goals. Current literature and prerequisite texts are used as reference sources. Lecture and laboratory. Prerequisites: 353, 394, and senior standing in mechanical engineering.

M E 498 Special Topics in Mechanical Engineering (1-5, max. 6) AWSp

Lecture and/or laboratory. Maximum of 6 credits may be applied toward an undergraduate degree. Prerequisite: permission.

M E 499 Special Projects (2-5, max. 9) AWSpS

Prerequisite: permission of department Chairperson.

Courses for Graduates Only

M E 502 Plastic Metal Forming (3) Sp

Wolok
Stress-strain and stress-strain-rate relations in metal forming; plastic instability. Work of deformation. The slip-line field. Load bounding. Metal characteristics and forming. Applications to basic metal forming processes. Prerequisite: 552 or permission. (Offered even-numbered years.)

M E 506 Friction and Wear (3) Sp

Firey, Wolok
Nature of the processes of friction and wear. Temperature rise at contact surfaces during sliding, and resulting wear. Boundary friction. Friction and anti-friction 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, experimental 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, max. 6)

M E 521 Thermodynamics (3) A

Depew, Emery, Walbler
Fundamental concepts of temperature, thermodynamic properties, and systems. The first, second, and combined laws. Development of the relations of classical thermodynamics. Prerequisites: 323 and graduate standing in mechanical engineering or permission.

M E 522 Thermodynamics (3) W

Corlett, Depew, Emery, Roberts, Walbler
Topics from statistical thermodynamics, including the Boltzmann, Bose-Einstein, and Fermi-Dirac statistics. Solutions of the Schrodinger wave equation and evaluation of the partition function for translation, rotation, and vibration. Prerequisite: 521 or permission. (Offered odd-numbered years.)

M E 524 Combustion (3) Sp

Corlett, Firey
Chemical and physical processes of combustion with applications to design of combustors, fuel selection, and consideration of environmental effects. Prerequisite: graduate standing in mechanical engineering or permission. (Offered even-numbered years.)

M E 525 Acoustics in Engineering I (3) W

Chalupnik, Harris, Ishimaru, Merchant, Sigelmann
Acoustic wave transmission, reflection, refraction, and diffraction. Review of continuum mechanics and examples from electromechanical systems. Offered jointly with E E 525. Prerequisite: graduate standing in mechanical or electrical engineering, or permission.

M E 526 Acoustics in Engineering II (3) Sp

Auth, Chalupnik, Harris, Merchant, Sigelmann
Continuation of 525. Material differs each year, covering such topics as scattering, moving media, ultrasonics, acoustic holography. Offered jointly with E E 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 psychological aspects of community noise; sources, scales for rating, propagation, and control of noise. Laboratory demonstration of lecture principles. Offered jointly with CEWA 528. Prerequisite: permission.

M E 530 Radiative Heat Transfer (3) Sp

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 532 Convective Heat Transfer (3) W
Depew, Emery, Waibler
Introduction to fluid flow and boundary layer theory as applicable to forced- and natural-convection heat transfer. Condensation and boiling heat transfer. Prerequisites: CEWA 542 and graduate standing, or permission. (Offered odd-numbered years.)

M E 533, 534 Fluid Mechanics (3,3) A,W
Bodoia, Childs, Gessner
Basic conservation laws and kinematics of fluid flow, two-dimensional inviscid flow, wave motion and shock waves in inviscid compressible flow, exact solutions and boundary layer analyses of laminar and turbulent viscous flow, analysis of non-Newtonian flow, applications. Prerequisite: 533 or permission for 534.

M E 535 Computational Techniques in Heat Transfer (3) A
Corlett, Depew, Emery, Kippenhan, McFeron, Waibler
Advanced heat transfer studies of interest to mechanical engineers. Subject coverage varies from year to year. Prerequisite: permission.

M E 537 Topics in Fluid Mechanics (3) Sp
Bodoia, Childs, Gessner
Selected fluid mechanics research topics relevant to current advances in mechanical engineering practice are explored in depth on the basis of literature reading and classroom discussion. Topics selected vary with faculty and student interest, but are drawn predominantly from the general areas of energy conversion, energy management, and manufacturing processes. Applicability of research results to the resolution of design and development problems, and delineation of new research appropriate to this end. (Offered odd-numbered years.)

M E 538 Turbulent Boundary Layer Theory (3) Sp
Bodoia, Childs, Gessner
Characteristic features of turbulent boundary layers; development of the turbulent boundary layer equations; equilibrium boundary layers; integral methods of solution based on power law and wall-wake velocity profiles; methods of solution based on higher order constitutive equations; application to diffuser flows and free shear flows; new developments and physical models. (Offered even-number years.)

M E 541 Advanced Engineering Materials (3) W
Daly, Taggart
Behavior of engineering materials as affected by various conditions of loading and environment. Lecture, laboratory. Prerequisite: graduate standing in mechanical engineering or permission.

M E 542 Topics in Engineering Materials (3) Sp
Daly, Taggart
Selected topics of current importance concerning the nature and behavior of engineering materials. Lecture, laboratory. Prerequisite: 541 or permission. (Offered odd-numbered years.)

M E 543, 544. Fluid Turbulence (3,3) A,W
Gessner
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 CH E 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
Daly, Emery, Kobayashi, Sherrer
Time-dependent aspects of stress and strain, and stability in mechanical engineering design. Stress analysis in the presence of creep and stress relaxation. Cyclic variation of load and temperature. Prerequisite: 551 or permission.

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
Day
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
Day
Continuation of 556 with extended applications and theory of experimental mechanics techniques. Holography; residual stress analysis methods; moiré; three-dimensional photoelasticity; acoustoelasticity. Lecture and laboratory. Prerequisite: 556 or permission.

M E 558 Experimental Stress Analysis (3) Sp
Day
Seminar and individual research on special problems in experimental mechanics. Prerequisite: 557 or permission. (Offered odd-numbered years.)

M E 559 Applied Fracture Mechanics (3) W
Kobayashi
Applications of linear fracture mechanics to failure analysis and fracture control based on actual case studies. Fracture toughness and fatigue testing techniques, crack initiation and 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 (3) A
Balise, Galle, Jorgensen
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 (3) W
Balise, Galle, Jorgensen
Applications of vectors, matrices, and partial differential equations to mechanical engineering systems, including computational techniques and analogies. Prerequisite: graduate standing in mechanical engineering or permission.

M E 571 Servomechanisms (3) W
Balise, Galle, Jorgensen
Linear and introductory nonlinear feedback system analysis and design. Prerequisite: 471 or permission.

M E 572 Servomechanisms (3) Sp
Balise, Galle, Jorgensen
Continuation of 571, to include topics of current importance. Further study of nonlinear control, statistical analysis of feedback systems, sampled-data methods, self-adaptive systems. Prerequisite: 571 or permission.

M E 575 Systems Theory (3) Sp
Balise, Galle
State variable approach as applied to the analysis and synthesis of systems. Systems 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
Bodoia, 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 588 Dynamics and Vibrations (3) A
Chalupnik, Merchant, Sherrer
Variational techniques, Hamilton's principle, Lagrange's equations applied to dynamics of particles and rigid bodies. Vibration analysis of multi-degree-of-freedom and continuous systems. Prerequisite: graduate standing in engineering or permission.

M E 589, 590 Vibrations (3,3) W,Sp
Chalupnik, Merchant, Sherrer
Study of systems with nonlinear damping and restoring forces excited by deterministic or random inputs. Applications in measurement, testing, and design of mechanical systems. Nonlinear systems are emphasized in 589 and random inputs in 590. Prerequisite: 588 or permission. (Offered even-numbered years.)

M E 598 Topics in Research (1) AWSp
Doctoral seminar. May be repeated for credit.

M E 599 Special Projects (1-5, max. 9) AWSpS
Prerequisite: permission of department Chairperson.

M E 600 Independent Study or Research (*)
AWSpS

M E 700 Master's Thesis (*) AWSpS

M E 800 Doctoral Dissertation (*)

MINING, METALLURGICAL, AND CERAMIC ENGINEERING

CERAMIC ENGINEERING

Courses for Undergraduates

CER E 198 Career Planning II (1) WSp
Mueller
Career opportunities in ceramic engineering and the required educational curricular planning. Offered on credit/no credit basis only.

CER E 199 Materials Analysis (1) AWSpS
Mueller
Practical use of optical and electron microscopy, X-ray diffraction, X-ray spectroscopy, electron microprobe, and scanning electron microscopy in the analysis of common engineering materials. Offered on credit/no credit basis only.

CER E 202 Ceramic Engineering I (2) W
Mueller
Scope of ceramic materials and ceramic industries; use of ceramics as engineering materials; economic importance.

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CER E 203 Ceramic Engineering II (2) Sp

Campbell
Theory and methods used in measuring properties of ceramic materials; control of ceramic processes.

CER E 300 Introduction to Ceramic Engineering (5) A

Mueller
Introduction to ceramic engineering materials and processes; standards, testing, and evaluation; types of industry and employment; career and curricular planning. Not open to students who have received credit in 202, 203.

CER E 301 Ceramic Raw Materials (4) A

Miller
Natural and synthetic materials used in ceramic products; their mineralogy, physical properties, compositions, and sources.

CER E 302 Ceramic Processing I: Transport (3) W

Miller
Transport in ceramic processing systems; fluid flow, heat flow, mixing, and applications of drying and firing.

CER E 303 Ceramic Processing II: Methods (5) Sp

Whittemore
Technology of ceramic fabrication processes. Material characterization at processing stages for control. Laboratory study of all operations in the manufacture of selected ceramic products.

CER E 306 Ceramic Engineering Excursion (1) A

Campbell
Plant inspection trip. Prerequisite: junior standing.

CER E 307 Ceramic Engineering Excursion (1) A

Campbell
Plant inspection trip. Prerequisite: senior standing.

CER E 311 Physical Ceramics I: Equilibria (3) W

Fischbach
Phase diagrams, thermodynamics of heterogeneous equilibrium, nonequilibrium processes, and the interpretation of three component diagrams.

CER E 312 Physical Ceramics II: Microstructure and Kinetics (4) W

Fischbach
Crystalline and glassy state; defects, diffusion, and physical-chemical reactions in ceramic materials.

CER E 313 Physical Ceramics III: Properties of Ceramic Solids (4) Sp

Miller
Thermal and optical properties; plastic deformation; elasticity and strength; electrical conductivity; dielectric and magnetic properties.

CER E 322 Microscopy of Ceramics (3) A

Scott
The use of optical and electron microscopes in the interpretation of ceramic microstructures; thin-section petrography, polished sections, quantitative microscopy, and the use of replicas in the electron microscope.

CER E 323 Instrumental Analysis (3) Sp

Mueller
Theory and application of X-ray diffraction and spectroscopic techniques.

CER E 400 Ceramic Materials (3) W

Scott
Nature and properties of ceramic materials and their relation to ceramics in engineering design. The atomic, microstructure, and macrostructure of ceramics related to their stability in electrical, mechanical, and thermal environments. For nonmajors only.

CER E 401 Equipment and Plant Design (3) A

Whittemore
The design process and its application in ceramic engineering. Design projects. Prerequisite: 302.

CER E 402 Ceramic Engineering Design I (3) W

Inclusive design of a specific plant or process, including materials, equipment, layout, feasibility, and optimization. To be taken in sequence with 403. Prerequisite: 401.

CER E 403 Ceramic Engineering Design II (3) Sp

Continuation of 402.

CER E 404 Ceramic Process Analysis (3) Sp

Whittemore
Case histories of ceramic industrial facilities. Plant visits. Economic factors and overall process integration, including raw materials, processes, fuels, personnel, distribution. Prerequisite: junior standing.

CER E 409 Ceramic Materials Laboratory (1) W

Scott
Concurrent registration in 400 required.

CER E 410 Physical Ceramics: Ceramic Equilibria II (3) A

Campbell
Derivation of phase equilibria relations, phase transformations, solid and liquid solutions, and nonequilibrium systems. Prerequisite: 311 or permission.

CER E 411 Vitreous State (4) A

Sarjan
Chemistry and physics of glass, glazes, and porcelain enamels; structure and properties of vitreous materials. Prerequisite: 312 or permission.

CER E 420 Colloidal Ceramics (3)

Whittemore
Properties and surface chemistry of ceramic colloids. Topics include absorption, adsorption, gels and their contributions to cementitious bonding, ion exchange, rheological properties, and analytical techniques applicable to these studies.

CER E 422 Electronic Ceramics (3)

Campbell
Principles and theory of conductive, ferromagnetic, piezoelectric, thermoelectric, and electroluminescent materials.

CER E 423 Special Composite Materials (3)

Theory, properties, and practice in fibrous composite materials. Micromechanics of load transfer from matrix to fiber; properties of individual phases; properties of the interfacial region; elastic and failure properties of composite; composite fabrication. Emphasis on glass and carbon fibers in polymer and metal matrices. Prerequisite: ENGR 170 or permission. (Formerly 513.)

CER E 441 Undergraduate Seminar (1) A

Miller
Employment selection. Resume writing and correspondence, personnel contacts, interview planning and job selection campaign.

CER E 442 Experience in the Arts (1) W

Campbell, Leahy
Informal experiences with the arts through attendance at theatres, concerts, art exhibits, etc.; through discussions with creative artists; and through personal attempts at producing a work of art. Offered jointly with HSS 461.

CER E 443 Undergraduate Seminar (1) Sp

Campbell
Discussion of research and problems.

CER E 450 Introduction to Carbon Materials (3) Sp

Fischbach
Nature and capabilities of crystalline and disordered forms of pure carbon as engineering materials. Influenced of structure on behavior. Preparation methods, structure and properties of diamond; synthetic and natural graphites; glassy, coke, pyrolytic, black, and fiber carbons.

CER E 455 Research Techniques (3) A

Fischbach
Philosophy of experimentation; error analysis; vacuum technique; production and measurement of high temperatures; selected topics in advanced experimental techniques. Meets with MET E 455.

CER E 460 Ceramic-Metal Systems (3) W

Campbell
Vitreous and crystalline coatings for metals; ceramic-metal composites.

CER E 470 Refractories (3) W

Whittemore
Chemical and mineralogical composition; processing methods; thermal, physical, and chemical properties and tests; application.

CER E 498 Special Topics (1-5, max. 6) AWSpS

Special topics in ceramic engineering offered as a course with lectures, conferences, or laboratory. Prerequisite: permission of division head.

CER E 499 Special Projects (*, max. 5) AWSp

Problems in ceramics; laboratory investigations and bibliographic research.

Courses for Graduates Only

CER E 501 Process Ceramics I (3) W

Whittemore
Technology of ceramic fabrication processes. Characterization of ceramic materials at stages of processing.

CER E 502 Process Ceramics II (3) W

Campbell
Principles of process control as applied to the ceramic industry; methods of measurement and evaluation of data; application to industrial production.

CER E 511 Advanced Physical Ceramics I (3) W

Sarjan
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

Mueller
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 Kinetics and Mechanisms of Reactions and Transformations (3)

Sarjan
Kinetics, mechanisms of reactions, and transformations. Homogeneous reactions. Heterogeneous reactions. Reaction rate theory and activation energy. Nucleation and growth. Diffusion controlled reactions. Oxidation. Diffusionless (martensitic) reactions. Thermodynamics of irreversible processes. Capillarity and surface phenomena: grain growth, sintering, Ostwald ripening. Recovery, recrystallization, and grain growth. Polymorphic changes. Spinodal decomposition.

CER E 514 Thermodynamic Topics in Ceramics (3)

Scott
Applications of thermodynamics to predict behavior of materials at high temperature. Techniques of measurement and estimation of high-temperature thermodynamic properties; use of estimated values for thermodynamic calculations.

CER E 520 Seminar (1, max. 6) AWSp

Registration required for all graduate students.

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 (*) AWSp

CER E 599 Special Topics in Ceramics (*) AWSp

CER E 600 Independent Study or Research (*) AWSp

CER E 700 Master's Thesis (*) AWSp

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 NUC E 444. Prerequisite: ENGR 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. Includes interdisciplinary aspects of the field, lecture-demonstrations, introduction to laboratory tools and techniques, and discussions of curriculum and career opportunities with current students.

MET E 201 Modern Metallurgy (2) ASP

Lectures on topics of current interest in 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 202 Special Projects (1-3) AWSpS

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 during junior and senior year. Required of all majors.

MET E 322 Metallurgical Thermodynamics (3) A

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

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

Physical and chemical principles of mineral preparation and concentration. Comminution; classification, thickening, filtering of mineral suspensions; sampling; transport; and related physical processes. Physical and chemical theory applied to concentration processes; surface phenomena, electromagnetic, electrostatic, phase change, solution, and precipitation. Laboratory illustrates fundamental principles.

MET E 326 Extractive Metallurgy IIN(4) Sp

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

Stang

Physical, mechanical, and transport properties of solids; crystal defects and their influence on physical and mechanical properties. Introduction to transport properties and the theory of atomic diffusion. Laboratory experiments related to the measurement of the properties of engineering solids. Prerequisite: 361.

MET E 363 Reactions in Solids (4) Sp

Polonis

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

Stoebe

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 discussion sections 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 (3) W

Stoebe

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) AWSp

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

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 and technology. 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 environments. Prevention and 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

Application of physical chemistry and transport theory to metal process engineering. Prerequisite: permission.

MET E 455 Metallurgical Experimental Techniques (3) A

Modern research techniques in physical metallurgy. Design and execution of experiments and the analysis of data. Laboratory experiments to illustrate solid-state phenomena. Meets with CER E 455. Prerequisite: 363.

MET E 460 Advanced Physical Metallurgy (3)

Current engineering topics in physical metallurgy. May be repeated for credit.

MET E 461 Engineering Physical Metallurgy (3) A

Polonis

Structure and properties of steels. Analysis of states of stress and strain, fracture mechanics, microstructural aspects of deformation. Casting and solidification of metals and alloys. For majors and nonmajors. Prerequisite: 363 or M E 340.

MET E 462 Deformation and Mechanical Behavior of Metallic Systems (3) W

Stang

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 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 466 Theory of Metals (3) A

Stoebe

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) AWSp

Offered on credit/no credit basis only.

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

Methods of laboratory investigations and recent plant and process innovations reported in the current literature. Prerequisite: 325.

MET E 473 Mineral Process Plant Design (3) W

General arrangement planning and design calculations on a project basis. Prerequisite: 325.

MET E 474 Opaque Minerals Microscopy (2) Sp

Brien

Microscopic determination of the ore minerals; physical and optical properties, etch reactions; microchemical testing of polished sections; mineral association, liberation, grain counting.

MET E 475 Pollution Control of Metallurgical Plants (3) Sp

Current topics related to the causes and control of pollution in metallurgical extraction and processing plants. Analysis of environmental pollution 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 499 Special Projects (*, max. 5) AWSpS

Laboratory investigation of a metallurgical problem

COLLEGE OF ENGINEERING

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) AWSp

Review of research problems and recent literature. Required for all graduate students.

MET E 525 Thermodynamic Topics in Metallurgy (3) Sp

Selected topics in application of classical and statistical thermodynamics to systems of current metallurgical interest.

MET E 531 Advanced Metallurgy (*) AWSp

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 551 Special Topics in Advanced Physical Metallurgy (*, max. 6) AW

Prerequisite: 363 or equivalent.

MET E 561 Phase Transformations in Metals and Alloys I (3) W

Polonis

Thermodynamics and kinetics of solid-state reactions in metals, phase stability, theories of nucleation and growth, precipitation from solid solutions, applications to specific metal and alloy transformations.

MET E 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)

Stoebe

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

Stoebe

Theories of magnetic phenomena, including dia-

magnetism, paramagnetism, ferromagnetism, and ferrimagnetism. Details of magnetization processes in materials; anisotropy, magnetostriction; domain energies and configurations; applications to magnetic materials. Prerequisite: 466.

MET E 567 Electronic Processes in Materials (3) W

Stoebe

Lattice dynamics, including vibrational modes and phonon effects. Brillouin zone theory, and Fermi surfaces with applications in the theory of electrical conduction and in the semiconductor 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

Stoebe

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

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

Thermodynamics and electrochemistry of surfaces. Potential differences across interfaces; electrical double layer, surface tension; Gibbs's adsorption equation in three-phase flotation systems; anionic and cationic selectivity; ion exchange and solvent extraction.

MET E 572 Advanced Mineral Processing Laboratory (*) S

Experimental study of theoretical principles in preparation, concentration, and hydrometallurgy.

MET E 599 Special Topics in Metallurgy (*) AWSpS

MET E 600 Independent Study of Research (*) AWSpS

MET E 700 Master's Thesis (*) AWSpS

MET E 800 Doctoral Dissertation (*) AWSpS

MINING ENGINEERING

Courses for Undergraduates

MINE E 221 Explosives and Rock Drilling (2) W

Anderson

Principles of rock breaking and characteristics of explosives. Theory of fragmentation; design of blast and explosive loading patterns; nuclear explosives in industry; safe practices, and elements of costs. Applications in tunneling and surface work.

MINE E 306 Mine Excursion (1, max. 2) Sp

Five-day trip to a neighboring mining region. Required in junior and senior years during spring vacation, or as scheduled.

MINE E 322 Principles of Mine Production (4) A

Anderson

Working of open pit and underground mines. Delineation of ore bodies; shafts and development; level planning and underground stoping methods; characteristics of mine rocks; support systems; introduction to transport, drainage, ventilation, hoisting, and mine organization. Emphasis on labor and equipment, productivity and costs.

MINE 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.

MINE E 330 Mine Surveying (3) Sp

Anderson

Practice in underground methods, use of special instruments, stope measurements, shaft surveying, solar observations, and carrying of meridian underground; production of working and geologic maps and sections.

MINE 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: GEOL 101 or 205 or ENGR 140 or permission.

MINE E 426 Exploration and Development of Mineral Deposits (4) Sp

Anderson

Mining 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.

MINE 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 E E 306.

MINE 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.

MINE E 481 Mineral Industry Economics (4) W

Anderson

World mineral resources, their distribution, exploitation, and depletion; social, economic, and political effects; international control and trade, industrial organization, government policies, taxation, tariffs, marketing, and pricing; elements of production costs. Offered jointly with GEOL 481. Prerequisites: 322, GEOL 205, or permission.

MINE E 499 Special Projects (*, max. 5) AWSp

Problems in mining or mineral processing; field or laboratory investigations on an independent basis.

Courses for Graduates Only

MINE E 520 Seminar (1, max. 6) AWSp

Lectures and discussions; review of research problems and recent literature. Required for all graduate students.

MINE E 521 Mining Systems (*) AWSp

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.

MINE E 522 Mine Shafts (3) A

Anderson

Location and design, surface plant, collar preparation; sinking, mechanization, and organization, support, concrete lining, stations and bottoms, equipment and maintenance, safety and costs; special attention to modern circular shafts.

MINE E 551 Special Topics (3-5, max. 15) AWSp

Topics of current interest and importance in the mineral industries or individual study on a subject of special interest.

MIN E 600 Independent Study or Research (*)
AWSp

MIN E 700 Master's Thesis (*) **AWSp**

NUCLEAR ENGINEERING

Courses for Undergraduates

NUC E 400 Introduction to Nuclear Reactor Analysis (4) A

Albrecht, Bodkin

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. Prerequisites: PHYS 327 and MATH 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 MTL E 444. Prerequisite: ENGR 170 or equivalent.

NUC E 477 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 RADGY 477.

NUC E 484 Introduction to Nuclear Engineering (4) A

Woodruff

Introductory course in nuclear engineering for seniors, graduate 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: MATH 238 or permission.

NUC E 485 Nuclear Instruments (3) Sp

Chalk, Woodruff

Principles, measurements, and detection of various types of radiations encountered in nuclear energy systems. Demonstrations include the use of Geiger, proportional, and scintillation detectors; ionization chambers; analog-digital data logging equipment; and multichannel analyzers. Sources of radiation include the University of Washington nuclear reactor and pulsed neutron generators. Prerequisite: junior standing.

NUC E 486 Nuclear Power Plants (3) W

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 converter and breeder reactors. Particular attention is given the problem of world energy resources and the United States and world views of the availability and consumption of nuclear fuels. 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 examples from both living and non-living systems. Offered jointly with RADGY 487. Prerequisite: permission.

NUC E 488 Nuclear Systems Design I (4) Sp

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 (4) W

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 490 Reliability and Decision Analysis (3) W

McCormick

Emphasis on the principles of reliability and safety analysis, including fault tree construction and decision theory. Examples and problems are for applications in nuclear engineering. Prerequisite: senior standing in engineering or permission.

NUC E 498 Special Topics in Nuclear Engineering (1-6, max. 6) AWSpS

Discussions, conferences, and lectures on topics of current interest in nuclear fission and fusion engineering. Prerequisite: permission of department Chairperson.

NUC E 499 Undergraduate Research Projects (1-6, max. 6) AWSpS

Independent research projects in nuclear engineering. Prerequisite: permission.

Courses for Graduates Only

NUC E 500 Nuclear Reactor Theory (4) A

McCormick

Covers the angle-independent transport equation and reduction to specialized forms; multigroup, multiregion 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) W

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 monochromator, 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) Sp

Babb, Chalk

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 521, 522, 523 Graduate Seminar (0,0,1)
A,W,Sp

NUC E 524 Seminar in Nuclear Systems Analysis (1-2, max. 12) 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 530 Nuclear Reactor Statics (4) Sp
McCormick

Emphasis on methods for calculation of neutron and gamma-ray distributions in nuclear reactors and shields. Covers the linear Boltzmann equation and the spherical harmonics, discrete ordinate, and Monte Carlo techniques. Explicit solutions to simple transport problems are obtained. Prerequisite: 500.

NUC E 532 Advanced Reactor Technology (3) A
Wirtz

Considers the advanced technology required for modern nuclear power reactor systems. 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

Robkin

For majors and nonmajors interested in evaluating the impact of nuclear power technology on man and his environment. Studies of modern nuclear power cycles, nuclear reactor safeguards, thermal effects, control of radioactivity releases, biological response to radiation, environmental monitoring, evaluation of new energy sources and energy conversion systems. Offered jointly with RADGY 540, 541.

NUC E 556 Introduction to Plasma Theory (4) W
Pietrzyk, Vlases

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 Plasmas and Controlled Fusion (3) Sp
Pietrzyk, Vlases

Emphasis on the problem of controlled thermonuclear fusion. After an introduction to the general problem, the basic principles of magnetic confinement, stability, and laser fusion are discussed. Final section deals with a review of current research in this field, including status of national fusion program devices. Prerequisite: 556.

NUC E 560 Nuclear Reactor Dynamics I (4) W
Albrecht

Nuclear reactor dynamic equations, delayed neutron representations, response of reactors to various perturbations, operational techniques of system analysis, feedback mechanisms, stability criteria, power coefficients. Prerequisites: 500, MATH 427, 428 or permission.

NUC E 561 Nuclear Reactor Dynamics II (3) Sp

Albrecht

Experimental nuclear reactor dynamics, oscillators, pulsed neutrons, stochastic processes; dynamics of heat removal system components, analysis of closed loop system, space-dependent dynamics. Prerequisite: 560.

NUC E 588 Nuclear Fuel Management (3) Sp
Garlid

Technical and economic principles for management of nuclear fuels including: energy resources, fuel cycle schemes, fuel cycle neutronics, fuel cycle economics, irradiated fuel processing, isotopic separations, utilization of fission products and other radioactive isotopes. Prerequisite: 484 or permission.

NUC E 599 Special Topics in Nuclear Engineering (*) **AWSp**

Discussions and readings of topics of current interest in the field of nuclear engineering research. Subject matter may include reactor fuels and materials, reactor dynamics and control, instrumentation, thermonuclear processes, direct conversion problems. Prerequisite: permission of department Chairperson.

NUC E 600 Independent Study or Research (*)
AWSpS

COLLEGE OF FISHERIES

NUC E 700 Master's Thesis (*) AWSpS

NUC E 800 Doctoral Dissertation (*) AWSpS

OCEAN ENGINEERING

O ENG 401 An Introduction to Ocean Engineering (3) A

Adee, Gray, Richey

Special design considerations for the ocean environment, including corrosion, biological encrustation, hyperbaric loading, wave, current and tidal forces, as well as various sea floor and coastal conditions. Selected examples of major ocean engineering projects are reviewed with attention given not only to technical function but also to safety and the environmental and social implications of operational failure. Students carry out a project requiring special ocean engineering considerations in design, operation, and maintenance. Prerequisite: MATH 238 or permission.

O ENG 444 Coastal Engineering I (3) W

Richey

Linear theory of water waves, wave transformations due to boundary conditions, sediment motion, elementary tidal theory; applications illustrated by laboratory experiments and selected case histories. Offered jointly with CEWA 444. Prerequisite: CIVE 342.

O ENG 490 Naval Architecture (3) A

Adee

Theory of naval architecture; ship's lines, hydrostatic curves, intact and damaged stability, launching. Offered jointly with M E 490. Prerequisite: junior standing in engineering or permission.

O ENG 491 Naval Architecture (3) W

Adee

Theory of naval architecture; strength, A.B.S. rules, water waves, ship and platform motions. Offered jointly with M E 491. Prerequisite: junior standing in engineering or permission.

O ENG 492 Naval Architecture (3) Sp

Adee

Theory of naval architecture; dimensional analysis, resistance model testing, propellers, steering. Offered jointly with M E 492. Prerequisite: junior standing in engineering or permission.

O ENG 498 Special Topics in Ocean Engineering (1-5, max. 6)

Special topics in ocean engineering offered with lecture and/or laboratory. Prerequisite: permission.

O ENG 541 Hydrodynamics in Water Quality (3) A

Neece

Theoretical, field study, and laboratory model approaches to mixing, diffusion, thermal effects, and stratified flow in problems of concern to water resources engineers. Offered jointly with CEWA 541. Prerequisite: CIVE 342 or permission.

O ENG 544 Coastal Hydraulics (3) Sp

Hartz, Richey

Nonlinear water waves and structural loadings analyzed by stream function theory; random waves and structural responses analyzed by time series techniques. Offered jointly with CEWA 544. Prerequisite: familiarity with linear wave theory.

O ENG 551, 552 Ocean Engineering Systems Design I, II (3,3) W,Sp

Vesper

Interdisciplinary ocean systems design, choice of system motivated by problems of current interest; participation by students and faculty from engineering, law, 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.

O ENG 599 Special Topics in Ocean Engineering (1-5, max. 9) AWSpS

Adee, Richey

Prerequisite: permission of Ocean Engineering curriculum adviser.

COLLEGE OF FISHERIES

FISHERIES

Courses for Undergraduates

FISH 101 Introduction to Fisheries Science (5) AS

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 non-majors.

FISH 311 Functional Anatomy of Fish and Shellfish (4) AS

Smith

Functional capabilities and limitations of fish and shellfish as reflected in their anatomy, biology, and ecology. The laboratory portion of the course includes dissection of representative species of economically and ecologically important fish and shellfish. Prerequisite: 10 credits in biology.

FISH 314 Methods and Instruments for Fishery Investigations (3) ASp

Theory and practice of instrumentation and sampling in fisheries; shipboard experience with equipment, collecting and recording data from biological samples, and the physical environment. Prerequisite: 5 credits in fisheries.

FISH 340 Applications of Digital Computers to Biological Problems (4) AW

Bevan

Methods and procedure for processing biological data by means of digital computers; problem analysis, elementary programming, use of package programs for statistical analysis. Prerequisite: Q SCI 281 or 381.

FISH 367 Recreational Fisheries (3) Sp

History of recreational fishing; present trends in sport fishing and prediction of future trends; types and characteristics of recreational fisheries; value of recreational fisheries; habitat requirements; ecology and behavior that are important considerations in management; management philosophy and techniques. Recommended for majors and nonmajors. Field trips. 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) ASpS

Welande

Concepts of taxonomy and organic evolution as applied to the higher categories of fishes and related to classical and current problems in the phylogeny of fishes. Prerequisite: 10 credits in biology.

FISH 405 Economically Important Mollusca (5) Sp

Chew

Classifications, life histories, distribution, methods of cultivation, and economic importance of oysters, clams, scallops, abalones, cephalopods, and other mollusca. Prerequisite: 10 credits in biology.

FISH 406 Economically Important Crustacea (5) W

Chew

Classifications, life histories, distribution, methods

of capture, and economic importance of crabs, shrimps, lobsters, crayfish, and the smaller Crustacea. Prerequisite: 10 credits in biology.

FISH 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.

FISH 425 Life History of Marine Fishes (5) W

Miller

Fecundity, spawning, incubation, and hatching of marine fishes; identification and survival of larvae and juveniles; food and feeding of adults; migration; recognition of subpopulations. Prerequisite: 401.

FISH 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.

FISH 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 CEWA 434.

FISH 435 Physiological Effects of Water Pollutants (3) Sp

Brown

Physiological effects of water pollutants on economically important or endangered fishes, especially with respect to waste water. Types of industrial, urban, and agricultural entities that contribute wastes to natural waters. Monitoring procedures and assessment of changes in fisheries as a consequence of waste effluents. Offered jointly with CEWA 435. Prerequisites: upper-division or graduate standing, organic chemistry, and some background in any of the following: general physiology, cell biology, biochemistry, chemical biology, sanitary engineering.

FISH 444 Fisheries Genetics (3) A

Hershberger

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: GENET 451 or equivalent.

FISH 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.

FISH 452 Nutrition and Care of Fishes (5) W

Brannon, Halver

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.

FISH 453 Salmonid Culture Technology and Production Management (5) Sp

Brannon

Design of fish production facilities; methods of incubation, rearing, and handling of fish; problems encountered in hatchery water supplies. Management goals and strategy; assessment of production; stocking; impact on natural populations. Prerequisite: 451 or permission.

FISH 454 Communicable Diseases of Fishes (5) A

Landolt

Organisms causing diseases in fishes; prevention

and known treatments of fish diseases. Prerequisites: 401 and MICRO 301.

FISH 456 Aquatic Entomology (5) Sp
Laboratory and field course dealing with the taxonomy, ecology, and life history of selected aquatic insects, with special reference to the impact of man on stream systems. Prerequisite: ZOOL 331 or FOR B 335, or permission.

FISH 457 Management of Exploited Animal Populations I (4) W
Mathews
Equilibrium yield model; spawner-recruit models, management methods; use of catch-effort statistics in estimation and management, computer simulation in management decisions. Offered jointly with Q SCI 457. Prerequisite: Q SCI 456.

FISH 458 Management of Exploited Animal Populations II (4) Sp
Mathews, Mathisen
Continuation of 457. Estimating catch and effort and analyzing catch-per-effort statistics. Standardizing effort, gear selectivity, recruitment, models of exploited fishery populations with management applications. Introduction to simulation of fish and wildlife populations with emphasis on applications using current data from fishery and game organizations. Offered jointly with Q SCI 458.

FISH 459 Aquatic Food Chains (5) W
Taub
Survey of the sources and nutritional values of foods for fisheries resources. Efficiencies, rates of transfer through the food chain, pollution effects, and the potential for using pollution are considered. Prerequisite: upper-division standing in a biology program.

FISH 460 Water Management and Pollution Studies (5) ASp
Stream flows and 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, MATH 105, and physics, or permission.

FISH 462 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 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, Q SCI 281, or permission.

FISH 465 Marine Fish Biology (9) S
Taxonomy, ecology, and life history of the fishes of the San Juan Islands and northeast Pacific. Prerequisite: permission. (Offered at Friday Harbor Laboratories Summer Quarter only.)

FISH 467 Fisheries Management (5) Sp
Whitney
Principles and practice of the management of commercial and recreational fisheries. Emphasis is on concepts. A field exercise provides practical experience. Guest lecturers from international, federal, and state agencies discuss the need to take into account factors other than biological in making management decisions. Students interested in a more quantitative emphasis should take Q SCI 456. Prerequisite: Q SCI 281 or 381; FISH 340 recommended.

FISH 472 Aquatic Radioecology I (3) W
Seymour
Nature, detection, and measurement of ionizing radiation. The use of radionuclides for aquatic ecological studies. Prerequisites: 10 credits in chemistry and 10 credits in biological sciences.

FISH 473 Aquatic Radioecology II (3) Sp
Seymour
Natural and artificial radionuclides in the aquatic environment and their impact on man and other organisms. Prerequisites: 10 credits in chemistry and 10 credits in biological sciences.

FISH 475 Marine Mammalogy and Conservation (5) W
Erickson
Lecture and laboratory in marine mammalogy: the evolution, taxonomy, physiology, life history, and behavior of marine mammals; the techniques of studying and the management and conservation of them. Offered jointly with WLF S 475, 15 credits in biology, including vertebrate anatomy and physiology recommended.

FISH 477 Applied Chemical Techniques in the Aquatic Environment (3) Sp
Schell
Procedures for obtaining representative samples for chemical analysis of biological materials in the food chains: procedures for initial treatment and wet chemical or instrumental analysis in pollution-related problems; comparative methods for analysis of different sample types; sample collection in the field; analysis of biological material and water. Prerequisites: general, inorganic (quantitative analysis), and organic chemistry, and permission.

FISH 499 Undergraduate Research (1-5, max. 9) AWSpS
Individual research within the College of Fisheries or on-the-job training in governmental or industrial fisheries organizations. Prerequisite: permission.

Courses for Graduates Only

FISH 501 On-the-Job Training (1-5, max. 9) AWSp
Guided on-the-job training in governmental or industrial fisheries organizations. Prerequisite: permission.

FISH 503 Systematic Ichthyology (5) W
Welander
Concepts of taxonomy and organic evolution as applied to the higher categories of fishes and as related to classical and current problems in the phylogeny of fishes. Prerequisite: 401 or equivalent.

FISH 504 Invertebrate Pathology (5) W
Landolt, Pauley
Pathological effects and communicable diseases in invertebrates. The discussion is phylogenetic and comparative. Prerequisites: 454 and invertebrate zoology or equivalent, or permission. Juniors and seniors may take the course, but must have course prerequisites.

FISH 505 Research Techniques in Shellfish Biology (5) Sp
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 (1-3, max. 15) AWSp
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 516 Fish Physiology Laboratory (2) Sp
Smith
Selected experimental techniques in fish physiology. Prerequisite: 515 or concurrent registration.

FISH 520 Graduate Seminar (1) A
Introduction to research in fisheries.

FISH 522 Graduate Seminar in Fisheries (1, max. 2) WSp
Lectures and discussions of current problems and current research in fisheries.

FISH 525 Ecology of Marine Fishes (3) Sp
Miller
Spawning, growth, survival, and distribution of fish in relation to physical, chemical, and biological factors; diel and seasonal migration; emphasis is on fishes of the nearshore environment. Prerequisite: 401 or equivalent or permission.

FISH 527 Aquatic Microcosms (3) Sp
Taub
Use of microcosms to evaluate biosphere processes. Students select a limited topic, such as a type of microcosm or a process; critically examine the original research reports; and share their findings by written and oral reports. Focus is on laboratory microcosms such as pesticide biomagnification and degradation in terrestrial-aquatic microcosms; nutrient cycles in aquaria; balanced aquaria (myth or reality?); closed ecological systems; leaf node microcosms; photosynthesis/respiration/biomass relationships in maturing aquatic communities; gnotobiotic ecosystems; artificial substrates in natural communities; predator-prey interactions in continuous cultures and natural communities studied as microcosms (e.g., watersheds, streams, ponds, marine upwelling systems). Recommended background: an ecology course and limnology or biological oceanography.

FISH 535 Metabolic Effects of Chemical Pollutants (4) W
Brown
Physiological and biochemical effects of industrial, urban, and agricultural chemicals on aquatic biota; specific metabolic effects of various poisonous and inhibitory substances; modes of inhibition of enzymes systems of aquatic organisms. Prerequisites: upper-division or graduate standing, organic chemistry, general physiology, biochemistry, or cell physiology, or equivalent.

FISH 540 Application of Digital Computers to Problems in Aquatic Ecology (3) W
Bevan
Laboratory problems adapted to special interests of the student. Consideration of the simulation of aquatic communities, analysis of aquatic populations, and ecological changes. Prerequisite: permission.

FISH 556 Introduction to Quantitative Population Dynamics (3) A
Fletcher
Simple analytic approaches to population management; applications of parent-progeny models and logistic models; biological and economic yields of natural populations; analysis of population data on high-speed digital computers. Prerequisites: Q SCI 291, 292, 383, 457, or permission.

FISH 557 Theoretical Models of Exploited Animal Populations (3) W
Fletcher
Mathematical representation of basic population processes such as growth, mortality, natality, and mobility; application of optimization technique to yield models. Laboratory work on digital computer. Prerequisite: 556 or permission.

FISH 558 Estimation of Population Parameters (3) Sp
Fletcher
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 600 Independent Study or Research (*) AWSpS

FISH 700 Master's Thesis (*) AWSpS

FISH 800 Doctoral Dissertation (*)

COLLEGE OF FOREST RESOURCES

FOOD SCIENCE

Courses for Undergraduates

FD SC 102 Food—The Technological Challenge (5) A

Liston, Pigott

Reviews the scientific and technological developments leading to the present food supply and food industry. Outlines principles of food science related to preservation, nutritional quality, food safety, and food supply. Considers additives, health and organic foods, preservatives, food-borne 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

Pigott

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 ship-board 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: CHEM 102 or 160.

FD SC 381 Environment, Food, and Technology (3) Sp

Matches, Pigott

Principles of process operations for seafood production and consideration of pollution problems arising from food processing wastes.

FD SC 382 Food Technology for Dietitians (5) W

Liston, Matches

Composition and nature of food materials, methods of handling and processing foods, novel foods and new products, microbiology of foods and food-borne illness, quality control and sanitation, preservation, spoilage, and analysis. Primarily for dietetics majors. Prerequisites: 10 credits of organic chemistry, MICRO 301, or permission.

FD SC 390 Food Engineering I (4) W

Pigott

Application of physical laws to the physical and chemical changes that occur in food during harvesting, transporting, processing, storage, packaging, and marketing. Emphasis on problems in industrial stoichiometry as applied to material and energy relationships of food and food components during these changes. Prerequisites: junior standing in food science or permission.

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

Iwaoka

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: BIOC 408 or permission.

FD SC 483 Principles of Food Analysis II (5) W

Iwaoka

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 (5) A

Liston, Matches

Unprocessed foods, their composition, nutritional

availability, associated micro-organisms, storage, and distribution. Prerequisite: 481 or permission.

FD SC 485 Food Engineering II (5) W

Pigott

Unit operations in food processing, engineering, and technological bases of food operations. Prerequisites: 390, 484 or permission.

FD SC 486 Deteriorative Processes in Foods (5) Sp

Matches

Biochemical, microbiological, physical, and chemical changes occurring in foods. Prerequisites: 483, 485, or permission.

FD SC 498 Undergraduate Thesis (2-6, max. 6) AWSps

Prerequisite: permission.

Courses for Graduates Only

FD SC 504 Principles of Technological Research in Food (3, max. 6) AWSp

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) AWSp

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. Prerequisite: permission.

FD SC 526 Advanced Unit Operations in Food Processing Laboratory (3) Sp

Pigott

Laboratory investigations concerned with the engineering of food processes and processing facilities. To be taken concurrently with 525.

FD SC 600 Independent Study or Research (*) AWSps

FD SC 700 Master's Thesis (*) AWSps

QUANTITATIVE SCIENCE

See Interschool or Intercollege Programs.

WILDLIFE SCIENCE

See Interschool or Intercollege Programs.

COLLEGE OF FOREST RESOURCES

The presence of B, M, or W following the prefix FOR indicates the division within the college responsible for teaching the courses: FOR B—Biological Sciences Division, FOR M—Management and Social Sciences Division, FOR W—Wood and Paper Division.

Courses for Undergraduates

FOR M 100 Introduction to Forest Resources Management (5) Asp

Thomas

Survey of man's use of forest resources and the impact of social and cultural institutions on resource management. The history and the development of forest conservation and forest utilization practices and policies in the United States. Changing patterns of resource use and methods of resolving conflicts among management alternatives.

FOR W 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 M 201 Conflicts in Forest Resource Use (2) A

Dowdle

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 B 202 The Conservation Movement—Past, Present, and Future (2) W

Brubaker

Origins of the conservation movement, factors that have shifted its direction, and directions it may take in the near future. Principles relating conservation to society are discussed.

FOR B 203 Crisis in the Quality of the Forest Environment (2) 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 M 204 Public Land Law Review Commission Research 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 W 205 Pollution Problems in the Forest Industries (2) A

Hrutford

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 B 206 Pesticides in the Environment (2) Sp

Gara

Biological analysis of short-term benefits and costs to the ecosystem through use of pesticides. Considerations of control alternatives and their consequences to management objectives. Presentation of new trends in insect manipulation.

FOR M 207 Regulation of Environmental Impact in Forest Resource Management (2) W
Bradley, Waggener
 Survey of current environmental legislation and policy affecting resource management. Discussion of environmental impact assessment and its relationship to forest practices. Selected case studies of prepared environmental impact statements.

FOR B 300 Dendrology (5) ASpS
Brubaker, Stettler
 Concepts of taxonomy, genetics, and organic evolution as applied to the classification of major tree genera of North America; lectures, laboratory demonstrations, and field exercises. Prerequisite: introductory biology.

FOR B 301 Forests in the Life of Man (3) 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 W 303 Wood in Art and Decoration (2) ASp
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 uses 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 W 304 Wood: Properties and Best Use (3) WSp
Erickson
 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 preventions of wood deterioration in service; physical and strength properties important in common uses. Types of solid wood and fiber products. Role of wood in man's physical and economic environment.

FOR W 305 Wood: Properties and Best Use Laboratory (1) WSp
Erickson
 Demonstrations and laboratory experiments on topics presented in 304 that should precede or be taken concurrently.

FOR W 309 Creativity and Innovation (2) A
Allan
 Meaning and understanding of the basic nature of creativity and creative thinking. Challenge and dynamics of thinking. Blocks in creative thinking; emotional, social, cultural, economic, environmental, and habitual. Requirements for creative innovation; knowledge, judgment, planning, observation. Techniques of creative thinking. Design and development of creative games. Computer-aided creative thinking. Creation, protection, and exploitation of a useful idea including bargaining and negotiations. Not open for credit to students who have taken GIS 309. Prerequisite: junior standing or permission.

FOR B 310 Forest Soils (5) ASpS
Ugolini, Zasoski
 Physical, chemical, and biological properties of forest soil; soil development and classification; and soils in relation to use of forest resources. Prerequisite: GEOL 205, 5 credits of geology or equivalent.

FOR B 311 Soils and Land Use (3) W
Cole, Riekerk
 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.

FOR B 320 Forest Ecology (5) ASpS
Oliver, Scott
 Introductory course in ecology for students with particular interest in forest ecosystems. Organismal interactions as related to environment; ecological characteristics of trees; structure pattern and suc-

cessional dynamics of forest communities, productivity of forests; and applications of forest ecology. Lectures and field exercises. Prerequisite: 10 credits in biology.

FOR B 321 Silvicultural Methods for Special Uses (3) W
Scott
 Theory and techniques of applying forest ecological knowledge in controlling the reproduction and development of forest ecosystems for social values other than wood. Prerequisite: 320.

FOR B 322 Silvicultural Methods (3) ASp
Oliver, Scott
 The theory and technique of applying silvicultural knowledge in controlling establishment, composition, and growth of forest stands. Includes reproduction methods and intermediate cuttings. Prerequisites: 320, 360.

FOR B 323 Forest Biology I (3) A
Brubaker
 Systematics, genetics, evolution, and identification of forest trees as related to structure and environment.

FOR B 324 Forest Biology II (3) W
Gara
 Consideration of environmental parameters and specific forest ecology, after an initial exposure to plant ecology and physiology.

FOR B 326 Range Ecology (5) Sp
Driver
 Interrelations of plants, animals, and men on range lands. History of rangeland use. One Saturday field trip required. Prerequisite: course entry card.

FOR B 329 Microclimatology (3) ASp
Fritschen
 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 ATM S 329. Prerequisite: ATM S 101 or 201 or 301.

FOR B 331 Introductory Forest Pathology (4) WSp
Driver, Edmonds
 Study of typical forest diseases stressing significance of forest ecology on disease occurrence and control. Prerequisites: 310, 320, BOT 320.

FOR B 333 Forest Protection (3) WS
Driver, Gara
 Introduction to biological aspects of forest protection, with emphasis on insect, disease, and animal damage related to Western forests and forest products. For non-forest-management majors only. No credit given if 331 or 335 has been taken.

FOR B 335 Forest Entomology (3) Sp
Gara
 Introduction to general entomology, characteristics, life histories, ecological relations, prevention, and control of forest insects.

FOR B 336 Laboratory in Forest Entomology (2) 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 M 340 Forest Surveying (3) ASpS
Schaeffer
 Basic elements of forest surveying. Emphasis on plane surveying techniques, as related to forest areas. Prerequisite: senior or junior standing in forest resources or landscape architecture, or permission.

FOR M 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 M 350 Field Studies in Outdoor Recreation (3) A
Bradley, Sharpe
 Studies of outdoor recreation in action. Introduction to the problems of managing large recreation complexes or private, county, state, or federal lands. A 2½-week field trip beginning after Labor Day. Prerequisite: outdoor recreation major.

FOR M 351 Introduction to Outdoor Recreation (5) 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.

FOR M 353 Interpreting the Environment (3-5) W
Sharpe
 Role of the interpretive specialist in outdoor recreation resource areas. Increasing visitor enjoyment, manipulating visitor impact, and improving agency image through interpretation. Interpretive media selection, personal and nonpersonal services, supporting activities, and the professional development of the interpretive specialist. Prerequisite: permission for 2-credit laboratory.

FOR M 354 Introduction to Management of Recreation Areas (3) Sp
Odegaard, Sharpe
 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.

FOR M 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 M 360 Forest Measurements (5) WSp
Rustagi, Turnbull
 Evaluation of information needs for decision making by forest manager. Study of geometry, sampling design, and estimation processes applied to forestry. Measuring instruments and procedures. Inventory management. Laboratory and field exercises to study contents and growth of tree and forest stand. Prerequisite: Q SCI 281.

FOR M 361 Field Studies in Forest Mensuration (3) AS
Atkinson, Rustagi
 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 M 362 Aerial Photos in Forestry (3) ASp
Schreuder, Wooldridge
 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.

FOR M 365 Forest Resources Management I (5) ASp
Barr, Dowdle, Schreuder, Waggener
 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. Prerequisite: 360, ECON 200, Q SCI 291 or equivalent.

COLLEGE OF FOREST RESOURCES

FOR W 374 Wood Utilization (3) A

Bryant

Nature of the forest products industries from a global and national perspective; major processing steps in manufacturing lumber, plywood, composition boards, pulp and paper; present trends and future possibilities of converting all forest growth into useful products; secondary forest products industries. Prerequisite: junior standing in forest resources or permission.

FOR W 375 Wood Utilization Laboratory (2) Sp

Leney

Familiarization with the processing and economic environment of the forest products industries through field studies in local plants. Emphasis on small-log utilization in general and on the lumber industry in particular. Prerequisite: 374.

FOR W 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 W 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 fibery relationship of wood structure to its total physical properties. Natural defects in wood and fiber. Prerequisites: forest resources majors, course entry card.

FOR W 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, Hooke's law for orthotropic materials. Electrical polarization, axial and bending stress, dielectric heating. Prerequisites: MATH 126, PHYS 116, course entry card.

FOR W 402 The Physics of Wood and Fiber Composites (4) Sp

Jayne

Equilibrium properties, mass and energy transport, time-dependent electrical behavior, inelastic behavior and vibration. Prerequisite: 401. (Offered alternate years; offered 1976.)

FOR W 403 Fibrous Structure and Rheology I (3) W

Allan

Review of the synthetic and natural fibers and their chemical, physical, microscopic, and submicroscopic properties. The bonding behavior of fibers in networks. Analysis of the structure of fiber networks with reference to nonwovens and paper.

FOR W 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 modification by physical and chemical processes and theory and design of fiber composite materials. Prerequisite: 403. (Offered alternate years; offered 1977.)

FOR W 405 Microtechnique (3) W

Leney

The technique of preparing, sectioning, staining, and mounting woody tissues and fibers for microscopic study. Prerequisite: course entry card.

FOR W 406 Wood Chemistry I (3) A

Sarkanen

Chemical and physical properties of cellulose, lignin, hemicellulose, and extractives. Wood as a raw material for the chemical industry.

FOR W 407 Wood Chemistry I Laboratory (2) W

Sarkanen

Laboratory to supplement 406.

FOR W 408 Wood Chemistry II (3) W

Sarkanen

Review of the chemistry of conversion of wood to pulp, paper, and by-products.

FOR W 409 Wood Extractives Chemistry (2) Sp

Hrutford

Nature, origin, and occurrence of the extraneous components of wood, their influence on pulp and paper preparation, and their utilization.

FOR B 412 Soil Genesis (5) W

Ugolini

Soil, the excited skin of the earth. Processes of soil formation and weathering distribution of major soils in the world. Prerequisites: CHEM 145, GEOG 205.

FOR B 413 Soil Distribution and Classification (4) Sp

Ugolini

Study of the distribution, morphology, and classification of soils in relation to environmental factors. Lectures and field trips to illustrate the properties and processes of the soils throughout the unique terrestrial ecosystems of the state of Washington. A soil survey exercise is included.

FOR B 414 Forest Soil Fertility (3) W

Zasoski

Consideration of the physical, chemical, and biological properties of forest soils that affect tree growth and fertilization. Prerequisite: 310.

FOR B 415 Applied Forest Hydrology (4) A

Woodriddle

Study of fundamental aspects of hydrology as influenced by silvicultural and timber harvest methods. Includes soil erosion, water quality, and manipulation of the forest stands for altered water yield. Prerequisite: senior standing.

FOR B 416 Micrometeorological Measurements and 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: MATH 126, PHYS 123.

FOR M 417 Principles and Practices of Forest Soil Management (3) W

Atkinson, Gessel

Presents material relating to forest soil fertility, productivity, and management and gives the student a working knowledge of soil in the practice of forestry.

FOR B 421 Dendrochronology (4) WSp

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 B 422 Reproduction Methods in Silviculture (3) WSp

Kenady

Advanced silviculture course that examines the characteristics of natural and artificial methods of regenerating forest stands. Emphasis on methods used in the Pacific Northwest; however, attention is given to problems and techniques of other forested regions. Lectures and weekly field trips. Prerequisites: 322 or equivalent, and permission.

FOR B 423 Advanced Forest Ecology (3) W

Oliver, Scott

Seminar in forest ecology for advanced undergraduates or graduates. Topics selected for relevance to the interests of the participants; field trips required. Prerequisites: previous course work in forest ecology and permission.

FOR B 424 Selected Topics in Silviculture (3) W

Oliver, Scott

Seminar in silviculture for advanced undergraduate and graduate students. Topics selected for relevance to the interest of the participants and current practice in the Pacific Northwest; field trips required. Prerequisites: previous course work in silviculture and permission.

FOR B 425 Introduction to Population Biology (4) Sp

Hayday

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, Q SCI 292. (Offered alternate years; offered 1976.)

FOR B 426 Forest Autecology (4) W

Brubaker, Oliver

The morphological, anatomical, and physiological responses of forest trees to the natural environment. Includes growth forms, seasonal and life-cycle changes, food relations, hormones, nutrients, and regeneration. Prerequisite: 320.

FOR B 427 Forest Genetics (3) 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 practices. Prerequisite: 300.

FOR B 429 Intermediate Operations in Silviculture (4) Sp

Oliver, Scott

For advanced undergraduate and graduate students in silviculture. Includes those operations designed to direct an existing forest into the desired form such as cleaning, weeding, thinning, irrigating, and fertilizing; all-day field trips required. Prerequisites: 322 or equivalent, and permission.

FOR M 430 Elementary Forest Fire Science and Technology (3) WSp

Pickford

Forest fire behavior; fire and ecology; organization and management of forest fire control systems; economics of fire control; use of fire in forest land management. Meteorological and thermophysical bases for forest fire behavior.

FOR B 433 Biology of Forest Diseases (5) Sp

Driver

Detailed studies on the biology of host-pathogen relationships exhibited by certain forest diseases. Prerequisite: 331. (Offered alternate years; offered 1977-78.)

FOR B 436 Ecology of Forest Insects (4) W

Gara

Host-insect interactions, introduction to population dynamics, research technique, and pertinent forest entomological literature. One field trip required. Prerequisite: permission. (Offered alternate years; offered 1977.)

FOR M 440 Construction (4) W

Stenzel

Design and construction of forest roads; earth-moving methods and costs, explosives, surfacing, drainage facilities. Laboratory: design of timber bridges. Prerequisites: 377, course entry card.

FOR M 441 Forest Engineering (5) A

Jorgensen, Stenzel

Planning the logging operation; logging methods, route projection, selection of landings and settings, logging cost control. Prerequisites: CETC 310, course entry card.

FOR M 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 various types of logging equipment. Individual student project includes some field work. Prerequisite: 441.

FOR M 443 Safety Practices in Forest Industries (1) A

Stenzel

Accident costs and frequency rates; accident investigations; safety inspection; safety organization and program. Prerequisite: forest engineering major.

FOR M 446, 447, 448, 449 Senior Forest Engineering Field Studies (2,5,5,3) Sp,Sp,Sp,Sp

Atkinson, Dowdle, Jorgensen, 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 M 450 Computer Applications to Forestry Problems (3) ASP

Bethel

Study of advanced forestry problems and their solution by computer. Problem organization and flows, data manipulation. Written codes in interactive BASIC solved on NOVA computer.

FOR M 451 Outdoor Recreation Economics (3) Sp Waggener

The application of economic principles to outdoor recreation problems. The elements of demand for outdoor recreation opportunities, the evaluation of recreation alternatives, and the allocation of resources for recreational use on public and private lands. Prerequisite: ECON 200.

FOR M 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 contemporary theories concerning leisure behavior; research techniques and problems of measurement in leisure research. Implications for the management of recreational areas provide an applied orientation and integration of substantive material. Prerequisite: SOC 110.

FOR M 453 Advanced Environmental Interpretation (5)

Sharpe

Interpretive management and planning. Includes independent study projects in selected park and recreation areas. A practical approach to interpretive inventory, planning, and programming. Prerequisite: 353.

FOR M 455 Advanced Planning and Design of Outdoor Recreation Areas (5) A

Advanced planning and design of outdoor recreation areas focuses on the integrated consideration of the resource base, social factors, and management objectives in the planning and design of outdoor recreation areas. Emphasis placed on the process of providing outdoor recreation opportunities within the constraints of biophysical and socioeconomic systems. A case study approach is utilized. Prerequisite: 355.

FOR M 456 Wilderness Preservation and Management (3) A

Hendee

Review of American wilderness philosophies, concepts, and values. Development of the Wilderness Act. Examination of current wilderness-management policies, trends in use, issues and controversies, wilderness research, social costs, and benefits of wilderness.

FOR M 459 Case Studies in Outdoor Recreation (5) Sp

Bradley, Sharpe

Application of social, economic, and biological principles in the formulation and solution of outdoor recreation problems. Utilization of the case study methodology in approaching selected problems. Particular emphasis placed on the development of solutions to problems in outdoor recreation, integrating planning, design, interpretive, and management techniques for the enhancement of recreation user benefit. Prerequisites: 351, 353, 354, 355.

FOR M 461 Advanced Forest Mensuration (3) W

Turnbull

Forest tree and stand models. Studies of forest tree and stand parameters. Estimation processes. Growth and yield analysis. Prerequisites: 360, MATH 281.

FOR M 463 Contemporary Problems in Forest Land Use (3) W

Schaffner

Current conflicts among competing uses for forest land; trends in forest land use; impact of public policy on growth and development of forest products industries.

FOR M 464 Economics of the Forest Products Industries (3) W

Bryant

Market structure of major forest-related industries. Supply and demand aspects of commercial forests on a world scale. Economic factors affecting distribution and marketing of forest products, including international, interregional, and intraregional competition. Prerequisite: ECON 200.

FOR M 465 Public Forest Administration (3) W

Waggener

Analysis of timber management activities on public lands. Application of economic and management principles to problems of timber regulation, timber sales activities, and land allocation decisions. Program planning and budgetary systems for public resource administration.

FOR M 466 Economics of Timber Production (3) Sp

Schreuder, Waggener

Application of basic economic concepts to the production of timber as a commercial land use. Analysis of timber investments, alternative management programs, and regulation models. Prerequisite: 365.

FOR M 468 Forest Resources Management II (5) WSp

Atkinson, Rustagi

Economic, administrative, and biological principles applied to the evaluation of alternative land-management goals and policies. Application of case-study methodology to selected problems of forest land management, with particular emphasis on long-term planning. Prerequisites: 300, 320, 322, 340, 362, 365.

FOR M 469 Forest Resources Management III (5) WSp

Bare, Schreuder

Application of biological, financial, and operations research principles to formulation and solution of forest resource planning problems. Application of case-study methodology to selected forest lands management problems involving the evaluation of alternative solutions to contemporary management problems. Prerequisite: 365.

FOR W 470 Wood Deterioration and Control (3) A

Erickson

Wood- and fiber-destroying agencies, biological and physical, classification and manner of attack. Theory of toxicity and the important preservatives; pressure and nonpressure treatments. Fire retardant chemicals and treatments, coatings and impregnation.

FOR W 472 Gluing Process Technology (3) W

Bryant

Theory of wood adhesion, chemical nature of wood adhesives, requirements of adhesives and binders relative to important wood and process variables. Prerequisites: 374, 377, or permission.

FOR W 473 Plywood and Board Processes (4) Sp

Bryant

Familiarization with the technology of the modern lumber laminating, plywood, and composition board industries; product properties as related to process and species variables; uses and markets for these products. Prerequisite: 472.

FOR W 475 Wood Drying Technology (3) WSp

Leney

Analysis of the wood-drying process; technology of reducing the moisture content of wood in the form of lumber, veneer, particles, and fiber. Relationship of moisture to wood and fiber as it affects the manufacturing process and end use. Prerequisite: senior or graduate standing in Wood and Paper Division.

FOR W 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: CHEM 102 or equivalent.

FOR W 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 M 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 M 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.

FOR W 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 CH E 330 and 340. Prerequisite: CH E 340.

FOR W 485 Undergraduate Research (1-3, max. 3) A WSp

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 W 487 Introduction to Wood Biochemistry (3) A

Hrutford

Basic biochemical concepts; emphasis on the chemistry of photosynthesis, plant metabolism, and protein biosynthesis. (Offered alternate years; offered 1976.)

FOR W 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 W 489 Wood Biosynthesis (3) W

Hrutford

Biosynthesis of carbohydrates, phenolic and terpenoid compounds in forest trees, and biochemistry of wood degradation. Prerequisite: 487 or BIOC 405. (Offered alternate years; offered 1977.)

FOR B 490, FOR M 490, FOR W 490 Undergraduate Studies (1-5 each emphasis)

FOR B 491, FOR M 491, FOR W 491 Undergraduate Studies (1-5 each emphasis)

FOR B 492, FOR M 492, FOR W 492 Undergraduate Studies (1-5 each emphasis)

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: course entry card.

FOR B 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 B 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.

INTERDISCIPLINARY GRADUATE DEGREE PROGRAMS

Courses for Graduates Only

FOR B 500 Graduate Seminar (2) A

Bethel, Gessel, Stettler

Discussion of current issues and problems in forestry and forestry research.

FOR W 501 Elasticity of Wood and Fiber Composites (4) W

Jayne

The concept of stress, strain, and Hooke's law for the orthotropic continuum. Tensor transforms of stress, strain, and the elastic coefficients. The compliance and stiffness tensors. Strain energy. Distribution functions of descriptions of internal geometry of composites. Orthotropic elasticity of the fiber wall. Elasticity and two- and three-dimensional fiber networks. Elasticity of particle composite and laminates. Prerequisites: 401 and 402.

FOR W 502 Transport Processes in Composite Systems (4) Sp

Jayne

Time-dependent and time-independent diffusion of moisture and energy in composite materials. Coupled moisture and thermal diffusion. Mechanisms of moisture and thermal transport. Diffusion in particle composites. Solution of the diffusion equation by separation of variables and finite difference methods. Prerequisites: 401 and 402.

FOR B 511 Forest Soils and Ecosystem Behavior (3) Sp

Riekerk

Many biogeochemical studies of forest and watershed ecosystem properties, behavior, and conservation mechanisms are discussed. A few field trips to ongoing research projects of this type illustrate the role of soils in forest and watershed ecosystems. Prerequisite: 310 or equivalent.

FOR B 512 Topics in Soil Chemistry (3) Sp

Zasoski

Topics in soil chemistry; surface chemistry of soil colloids, exchange and sorption phenomena, micronutrient and trace metal soil solution chemistry. Prerequisite: permission. (Offered alternate years; offered 1977.)

FOR B 513 Soil Classification and Survey (3) A

Historical and modern soil classification with respect to forest and wildland areas. Survey procedures examined by field trips to local soil areas. Emphasis on application to forest land use and planning.

FOR B 514 Forest Influences (4) Sp

Woodbridge

Study of the interacting effects of climate, soil, and plants as a basis for understanding the hydrologic cycle. Places special emphasis on disposition and movement of water in forest ecosystems. Prerequisite: graduate standing.

FOR B 517 Soil Plant-Atmospheric Relations (3) W

Fritschen

Principles of mass and energy exchange between the earth and the atmosphere with special emphasis on the state and movement of water in soils, energy balance of the vegetated surface and individual leaves, and methods of evapotranspiration determination. Prerequisites: MATH 126, PHYS 123, ATM S 329. (Offered alternate years; offered 1976-77.)

FOR B 518 Weathering of Minerals in Soil (5) W

Ugolini

Mineral weathering is the chemical changes and transformations of soil inorganic material under the influence of the atmosphere, hydrosphere, and biosphere. These changes and transformations can be quantitatively estimated by analytical techniques and explained by invoking geochemical and pedological principles. For students in forestry, geology, engineering, and oceanography. Prerequisites: mineralogy, chemistry, including physical chemistry and soils.

FOR B 521 Current Problems in Forest Ecology (3) W

Scott

Consideration of current literature and topics in forest ecology and tree physiology. Course entry card.

FOR B 522 Current Problems in Silviculture (3) Sp

Scott

Detailed study of the literature dealing with recent applications of silviculture in world forestry. Course entry card.

FOR M 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 practices. Forest land use practices and problems in the tropical regions of the world. Course entry card.

FOR B 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: GENET 451, or equivalent. (Offered alternate years; offered 1976.)

FOR M 531 Forest Fire Science Seminar (2) W

Pickford

Presentation and discussion of current issues in forest fire prevention, control, use, and discussion of ongoing fire research.

FOR M 532 Planning, Management, and Analysis of Forest Fire Control Systems (3) Sp

Pickford

The forest fire control system. Study of plans, service, finance, line, and command functions. Forest fire control and production economics, techniques of operations research and computer sciences applicable to planning and analyzing forest fire control systems. Prerequisites: A ORG 500, QMETH 510.

FOR B 533 Investigations of Forest Diseases (5) Sp

Driver

Studies on concepts and experimental procedures used in forest microbiological research. Prerequisites: 433 and permission. (Offered alternate years; offered 1976.)

FOR M 537 Forest Fire Behavior (3) W

Pickford

Basic combustion and heat transfer processes related to behavior of free-burning fires. Forest fuels. Effects of fuel, weather, and topography on the spread, intensity, and difficulty of control of forest fires. Prediction of fire behavior. Prerequisites: 329, 538, ATM S 310.

FOR M 538 Forest Fire Thermophysics (3) W

Corlett

Principles of combustion and heat transfer. Basic processes of ignition and flame spread; high-intensity fires. Emphasis is on free-burning fires in cellulose fuels. Prerequisites: MATH 105, PHYS 114, 115.

FOR M 541 Advanced Forest Engineering (5) AW

Jorgensen, Stenzel

Logging organization and management; logging cost analysis and budgeting. Prerequisite: course entry card.

FOR M 542 Advanced Logging Engineering (3) W

Jorgensen, Stenzel

Detailed consideration of problems of logging planning and truck road engineering, including the preparation and field layout of logging plans; location, design, and construction of logging truck roads. Prerequisite: course entry card.

FOR M 551 Current Problems in Outdoor Recreation (3)

Seminar approach to investigating, examining, and discussing contemporary issues and controversies in outdoor recreation. Prerequisites: graduate standing and permission.

FOR M 552 Outdoor Recreation Research Methods (3) W

Clark

Overview of research concepts, assumptions, and

methods employed in outdoor recreation research. General procedures and techniques for conducting research on recreation problems and understanding research findings, such as problem formulation, study plans, and data collection, analysis, and interpretation of results. Prerequisite: graduate standing.

FOR M 557 Topics in Forest Zoology (3) W

Weisbrod

Graduate seminar considering applied and basic zoological topics relating to the forest environment. Different topics are selected each year. May be repeated for credit. Participants submit short papers and give oral presentations.

FOR M 561 Forest Environmental Resource Planning (3) W

Bradley

Origins and evolution of environmental planning in the forest environment. Discussion of the planning process and methodologies for environmental management and planning; selected case studies of environmental resource plans. Prerequisite: graduate standing.

FOR M 562 Advanced Forest Resources Management (3) A

Bare, Rustagi

Overview of concepts and procedures involved in managing forested lands for the production of commodity and amenity values. Use of systems analysis techniques for evaluating alternative land-use programs and manipulations of the forest ecosystem. Prerequisites: graduate standing and permission. (Offered even-numbered years.)

FOR M 564 Advanced Forest Biometry (3 or 5) W

Turnbull

Classical problems in analysis of forest populations and growth theory, and principles of parametric analysis and estimation processes in forest biometry. Prerequisite: course entry card.

FOR W 571 Advanced Wood Preservation (3) W

Erickson

Permeability of wood, theory and factors affecting penetration, liquid movement in wood, chemical effects on wood. Prerequisite: course entry card.

FOR W 572 Wood Chemistry and Analysis (3-5) Sp

Hrutford

Application of instrumental methods of analysis to wood, wood products, and forest products processing effluents. Emphasis on separation systems, including gas and liquid chromatography, and on spectral analysis. Prerequisite: course entry card. (Offered alternate years; offered 1976.)

FOR W 573 Wood-Moisture Relations (3) W

Erickson

Theories and practice on relationships between wood and moisture over a range of moisture contents; effects of other polar and nonpolar compounds; capillarity, adsorption, and diffusion in wood. Prerequisite: course entry card.

FOR W 574 Wood-Resin Relations (3) Sp

Bryant

Technology of synthetic resins as wood adhesives, wood impregnants, binders, overlays, and surface coatings. Prerequisite: course entry card.

FOR M 575 Forest Products Economics (3) A

Waggener

Economic analysis of the forest products industries; market structure, regional impact of forest products industries, current problems in forest products economics. Prerequisite: course entry card.

FOR W 576 Photomicrography of Woody Tissues (3) Sp

Leney

Theory and method in microscopy and photomicrography of woody tissues. Prerequisite: course entry card.

FOR W 577 Wood and Paper Science Seminar (1) AWSp

Discussion of current topics in the science of wood and its various composites in the form of composition board, laminates, and paper. Prerequisite: course entry card.

FOR W 578 Environmental Protection in the Pulp and Paper Industry (2) Sp
Hrutford
 Nature and sources of air and water pollution in the pulp and paper industry. Methods to remove pollutants from aqueous and gaseous effluent. Reduction of effluent volume by recycling of water and chemicals and by the manufacture of by-products. Novel pulping and bleaching techniques to reduce the formation of pollutants. Offered jointly with CH E 578. Available to seniors. Prerequisites: 406, 476. (Offered alternate years; offered 1977.)

FOR B 590, FOR M 590, FOR W 590 Graduate Studies (1-5 each emphasis)
 Study in fields for which there is not sufficient demand to warrant the organization of regular courses. Prerequisite: course entry card.

FOR B 600 Independent Study or Research (*)

FOR B 600, FOR M 600, FOR W 600 Independent Study or Research (*)

FOR B 700, FOR M 700, FOR W 700 Master's Thesis (*)

FOR B 800, FOR M 800, FOR W 800 Doctoral Dissertation (*)

TUTORIAL STUDY

Tutorial study designed to meet individual requirements is available to graduate students in the graduate studies courses listed below. Such study may include literature review and field and laboratory work. The courses are offered in all quarters, and credits can vary from 1 to 5, and with the permission of the instructor, each course may be repeated for credit. Credits are individually arranged for each course. Prerequisites: include graduate standing and permission of the instructor.

FOR B 510 Graduate Studies in Forest Soils (1-5)
Cole, Gessel, Ugolini

FOR B 515 Graduate Studies in Forest Influences (1-5)
Fritschen, Wooldridge

FOR B 516 Graduate Studies in Forest Meteorology (1-5)
Fritschen

FOR B 520 Graduate Studies in Forest Ecology and Silviculture (1-5)
Scott

FOR B 526 Graduate Studies in Forest Genetics (1-5)
Hatheway, Stettler

FOR M 530 Graduate Studies in Forest Fire Control (1-5)
Pickford, Schaeffer

FOR B 534 Graduate Studies in Forest Pathology (1-5)
Driver

FOR B 535 Graduate Studies in Forest Entomology (1-5)
Gara

FOR M 540 Graduate Studies in Logging Engineering (1-5)
Atkinson, Dowdle, Jorgensen, Stenzel

FOR M 550 Graduate Studies in Forest Recreation (1-5)
Clark, Field, Hendee, Sharpe, Wagar

FOR B 555 Graduate Studies in Wildlife Management (1-5)
Manuwal, Taber

FOR B 556 Graduate Studies in Forest Zoology (1-5)
Weisbrod

FOR M 559 Graduate Studies in Forest Resource Planning (1-5)
Bradley

FOR M 560 Graduate Studies in Forest History and Policy (1-5)
Dowdle, Waggener

FOR M 563 Graduate Studies in Forest Mensuration (1-5)
Rustagi, Turnbull

FOR M 565 Graduate Studies in Forest Management (1-5)
Atkinson, Bare, Schreuder, Waggener

FOR M 566 Graduate Studies in Forest Photogrammetry (1-5)
Schreuder

FOR M 568 Graduate Studies in Forest Economics (1-5)
Dowdle, Schreuder, Waggener

FOR W 570 Graduate Studies in Forest Products (1-5)
Allan, Bryant, Erickson, Gardner, Hrutford, Jayne, Leney, Sarkanen, Thomas

QUANTITATIVE SCIENCE

See Interschool or Intercollege Programs

INTERDISCIPLINARY GRADUATE DEGREE PROGRAMS

These programs are administered by interdisciplinary groups of the Graduate School. Certain courses carrying 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.

BIOLOGY TEACHING

No courses have this program prefix; all courses included in this interdisciplinary program appear under the appropriate headings in the various biological science and science education departments.

BIOMATHEMATICS

BMATH 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.

BMATH 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
Fletcher, Gallucci, Hatheway, Jayne, McCaughan
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

See also Comparative Literature graduate course listings under Arts and Sciences section.

C LIT 600 Independent Study or Research (*)

C LIT 700 Master's Thesis (*)

C LIT 800 Doctoral Dissertation (*)

DRAMA ARTS

See also Arts and Sciences section under appropriate discipline heading for graduate course listings.

D ART 800 Doctoral Dissertation (*)

EAST ASIAN STUDIES

See also Comparative and Foreign Area Studies in the Arts and Sciences section for graduate course listings.

EASIA 600 Independent Study or Research (*)
AWSp

EASIA 700 Master's Thesis (*) AWSp

HEALTH SERVICES ADMINISTRATION AND PLANNING

No courses have this program prefix; all courses included in this interdisciplinary program appear under other pertinent Graduate School and departmental listings.

INDIVIDUAL PH.D. PROGRAM

IPHD 800 Doctoral Dissertation (*)
Restricted to graduate students approved for a special individual Ph.D. program in the Graduate School. Requires permission of the student's Supervisory Committee chairperson. Name of dissertation supervisor should appear on the student's Program of Studies.

PHYSIOLOGY PSYCHOLOGY

P PSY 800 Doctoral Dissertation (*)

QUATERNARY STUDIES

No degree program is offered.

QUAT 417 The Late Cenozoic Glacial Ages (3) Sp
Porter

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 GEOL 417.

QUAT 501 Seminar in Quaternary Environments (2, max. 8) W
Interdisciplinary seminar in the changing natural environments of the Quaternary Period, with emphasis on climatic changes and their effects.

QUAT 502 Interdisciplinary Quaternary Investigations (3-5, max. 15) WSp
Research course for interdisciplinary investigation.

INTERSCHOOL OR INTERCOLLEGE PROGRAMS

of Quaternary problems. Student attends sessions of 501 and pursues problem-oriented case study concurrently under faculty direction. Paper reporting on case study is required. Prerequisite: graduate standing.

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 GEOL 513.

QUAT 514 Quaternary Stratigraphy of the Eastern Hemisphere (3) Sp

Porter

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 GEOL 514.

RADIOLOGICAL SCIENCES

RAD S 520 Radiological Sciences Seminar (1, max. 6)

RAD S 600 Independent Study or Research (*) AWSpS

RAD S 700 Master's Thesis (*) AWSpS

RUSSIAN AND EAST EUROPEAN STUDIES

See also Comparative and Foreign Area Studies in the College of Arts and Sciences section for graduate course listings.

REEU 600 Independent Study or Research (*) AWSp

REEU 700 Master's Thesis (*) AWSp

SOCIAL WELFARE

SOCWL 600 Independent Study or Research (*) AWSp

SOCWL 800 Doctoral Dissertation (*) AWSp

SOUTH ASIAN STUDIES

See also Comparative and Foreign Area Studies in the College of Arts and Sciences section for graduate course listings.

SASIA 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. Offered on credit/no credit basis only.

BIOEN 402 Fundamentals of Bioengineering I (3) A

Includes engineering opportunities in health care and its delivery, medical instrumentation, computer applications in bioengineering, principles of biomaterials, and engineering applications to the muscu-

loskeletal system. Prerequisite: senior standing in the College of Engineering or permission.

BIOEN 403 Fundamentals of Bioengineering II (3) Sp

Includes engineering applications to the cardiovascular system, respiratory system, kidney, digestive system, eyes and ears, and the reproductive system. Prerequisites: P BIO 360 or equivalent, and senior standing in the College of Engineering, or permission.

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, data processing, 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 436 Medical Instrumentation (3) W Moritz

Introduction, with laboratory, to the application of instrumentation to medicine. Topics include transducers, preamplifiers, amplifiers, recorders, and special electronics as used for clinical diagnosis and patient monitoring. Offered jointly with E E 436. Prerequisites: some knowledge of human physiology and electronics or instrumentation, and permission.

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: E E 381 or other course in wave propagation, as approved by instructor. Offered jointly with E E 460.

BIOEN 472 Diagnostic Ultrasound (3-6) AWSp

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, lung) and artificial structural elements (bone, teeth, skin), all for use in contact with body fluids. Offered jointly with the CH E 490. Prerequisite: permission.

BIOEN 499 Special Projects (2-6, max. 6) AWSp

Individual undergraduate bioengineering projects under the supervision of an instructor. In addition, classes on selected topics of current interests as announced. Prerequisite: permission.

BIOEN 547 Engineering Aspects of the Fluid Mechanics of the Human Body (3) W

Oates

Engineering background to the many flow regimes existing in the human body. Specific examples of flow problems such as cardiovascular, bronchial, microcapillary, urethral, etc. Offered jointly with A A 547. Prerequisite: permission.

BIOEN 570 Engineering Approaches to the Cardiovascular System (3) Sp

Huntsman

Engineering techniques and physiological concepts appropriate to a quantitative approach to the cardiovascular system. Emphasis is on current literature, texts, and guest lecturers who discuss specialized topics. Prerequisite: permission.

COMPUTER SCIENCE

Courses for Undergraduates

C SCI 201 Introduction to Computer Science (3) W

Provide a rigorous introduction to the theoretical and practical components of computer science: algorithms, programs, data structures, machines, computability, applications, social aspects. Prerequisite: MATH 124.

C SCI 241 Programming (3) A

Basic algorithms, programming techniques, and basic concepts of a sophisticated high-level language. Prerequisite: 201 or permission.

C SCI 321 Discrete Structures (3) A

Fundamentals of set theory, graph theory, Boolean algebra, and algebraic structures with applications in computing. Prerequisite: MATH 126.

C SCI 326 Data Structures (3) Sp

Sequential and linked allocation of linear structures; tables, arrays, stacks, queues; in-core searching and sorting; circular and doubly linked lists; trees and threaded lists; dynamic memory allocation and garbage collection. Prerequisites: 321 and 378.

C SCI 378 Machine Organization and Assembly Language (3) W

Differences and similarities in machine organization; central processors; fundamentals of machine language and addressing; assembly language programming, including macros; operating system interfaces. Prerequisite: 241.

C SGI 431 Introduction to Theory of Computation (3) Sp

Fundamentals of automata theory and formal language theory; models of computation; Turing machines; space and time complexity; the halting problem. Prerequisites: 321 and 241.

C SCI 441 Programming Languages (3) A

Designed to make the student reasonably fluent in several radically different languages, such as LISP, SNOBOL, APL, ALGOL 60, PASCAL, SIMULA 67, and others. 445 may be taken concurrently.

C SCI 445-446-447 Programming Languages Laboratory (2-2-2) A,W,Sp

Practical programming experience in a number of computer languages, such as FORTRAN, ALGOL, COBOL, SNOBOL, LISP, APL, and assembly language. The laboratory will be based on independent study, supplemented by occasional lectures. Students must register for three consecutive quarters. 441 maybe taken concurrently with 445.

C SCI 470 Computer Design (4) AW

Fundamental gating circuits are developed into large logic gating structures. The use of these structures in the design of central processing units, memories, and peripheral equipment is illustrated. For computer science majors. 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 E E 501 or 502. Offered jointly with E E 472. Prerequisite: 478.

C SCI 478 Computer Organization and Machine Language Programming (4) ASp

Differences and similarities in computer structure. Number representations, instruction codes, addressing techniques, subroutine and macro linkage and expansion, principles of assemblers, data structures (arrays, tables, lists), searching and sorting, input-output operations. Offered jointly with E E 478. Prerequisites: ENGR 141 and 346, or equivalent.

C SCI 498 Senior Project (1-6, max. 6) WSp

Consists of a report (and perhaps demonstration) describing a development, survey, or small research

project completed by the student in an area of specialization. Objectives of: (1) applying and integrating the classroom material from several courses, (2) introducing the professional literature, (3) gaining experience in writing a technical document, and (4) enhancing employability through the evidence of independent work. The project may cover an area in computer science or an application to another field. Prerequisite: senior standing.

C SCI 500 Computers and Society (2) W
Study of the impact of computer technology on present and future societies; computer technology and economics; political, economic, cultural, social, and moral issues. Seminar with frequent guest lecturers and discussion leaders. Each student is required to complete a term project. Offered on credit/no credit basis only. Prerequisite: graduate standing in computer science or permission.

C SCI 501 Compiler Construction I (3) W
Basic concepts and design of interpreters and compilers. Lexical analysis, syntax analysis, storage management, and code generation for general-purpose languages. Prerequisites: 478, 531, and working knowledge of a block-structured programming language.

C SCI 502 Compiler Construction II (3) Sp
Advanced topics of compiler construction. Translator writing systems, incremental compilation, compiler-interpreters. Practical considerations for production compilers. Prerequisite: 501.

C SCI 504 Comparative Study of Programming Languages (3) W
Important programming languages from various traditions are studied and compared, so that major contributions of each language will 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) W
Herriot
Basic concepts in programming languages, data structures (arrays, records) types, patterns, environments, control, evaluation, application, matching; relation to high-level machines. Prerequisites: 478 and working knowledge of at least one ALGOL-like programming language and one LISP-like programming language.

C SCI 508 Representation and Handling of Data Structures (3) A
Linear lists (stacks, queues, deques): sequential and linked allocation; circular and doubly linked lists; trees, binary trees, and threaded trees; traversal algorithms; analysis of flow charts; path length of trees; garbage collection; dynamic storage allocation; data management on external media. Prerequisite: 478 or permission.

C SCI 510 List Processing and String Manipulation (3) Sp
Structure of information sets and processes that reflect syntactic and semantic relationships. The generation and processing of structures such as lists and trees. Symbolic pattern recognition and manipulation. Concepts and applications of recent versions of languages such as LISP, SNOBOL, and FORMULA-ALGOL. Recent developments in languages for artificial intelligence.

C SCI 518 Digital Signal Processing (4) Sp
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 E E 518. Prerequisite: graduate standing or permission.

C SCI 520 Computer Science Seminar (1, max. 9) AWSp
Weekly discussion by students and faculty or visitors on current topics of interest. Offered on credit/no credit basis only.

C SCI 521 Design and Analysis of Algorithms (3) Sp
Principles of design of efficient algorithms: recursion, divide and conquer, balancing, dynamic programming, data structure selection. Algorithms

designed and analyzed include those from sorting, searching, set manipulation, graphs, matrices, polynomials, and integers. Prerequisite: 508.

C SCI 531 Syntactic Analysis (3) A
Regular sets and finite automata. Context free grammars and pushdown store automata. General parsing methods: top down and bottom up. Restricted parsing methods: LL (k), LR (k), precedence grammars, shift reduce parsing.

C SCI 532 Models of Computation (3) W
Models of computation and their equivalence. The halting problem for Turing machines. Space and time complexity. Deterministic and nondeterministic computation. Problems complete in nondeterministic polynomial time and polynomial space. Petri nets and vector addition systems.

C SCI 537, 538 Computability Theory (3,3) A,Sp
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: MATH 502 or permission.

C SCI 540 Discrete System Simulation (3) A
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 SIMULA and study of functional components and data structures. Prerequisite: programming experience with 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, with problem assignments making use of computers available on campus.

C SCI 542 Central Processor Architecture (3) Sp
Several central processing units are examined at the gate level. Included are the logic structures of: I/O bus, 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
Notations for describing computer systems. Powerful CPUs. Memory organization. Channels and I/O processors. Micro programming. Stack computers. Array and pipe line processors. Prerequisite: 478; corequisite: 470 or permission.

C SCI 551 Operating Systems (3) Sp
Design and construction principles for multiprogramming systems: Early batch processing systems. Cooperating sequential processes. Multiprogramming. Main storage management. Process and resource control and scheduling. File systems. Projects using the computer science teaching laboratory. Prerequisite: 508 or permission.

C SCI 557 Computer Graphics (3) A
Generation and interpretation of pictures by computer with or without human interaction. Graphics hardware. Display programming. Picture transformations. Representations of pictures and their attributes. Hidden line and surface problems. Graphics programming languages and systems. Linguistic methods in picture analysis and generation. Each student is required to complete a project on the interactive graphics facility in the computer science teaching laboratory. Prerequisite: 508.

C SCI 561 Computer Communications and Networks (3) A
Golde
Fundamentals of data transmission: coding, mes-

sage formats, and protocols; job and data management problems; organization of computer networks. A number of networks are studied, and students are expected to prepare a class presentation of a network. Offered on credit/no credit basis only. Prerequisite: graduate standing. (Offered alternate years.)

C SCI 573 Artificial Intelligence I (3) A
Introduction to the use of the computer in nonnumerical problem solving. Survey of theorem proving, symbol manipulating, pattern recognition, and inductive problem-solving techniques. Computer models of human thought. Prerequisite: 478.

C SCI 574 Artificial Intelligence II (3) W
Continuation of studies of artificial intelligence systems, emphasizing theorem proving, symbolic problem solving, pattern recognition, and natural language data processing. Students are required to do projects. Prerequisite: 573 or permission.

C SCI 590 Special Topics in Computer Science (*) AWSp
Lectures and discussions of topics of current interest in computer science. May not be offered every quarter; content may vary from one offering to another. Prerequisite: permission.

C SCI 600 Independent Study or Research (*) AWSpS

C SCI 700 Master's Thesis (*) AWSpS

C SCI 800 Doctoral Dissertation (*) AWSpS

INSTITUTE FOR MARINE STUDIES

IMS 499 Undergraduate Research (1-3, max. 6) AWSpS
Research on assigned topics under the supervision of faculty members. Prerequisite: permission.

IMS 501, 502 Marine Studies: Scope and Content I, II (3,3) AW
Comprehensive survey of the relations between man and the ocean, the nature and causes of conflicts, the organizations involved and the techniques employed in planning, management, and the formulation of alternatives. 501 reviews human needs and the historical development, present status, and future trends in marine technologies and uses of the ocean. 502 considers the causes, characteristics, and frequency of conflicts at the international, national, and local levels. The requirements for planning, policy development, management, conflict resolution, and enforcement are related to the institutions that deal with such topics as the coastal zone, the high seas, marine resources, and transportation. Prerequisite: 501 for 502.

IMS 503 Marine Studies: The Ocean System (4) A R. H. Fleming
Descriptive and quantitative survey of the marine sciences to serve as a foundation for the formulation and analysis of questions concerning the uses of the ocean and its resources. Prerequisite: permission.

IMS 504 Marine Sciences and the Uses of the Ocean (2) W R. H. Fleming
Analysis and applications of ocean data and information to selected examples of ocean use and resource exploitation. The nature and availability of such information is reviewed in terms of its applications in policy planning, decision making, regulation, and enforcement. The constraints imposed by ocean conditions are identified and the consequences of human activities examined. Prerequisite: 501 and 503, or permission.

IMS 505 Marine Uses and Resources: Living Resources (3) W McKernan
Survey of living marine resources; factors affecting distributions and abundance; direct and indirect impact of human activities; bases for management; the origin and character of conflict in fisheries management. Prerequisite: 501 or permission.

INTERSCHOOL OR INTERCOLLEGE PROGRAMS

IMS 506 International Law of the Sea (3) Sp *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, energy and mineral development, military uses, emplacement of installations, and the boundary issues involved in these various ocean uses. Offered jointly with LAW 587.

IMS 507 International Organizations and Ocean Management (3) W *Miles*

Survey of the manner in which international organizations attempt to manage and regulate the uses of the ocean. Primary emphasis is on the analysis of processes that support or constrain these organizations and on the search for alternative policies and organizations. Offered jointly with PB PL 507. Prerequisite: 501 or permission.

IMS 508 Economic Aspects of Marine Policy (3) W *Crutchfield, Stokes*

Development of pertinent economic concepts and their application to selected topics in marine policy decision making. Offered jointly with ECON 537. Prerequisite: 501 or permission.

IMS 509 Marine Coastal Zone: Policy and Management (3) Sp *Hershman*

Multiple uses of coastal waters and the adjacent land; conflicts arising from competition for space and resources; organizational problems associated with overlapping jurisdiction and spheres of interest; the development of alternatives for the resolution of conflicts. Prerequisite: 502 or permission.

IMS 510 Law of the Coastal Zone (3) Sp *Johnson*

The coastal zone has three main physical components: the sea, the sea bed, and the uplands. Legal questions arise with respect to the latter 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 quite varied, often incompatible, and subject to a broad range of decision-making bodies and techniques. The course considers 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 developed, it often is possible to consider specific questions in the Washington context without risking provincialism. Offered jointly with LAW 534.

IMS 517 Marine Uses: Transportation and Commerce (3) Sp *D. K. Fleming*

Role of the oceans in the transportation of men and materials; character and trends in vessel design and terminal facilities; pattern and nature of industry organization; regulations; economics of the shipping industry; management of fleets and vessels; manpower at sea and ashore; national policies affecting the merchant marine and port facilities. Prerequisite: 502 or permission.

IMS 520 General Seminar in Marine Studies (1-3, max. 6) AWSpS

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 530 The Regional Implementation of an Extended Economic Zone (3) Sp *Miles*

Team-research seminar to evaluate the implications of a two-hundred-mile economic zone in the Central and North Pacific and Atlantic oceans, the Arctic and Indian oceans, and the Mediterranean Sea. Focus is on one region at a time. Prerequisite: 507

IMS 550 Special Topics in Marine Studies (1-3, max. 18) AWSpS

Examination of various aspects of marine studies. Content varies, depending upon the interests of the

faculty and students. Intended for the joint participation by the faculty and advanced students in the investigation of selected topics. One or more groups are organized each quarter. Entry card required.

IMS 600 Independent Study or Research (*) AWSpS

QUANTITATIVE SCIENCE

Administered by the College of Fisheries and the College of Forest Resources.

Q SCI 270 Introduction to Operations Research and Resource Management (4) Sp *Bare, Rustagi*

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 281 Elementary Statistical Methods (5) AWSp

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: MATH 105 or equivalent.

Q SCI 291, 292 Analysis for Biologists (3 or 4, 3 or 4) AW,WSp

Differentiation; integration, including multiple integrals and partial derivatives. Numerical and computing techniques in analysis. Emphasis on biological problems, particularly in ecology. Lecture, 3 credits; optional laboratory, 1 additional credit. Prerequisites: MATH 105 for 291; 291 or MATH 124 for 292.

Q SCI 340 Applications of Digital Computers to Problems in Resource Management (4) AW

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 FISH 340 has been taken. Prerequisite: 281 or 381.

Q SCI 376 Operations Research in Resource Utilization I (3) A *Bare*

Introduction to some of the tools of operations research and the application of these in examining, defining, analyzing, and solving complex problems of resource management 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.

Q SCI 381 Introduction to Probability and Statistics (5) AWSpS

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: MATH 105 or equivalent.

Q SCI 382, 383 Statistical Inference in Applied Research (5,5) AW,WSp

Analysis of variance and covariance; chi square tests; multiple and curvilinear regression; sampling theory; discrete distributions; experimental design and power of tests. Application to biological problems. Use of computer programs in standard statistical problems. Prerequisites: 381, MATH 124 or Q SCI 291 or permission for 382; 382 for 383.

Q SCI 391 Introduction to Matrices and Their Applications (3) A *Hatheway*

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: 281, MATH 125 and 114, or FISH 340 or equivalent course in computer use, or permission.

Q SCI 392 Techniques of Applied Mathematics in Biology I (3) A *Fletcher*

Ordinary differential equations—linear and nonlinear; systems of differential equations; approximation techniques, numerical solution techniques; applications to biological processes. Prerequisite: 292 or MATH 126, or permission.

Q SCI 393 Techniques of Applied Mathematics in Biology II (3) W *Fletcher*

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: 392 or permission.

Q SCI 450 Ecological Models (4) Sp *Bledsoe, Swartzman*

Empirical models; energy flow and compartmental models and their use in ecology; spatial patterns; ecological diversity; other special models. Prerequisite: 456.

Q SCI 451, 452 Ecosystem Dynamics (3,3) A,W *Bledsoe, Swartzman*

Unified overview of the physical and biological processes that make up natural and man-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). Prerequisites: 292, 340, 450, or permission for 451; 451 for 452.

Q SCI 456 Mathematical Models in Population Biology (4) A *Gallucci, Mathews*

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, FISH 425 or BIOL 210 or permission.

Q SCI 457 Management of Exploited Animal Populations I (4) W *Mathews*

Equilibrium yield model; spawner-recruit models, management methods; use of catch-effort statistics in estimation and management, computer simulation in management decisions. Offered jointly with FISH 457. Prerequisite: 456.

Q SCI 458 Management of Exploited Animal Populations II (4) Sp *Mathews, Mathisen*

Continuation of 457. Estimating catch and effort and analyzing catch-per-effort statistics. Standardizing effort, gear selectivity, recruitment, models of exploited fishery populations with management applications. Introduction to simulation of fish and wildlife populations with emphasis on applications using current data from fishery and game organizations. Offered jointly with FISH 458.

Q SCI 461 Thermodynamics of Life Processes (4) W *Gallucci, Jayne*

Thermodynamics of life processes with particular application of the free energy functions 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, BIOL 210, 211, 212.

Q SCI 462 Irreversible Thermodynamics in Biology (4) Sp*Gallucci, Jayne*

Flows and forces in irreversible processes in biological systems. Onsager's laws. Diffusion and sedimentation. Membrane permeability. Transport in biological systems. Electrochemical processes. Prerequisites: 461, 493, or equivalent.

Q SCI 471 Systems Analysis in Resource Management (4) A*Mar*

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 MATH 124.

Q SCI 476 Operations Research in Resource Utilization II (3) W*Bare*

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 analytic solutions can be obtained and when they cannot, form the core of the course. This course can be taken independently from 376. Prerequisites: 281, 291.

Q SCI 477 Advanced Mathematical Programming With Applications in Resource Management (3) Sp*Bare*

Selected techniques from mathematical programming, with primary emphasis on the formulation, solution, and interpretation of natural-resource oriented problems. Material presented includes: (1) selected techniques from linear programming (i.e., the revised simplex, dual simplex, decomposition, 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 QMETH 450 and 451.

Q SCI 480 Sampling Theory for Biologists (4) Sp*Gallucci, McCaughran*

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, 383, or permission.

Q SCI 486 Experimental Design (3) Sp*Chapman, McCaughran*

Topics in analysis of variance and experimental designs: choice of designs, comparison of efficiency, power, sample size, use of computer for standard analyses. Prerequisite: 383 or MATH 485.

Q SCI 499 Undergraduate Research (1-5, max. 5) AWSpS

Special studies in quantitative ecology and resource management for which there is not sufficient demand to warrant the organization of regular courses. Prerequisite: permission.

Q SCI 502 Statistical Consulting for the Life Sciences (4) AWSp*McCaughran*

Consulting experience in data analysis, applied statistics, experimental design, biological parameter estimation, and sampling problems for graduate students majoring in statistics. The student is required to provide consultation services to students and faculty three hours per week. Consulting problems are given to students by quantitative science faculty, particularly in areas not covered by the consulting experience. In addition, students spend one classroom hour per week under faculty supervision discussing the problems encountered. Prerequisites: 382, 383, MATH 482, 483, Q SCI 486 or BIOT 571, 572, 573, or the equivalent courses, and permission.

SOCIAL MANAGEMENT OF TECHNOLOGY**SMT 301 Creating the Future (5)ASp***Osborn*

Examines the concept of alternative individual and societal futures and the opportunities for creating them. Several aspects of thinking about alternative futures are considered, including the determinants and nature of change, notions of time, the perception of present reality and development of visions of the future, and the implications of alternative values and assumptions. A number of scenarios for the future are explored and several methods of forecasting investigated. Offered jointly with HSS 301.

SMT 310 Social Constraints on Engineering Design (3) WS*Bereano, Evans*

Examines cases of engineering designs and identifies ways in which social goals affect engineering design decisions. As part of this examination, social values and public policy issues that generate design criteria are explored. Course appropriate for students from any discipline. Offered on credit/no credit basis only. Offered jointly with ENGR 310. Prerequisite: junior standing or permission.

SMT 401 Introduction to the Social Management of Technology (3) ASp*Osborn*

Survives the problems facing different kinds of professionals in attacking issues related to contemporary technology: the differing perceptions of technology in different social and professional roles, alternative modes of understanding the relationship between human action and instrumental means, and an introduction to the emergent strategies of technology assessment and future studies as ways of grappling with technology-laden issues of public policy. Prerequisite: junior standing or permission; no prior technical background is required.

SMT 403 Satisfying Human Needs in a Technological Society (4) WSp*Osborn*

Technology, via the value system of a particular culture, is related to the satisfaction of basic human needs. Students are asked to become aware of new ways to think about human needs, to increase their awareness of their own needs and values, to determine the role of technology in satisfying needs, and to invent new cultural solutions for better meeting human needs. This course is a collective experience with a multimedia format. The ideas of others (Tofler, Ellul, Lilly, Maslow, Ram Dass, Slater, etc.) are combined with class experience, integrating them into a coherent whole.

SMT 410 Technology Assessment—Concept and Methods (3) A

Technology assessment is suggested as the systematic study of the various impacts on society that may occur when a technology is introduced, extended, or modified. Prepares a student to perform a technology assessment through exploration of the concept, investigation of various methods, and analysis of several assessments. Prerequisite: junior standing or permission; students from all disciplines are encouraged to enroll.

SMT 461 Energy Technology and Public Policy (5) WSp*Hyman*

Analysis of the bases of national and state energy policy developments, with main focus on institutional, environmental, and economic implications of energy development. Graduate students invited to enroll. Prerequisite: ENGR 307, which may be taken concurrently, or permission; introductory-level familiarity with the technical background recommended.

SMT 530, 531 Technology Assessment Methods and Analysis I, II (3,3) WSp

Analysis of the practice and methods of technology assessment and preparation of a specific assessment. The two-quarter sequence investigates how a systematic attempt to anticipate the social, economic, political, and environmental impacts of technology on society can be undertaken. The first quarter deals with the concept and uses of technology assessment, and the analysis of various case

studies generated (e.g., in the areas of offshore oil, telecommunication, therapeutic drugs, and automotive propulsion systems). It undertakes various exercises, using several of the analytical methods available. The second quarter is a class-generated technology assessment done as a group research effort. Differing techniques are used in generating the analysis. Students from all disciplines are encouraged to enroll. Prerequisite: 530 or permission for 531.

SMT 498 Special Topics: Technology, Society, and Public Policy (3-5) AWSp

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 (2-5, max. 10) AWSp

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.

SMT 520 Seminar (2, max. 6) AWSp

Prerequisite: permission of program director. (Last time offered: Spring Quarter 1977.)

SMT 540, 541, 542 Social Management of Technology I, II, III (3,3,3) A,W,Sp*Wenk*

Analyses of the interaction of technology and society through general principles and case studies of contemporary issues and public policy: the nature of the 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. Offered jointly with CIVE 540, 541, 542, and with PB PL 540, 541, 542. Prerequisites: permission for 540; 540 for 541; 541 for 542.

SMT 560 Urban Technology and Urban Policy (3) WSp

Study of major trends linking technology and urban life in the growth of American cities. Major technology policy questions are addressed pertaining to: fire protection, police protection, computer information systems, solid-waste management, communications, transportation, and related public services. Emphasis on technology policy and analysis of technology policy decisions. Content may vary from year to year. May be repeated for credit.

SMT 565 Seminar in Atmospheric Science Policy Problems (1-3) W*Fleagle*

Decision making and policy determination in major national atmospheric programs. Case studies of policy development for the Global Atmospheric Research Program, climate change, weather modification, and air quality. Individual student study of selected topics, with emphasis on developing and evaluating alternate policies. Oral presentation and term paper. Offered jointly with ATMS 565. Prerequisite: 540 or permission.

SMT 599 Current Topics in the Social Management of Technology (3, max. 9) AWSp

Readings, lectures, and discussions of topics of current interest in the field of technology policy assessment. Subject matter changes from year to year. Prerequisite: permission of program director. (Last time offered: Spring Quarter 1977.)

UNIVERSITY CONJOINT COURSES**UCONJ 410 Study of Interdisciplinary Evaluation and Management of Handicapped Children (3) AWSp***McCartin, Rolla*

Interdisciplinary study of handicapped children, including identification of children with problems,

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clinical assessment by interdisciplinary team, formulation of plans for management, and reassessment in terms of progress made. (Offered cooperatively by School of Nursing, College of Education, Department of Pediatrics in the School of Medicine, departments of Psychology and of Speech and Hearing Sciences and School of Home Economics in the College of Arts and Sciences. School of Social Work, and School of Dentistry.) Offered on credit/no credit basis only. Prerequisites: post-baccalaureate or graduate standing in a child-service-oriented discipline, and permission.

UCONJ 415 Drug Abuse (2) Sp *Hammarlund*

In-depth and multidisciplinary course covering selected topics of drug abuse primarily designed for upper-division students in the social and life sciences (i.e., law, medicine, nursing, pharmacy, social work, sociology, etc.). The student is expected to have already some previous knowledge of drugs of abuse and basic pharmacology or biology and biochemistry. Teachers in the areas of law, nursing, pharmacy, pharmacology, psychiatry, social psychology, and social work instruct in their areas of expertise, possibly including some off-campus visitations. Offered on credit/no credit basis only. Prerequisite: permission.

UCONJ 422 Venereal Diseases: An Overview (2) *A Elmer, Holmes*

Clinically oriented course designed to train upper-class health science students to the point they are stimulated and qualified to participate effectively in community outreach programs for the prevention of venereal diseases. Lecture-discussion session each week with emphasis on the nature of the prevalent sexually transmitted diseases. Field experience includes visits to VD clinics and possible speaking engagements. Offered cooperatively by the departments of Pharmaceutical Sciences, Medicine, and Epidemiology and International Health. Department of Pharmaceutical Sciences responsible for administration of course. Offered on credit/no credit basis only. Prerequisite: permission.

UCONJ 490 Social Sensitivity in Health Care (3) *AWSp Standeven*

Multidisciplinary course for students in the health professions to sensitize them to the life situation of the poverty and minority groups as it relates to the community's health-care system. Focuses particularly on the social, cultural, and physical barriers that these groups encounter when they seek solutions to their health problems. Stimulates student to define more clearly his professional role in the health-care problems of these groups. Since the primary input of information for this course is experiential, students are involved in field experiences with persons in minority groups and poverty situations to furnish students with the first-hand personal involvement with the life styles and experiences of these persons. The faculty is selected from the involved schools, as well as from members of the cultural groups being surveyed. Enrollment is limited to twenty students. An attempt is made to achieve a balance of students from the various departments. (Offered cooperatively by School of Nursing, School of Dentistry, School of Social Work, School of Medicine, School of Pharmacy, School of Public Health and Community Medicine, and the School of Home Economics in the College of Arts and Sciences.) Prerequisite: permission.

UCONJ 491 Emergency Cardiac Care and Resuscitation (2)

Teamwork for emergency cardiac care, including training in cardiopulmonary resuscitation, acute drug and electrical therapy, immediate and postresuscitation care—theory and practice. Prerequisites: junior standing or above in School of Medicine or School of Nursing and permission; permission for students from allied health professions.

UCONJ 493 Interdisciplinary Health Team in Primary Care I (*, max. 5) W

Anderson, Carnevall, Eaton, Pittman, Smith, Truelove
Dentistry, medicine, nursing, pharmacy, and social work students are assigned to interdisciplinary teams representing each discipline. Classes are conducted in didactic and seminar mode. Family his-

tory and professional socialization experiences form the point of departure for movement into study of team development and maintenance skills for health-care delivery teams. Self-instruction on baseline assessment skills in other discipline areas prepares students for team-delivered care in 494. Students observe role behavior in selected clinical teams and begin to function as a team in a selected primary-care site. Prerequisite: permission. Limit: six students from each discipline.

UCONJ 494 Interdisciplinary Health Team in Primary Care II (*, max. 4) Sp

Anderson, Carnevall, Eaton, Pittman, Smith, Truelove
Multidisciplinary student teams (dentistry, medicine, nursing, pharmacy, social work) are provided a clinical experience with model faculty teams in selected primary-care sites. Students continue to examine and conceptualize the multidisciplinary process in primary care in seminars and conferences. Variable credit is based on clinical hours taken for credit. Prerequisites: 493 and permission.

UCONJ 584 Plant Tumors (1, max. 9)

Discussion of the literature of plant tumors and current research work being carried on in this area at the University. (Offered cooperatively by the departments of Biochemistry, Botany, and Microbiology and Immunology.) Prerequisite: offered only to persons actively pursuing work in this area.

WILDLIFE SCIENCE

Administered by the College of Fisheries and the College of Forest Resources.

WLF S 350 Survey of Wildlife Biology and Conservation (4) W

Manuwal, Weisbrod
Wildlife ecology and population biology, and interrelationships between wild animals and man, including encouragement of wildlife population growth and productivity, control of pest populations, and preservation of endangered species. Prerequisite: junior standing.

WLF S 401 The Biology and Conservation of Birds (5) 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. 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.). Prerequisite: 350 or permission.

WLF S 404 Biology and Conservation of Mammals (5) 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.

WLF S 450 Advanced Studies in Wildlife Ecology (3) A

Manuwal
Within the seminar format, students are expected: (1) to deliver a forty-minute presentation on either a selected topic or a major published paper on wildlife population; (2) to prepare a written paper summarizing the important points made in the oral

presentation; (3) to prepare a critical review of a recently published journal article on wildlife ecology. This review should include comments on the author's methods, results, and conclusions based on data generated by the study. The oral presentation of each student is evaluated by each member of the class. Prerequisite: senior standing or graduate student status.

WLF S 475 Marine Mammalogy and Conservation (5) W

Erickson
Lecture and laboratory in marine mammalogy: the evolution, taxonomy, physiology, life history, and behavior of marine mammals; the techniques of studying and the management and conservation of them. Offered jointly with FISH 475. 15 credits in biology, including vertebrate anatomy and physiology, recommended.

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LAW 442 Land Law and the Urban Environment (3) S

Stoebuck
Examination of the major legal tools available to shape the urban environment by controlling the use of land. Considers zoning, subdivision controls, urban renewal, private land-use restrictions, and the rules of nuisance law. Offered on credit/no credit basis only. For nonlaw students only; must be graduate or upper-division undergraduate. (Not offered every year.)

LAW 443 The Legal Process (6) S

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. (Not offered every year.)

FIRST YEAR

LAW 500 Administrative Law (4) Sp

Andersen, Peck
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 (3-2-3) AWSp

Corker, Cosway, Loh, 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.

LAW 504 Civil Procedure (3-3) AW

Chisum, Meisenholder, 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.

LAW 512 Legal Research and Analysis (2-3-1) AWSp

Aronson, Hume, Lyness, Powers, Rombauer
Integrated introduction to the legal problem-solving process and skills. In the introductory phase, problem solving in the legal setting and the problem-solving skills are discussed, including analysis and synthesis of appellate court opinions. The next

phase provides an intensive introduction to legal research methods and materials. Students integrate use of their developing problem-solving skills and their writing skill through preparation of memoranda or other documents for moot legal problems. In a final phase, students prepare appellate briefs and argue orally before a moot appellate court.

LAW 514 Property I (3-2-3) AWSp

Cross, Hume, Hunt, Stoebuck

Ownership and transfer of realty and personality. The course analyzes the legal relationship of persons to things, from both a historical and a contemporary point of view. Specific subjects included are bailments, fixtures, gifts, 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.

LAW 517 Torts (4-4) AW

Peck, Reid, Seawell, Strickland

Liability for civil injuries arising from the intentional and unintentional interference with personal and property interests.

LAW 518 Criminal Law (2-3) WSp

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 processes in a democratic society.

SECOND- AND THIRD-YEAR ELECTIVES

LAW 502 Land Use Controls (3) A

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 restrictions, such as the law of nuisance and running covenants.

LAW 503 Associations (3) A

Tunks

Introduction to law relating to association in business and its nonprofit analogies through agency, partnership, other unincorporated forms, and corporations. Emphasis throughout 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 Civil Procedure II (2) A

Trautman

Continuation of 504. Includes a study of methods of obtaining and enforcing judgments, appellate procedure, the doctrines of *res judicata* and collateral estoppel, and multiparty litigation, particularly class actions, interpleader, and intervention.

LAW 506 Corporations (4) Sp

Kummert, Price

Basic corporation law and practice. Covers state law provisions and common contractual 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 on the "federal corporation law" evolving out of the SEC proxy rules and Rule 10(b)-5.

LAW 507 Business Planning (3-3) WSp

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 pre-

senting corporate and tax issues for analysis and resolution. The problems 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, division, and dissolution of corporations. Students normally should complete 532 before taking 507. With permission of the instructor, however, students may take the necessary tax course concurrently with 507. Prerequisite: 506.

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 (3-4) AS

Chisum

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. Offered Summer Quarter for 3 credits. Prerequisite: 520.

LAW 510 Legal Problems Relating to Women (3) Sp

Hume

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 desired 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

Tunks

Focus on the legal problems of persons entitled to governmentally supplied housing, goods, or services. (Not offered every year.)

LAW 513 Law and Psychiatry (2) A

Hardisty

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. (Not offered every year.)

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, literary, race, and property ownership); process 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 (3-6) WSpS

Cosway, F. W. Smith

Payment, financing, and other problems in the distribution of merchandise. Sale, transportation, and storage of goods, as well as commercial paper, including notes, drafts, and checks, are studied. Emphasis is given the Uniform Commercial Code. Offered Summer Quarter for 3 credits.

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 criminal charges. Assigned 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. (Not offered every year.) Limit: twenty-four students.

LAW 520 Constitutional Law (3-3-2) 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 Problems in Professional Responsibility (3) W

Aronson

Examines the various roles lawyers play in our system and explores some of the ethical problems faced by lawyers. Modes and methods of practice (e.g., the organization of firms, public interest law, government service including judging, and various types of "house" counseling), as well as the ethical problems and dilemmas inherent in each type of practice and in the adversary system itself. Many of the issues are approached through role playing and other clinical techniques.

LAW 522 Political and Civil Rights (4-4) AW

Morris

Basically constitutional law, with emphasis in the areas of freedom of expression, religion, and other individual rights, and in problems of discrimination. While the coverage necessarily overlaps with that in the regular constitutional law courses, the course also deals with the emerging statutory protections of these constitutional interests. 509 recommended. (Not offered every year.)

LAW 523 Problems of Economic Development (3) W

Prosterman

Legal problems of agricultural and industrial growth, land reform, population planning, environmental protection, and related issues in the less-developed countries. Focus is on the problems of legislating, administering, funding, and monitoring programs for achievement of these goals, examining a series of specific programs—of varying success—in selected less-developed countries. Foreign-aid and investment roles, and parallels to certain United States and industrialized country problems.

LAW 524 Contemporary Maritime Law Problems (2) Sp

Roddis

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 organizations, federal regulation, marine insurance, port facilities, maritime litigation, and the impact of various courts). (Not offered every year.)

LAW 525 Environmental Law (3) S

Corker

Constitutional issues encountered in environmental law. Judicial review of environmental decision making: standing, control of discretion, justiciability.

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ity, sovereign immunity, federalism. The National Environmental Policy Act, its administration and problems. Public lands and their administration. Private land control, and the distinction between compensated "takings" and uncompensated "regulation." Water and air pollution, public and private remedies. Public participation and environmental advocacy. Open to law students; nonlaw students may enroll with permission of the instructor on the basis of an equivalent to one year of law school completed. (Not offered every year.)

LAW 526 Equitable Remedies (3) Sp

Stoebuck
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

Chisum
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 Water Law (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 530 Constitutional Freedom and American Education (4) A

Morris
Examines the relationships between the Constitution of the United States and the American system of public education, excluding higher education, constitutional freedom, and the obligation to go to school; constitutional freedom and the legal controls over curriculum, teachers, and students; constitutional freedom and racial desegregation; constitutional freedom and equal educational opportunity, including equal financing of the public schools. Prerequisite: second- or third-year law standing or graduate student status in another division of the University.

LAW 531 Federal Income Taxation (3) S

Huston
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. (Not offered every year.)

LAW 532 Federal Income Taxation VI (3-3) 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.

LAW 533 Federal Tax Procedure (3) W

Hjorth, Tunks
Consideration of procedural problems involved in the settlement of tax disputes. Topics covered include (1) return and filing requirements; (2) defi-

ciencies and the mechanics of their assessment; (3) waivers and consents; (4) extended periods of limitation on assessments and claims for refund; (5) jeopardy assessments and injunctions; (6) payment, credits, and refunds; (7) additions to tax, revocable and irrevocable elections, and legal effect of regulations; (8) rulings, compromises, and closing arguments; (9) appellate division settlements, estoppel and setoffs; and (10) recoupment and the obligation of consistency. Prerequisite: 532, which may be taken concurrently. (Not offered every year.)

LAW 534 Law of the Coastal Zone (3) Sp

Johnson
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 quite varied and often incompatible, and subject to a broad range of decision-making bodies and techniques. Considers 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 developed, it often is possible to consider specific questions in the Washington context without risking provincialism. Offered jointly with IMS 510.

LAW 535 Property II (4-4) WSp.

Fletcher, Huston, Price
Problems of voluntary disposition of assets, primarily through wills and trusts. Attention is paid to disposition by will; creation of, and disposition by, a trust; and the effectiveness of the disposition in the creation of present and future interests in property. Some consideration is given to alternative methods of wealth transmission and to the basic tax framework important in formulating plans of disposition.

LAW 536 Criminal Procedure III (3) A

Hardisty
Shorter version of 556. (Not offered every year.)

LAW 537 Problems of Judicial Administration

Workshop (3) Sp
C. Z. Smith, Staff
Workshop in selected current problems of judicial administration. During the first phase of the workshop, participating students are divided into groups for field work and research on specific topics and for preparation of documentary reports. During the second phase, each group presents to the entire class a summary of the results of the group's first-phase investigations, with opportunities for questions and discussion. Offered on credit/no credit basis only. Limit: twenty-five students. (Not offered every year.)

LAW 538 Personal Property Security (3) A

F. W. Smith
Course is concerned with all aspects of security in personal property. ("Personal property" includes everything except land.) Covered are problems and legal principles relevant to the creation of the security interest, to its perfection, to priorities between competing security interests and between a security interest and other kinds of property interest, to payment and redemption, and to realization procedures. Both the Uniform Commercial Code and the noncode law are considered, with emphasis on the former.

LAW 539 Real Property Security (3) W

Stoebuck
Methods by which an obligation may be secured by real property of the obligor or of a third person. The course covers the common-law principles and statutes that regulate the creation, operation, and extinguishment of the legal relations known as real property mortgage and deed of trust, considered in the context of financing the purchase or development of land. Some attention may be given to principles governing operation of the lending industry.

LAW 540 Products and the Consumer (3-4) AS

Kummert
Introduction to the issues involved in trying cases that involve dangerous and defective products, in

legislating on products problems, and in administering statutes dealing with such matters. The course is fairly evenly divided between consideration of issues in governmental regulation of dangerous and defective products and issues involved in civil actions for harm resulting from defective and dangerous products. Offered Summer Quarter for 3 credits. (Not offered every year.)

LAW 541 Corporate Finance and Investment Protection (4) A

Kummert
Study of legal controls in the areas of senior securities, dividends, mergers, corporate reorganizations and securities regulation, and their relation to financial and management theory. The federal Securities Act of 1933 is covered. The workshop deals exclusively with the problems of publicly held corporations. (Not offered every year.)

LAW 542 Law and the Correctional Process (2) Sp

Reid
Pretrial detention, sentencing procedures and alternatives, probation, the rights of the confined, prison and jail conditions, and parole. Emphasis on the impact of legal standards and the role of the courts. No background in law required. Open to law students. Offered on credit/no credit basis for non-law students only. (Not offered every year.)

LAW 543 American Indian Law (3) W

Strickland
Indian legal problems and administration with special emphasis upon governmental relations and services, treaty interpretation, land claims, internal tribal relations, economic and industrial development of tribal resources, and personal problems of the individual Indian's association with crime, poverty, discrimination, and violation of civil rights.

LAW 546 Legal History (3) W

Strickland
In-depth study of selected episodes important to the development of the Anglo-American legal system. Such episodes include, among others, the origins of the common-law writ system, English seventeenth-century constitutional struggles, the role of legislatures in the formation of American law, and the development of legal 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.)

LAW 547 Employment Discrimination (3) S

Peck
Intensive view of the legal remedies available to attack employment discrimination based on age, sex, race, religion, or national origin, under federal, state, and local law. (Not offered every year.)

LAW 550 Admiralty (3) W

Henderson
Nature and sources of both the admiralty jurisdiction and the substantive maritime law. Some constitutional history noted in examining the present scope of admiralty jurisdiction. Substantive law coverage gives primary attention to maritime liens, carriage of goods, and maritime industrial accidents. Additional topics, including general average, salvage, collision, and limitation of liability are covered as time permits.

LAW 551 Community Property (3) A

Cross, Lyness
Dealing with all aspects of community property, including what constitutes community property as distinguished from separate property, how it may be acquired and disposed of, and the problems of conflict of laws encountered in transactions with common-law jurisdictions. Washington cases constitute nearly all of the course material.

LAW 552 Comparative Law (3) A

Haley
Topics are those deemed most useful to American lawyers seeking a career specialty: brief history of Japanese law and reception of Western 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 553 Conflict of Laws (6) WSp

Powers, Trautman

Problems arising when one or more fact elements in a case occur in a jurisdiction other than the forum. The course involves the study of the part of the law that determines before the courts of what state or nation a suit may be brought and by the law of what state or nation a suit may or should be decided.

LAW 554 Legislative Clinic (15) W

Johnson

A limited number of law students work full time with a legislative committee, such as the House Judiciary Committee or the Senate Judiciary Committee, during Winter Quarter while the Legislature is in session. The clinic offers a direct experience in the legislative process, including analysis and drafting of legislation, research on statutory, common law, and constitutional questions affecting legislation, attendance at hearings, preparation of reports on bills for committees, and participation in executive committee sessions. At the end of the quarter, each student must prepare a written report in three parts: (1) a factual description of what he did, including copies of all memoranda, bills, amendments, or other documents worked on 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. The student who earns 15 credits in this clinic may not have more than 5 credits earned outside of the law school applied toward graduation requirements. (Not offered every year.)

LAW 555 Creditor-Debtor Law (4) Sp

Rombauer, 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' exemptions. Bankruptcy emphasized. Strongly recommended that student has taken or is currently taking 538.

LAW 556 Criminal Procedure VI (3-3) WSp

Junker

State and federal rules of criminal procedure, including the constitutionally derived procedural rights of those accused of crime.

LAW 557 Social Research for Lawyers (2-2)

Loh

Introduction to the logic, applications, and limitations of social science methods in law and policy. The aim is to train law students to become knowledgeable consumers—not practitioners—of social research who would be capable of using empirical methods in conjunction with their legal skills as tools for analysis and decision making on issues of fact. Principles rather than technical knowledge cover: legal and scientific reasoning; basic statistical and measurement concepts; methods of field experimentation, observation, evaluation, survey research, and organizational change; and case studies illustrating the application of those methods and the use of empirical data in litigation, judicial administration, legislation, and program planning. Recommended preparation for 644.

LAW 558 Death and Gift Taxation (3) A

Huston

Federal and state death and gift tax systems. The major 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 variation for tax purposes of property transferred.

LAW 559 Domestic Relations (3)

Hardisty, Rieke

Law pertaining to marriage, protection of the mar-

ital relations, 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) Sp

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: 535 and 558. Limit: thirty students.

LAW 561 Evidence (3-4) 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, admission and 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 presumptions, judicial notice and the parol-evidence rule. Emphasis throughout is laid on trial evidence and trial problems. Offered Summer Quarter for 3 credits.

LAW 562 Juvenile Courts (3) W

Hardisty

The following aspects of the juvenile justice system are covered: philosophical bases, criminal and non-criminal 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 (2-3) WSp

Andersen

Control of economic activity by attempts to encourage and maintain competition. The law of anti-trust 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) W

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 risks 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.

LAW 566 Jurisprudence and Legal Philosophy (2-2) AW

Morris

Introduction to legal philosophy. The coverage in this course varies each year. Some of the traditional school 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. Limit: ten students. (Not offered every year.)

LAW 567 Labor Law (3) A

Peck

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 organi-

zational 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.

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 intensive investigation. 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.

LAW 569 Professional Responsibility (1) Section A, W; Section B, 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 (2-2) 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. Limit: fifteen students. (Not offered every year.)

LAW 571 Local Government Law (3) A

Trautman

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 local units themselves. 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

Stoebuck

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 "overpromoting." (Not offered every year.)

LAW 573 Workshop in the Legal Rights of Prisoners (*) AWSp

Chisum

Workshop on the legal rights of prisoners and the procedures for protecting them. Areas covered include postconviction remedies, legal disabilities, and other problems arising from the prisoners' isolation from society, and remedies for the mistreatment of prisoners. The role of the lawyer and the adequacy of present legal representation is considered. The workshop is open only to students concurrently participating in the Legal Assistance to McNeil and Monroe Prisoners program or similar programs.

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LAW 574 Water, Public Land, and the Environment (3) A

Johnson

Covers key aspects of water law and policy, dealing with irrigation, power generation, pollution control, esthetics, recreation, environmental quality, and municipal and industrial uses. It covers federal land law and policy dealing with national parks, recreation, wildlife, environmental quality, mining, grazing, and timber production. It reveals the points of conflict between these competing uses of land and water and analyzes the changes in priorities now occurring among them.

LAW 575 Problems in Urban Government (4) A

Andersen

Anatomy of urban government from the perspective of the lawyer, acting either as a representative of private interests or dealing with a community problem such as environmental quality, housing, transportation, poverty, or crime. Emphasis on the relationships of local governments to one another and to the state and national governments. Among the topics considered are the allocation of functions of local government power, problems associated with the functional territorial division of governmental power at the local level, role of judicial review that are raised in these contexts. Not open to students who have taken 571.

LAW 577 Problems in Urban Finance (3) W

Andersen

State and local taxation, broadened to include an examination of other techniques by which the modern urban community finances the provision of public goods and services, including borrowing, intergovernmental grants, federal revenue sharing, etc. Emphasis is ultimately on issues of tax policy, viewed from both the individual and the community perspectives.

LAW 578 Advanced Evidence (3) Sp

Meisenholder

Advanced course concerning fundamentals of evidence. Continues, but does not duplicate, the study of evidence begun in the regular evidence courses. Includes study of relevancy, experimental evidence, scientific evidence, demonstrative evidence, views, proof of mental states, certain witness privileges, judicial notice, presumptions, evidence before administrative tribunals. A problem method course and demonstrations may be required. Prerequisite: successful completion of the course in evidence.

LAW 579 Mass Communication Law (3) W

Strickland

Survey of selected legal problems of public and private regulation of the communications media, including questions concerning the Federal Communications Commission, newsmen's press law, privacy, press in the courts, political campaigns, the fairness doctrine, advertising, and licensing. (Not offered every year.)

LAW 580 Trial Practice (3-2) WSP

Rothstein, Watts

Washington statutes, rules, and decisions governing various aspects of the trial and appeal of cases. Within the available time, the course attempts to provide information and training in the how-to-do-it of trial practice. A required part of the course is the conduct of an actual case before a judge from the local superior courts. The emphasis throughout is on the example of Washington procedure, and only limited consideration is given federal practice. Prerequisite: 561 or 585 prior to the beginning of Winter Quarter 1975.

LAW 581 Processes I (3) W

Hardisty

Overview of the American legal system. Facilitates the integration of legal knowledge obtained from other courses. Topics include: stare decisis; retrospective and prospective overruling; the impact of custom on law; judicial reasoning; the functions of courts, legislatures, and administrators; the interrelation of private agreements, judicial decisions, statutes, and administrative ordering; state facilitation and limitation of ordering by private persons; the relation between law and fact; legislative codification and revision of existing decisional law; licensing, subsidies, and other methods of control; executive power and discretion; interpretation of stat-

utes in the light of legislative purpose, legislative history, legislative silence, and popular and administrative constructions; and the nature and function of law in general. 582 recommended.

LAW 582 Processes II (2) Sp

Tunks

Continuation of 581. Prerequisite: 581.

LAW 584 International Legal Organization (3)

Prosterman

Understanding the roles of such organizations as the United Nations, including some of its specialized agencies, and other selected organizations with legal impact established by two or more national states.

LAW 585 Evidence (4) Section A, W; Sections B, C, D, Sp

Aronson, Gallagher, Meisenholder

Course in evidence conducted by the problem method. A casebook is not used. The major subdivisions covered are relevancy, examination of witnesses, opinion rule, hearsay rule, introduction of exhibits in evidence, and the best evidence rule. Other topics are covered as time permits. This course is not an advanced course, but an alternate course to 561 on the basic subject matter.

LAW 586 International Legal Order (3) A

Prosterman

Considers 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 crises, 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) Sp

Burke

Examination of the way nation-states regulate activities on and under the ocean. Covers the international regulations and institutions concerned with fishery exploitation, pollution, transit rights, scientific research, energy and mineral development, military uses, emplacement of installations, and the boundary issues involved in these various ocean uses. Offered jointly with IMS 506.

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

Hjorth

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, divisions, 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 593 Social Legislation (3) W

Rombauer

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; concerned 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

Qualified students, with the consent of a member of the law faculty and the Dean, receive from 1 to 6 credits (per academic year—Summer Quarter through Spring Quarter) for independent study in any of the major fields covered by the curriculum.

LAW 603 Clinical Clerkships (3-3-3) AWSp

Chisum, Staff

Students who have completed two years of law study and are qualified for internship under Rule 9 of the Washington State Bar Association work with a selected public agency under the supervision of a practicing attorney and a member of the faculty. Students may take the clerkship for one, two, or three quarters, but priority in the assignment of available clerkships is given first to students who have not previously taken a clerkship and second to those who have taken a clerkship for only one quarter. Offered on credit/no credit basis only.

LAW 605 Research and Writing (*)

Qualified students, at the third-year level, may earn 1 to 6 credits (but no more than 3 in any one quarter) for participation in a group intensive study and research project organized, planned, and supervised by a faculty member. The project would encompass a specialized area of law or a particular topic prescribed and defined by the supervising faculty member. Student performance is evaluated and validated by one or more papers and/or examinations and is graded. The groups meet together with the faculty member to a substantial extent (but not necessarily on a regular basis). Ordinarily limited: six to twelve students.

SEMINARS

LAW 617 Federal Tax Policy Seminar (2-2-2)

AWSp

Tunks

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. (Not offered every year.) Limit: eight third-year students.

LAW 624 Ocean Resources Seminar (2-2-2)

AWSp

Burke

International law of the high seas, concerned with fisheries, mineral, and other resources of the continental shelf, navigation, and territorial waters; treaty law 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. Open to second-year students with permission. Limit: eight students.

LAW 627 Selected Problems on Environmental Protection Seminar (2-2-2) AWSp

Johnson

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 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 (2-2-2, max. 6) AWSp Andersen

An opportunity to explore in depth selected 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. (Not offered every year.)

LAW 635 International Legal Order Seminar (2-2-2)

Prosterman
Focuses on the international legal context, especially bilateral or multilateral foreign-aid mechanisms, which promote or inhibit democratic development and economic growth: income redistribution including land reform, population limitation, food production, environmental damage, and "limits to growth" are among major problems considered. (Not offered every year.)

LAW 641 Federal Tax Seminar (2-2-2)

Hjorth
Intensive examination of selected areas of federal taxation. The student is expected to prepare a high-quality paper. Limit: eight third-year students who have had 590, or permission.

LAW 642 Race, Racism, and American Law Seminar (2-2-2) AWSp

Seawell
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 approach to alleviating racism, focusing on the strength and weaknesses of such an approach.

LAW 643 Deferred Compensation Seminar (2-2-2) AWSp

Huston
Advanced problems in the tax aspects of deferred compensation, with particular emphasis on pension and profit-sharing plans for corporate employees and the self-employed and stock purchase options for executives and other employees. (Not offered every year.)

LAW 644 Seminar on Reforms in Criminal Justice (2-2-2)

Interdisciplinary study of reforms at various stages of the criminal process from arrest to parole. Legal materials (case law and statutes on selected reforms; model criminal justice standards and goals) and social science literature (strategies of planning, implementation, and evaluation of reforms). Each student studies the reform of a particular agency or process using empirical field research, doctrinal-statutory analysis, or ideally a combination of both modes of inquiry, culminating in a substantial policy-relevant paper. Possible topics for seminar discussions and papers include, for example, the new federal and state speedy trial legislation; the impact of *Argersinger*; the federal parole release guidelines; experiments in pretrial release; and standards for plea bargaining and uniform sentencing. 556 and 557, both of which may be taken concurrently with the seminar, are recommended.

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. The 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) W

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; 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) Sp

Haley
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 "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) W

Haley
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) Sp

Henderson
Corporate law problems with emphasis on trans-Pacific business planning and United States-parent, Japanese-subsidiary problems.

LAW 600 Independent Study or Research (*) AWSp

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, Korea, or China). Discussion is comparative.

LAW 620 Tutorial in Japanese Law (*) 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 the practice of the United States; in the case of a student whose basic training was in a common-law country, the subject matter of the tutorial is a topic selected from the law and the practice of Japan or of 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

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 nonbook, 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)

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)
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)

Skellley
Development of the written and printed book, growth of the book trade, and aspects of rare book collecting as it affects libraries.

LIBR 476 Archival Management (3)

Lecturers and demonstrations in archival administration, organization of manuscript collections, and study of the principles and techniques employed by state archival and historical institutions. (Not offered every year.)

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.

SCHOOL OF MEDICINE

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

Organization of bibliographic data for computer storage. Automated searching and retrieval techniques. Keyword and descriptor indexing, thesaurus construction. Design and evaluation of document retrieval systems. Prerequisite: 497 or permission.

LIBR 502 Library Organization and Administration (3)

Zweizig

Study of public and academic library service, including a consideration of legal structure; finance 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, Soper

Government publications of the United States and foreign countries, their acquisition, organization, and use.

LIBR 514 Library Audiovisual Materials and Services (3)

Lieberman

Program services, administration, organization, and bibliographic control of library audiovisual materials. Prerequisite: EDC&I 480 or 587, 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, serial 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 head-

ings. Emphasis is on theory and practice in the use of the scheme. Prerequisite: 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 553 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)

Ahlors

Problems and trends that affect the school library media program are considered in group discussion and independent study. Prerequisite: 454 or equivalent.

LIBR 580 Library and Information Retrieval Skills for Clinical Applications (3) Sp

Mignon

Practical introduction to effective use of research libraries, bibliographic services, and information retrieval systems, emphasizing materials and skills strategic to needs of clinical professions. Efficient techniques for systematic searching of technical literature, organization of document collections, and information client consultation. Not open to librarianship majors. Prerequisite: graduate standing in School of Pharmacy or permission.

LIBR 590 Special Topics in Librarianship (3)

Seminar dealing with various topics in librarianship. Offered by visitors or resident faculty. Topics are 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)

Zweizig

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 (*)

SCHOOL OF MEDICINE

ANESTHESIOLOGY

Courses numbered with a "P" suffix are not graduate courses and are restricted to medical student enrollment only.

ANEST 498 Undergraduate Thesis (*) AWSpS

Bonica

By special arrangement. Time and credit to be arranged.

ANEST 499 Undergraduate Research (*) AWSpS

Bonica

Specific research problems relating to pulmonary, cardiovascular, renal, obstetric, and central nervous system functions, and their alteration by anesthetic techniques and agents. (Six weeks, full time. Limit: two students.)

ANEST 680P Basic Anesthesia Clerkship (4) AWSpS

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. (Two weeks, full time. Limit: one to five students.) All affiliated hospitals.

ANEST 681P Advanced Clerkship in Anesthesiology (8) 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: 680P or first two weeks on surgical anesthesia. (Four weeks, full time. Limit: one student in each area.) All affiliated hospitals.

ANEST 697P Anesthesiology Special Electives (*, max. 24) 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 should obtain a "Special Assignment" form from the Dean's office at least one month before advance registration. Prerequisite: permission. (Six to twelve weeks, full time.)

BIOCHEMISTRY

Courses numbered with a "P" suffix are not graduate courses and are restricted to medical student enrollment only.

BIOC 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 experiments 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 440, 441, 442 Molecular Biology (3,4,3)

A,W,Sp

Davie, Fangman, Morris, Walsh

Interdisciplinary course in general biochemistry with a strong component in molecular biology. Designed for undergraduate students enrolled in the curriculum in molecular and cellular biology and graduate students in other science departments. Prerequisites: CHEM 337 or permission for 440; 440 for 441 (each student in 441 required to enroll in one-hour quiz per week); 441 for 442; introductory physical chemistry recommended.

BIOC 444 Molecular Biology Laboratory (3) W

Agabian, Keller

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 (*) AWSpS

For senior medical students. Prerequisite: permission.

BIOC 499 Undergraduate Research (*) AWSpS

Investigative work on enzymes, proteins, lipids, nucleic acids, protein biosynthesis, intermediary metabolism, physical biochemistry, and related fields. Offered on credit/no credit basis only. Prerequisite: permission.

BIOC 512P Medical Students' Laboratory (3) W

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: HUBIO 514P, 524P or equivalent and permission.

BIOC 515P Biochemistry Review I (1) A

Elective quiz section to clarify and amplify material presented in HUBIO 514P.

BIOC 520 Seminar (1) AWSp

Seminar dealing with special topics in the field of biochemistry. May be repeated for credit. Prerequisite: permission.

BIOC 525P Biochemistry Review II (1) W

Elective quiz section to clarify and amplify material presented in HUBIO 524P.

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, 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,W,Sp

Emphasizes critical evaluation of original articles in the literature. Coordinated with 530, 531, 532, and to be taken concurrently. For first-year graduate students in biochemistry and students of other science departments, with permission.

BIOC 560 Physical Biochemistry (3) W

Specialized aspects of physical chemistry as applied to systems of biological interest. Particular emphasis on hydrodynamic and optical properties of macromolecules. Prerequisite: physical chemistry.

BIOC 574 The Biochemical Basis of Disease (2)

Sp

Bornstein, Shapiro

Discussion of pathologic physiology and molecular basis of clinical disorders. An attempt is made to demonstrate the relevance of biochemical research to the understanding and the rational therapy of human disease. Scope limited to diseases in which new developments permit description in biochemical terms. Prerequisites: 442 or HUBIO 514P, 524P or permission.

BIOC 583 Advanced Techniques in Biochemistry

(3) Sp

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)

AWSp

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) AWSpS

Davie, Fischer

Review of the current literature on the control of cellular processes at the molecular level. Topics include hormonal control of mammalian systems, role of cyclic-AMP in pro- and eukaryotic organisms, allosteric and 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)

AWSpS

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

Agabian, Byers, Morris, Palminter, 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

Bornstein

Seminars designed to discuss current knowledge of the biochemistry and pathophysiology of fibrous proteins and other structural macromolecules. Prerequisite: 442 or HUBIO 514P, 524P or permission.

BIOC 590 Proteins and Enzymes Seminar (1, max. 8) 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

Herriott, Jensen

Topics on the determination of protein structure by X-ray crystallography, and on relationships between structure and chemical properties in solution and in the crystalline state. May be repeated for credit. 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 Membranes, Bioenergetics (1) AWSpS

Shapiro

Weekly research conferences on biochemical processes that occur in membranes. May be repeated for credit. Offered on credit/no credit basis only. Prerequisite: permission.

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

Hauschka

Discussion covers recent advances in the field of developmental biology, especially those areas that are or can be analyzed by a biochemical approach. May be repeated for credit. Prerequisite: permission.

BIOC 599 Seminar in Physical Chemistry of Polymers (1) AWSpS

Teller

Weekly conferences on current research in the physical chemistry of macromolecules. For graduate students in biochemistry. May be repeated for credit. Prerequisite: permission.

BIOC 600 Independent Study or Research (*) AWSpS

BIOC 700 Master's Thesis (*) AWSpS

BIOC 800 Doctoral Dissertation (*) AWSpS

BIOENGINEERING

See Interschool or Intercollege Programs.

BIOLOGICAL STRUCTURE

Courses numbered with a "P" suffix are not graduate courses and are restricted to medical student enrollment only.

B STR 301 General Anatomy (4) Sp

Merchant, Robson

Survey of systemic human anatomy, with correlated lectures and laboratory demonstrations. Limited to students who have declared majors in health education, physical education, physical therapy, occupational therapy, or orthotics and prosthetics; others by permission.

CONJ 317-318 Introductory Anatomy and Physiology (6-6)

See Conjoint Courses.

B STR 331 Introduction to Neuroanatomy (2) W

Coates

General survey of the structure of the central nervous system, including an analysis of sensory and motor systems and higher integrative functions. Prerequisite: 301 or permission.

B STR 340 Systemic Anatomy for Dental Students (5) A

Broderon, Robson

Lecture and laboratory work in neuroanatomy and gross anatomy. Emphasis on head and neck anatomy. For dental students; others by permission.

B STR 341 Microscopic Anatomy for Dental Students (3) A

Prothero

Lecture and laboratory work in microscopic anatomy for dental students; others by permission.

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.

B'STR 498 Undergraduate Thesis (*) AWSpS

Prerequisite: permission.

SCHOOL OF MEDICINE

B STR 499 Undergraduate Research (*) AWSpS
Prerequisite: permission.

B STR 501 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.

B STR 502 Gross Anatomy (3) W
Graney, Rosse
Lecture and dissection course in regional anatomy: upper and lower extremities. For graduate students and medical students; others by permission.

B STR 503 Gross Anatomy (4) Sp
Graney, Rosse
Lecture course in regional human anatomy; head and neck. For graduate students and medical students; others by permission.

B STR 504 Human Embryology and Development (3) A
Blandau
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.

CONJ 505 Histochemical and Cytochemical Methods (3)
See Conjoint Courses.

B STR 505 Comparative General Histology (3) W
Roosen-Runge
Study of biology, histology, and ultrastructure of general tissues in vertebrates and invertebrates. Prerequisite: permission.

B STR 510 Hemopoiesis (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, radioautography, transplantation, culture, etc.) for the study of cellular kinetics and differentiation are discussed in lectures and demonstrations. Seminars 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.

B STR 511 Cellular Structure and Function (4) W
Bolender, 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. Prerequisite: permission.

B STR 512 Human Microanatomy (4) Sp
Roosen-Runge
Lectures and laboratory treating the specialized tissues and organs of the body from the microscopic and ultramicroscopic points of view. Prerequisite: permission.

B STR 515 Biological X-ray Structure Analysis (3) W
Jensen
Theory of X-ray diffraction, with emphasis on applications to biological systems. Prerequisite: permission.

B STR 517 Histological Basis of Biomechanics (3) W
Luft, 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: CONJ 400, M E 340, or 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 529 Neuroanatomy (2) Sp
Lund
Lecture and seminar on current topics in experimental neuroanatomy with special emphasis on developmental problems. Prerequisite: permission.

B STR 531, 532, 533 Electron Microscopy (1-5, 1-5, 1-5) A, W, Sp
Luft
Theoretical and applied aspects of microscopy in biology, with emphasis on newer methods. Prerequisite: permission.

B STR 540P Special Problems in Biological Structure (1-6, max. 6) AWSpS
Broderick, Graney, Kashiwa, Rosse
Guided dissection. Primarily for advanced medical students. Prerequisite: permission.

B STR 557 Seminar (1, max. 9) AWSpS
Required of graduate students. Prerequisite: permission.

B STR 575 Cellular Differentiation (1, max. 2) WSp
Nameroff
Seminar in which students read and critically discuss papers on the literature on cellular differentiation. 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 processes discussed in the first part of the course.

CONJ 585 Surgical Anatomy (1-3, max. 12)
See Conjoint Courses.

B STR 600 Independent Study or Research (*) AWSpS

B STR 697P Biological Structure Special Elective (*, max. 24) AWSpS
By specific arrangement, for qualified students; special clerkship, externship, or research opportunities can at times be made available at institutions other than the University of Washington. The faculty can advise students of possible opportunities. Students wishing to elect this course should obtain from the Dean's office a "Special Assignment" form at least one month before preregistration. Prerequisite: permission. (Six to twelve weeks.)

B STR 700 Master's Thesis (*) AWSpS

B STR 800 Doctoral Dissertation (*) AWSpS

BIOMEDICAL HISTORY

BI HS 101 The Evolution of the Life Sciences (3) W
Gottender, Whorton
For nonscience majors, presenting the basic concepts of the life sciences through a historical analysis of their development. Broad subjects to be studied historically include morphology, physiology, biochemistry, heredity, biological evolution, and ecology.

BI HS 401 Historical Development of Medical Thought (3) A
Bodemer
Survey of the history of medicine from antiquity to the twentieth century, emphasizing concepts and ideas that influenced and were influenced by medicine.

BI HS 403 Issues of Life and Death in Historical Perspective (3) Sp
Bodemer
Examination, in terms of their historical development and relation to human values, of some critical contemporary issues arising from advances in biology and medical technology. Topics include: the creation, prolongation, and termination of life, the control of human reproduction, transplanted and artificial organs, behavior modification, and human

experimentation, which are considered in the context of past and present concepts of life, death, and the individual, and the value judgments that impact upon the ethical dilemmas of modern medicine and society.

BI HS 413 Irregular Practice and Quackery in American Medicine (3) W
Whorton
Detailed study of the development of unorthodox systems of medicine in the nineteenth- and early twentieth-century United States. Analysis of the conditions encouraging recourse to irregular practitioners are followed by a discussion of the personalities, theories, and practices associated with each system, the receptions given each by the public and the regular medical profession. The survey includes, but is not limited to, homeopathy, Thomsonianism, eclecticism, hydropathy, hygienic cultism, phrenology, osteopathy, chiropractic, Christian Science, and proprietary medicines.

BI HS 414 Public Health and Hygiene in Nineteenth-Century America (3) Sp
Whorton
Detailed examination of the health problems (including infectious disease, chemical pollution, industrial hazards, and injurious living habits) that afflicted nineteenth-century Americans, and the public health institutions and practices and the hygienic measures established to ameliorate these problems.

BI HS 415 The History of Physiological Chemistry (3) Sp
Whorton
Examination of the application of alchemy and chemistry to the investigation and the explanation of physiological phenomena, from the period of the Renaissance through the nineteenth century.

BI HS 416 The Use and Abuse of Drugs in Western History (3) A
Whorton
Analysis of the historical development of attitudes toward the medical and lay employment of drugs is made through the detailed study of five controversies: natural versus chemical remedies in the seventeenth century; heroic therapy opposed by therapeutic skepticism in the nineteenth century; chemotherapy and overmedication in the twentieth century; drug regulation since 1800; and the use of alcohol and opium during the past century.

BI HS 417 History of Disease and Public Health (3) W
Whorton
Investigation of the role played by infectious disease in the development of Western civilization, of the theories devised to account for the origin and spread of 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 contributions to medical progress that they have made, and to the attitudes of the American public toward its physicians.

BI HS 419 Historical Foundations of Modern Biology (3) A
Gottender
Survey examining the origins and development 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 421 Biology in the Nineteenth Century (3) W
Gottender
General survey of the development of the biological sciences from the 1770s 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

Gottdenker

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 425 The Origin of Life from Myth to Mars (3) Sp

Gottdenker

Consideration of the supernatural and naturalistic ideas from antiquity to the twentieth century that influenced the scientific approach to the problem of the origin of life.

BI HS 426 The Biological Harvest of Travels and Scientific Explorations (3) A

Gottdenker

Consideration through lectures, readings, and discussion of travels and voyages from the conquering marches of Alexander the Great to the space explorations of NASA. It is shown that these daring, and often greedy, voyagers not only opened new horizons, but also discovered many forms of life of great economical, medical, and biological importance. Eventually this led to radical changes in the way man looked at himself and his place in nature.

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 physiological foundations of psychopathological concepts and the treatment of the mentally ill since the end of the eighteenth century. The history of the asylum movement and the mental health movement are considered in their social and cultural context, with special attention to the United States.

BI HS 434 Seminar in the History of Psychiatry (2) Sp

Bodemer

To be taken concurrently with 433 or by permission. Readings and discussion of primary works appropriate to topics considered in 433.

BI HS 497 Biomedical History Special Electives (*) AWSpS

Prerequisite: permission.

BI HS 498 Undergraduate Thesis (*) AWSp

Prerequisite: permission.

BI HS 499 Undergraduate Research (*, max. 5) AWSpS

Investigative work in history of the biomedical sciences. Prerequisite: permission.

BI HS 500 Biomedical Historiography (4-6) 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 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, and student presentations, of selected topics in the history of biological thought, emphasizing the nineteenth and early twentieth centuries. Intended for, but not limited to, those individuals in biology education. 505 is highly recommended, but not required.

BI HS 510 Topics in Biomedical History (*, max. 6) AWSp

Detailed study of topics in biomedical history through lectures, seminars, and discussion. Open to majors and graduate students in medicine, the arts and sciences, and others with appropriate background and interest. Prerequisite: permission.

BI HS 520 Seminar in the History of Medicine (3) W

Bodemer

Seminar in the history of medicine and allied sciences, stressing original literature and emphasizing independent research by the student. Prerequisite: permission.

BI HS 521 The Ethical Challenges of Modern Medicine (3) W

McCormick

Readings and discussion of critical contemporary ethical issues arising from progress in the biomedical sciences and medical technology. 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. Prerequisite: permission.

BI HS 522 Ethical Problems Surrounding Death (3) Sp

McCormick

Ethical issues related to the termination of life, such as the prolongation of life, negative euthanasia, positive euthanasia, the terminally ill patient as person, truth telling, guilt, and grief. Objectives are to identify "ethical" issues, to recognize patient "rights," and to encourage students in a process of ethical analysis when conflicting values are at stake. Prerequisite: permission.

BI HS 523 Biomedical Ethics and the Life Sciences (3) A

McCormick

Focus is on the history and development of medical ethics with consideration of the impact of value questions in biology and medicine. Case studies are utilized to illustrate the current interface of ethics, biology, and medicine. Prerequisite: permission.

BI HS 525 Seminar in the History and Philosophy of Biology (3) A

Gottdenker

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, and 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 (*) AWSpS

Prerequisite: permission.

BI HS 700 Master's Thesis (*) AWSpS

Prerequisite: permission.

CONJOINT COURSES

Courses numbered with a "P" suffix are not graduate courses and are restricted to medical student enrollment only.

CONJ 317-318 Introductory Anatomy and Physiology (6-6) SA, WSp

Gaddum-Rosse, Landau

Human physiology with anatomical demonstrations. Introductory course integrating gross and microscopic anatomy, physiology, and biochemistry of the human body. Offered conjointly by the departments of Biological Structure and of Physiology and Biophysics. Prerequisites: CHEM 101 and 102, or equivalent; primarily for nursing students; others by permission. Coordinator: Department of Physiology and Biophysics.

CONJ 448 Fundamental Immunology Laboratory (2) A

Gilliland, Pearsall

Introduction to immunologic techniques. Experiments and demonstrations designed to illustrate the principles of antigen-antibody interactions and cell-mediated reactions. Special emphasis on medical applications of immunologic methods. Prerequisite: MICRO 441 or 447 or HUBIO 521P, which may be taken concurrently, or permission. Coordinator: Department of Microbiology and Immunology.

CONJ 503 Somatic Cell Genetics (2, max. 6) A

Garfiter, 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 conjointly by the departments of Genetics, Pathology, and Pediatrics. Coordinator: Department of Pathology.

CONJ 505 Histochemical and Cytochemical Methods (3) Sp

Broderick, Kashiwa, Lagunoff

Introduction to principles and techniques of tissue fixation, sectioning, and staining; theory and application of histochemical methods for carbohydrates, lipids, nucleic acids, minerals, and proteins, including enzyme histochemistry and fluorescent antibody methods. Offered conjointly by the departments of Biological Structure and Pathology. Prerequisites: HUBIO 514P, 524P or permission. Coordinator: Department of Biological Structure.

CONJ 509 Neurochemistry (3) W

Stahl, Staff

Introductory neurochemistry course covering chemistry and metabolism, chemical pathology of disorders of lipid, amino acid, and carbohydrate metabolism, transport phenomena, neurotransmitters, memory, the visual system, and unique proteins of the central and peripheral nervous systems. This course is recommended for graduate students in the biological sciences and for medical students. A general knowledge of biochemistry is strongly advised. Offered conjointly by the departments of Physiology and Biophysics, Medicine (Neurology), and Ophthalmology. Prerequisite: permission. Coordi-

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nator: Department of Physiology and Biophysics. (Offered alternate years; offered 1976-77.)

CONJ 511 Functional Neuroanatomy (4) W Lund, Smith, Sundsten

Lecture and laboratory course in neuroanatomy, the sequence being coordinated with P BIO 511, 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 conjointly by the departments of Biological Structure and of Physiology and Biophysics. Prerequisite: permission. Coordinator: Department of Physiology and Biophysics.

CONJ 525P Preventive Medicine in Primary Care (2) Sp

Leversee, Legerfo

Practice of health maintenance is discussed in a seminar format. Goal of course is to help students develop skills in evaluating the usefulness of current and future preventive measures. Coordinator: Department of Family Medicine.

CONJ 544P Medical Aspects of Sexual Problems (3) S

James, Vontver

Lecture-discussion format, covering a body of information on sexual therapy, both normal and disturbed, with particular focus on the pertinence to medical practice. Elective open to medical students. Coordinator: Department of Psychiatry and Behavioral Sciences.

CONJ 550P 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 HUBIO 521P would have considerable difficulty with this course. Coordinator: Department of Medicine.

CONJ 560 Tumor Biology (3) S

Hakomori, J. Hellstrom, K. E. Hellstrom, Nowinski, 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 conjointly by the departments of Microbiology and Immunology and of Pathology. Required of all pathology graduate students. Prerequisite: permission of Department of Microbiology and Immunology. Coordinator: Department of Microbiology and Immunology.

CONJ 565 Cancer—Application of Basic Principles to Clinical Management (3) W

Fefer, Moe, Parker

Survey of the major aspects of cancer, such as virology, pathology, biochemistry, etc. A multidisciplinary approach is stressed. Principles of chemotherapy, radiative therapy, surgical oncology, psychological aspects, rehabilitation, and pain control are reviewed. Malignancies of breast and lung, melanoma, acute leukemia, and Hodgkin's disease are covered as an overview of present and future approaches to this disease.

CONJ 585 Surgical Anatomy (1-3, max. 12) AWSp

Guided dissection of selected regions, supplemented by conferences. Offered conjointly by the departments of Biological Structure and Surgery. Prerequisite: permission. Coordinator: Department of Biological Structure.

CONJ 660P Clinical Research Center Clerkship (*, max. 24) AWSpS

Ensinck

Students are introduced to a variety of clinical investigations that are being undertaken in the clinical research centers of Harborview Medical Center and University Hospital. Through association with investigators from the clinical faculty, the students become familiar with experimental design and laboratory techniques used in clinical research. Each student is expected to prepare a scholarly treatise on a research problem. In addition, students attend meetings of 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. Prerequisites: basic curriculum and permission. Coordinator: Department of Medicine. (Six or twelve weeks.)

CONJ 677P Clinical Allergy (*, max. 12) AWSpS
Bierman, Van Arsdel (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 interest, emphasizing adult or pediatric allergy with a balanced introduction to the entire field of clinical allergy. Offered conjointly by the departments of Pediatrics and Medicine. Prerequisite: PEDS 665P or MED 665P or FAMED 665P. Coordinator: Department of Medicine. (Four or six weeks, full time.)

FAMILY MEDICINE

Courses numbered with a "P" suffix are not graduate courses and are restricted to medical student enrollment only.

FAMED 501P Introduction to Family Medicine: Preceptorship (2½) AWSp

Leversee

Students are introduced to family medicine and its practice through preceptorship assignments with practicing family physician clinical faculty, selected readings, directed observations, and monthly seminars. Each student spends one morning each week participating in the preceptor's clinical practice and attends one seminar each month discussing readings and practice experiences. First-year (occasionally second-year) medical students.

FAMED 520P-521P-522P Ambulatory Care in Family Practice (2½-2½-2½) A,W,Sp

Gordon, Smith

In the University or an affiliated teaching family practice the student works up and follows a small group of families. The student and preceptor are responsible for continuous and comprehensive care over a nine-month period. The student's experience will be the subject of a conducted seminar series, and he or she should register for 523P-524P (Autumn and Winter quarters) when electing the continuity clerkship.

FAMED 523P-524P Seminar—Topics in Family Medicine (1-1) AW

Gordon, Smith

Major topics in primary care and preventive medicine that arise in the course of treating patients in the elective Ambulatory Care in Family Practice are discussed. These include issues in patient care, office management, and community medicine. For Family Physician Pathway students and others interested in primary care. Limited to those students taking 520P-521P-522P. Prerequisites: HUBIO 513P, 522P, 535P.

FAMED 665P Community Clinical Clerkship in Family Medicine (12) AWSpS

Delsher

Stresses the common and important clinical problems in family practice. Student functions as clinical clerk in a community clinical unit of the Department of Family Medicine, where he or she participates in care of assigned patients, using office, hospital, home, and community resources. Prerequisites: HUBIO 563P and MED 665P or permission. (Six weeks, full time.)

FAMED 675P Advanced Preceptorship in Family Medicine (*, max. 24) AWSpS

Leversee

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., MED 665P, PEDS 665P, SURG 665P, etc.). Prerequisites: HUBIO 563P and permission.

HUMAN BIOLOGY

Courses numbered with a "P" suffix are not graduate courses and are restricted to medical student enrollment only. This sequence is required for all medical students. Other students may enroll by permission of the Assistant Dean for Curriculum, School of Medicine.

HUBIO 500P Medical Practice Preceptorship at WAMI Sites (1, max. 3) AWSp

Provides opportunity for first-year medical students to gain personal experience with, and insight into, medical 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 511P Anatomy (*, max. 8) A

Koehler, Rasse

Development of the embryo from fertilization and implantation to full organ and organismal differentiation, with illustration of basic body plan. Important examples and etiology of faulty prenatal morphogenesis. Cell differentiation leading to a study of basic histology. Developmental and morphological aspects of hemopoietic system.

HUBIO 512P Mechanisms in Physiology and Pharmacology (*, max. 8) A

A. Gordon

Physiological mechanisms. Membrane transport, epithelial transport, excitability, sensory receptors, junctional transmission, contractility, energy metabolism, hormonal mechanism, mechanisms of homeostasis control, integration of mechanisms, neural and hormonal-spinal reflex, autonomic nervous system, endocrines, gastrointestinal secretions and motility, temperature regulation.

HUBIO 513P Introduction to Clinical Medicine (1½) A

C. Smith

Instruction in communication skills and interview techniques to form the basis for the eventual doctor-patient relationship and for the skill of communicating with patients. The patient profile is obtained, and the concept of problem identification is introduced.

HUBIO 514P Molecular and Cellular Biology I (*, max. 4) A

M. Gordon

Coordinated course covering classical molecular and cellular biochemistry, cellular physiology, and molecular genetics. Metabolic interrelationships as they occur in the individual are stressed and related to disturbances in disease states.

HUBIO 515P The Ages of Man (*, max. 4) 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 problems of senescence.

HUBIO 520P Cell and Tissue Response to Injury (*, max. 7) W

Benditt

Patterns of cell and tissue response to injury. Immunity and immune responses. Hypersensitivity, homologous reaction and autoimmune response. Immunohematology. Morphological, functional, and kinetic aspects of leucocytes and immunocytes. Principles of neoplasia.

HUBIO 521P Natural History of Infectious Diseases and Chemotherapy (*, max. 7) W

Falkow

Pathogenesis and immunity of infectious diseases, natural barriers. Microbiology, epidemiology, clinical manifestations and control of representative bacterial, fungal, parasitic, and viral infectious diseases. Chemotherapeutics and principles of chemotherapy. Sterilization, principles of asepsis, noso-

comial and iatrogenic infections and their prevention.

HUBIO 522P Introduction to Clinical Medicine (2) W

C. Smith

Continuation of communication skills especially as related to and dealing with affective material. The medical history is introduced and instruction in data collection begins. There is some experience with patients in conducting a medical interview for the purpose of obtaining the medical history and patient profile.

HUBIO 523P System of Human Behavior I (*, max. 3) 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 524P Molecular and Cellular Biology II (*, max. 2) W

M. Gordon

Continuation of 514P.

HUBIO 530P Epidemiology (*, max. 2) Sp

Peterson

Introduction to statistical inference and basic concepts of variance and statistical significances as applied to 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 531P Head, Neck, Ear, Nose, and Throat (*, max. 4) Sp

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Gross anatomy (including skull, pharynx, and larynx), Audition and balance. Physiology and clinical evaluation. Maxillofacial disorders, diseases of nasal passages, nasopharynx and oropharynx, accessory sinuses. Physical examination.

HUBIO 532P Nervous System (*, max. 8) Sp

Sundsten

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 533P Medicine, Health, and Society (*, max. 2) Sp

Lawrence

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 534P Endocrine System (*, max. 4) Sp

Green

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 535P Introduction to Clinical Medicine (3) Sp

Clark

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 540P Cardiovascular-Respiratory System (*, max. 10) A

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 541P Gastro-Intestinal System (*, max. 6) A

Saunders

Anatomy of the gastrointestinal system; physiology and pathology of digestion and hepatic function; and physical and laboratory examination.

HUBIO 542P Introduction to Clinical Medicine (2) A

Goodell

Advanced instruction in interview technique, history taking, and physical examination, with emphasis on detection of abnormalities.

HUBIO 543P Medicine, Health, and Society (2½) A

Lawrence

Community medicine and environmental health. Organizational aspects of medical care and public health. Socioeconomic factors in health-care delivery and environmental health.

HUBIO 549P Genetics (*, max. 2) A

Flakow

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 550P Introduction to Clinical Medicine (6) W

Goodell

Continuation of 442 with emphasis on identification of problems and correlation of findings with pathophysiological mechanisms.

HUBIO 551P Skin System (*, max. 2) 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 illustrating examples of inflammatory, vascular, immunological (including drug hypersensitivity), and neoplastic diseases.

HUBIO 552P Reproductive Biology (*, max. 6) Sp

Blandau

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 553P Musculoskeletal System (*, max. 5) W

Szolov

Gross, surface, applied, and X-ray anatomy of system, including entire spine but excluding head and neck. Histology of bone, cartilage, tendon-muscle junction and joints. Musculoskeletal trauma and healing. Pathology and clinical manifestations of other degenerative, inflammatory, metabolic, nutritional, and congenital disorders. Physical examination.

HUBIO 560P Introduction to Clinical Medicine (6) Sp

Goodell

Continuation of 550P. Introduction to clinical and laboratory diagnosis.

HUBIO 561P Hematology (*, max. 4) W

Adamson

Familiarizes students with the basic pathophysiology

mechanisms leading to disturbances of red cell, white cell, and platelet production, as well as abnormalities of hemostasis presenting clinical problems. Physiology, rather than minute details of individual disease, is stressed.

HUBIO 562P Urinary System (*, max. 6) W

Kivlat

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 563P System of Human Behavior II (*, max. 3) Sp

M. Scher

Provides the student with a basic knowledge of clinical psychopathology, its etiology, objective clinical description, and methods of treatment. Students obtain a working knowledge of the cognitive, affective, biologic, and social factors that determine and contribute to behavioral disorders and diseased states; the processes of diagnosis and problem definition and selection of appropriate modes of intervention and behavioral change.

HUBIO 565P Saturday Morning Clinical Conferences (3-9) W

Striker

Didactic seminar sessions covering the basic content of the basic science and clinical curriculum. The lecture-seminars, held every Saturday morning from 8:30 to noon, are problem-oriented and include a question-and-answer period. All third- and fourth-year medical students are excused from their clerkships during these hours, because they are expected to attend the seminars. Prerequisite: 563P.

LABORATORY MEDICINE

Courses numbered with a "P" suffix are not graduate courses and are restricted to medical student enrollment only.

LAB M 321 Medical Technology: Introductory Clinical Hematology (5) W

Behrens, 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 322 Medical Technology: Introductory Clinical Chemistry (4) A

LeCrone, Szabo

Lecture and laboratory covering the theoretical and practical concepts associated with testing procedures performed in clinical chemistry. Prerequisite: permission.

LAB M 418 Topics in Clinical Chemistry (4) Sp

Clayson, Szabo

Lecture and laboratory exercises covering fundamentals of instrumentation, methodology, and quality control in the clinical chemistry laboratory. Prerequisite: 322.

LAB M 419 Clinical Coagulation (3) S

Behrens

Lecture and laboratory covering the theory and pathology of coagulation with inclusion of selected diagnostic procedures. Prerequisite: permission.

LAB M 420 Clinical Microscopy (3) S

Hamernyk

Lecture and laboratory covering urinalysis testing procedures and associated disease entities. Prerequisite: permission.

LAB M 421 Medical Microbiology (1 or 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 Topics in Hematology (2) S

Behrens

Advanced didactic coverage of topics relating to theoretical concepts and pathology in hematology.

SCHOOL OF MEDICINE

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

Hamernyk, Staff

Clinical study of immunohematology of the red cells and hemagglutination techniques.

LAB M 427 Selected Studies in Laboratory

Medicine (15) Sp

Behrens, Clayson, Hamernyk, 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 501P Clinical Laboratory Diagnosis (3)

W

Gilliland, Stauffer

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: HUBIO 513P, 522P, 535P, 542P, 550P, 563P, or permission.

LAB M 596 Clinical Chemistry Seminar (1)

AWSp

Kaplan

Conferences on research and development in clinical chemistry. For postdoctorals in clinical chemistry and graduate students with permission. May be repeated for credit. Prerequisite: permission.

LAB M 677P Clinical Electroencephalography (*,

max. 12) AWSpS

Chairman, Wilkus

For students who desire to acquire familiarity with the techniques, interpretive criteria, and clinical applications of electroencephalography. Prerequisites: HUBIO 536P and permission. (Two or four weeks).

MEDICAL PRACTICE

MED P 401 Medical Practice Preceptorship (1)

AWSpS

Provides opportunity for first- and second-year medical students to gain personal experience with, and insight into, the medical practice situations in the departments of Medicine and Pediatrics. During this introductory period, the student is stationed with carefully selected clinical faculty members in their offices. Contact the Student Scheduling Coordinator (registrar) in the Dean's office.

MEDICINE

Courses numbered with a "P" suffix are not graduate courses and are restricted to medical student enrollment only.

MED 498 Undergraduate Thesis (*), AWSpS

For medical students. Prerequisite: permission.

MED 499 Undergraduate Research (*), AWSpS

Case studies, with laboratory research. For medical students. Prerequisite: permission.

MED 520P Community Experience in Internal

Medicine (1-1-1) AWSp

Quadracci, Van Arsdel

Provides opportunity for second-year medical students to gain personal experience with, and insight into, the medical practice situations and primary care as practiced by internists. 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 clinical practice in internal medicine. Each student is assigned to one preceptor for the entire three quarters and meets with him or her one morning each week throughout the year. Prerequisite: permission.

MED 531P Human Genetics (*), AWSp

Hall, 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 532P Applied Blood Group Genetics (2) Sp

Giblett

Lecture and laboratory work including individual projects that are related to blood transfusion, immune hemolysis, and inheritance. Prerequisite: HUBIO 534P.

MED 533P Clinical Endocrinology (2), Sp

Williams

Emphasis on the most major and dependable symptoms, signs, laboratory tests, and therapy for clinical endocrinopathies. Patient illustrated.

MED 534P Clinical Respiratory Physiology (2)

AWSp

Butler, Culver, Hildebrandt, Hlastala, Hudson,

Lakshminarayan

Intermediate-level course in respiratory physiology. Basic physiology, pulmonary function testing, applied physiology to clinical problems, and review of related literature. Covers clinical respiratory physiology in three sequential quarters, but students may register for any single quarter if desired. Prerequisite: permission. (Twelve weeks.)

MED 548P Genetics, Medicine, and Society (1)

WSp

Motulsky, Omenn

Students and faculty discuss in lectures and seminars the aspects of genetics relevant to medicine and society. Prerequisite: HUBIO 562P.

MED 604P Clinical Preceptorship in Internal

Medicine—Bremerton (8), AWSpS

Hamon

Working closely with primary-care physicians, the student is exposed to the private practice of internal medicine in a small community. Operating on a one-to-one basis with an internist (tutor), the student evaluates and 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: 665P. (Four weeks, full time.)

MED 640P Dermatology Clinic (*, max. 5)

AWSpS

Odland

Students attend dermatology clinic on Monday mornings and Thursday afternoons for twelve weeks. Prerequisite: 665P.

MED 641P Clinical Gastroenterology (8) 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: 665P. (Four weeks, full time.)

MED 642P Clinical Oncology (*, max. 24)

AWSpS

Thomas (Fred Hutchinson Cancer Research

Center)

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 rotation with clinic experience included. Students function as the primary physicians for assigned patients under supervision of the fellows or residents on the wards. Prerequisite: 665P. (Four, six, or twelve weeks, full time.)

MED 643P Clerkship in Clinical Pharmacology

(, max. 12) AWSpS*

Aagaard, Holcenberg, Johnson

Clinical experience is provided in the diagnosis and treatment of patients with adverse drug reactions, drug interactions, or other significant therapeutic problems, utilizing outpatient clinics and inpatient care at University Hospital. Emphasis on special problems in clinical pharmacology and therapeutics presented by patients in the clinic or in the hospital. Reading, seminars, and preceptorial sessions are the method of instruction. Monday afternoon and Wednesday and Friday mornings are committed to this course, with the remaining time for use in activities outlined above. Prerequisite: good standing as a third- or fourth-year medical student in a United States medical school. (Six weeks, full time.)

MED 649P Application of Genetic Principles to

Medicine (7) AWSpS

Fialkow, Hall, Motulsky, Omenn,

Stamatoyannopoulos

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 Thursday. Prerequisite: 665P.

MED 665P Clinical Clerkships (*, max. 24)

AWSpS

Beatty, Dale, Griep, Pope, Turck

Hospital patients are assigned to each student for a complete work-up. Ward rounds are held daily; lectures, clinics, and conferences weekly. Prerequisite: HUBIO 563P. (Six or twelve weeks, full time.)

MED 666P Clinical Preceptorship in Internal

Medicine—WAMI (12) AWSpS

Wallace

Advanced clinical preceptorship in internal medicine in three small urban communities in Washington and Montana, under the WAMI experiment in medical education. The student has a supervised and structured experience in dealing with situations 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: 665P. (Six weeks, full time. Limit: six students.)

MED 678P Clinical Dermatology (8) AWSpS

Odland (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: 665P. (Four weeks.)

MED 679P Clinical Gastroenterology (*, max. 12)

AWSpS

Volwiler (University Hospital)

Participation in consulting ward rounds, procedures, conferences, and selected clinics with full-time divisional staff at University, Veterans Administration, and United States Public Health Service hospitals and at Harborview Medical Center, plus directed tutorial work. Prerequisite: 665P. (Four or six weeks, full time.)

MED 680P Rheumatology (8) AWSp

Mannik

Full-time inpatient-outpatient clerkship in rheumatology. Clinical experience provided in diagnosis and treatment of rheumatic diseases, utilizing out-

patient 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. Prerequisite: 665P.

MED 681P Advanced Clinical Endocrinology (*, max. 24) AWSpS
Leonard (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: 665P. (Four, six, or twelve weeks.)

MED 682P Clinical Cardiology and Electrocardiography (8) AWSpS
Blackmon (University Hospital), *Cobb* (Harborview Medical Center), *Kennedy* (Veterans Administration Hospital), *Preston*, *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: 665P. (Four weeks.)

MED 683P Clinical Respiratory Disease and Pulmonary Physiology (8 or 12) AWSpS
Butler (University Hospital), *Hudson* (Harborview Medical Center), *Lakshminarayan* (Veterans Administration 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: 665P. (Four weeks.)

MED 684P Clinical Hematology/Oncology (*, max. 24) AWSpS
Finch (University Hospital), *Harker* (Harborview Medical Center), *Adamson* (Veterans Administration Hospital), *Thompson* (United States Public Health Service Hospital)
Outpatient and inpatient experience with hematologic/oncologic disorders. The elective includes teaching rounds, conferences, and evaluation of laboratory work. Prerequisite: 665P. (Four weeks.)

MED 685P Clinical Genetics (*, max. 12) AWSpS
Flakow, *Hall*, *Motulsky*, *Omenn*, *Stamatoyannopoulos*
Intensive study of genetic principles required in clinical work. May work in depth on one or more clinical problems or get broader experience in working up a variety of clinical cases. Prerequisite: 665P. (Six weeks.)

MED 686P Clinical Neurology (*, max. 8) AWSpS
Swanson (University Hospital)
Inpatient and outpatient experience in clinical neurology at University Hospital, Veterans Administration Hospital, United States Public Health Service Hospital, Harborview Medical Center, Virginia Mason Hospital, or Children's Orthopedic Hospital and Medical Center. Students work closely with staff, work-up and present patients on attending rounds, attend clinical conferences, and become familiar with diagnostic neurological procedures. Students from all participating hospitals assemble twice weekly for seminars with the neurology staff on topics in clinical neurology. In addition, students attend one or more clinics per week. For students taking a linear quarter, an exclusively outpatient experience can be arranged. (Four weeks; limit: ten students, six students during summer.)

MED 687P Ambulatory Medicine Elective (*, max. 12) AWSpS
Mitchell (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 internal 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 must register for a minimum of two half-days per week to a maximum of five half-days per week (except with the permission of the instructor) in the general internal medicine clinics either at University Hospital (mornings and Monday afternoons) or at Harborview Medical Center (afternoons). M.D.-Ph.D. students may register for one half-day per week providing the M.D.-Ph.D. students take two or more quarters of this elective. Prerequisite: 665P or FAMED 665P. (Twelve weeks. Enrollment limits: five at University Hospital, eight at Harborview Medical Center.)

MED 688P Ward Medicine Subinternship (*, max. 24) AWSpS
Turek (Harborview Medical Center), *Flakow*, *Pope* (Veterans Administration Hospital), *Grip* (United States Public Health Service Hospital), *Bujak* (Sacred Heart Hospital), *Bagdade* (Providence Hospital)
Students act in the capacity of interns on the medical wards under supervision of house-staff and visiting physicians. They attend all regular medicine rounds and conferences as their schedules permit. Prerequisite: 665P. (Six or twelve weeks.)

MED 689P Clinical Infectious Diseases (*, max. 12) AWSpS
Kirby (University Hospital)
Students participate in the consulting service throughout the hospital, attend daily plate rounds, conferences, and seminars. Prerequisite: 665P. (Two, four, or six weeks.)
Turek (Harborview Medical Center), *Holmes* (United States Public Health Service Hospital), *Bujak* (Sacred Heart Hospital), *Florde* (Veterans Administration Hospital)
Students participate in the consulting service throughout the hospital. They are given the opportunity to learn the microbiological aspects of infectious diseases through the clinical-laboratories. Prerequisite: 665P. (Four weeks.)

MED 690P Cardiology Subinternship (8) AWSpS
Blackmon
Students act in the capacity of interns on the white service under the supervision of house officer. Prerequisite: 665P. (Four weeks.)

MED 692P Clinical Endocrinology and Metabolism (*, max. 12) AWSpS
Goodner (Harborview Medical Center), *Leonard* (University Hospital)
Participation in inpatient rounds, conferences, and outpatient clinics at University Hospital and Harborview Medical Center. Directed tutorial work in selected aspects of endocrinology and metabolism. Full-time or part-time (outpatient clinic only) scheduling may be arranged with instructor. Prerequisite: 665P. (Four or six weeks.)

MED 693P Nephrology and Fluid Balance (8) AWSpS
Scitbner
Nephrology/fluid balance clerkship at University Hospital, Harborview Medical Center, Veterans Administration Hospital. Students see clinical nephrologic problems under close supervision, participate in nephrology and transplant rounds, 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: 665P. (Four weeks.)

MED 694P Metabolism and Diabetes (4 or 8) AWSpS
Nielsen (Virginia Mason Clinic)
In addition to the 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. Open only to fourth-year medical students. Prerequisite: 665P. (Two or four weeks, full time.)

MED 695P Clinical Aspects of Aging (7) AWSpS
Fribble
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: 665P. (Twelve weeks, one morning per week.)

MED 697P Medicine Special Electives (*, max. 24) AWSpS
Wallace

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. The department is particularly interested in placing students in a preceptorship in Hawaii. Students wishing to elect this course should obtain from the Dean's office a "Special Assignment" form at least one month before preregistration. Prerequisite: permission. (Six or twelve weeks.)

MICROBIOLOGY AND IMMUNOLOGY

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 or model of life based on cellular, subcellular, and molecular organization is developed. Major biological concepts are stressed, as is the nature of scientific inquiry. A voluntary laboratory is available.

MICRO 301 General Microbiology (3) AWSpS
Nester

One-quarter lecture course designed to acquaint students in the biological and physical 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 micro-organisms 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. Prerequisite: 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 and 302 or equivalent, and permission.

MICRO 322 Applied Bacteriology (5) AWSpS
Schoenknecht

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

SCHOOL OF MEDICINE

In G303 Health Sciences recommended. 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 302. 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: BIOL 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; BIOL 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 taken concurrently by students taking 400. Isolation by enrichment culture techniques of a wide selection of nonpathogenic bacteria. The isolates are identified, and exercises are performed to illustrate the kinetics of growth, quantitation of micro-organisms, genetic transfer in bacteria and yeast, and isolation of bacteriophage. Prerequisites: 6 credits in organic chemistry; BIOL 210, 211 and 212, or 10 credits in botany or zoology.

MICRO 407 Animal Techniques (1) W

Wetser
Designed to familiarize graduate students with proper and humane procedures pertaining to the care of, handling and breeding of, and experimentation with, small laboratory animals. One or more hours of laboratory each week, not to exceed twenty hours. Demonstrations, practice handling, and experimental procedures. Limited reading required. Prerequisite: permission.

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 micro-organisms, particularly bacteria and bluegreens, play in environmental processes. The interrelationships among micro-organisms and the effects of the physical, chemical, and biological properties of their environment are discussed and assessed. Prerequisites: 400 and 401 or equivalent, or permission.

MICRO 436 Microbial Ecology Laboratory (2) 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. Offered on credit/no credit basis only. Prerequisites: concurrent registration in 435 and permission. (Limit: ten students.)

MICRO 440 Introductory Bacteriology for Medical Technologists (1) A

Falkow
For medical technology students who need a limited introduction to basic microbiology, with focus on structure, metabolism, and genetics of medically important organisms. Prerequisite: medical technology student, or permission.

MICRO 441, 442 Medical Bacteriology, Virology, and Immunology (3,3) A,W

Evans, Pearsall, Sherris
441: brief survey of general bacteriology, immunology, and virology. During the last part of 441 and throughout 442 specific pathogenic bacteria 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 and 400 or 440 concurrently or previously, or 301, for 441; 441 for 442.

MICRO 443 Medical Microbiology Laboratory (3) AW

Coyle, Memmer, Schoenknecht
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 micro-organisms and testing of their susceptibility to antibiotics. Selected reading assignments and demonstrations. Prerequisites: enrollment in 441, 442 sequence or HUBIO 521P and permission.

MICRO 444 Medical Mycology and Parasitology (4) Sp

Coyle, Cramer, Florde
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, Welser
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 haptens; synthesis, nature, fate, and activities of antibodies; antigen-antibody interaction; immunologic injury; tissue transplantation; blood groups and transfusion; tumor immunology; Rh diseases; allergic and autoimmune diseases; and immunity to parasites. Prerequisites: 10 credits of zoology or biology; 6 credits of organic chemistry, and upper-division standing; for medical students, HUBIO 521P.

MICRO 450 Molecular Biology of Viruses (3) Sp

Champoux, Klehn
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 BIOL 211 or introductory biochemistry courses or *Watson's Molecular Biology of the Gene*.

MICRO 495 Honors Undergraduate Research (*) AWSpS

Klehn
Specific problems in medical and general microbiology or immunology. Prerequisite: permission.

MICRO 496 Undergraduate Library Research (2) AWSpS

Staley
Introduction to library research and to the microbiological literature. Topics are assigned and supervised by staff members. Offered on credit/no credit basis only. Prerequisite: permission; senior standing desirable.

MICRO 497 Microbiology Special Electives (*) AWSpS

Sherris
By specific arrangement with the Department of

Microbiology and Immunology, 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 and Immunology at least one month before preregistration. Limited to medical students. Prerequisite: permission.

MICRO 498 Undergraduate Thesis (*) AWSpS

For medical students. Prerequisite: permission.

MICRO 499 Undergraduate Laboratory Research (*) AWSpS

Ordal
Specific problems in medical and general microbiology or immunology. 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 using bacteriophage. 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, BIOC 440, 441, 442, and permission.

MICRO 503 Research Techniques in the Study of Nucleic Acids (*, max. 5) W

Champoux, Chilton
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 Micro-organisms (3) Sp

Lara
Techniques used in the preparation of micro-organisms for electron microscopy, the operation of the electron microscope, and the photographic reproduction of observations. 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 BIOC 440, 441, 442, or permission. (Offered alternate years; offered 1976-77.)

MICRO 520 Seminar (1) AWSp

May be repeated for credit.

MICRO 525 Cell Surface Membrane in Cell Sociology and Immunology (2) Sp

Hakomori
Structure and function of cell surface membranes in relation to various immunobiological and pathobiological phenomena (differentiation, organization, infection, and cancer, etc.). Offered jointly with PABIO 525. Prerequisites: 447, BIOC 440, 441, 442, and permission.

MICRO 530 Advanced General Microbiology (4) Sp

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

Nowinski
Lecture-seminar course concerning host viral-interactions. Immunological and genetic approaches are emphasized. Prerequisite: permission. (Offered alternate years; offered 1975-76.)

MICRO 550 Selected Topics in Immunology (2, max. 18) ASP

Hellstrom, Pearsall, Weiser
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

Weiser
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 HUBIO 521P, PATH 444 or HUBIO 520P, BIOC 405 or HUBIO 521P and permission. (Offered alternate years; offered 1975-76.)

MICRO 555 Advanced Clinical Microbiology (2½) AWSp

Coyle, Schoenkecht, Sherris
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) AWSpS

Ray, Schoenkecht
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.

CONJ 560 Tumor Biology (3) S

See Conjoint Courses.

MICRO 570 Advanced Immunology I: Molecular Immunology (2) W

Storb
Lecture course for graduate students and upper-division undergraduates. Together with Advanced Immunology II and III, the course provides an in-depth treatment of basic immunology. Part I covers the structure and function of antigens, antibodies, and complements, theories of antibody synthesis, and subcellular studies of the immune response. Prerequisites: 447 or equivalent, biochemistry, genetics. (Offered every three years; offered 1976.)

MICRO 571 Advanced Immunology II: Cellular Immunology (2) W

Pearsall
Lecture course for graduate students and upper-division undergraduates. Together with Advanced Immunology I and III, the course provides an in-depth treatment of basic immunology. Part II covers the cellular mechanisms of antibody synthesis, the activities of T- and B-cells, the mechanisms of cell-mediated immunity, and regulation of the immune response. Prerequisites: 447 or equivalent, biochemistry, genetics. (Offered every three years; offered 1977-78.)

MICRO 599 Topics in Microbiology and Immunology (*, max. 6) AWSpS

Sherris
Current problems in microbiological research. Prerequisite: permission.

MICRO 600 Independent Study or Research (*) AWSpS

MICRO 700 Master's Thesis (*) AWSpS

MICRO 800 Doctoral Dissertation (*) AWSpS

NEUROLOGICAL SURGERY

Courses numbered with a "P" suffix are not graduate courses and are restricted to medical student enrollment only.

NR 498 Undergraduate Thesis (*) AWSpS

G. Ojemann
Prerequisite: permission.

NR 499 Undergraduate Research (*) AWSpS

G. Ojemann
Investigation of special problems as an intimate member of the research team in the neurological surgery laboratories. Research to lead to a thesis, if desired. List of projects available on request. Prerequisite: permission.

NR 528P Neurological Surgery Seminar (1) AWSpS

Calvin
Weekly seminar centered around neurological research topics with discussion by staff and students. Prerequisite: HUBIO 532P or permission.

NR 541P Neurosurgery for the Generalist and Clinical Specialist (2) W

Kelly, Loeser
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 management of such conditions as head and spinal injuries, intracranial hemorrhage, CNS mass lesions, disk disease, hydrocephalus, and chronic pain are covered in depth. This course is not intended for those students planning to take 679P or 680P. Prerequisite: HUBIO 532P; detailed information about any of the neurosciences is not required.

NR 542P Clinical and Basic Research Correlates of Epilepsy (2) A

G. Ojemann, Westrum
Clinical symptoms and treatment of epilepsy; related basic research in neuroanatomy, neurophysiology, neuropsychology, and neuropharmacology of epilepsy. Prerequisite: HUBIO 532P for medical students; permission for others.

NR 679P Clinical Neurological Surgery (*, max. 4) AWSpS

G. Ojemann
Student serves clinical clerkship as active extern on neurological surgery ward at University Hospital or University-affiliated hospital. Prerequisite: HUBIO 563P. (Two weeks.)

NR 680P Neurological Surgery Clerkship (*, max. 8) AWSpS

G. Ojemann
Student serves clinical clerkship as an intimate member of the staff, participating in inpatient and outpatient care, both preoperative and postoperative, involving neurological surgery patients. University Hospital or a University-affiliated hospital may be selected, subject to approval of the department. May be taken in lieu of 679P, if student wishes. Prerequisite: HUBIO 563P. (Four weeks.)

NR 681P Seizure Clinic Clerkship (2½) AWSp

A. Troupin, Staff
Students participate in the initial evaluation and follow-up of patients with seizure disorders in the outpatient seizure clinic. Definition of the medical and social problems and drug therapy is stressed. Alternate forms of therapy are considered. Linear follow-up of patients seen throughout the clerkship is maintained. Limited contact with inpatients is possible. This clerkship provides not only a specialized contact with a common specific neurologic problem, but uniquely provides an experience in

prolonged follow-up and management planning for a chronic disease. Prerequisites: MED 665P and permission.

NR 697P Neurological Surgery Special Electives (*, max. 24) AWSpS

Ward
By specific arrangement, for qualified students, special clerkship, externship, or research opportunities can at times be made available at institutions other than the University of Washington. The faculty can advise students of possible opportunities. Students wishing to elect this course should obtain from the Dean's office a "Special Assignment" form at least one month before preregistration. Prerequisite: permission.

OBSTETRICS AND GYNECOLOGY

Courses numbered with a "P" suffix are not graduate courses and are restricted to medical student enrollment only.

OB GY 498 Undergraduate Thesis (*) AWSpS

Gibson
By arrangement.

OB GY 499 Undergraduate Research (*) AWSpS

Heinrichs
Prerequisite: permission.

OB GY 579P Obstetric and Gynecologic Investigation (*) AWSpS

Heinrichs
The investigation may cover any one of the following fields: uterine muscle physiology, toxemias of pregnancy, hormone assays in obstetrics and endocrinology, obstetric and gynecologic oncology. By arrangement.

OB GY 665P Introduction to Obstetrics and Gynecology (*, max. 12) AWS

Gibson
Clinical clerkship in obstetrics and gynecology that complements HUBIO 552P. 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 twelve students. Prerequisite: HUBIO 552P. (Four weeks.)

OB GY 666P Community Clinical Clerkship in Boise, Idaho (*, max. 12) AWSpS

Gibson
May be taken in lieu of 665P. 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 or she 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. Prerequisite: HUBIO 552P. (Six weeks; limit: three students.)

OB GY 667P Obstetrics and Gynecology—Introductory Elective (6) AWSp, full time; S, second and third four weeks only (Madigan General Hospital)

This clerkship may be taken in lieu of OB GY 665P. Third- and fourth-year medical students actively participate in obstetric deliveries and closely follows the management of obstetric patients. They do history and physical examinations on surgical patients and attend the patients' surgery. Hospital rounds are made on both obstetric and gynecologic patients. The students also have a great deal of exposure to office practice and family planning. Prerequisite: HUBIO 552P. (Limit: three students.)

OB GY 680P Clinical Clerkships (*, max. 8) AWSpS

Gibson
University Hospital (two students), United Public Health Service Hospital (two students), Virginia Mason Clinic (one student, office orientation). The student spends four weeks as a clinical clerk on ob-

SCHOOL OF MEDICINE

stetrics 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 clinics that afford him the opportunity to learn the office problems of the specialty. Some changes in assignments at hospitals are made as services offered at these hospitals change. Prerequisite: 665P.

OB GY 684P Endocrinology of Reproduction (*, max. 12) 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 697P Obstetrics and Gynecology Special Electives (*, max. 24) 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. Prerequisite: permission.

OPHTHALMOLOGY

Courses numbered with a "P" suffix are not graduate courses and are restricted to medical student enrollment only.

OPHTH 498 Undergraduate Thesis (*) AWSpS

Futterman (University Hospital)
Thesis based on research on the visual system conducted in the Department of Ophthalmology. Elective. Prerequisite: permission. (Limit: two students.)

OPHTH 499 Undergraduate Research (*) AWSpS

Futterman (University Hospital)
Laboratory or clinical research in physiology, anatomy, or biochemistry of the visual system. Elective. Prerequisite: permission. (Limit: two students.)

OPHTH 524P Topics in Vision (3) W

Lund (University Hospital)
Seminar covering special topics concerned with recent research in the anatomy, the biochemistry, and the physiology of vision. Prerequisite: permission.

OPHTH 681P Ophthalmology Clerkship (8) AWSp

McLean (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: HUBIO 563P and concurrent registration in 684P. (Limit: one student, four weeks.)

OPHTH 682P Ophthalmology Externship (4) AWSpS

Kramer (United States Public Health Service Hospital)
Student works with a faculty member in the diagnosis and treatment of ocular diseases in both outpatient and inpatient populations. Experience in common ocular disorders is gained, and neurological and other consultations seen. Prerequisite: HUBIO 563P. (Limit: one student.)

OPHTH 683P Pediatric Ophthalmology (2½) AWSpS

Kallina (Children's Orthopedic Hospital and Medical Center)
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 loaned. Prerequisite: HUBIO 563P. (Limit: two students.)

OPHTH 684P Ophthalmic Pathology (1) AWSp

Minkler (Harborview Medical Center)
Student participates with the eye pathologist in gross and microscopic examination of surgical and autopsy eyes. Emphasis is placed upon anatomic study and upon correlation of observations with clinically recognized ocular and systemic disease processes. Prerequisite: HUBIO 563P. (Limit: two students.)

OPHTH 697P Ophthalmology Special Electives (*, max. 24) AWSpS

Kallina
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.

ORTHOPAEDICS

Courses numbered with a "P" suffix are not graduate courses and are restricted to medical student enrollment only.

ORTHP 437 Advanced Athletic Training (5) WSp

Garrick, Staff
Designed and required for the student planning a career in the field of athletic training. The care of athletic injuries is analyzed through theory, demonstration, and practice. Prerequisite: PE 336.

ORTHP 498 Undergraduate Thesis (*) AWSpS

Matsen, Spengler
Student works directly with a preceptor in selecting a suitable area for laboratory or clinical research in the area of orthopaedics, and develops a thesis recognition. Prerequisites: HUBIO 523P and permission of department. (Twelve weeks.)

ORTHP 499 Undergraduate Research (*) AWSpS

Chaplin, Greenlee, Lippert, Matsen, Spengler
Investigation of problems pertinent to the study of musculoskeletal problems in the orthopaedic laboratories as part of the research group. Prerequisite: permission of department. (Twelve weeks.)

ORTHP 515P Orthopaedic Biomechanics (2) Sp

Briggs, LaVigne, Lippert, Spengler
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 bioengineering courses.

ORTHP 540 Injury Recognition in Competitive and Recreational Athletics (3) W

Garrick, Staff
To familiarize students with the basic concepts of sports medicine, with primary emphasis on the recognition of the urgent and emergent medical condition. Structural considerations in planning the emergency management of the life-threatening injury as well as a simplified decision model for athletic injuries. Medical problems associated with athletic activity and the appropriateness of athletic participation by various age and sex groups. Prerequisite: upper-division undergraduate or graduate student.

ORTHP 541 Injury Assessment in Sport (5) W

Garrick, Staff
Provides an advanced perspective on injury prevention, emergency management, and rehabilitation for the student interested in sports medicine. Prerequisites: 540 and graduate standing; others by permission.

ORTHP 545 Nutrition in Sports Medicine (3) W

N. Smith, Staff
Designed to provide the performing athlete, teacher, and coach with a basic understanding of food and the nutritional process and its relation to exercise and competition. Particular consideration will be given to the nutritional needs and practices of adolescent girls and boys in physical education and sport programs. Consists of class lecture-discussion periods, case-problem analysis, and completion

of one related field project. Prerequisite: upper-division or graduate standing or permission.

ORTHP 561 Sports Equipment: Principles and Practice in Safety (2) Sp

Garrick, Staff
Educates students in the functional and compositional aspects of sports equipment as they relate to safety. Competitive and recreational sports with students performing practical modifications and repairs on equipment. Questions dealing with equipment care, field surfaces, and other current issues regarding the athlete and his or her safety are discussed. Prerequisites: 540 and graduate standing; others by permission.

ORTHP 675P Preceptorship in Orthopaedics (*, max. 4) AWSpS

Student spends full time with the preceptor during all his working day in order to gain a better understanding of the diagnosis and the management of problems of the musculoskeletal system as seen in the private orthopaedic practice. Prerequisites: SURG 665P or HUBIO 563P and permission of department. (Two weeks, full time.)

ORTHP 676P Pediatric Orthopaedics (*, max. 8) AWSp

Simons, Stahell, Staff
Specifically designed to acquaint the student with all aspects of musculoskeletal problems in childhood. In addition to the didactic conferences and seminars, the student has opportunities for active participation in both inpatient and outpatient care at the Children's Orthopedic Hospital and Medical Center, and the correlative anatomy and pathology as in 680P. Prerequisite: SURG 665P or HUBIO 563P. (Four weeks, full time.)

ORTHP 677P Musculoskeletal Trauma (*, max. 8) AWSp

Chaplin, Garrick, Greenlee, Hansen, Lippert, Matsen, Spengler, Winquist
Instruction takes place largely at Harborview Medical Center, where there is a high concentration of musculoskeletal trauma. The student follows the patient from the emergency room onto the wards and into the operating room as necessary and has opportunity to continue follow-up in the outpatient clinics. Instruction is given in both general and special clinics, including hand, hip, foot, and fracture, with emphasis placed on physical examination of the patient. Students take correlative anatomy and pathology as in 680P. Prerequisites: SURG 665P and HUBIO 563P. (Four weeks, full time.)

ORTHP 680P General Orthopaedic Clerkship (*, max. 8) AWSp

Chaplin, Garrick, Greenlee, Hansen, Lippert, Matsen, Spengler, Winquist
This clerkship offers the student the unique opportunity to study the wide variety of problems presented to a general orthopaedic service. 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: HUBIO 563P or SURG 665P. Students automatically are registered for correlative anatomy and pathology, a review of gross anatomy and pathology in light of clinical problems affecting the musculoskeletal system. It is an anatomic, clinical, and radiographic correlation of disease processes. (Four weeks, full time.)

ORTHP 683P Sports Medicine (*, max. 4)

Garrick, Staff
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.

ORTHP 697P Orthopaedic External Elective (*, max. 12) AWSpS

Matsen
Special arrangements can be made for students de-

siring to take orthopaedic electives at other institutions. Programs generally approved include orthopaedic clerkships at other universities or at large orthopaedic institutes. Prerequisites: HUBIO 563P and permission of department.

OTOLARYNGOLOGY

Courses numbered with a "P" suffix are not graduate courses and are restricted to medical student enrollment only.

OTOL 498 Undergraduate Thesis (*) AWSpS

Miller
Student works directly with department faculty in selecting a suitable area for laboratory or clinical research in the area of otolaryngology, and develops a thesis for recognition. Prerequisite: permission.

OTOL 499 Undergraduate Research (*) AWSpS

Miller
Research opportunities offered under direction in the area of otolaryngology. May be repeated for credit. (Twelve weeks.)

OTOL 681P Otolaryngology Clerkship (*, max. 8) AWSpS

Smith (University Hospital)
Student participates in evaluation and care of outpatients and inpatients at the University Hospital. In addition he attends department conferences. Prerequisite: HUBIO 563P. (Four weeks, full time.)

OTOL 682P Otolaryngology Externship (*, max. 8) AWSpS

Morrison (United States Public Health Service Hospital)
Student serves externship in otolaryngology in outpatient clinic, where visits average six hundred 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: HUBIO 563P. (Four weeks, full time.)

OTOL 683P Otolaryngology Externship (*, max. 8) AWSpS

Hays (Madigan Hospital)
Individual externship training at outpatient clinic, where visits average twelve hundred per month, supplemented by inpatient assignments. Student is responsible for patient work-ups; follows assigned patient to operating room; participates in ward rounds and hospital conferences. Students reside at the hospital during externship, using facilities of BOQ and hospital mess. (Subsistence and quarters charges, approximately \$2 per day.) Prerequisite: HUBIO 563P. (Two or four weeks, full time.)

OTOL 684P Otolaryngology Clerkship (*, max. 8) AWSpS

Donaldson
Student participates in evaluation and care of outpatients and inpatients at Harborview Medical Center. He or she assists in surgery, and in addition, the student attends department conferences at both Harborview Medical Center and University Hospital in conjunction with department training. Prerequisite: HUBIO 563P.

OTOL 685P Otolaryngology Externship (*, max. 8) AWSpS

Novack
To give medical students additional training in pediatric otolaryngology at Children's Orthopedic Hospital and Medical Center. Students assist in patient work-ups, surgery, and postoperative care, and study general otolaryngology problems with special emphasis on childhood disease entities. Prerequisite: SURG 665P or HUBIO 563P. (Four weeks.)

OTOL 687P Otolaryngology Clerkship (*, max. 8) AWSpS

Doble
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: HUBIO 563P.

site: HUBIO 531P. (Four weeks; limit: one student.)

OTOL 697P Otolaryngology Special Electives (*) AWSpS

Miller
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.

PATHOLOGY

Courses numbered with a "P" suffix are not graduate courses and are restricted to medical student enrollment only.

PATH 310 Introduction to Pathology (3) A

Barker, Wlegenstein, Wolf
Study of causes, processes, and effects of important diseases. Required for students in medical technology, physical therapy, and pharmacy. Prerequisites for other students: CONJ 317-318, and MICRO 301, or equivalent courses in human anatomy, human physiology, and microbiology, and 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 sciences. Prerequisite for nondental students: permission.

PATH 445 Systemic Pathology (3) W

Page, Wolf
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.

CONJ 473 Musculoskeletal Pathology (2)

Clawson, LaZerte
See Conjoint Courses.

CONJ 474 Advanced Musculoskeletal Pathology (2)

Clawson, LaZerte
See Conjoint Courses.

PATH 498 Undergraduate Thesis (*) AWSpS

Benditt, Staff
Elective. Prerequisite: permission.

PATH 499 Undergraduate Research (*) AWSpS

Benditt, Staff
Elective. May be repeated for credit. Prerequisite: permission.

PATH 500 Principles of Pathology (5) A

Benditt, Staff
Basic disease processes such as inflammation, neoplasia, cell alteration, and genetic and developmental pathology. Lectures, laboratory exercises, and demonstrations of animal and human pathologic materials are used to teach the basic concepts of pathology that are important in biologic medical research. Intended for graduate students and advanced undergraduates in the biological sciences. Suitable knowledge of either biochemistry or biological structure is strongly recommended. Prerequisite: permission.

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)

Gariler, Martin, Plous
See Conjoint Courses.

CONJ 505 Histochemical and Cytochemical

Methods (3) Sp
Broderson, Koshieva, 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) WS

Lowe, Reichenbach
Instruction in techniques of electron microscopy. May be repeated for credit. Prerequisite: permission.

PATH 510 Anatomical Analysis of Disease (*, max. 30) AWSpS

Norris
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) AWSpS

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)

AWSpS
Wolf
Review of current research in various areas of experimental pathology by members of the department and visiting scientists. May be repeated for credit. Prerequisite: permission.

PATH 530P Human Cytogenetics (*, max. 4) A

Hoehn
Sources and methods of preparation and identification of human chromosomes. Human cytogenetic pathology; karyotype-phenotype interactions. Prerequisite: permission.

PATH 551 Experimental and Molecular Pathology (2-5, max. 20) AWSpS

Introduction to experimental pathology. A tutorial course designed to introduce a graduate student (medical, dental) or senior undergraduate to selected methods and problems through literature surveys and/or laboratory experience. Exploration of causes at the cellular and molecular levels in the study of disease is emphasized. Prerequisite: permission.

PATH 552 Contemporary Anatomic Pathology (2-5, max. 30) AWSpS

Barker
Study of recent developments in anatomic pathology. Subject includes areas of basic science and review of systemic pathology. Recent developments and interpretation of these findings are stressed.

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For pathology residents, fellows, and trainees. Prerequisite: permission.

CONJ 560 Tumor Biology (3)
Champoux, Hakomori, I. Hellstrom, K. Hellstrom, Smuckler

PATH 560P Introduction to the Analysis of Human Disease I (3) AWSpS
Mottet (University Hospital, Harborview Medical Center)

Autopsy participation and review serves 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 required in order to make appropriate group assignment.

PATH 562P 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: HUBIO 540P and permission.

PATH 563P Neuropathology (*) AWSpS
Alvord, 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 clinicopathologic correlations) held at various hospitals—Children's Orthopedic Hospital and Medical Center, Harborview Medical Center, University Hospital, Veterans Administration Hospital, Virginia Mason Hospital, and Swedish Hospital—constitute, respectively, the first six parts of the course. 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). Designed for graduate students, residents, and interns; and open to interested medical students. Prerequisite: permission.

PATH 564P Neuropathology Brain Modeling (4) S
Alvord

Designed along clinically important, functional, neuroanatomic lines, generally based first on the embryologic development of the most primitive segmental elements (sensory, motor and association cells, and simple reflexes), followed by the more elaborate suprasegmental elements (cerebellum, colliculi, and forebrain). Lectures emphasize comparative (phylogenetic) and developmental aspects of the segmental, intersegmental, and suprasegmental components of the human nervous system. May be taken concurrently with 584.

PATH 574P Systemic Pathology I (3) W

Reichenbach
Systematic presentation of disease processes organized on the basis of the organ systems with emphasis on dynamic morphology and clinicopathologic correlation. Prerequisite: HUBIO sequence through 540P.

PATH 575P Systemic Pathology II (3) Sp

Mottet
Systematic presentation of disease processes organized on the basis of the organ systems with emphasis on dynamic morphology and clinicopathologic correlation. Prerequisite: HUBIO sequence through 540P.

PATH 576P Systemic Pathology Laboratory I (2) W

Reichenbach
Common and uniquely informative specimens of

lesions from human autopsies are reviewed grossly and microscopically. Students are drilled in the recognition of human disease lesions and the correlation of the morphologic features of diseases with the clinical findings on the patient. Lesions from the same organ systems presented in PATH 574 are studied. Laboratory designed to complement and supplement the HUBIO sequence. Prerequisites: HUBIO 540P or Module 21 for ISP students, or PATH 500 and permission.

PATH 577P Systemic Pathology Laboratory II (2) Sp

Mottet
Common and uniquely informative specimens of lesions from human autopsies are reviewed grossly and microscopically. Students are drilled in the recognition of human disease lesions and the correlation of the morphologic features of diseases with the clinical findings on the patient. Lesions from the same organ systems presented in PATH 575 are studied. Laboratory designed to complement and supplement the HUBIO sequence. Prerequisites: HUBIO 540P or Module 21 for ISP students or PATH 500 and permission.

PATH 584 Neuropathology Brain Modeling Laboratory (4) S
Alvord

Designed along clinically important, functional, neuroanatomic lines, generally based first on the embryologic development of the most primitive segmental elements (sensory, motor and association cells, and simple reflexes), followed by the more elaborate suprasegmental elements (cerebellum, colliculi, and forebrain). Three-dimensional neuroanatomical relationships, critical for understanding neuropathology, can best be obtained in the construction of a model of the brain. May be taken concurrently with 564P.

PATH 600 Independent Study or Research (*) AWSpS

PATH 665P Surgical Pathology (*) AWSpS
Norris

Study of fresh gross surgical specimens and review of microscopic sections of diagnostic problems in general surgery. Prerequisites: HUBIO 563P and permission.

PATH 667P Renal Pathology Conference (*) AWSpS
Striker

Light and electron microscopic study of human and experimental renal disease. Conference discussions and individual study. Students should concurrently register for MED 693P. Prerequisite: HUBIO 520P.

PATH 668P Skin Pathology (*) AWSpS
Barker

Histopathological aspects of skin diseases are presented and discussed in a group-conference type of seminar. Current dermatologic cases also are discussed. Prerequisites: dermatology elective and permission.

PATH 669P Oral Pathology (*) W

Page
Experience in, and recognition and interpretation of, the histopathologic and clinical manifestations of the oral cavity, and study of basic pathological mechanisms responsible for these conditions. Prerequisites: HUBIO 520P and 531P, and permission.

PATH 670P Gastrointestinal Pathology (*) Sp

Norris
Laboratory elective for medical students, and certain graduate students covering the developmental, inflammatory, neoplastic, and degenerative diseases of the gastrointestinal tract, 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 HUBIO 541P. (Limit: six students.)

PATH 671P Neuroanatomic Pathology (*) W
Alvord, Shaw, Sumi

The particular diseases occurring in specific parts of the nervous system are considered in terms of the segmental (motor, sensory, and association plates), intersegmental (reticular formation), and suprasegmental (cerebellum, colliculi, and forebrain) com-

ponents. Clinicopathologic correlations are emphasized in the discussions of the syllabus and study sets of 35-mm. lantern slides. Prerequisites: HUBIO 532P and permission; 672P recommended; 563P recommended as concurrent course.

PATH 672P Neuropathologic Reactions (2½) A
Alvord, Shaw, Sumi

The reactions of the nervous system, only more or less similar to those of other organs of the body, are considered in terms of congenital 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: HUBIO 532P and permission; 563P recommended as concurrent course.

PATH 673P Cardiovascular Pathology (*) 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: HUBIO 540P. (Limit: fourteen students.)

PATH 680P Diagnostic Pathology Clerkship (*, max. 24) Six or twelve weeks, full time, AWSp; ten or twelve weeks, S

Medical student participation in the dissection and study of autopsy and surgical pathology cases. Each student is responsible for the work-up of cases assigned to him or her under the direction of a senior staff member. This may include dissection, microscopic examination, and literature review. The student also attends pathology conferences and seminars. Clerkships are available at the University Hospital, Veterans Administration Hospital, Harborview Medical Center, and Children's Orthopedic Hospital and Medical Center, and selected community hospitals. Prerequisites: HUBIO 520P and permission.

PATH 700 Master's Thesis (*) AWSpS

PATH 800 Doctoral Dissertation (*) AWSpS

PEDIATRICS

Courses numbered with a "P" are not graduate courses and are restricted to medical student enrollment only.

UCONJ 410 Study of Interdisciplinary Evaluation and Management of Handicapped Children (3) AWSpS

For course description, see Interschool or Intercollegiate Programs.

PEDS 498 Undergraduate Thesis (*) AWSpS
Morgan

For medical students. Prerequisite: permission.

PEDS 499 Undergraduate Research (*) AWSpS
Morgan

An opportunity to gain research experience through participation in various clinical or basic research programs in progress. The following specific opportunities are available, and others can be arranged: child development, developmental biology, human embryology and teratology, 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.

PEDS 501P Survey of Human Growth and Development (1½) AWSp

Baker (Clinical Training Unit)
Clinical observation and study of normal growth patterns in multiple areas of human development.

within the setting of routine well-child care. Observation and increasing participation in patient interview, examination, and treatment plan. This course covers briefly the subjects covered in more detail in 502P-503P-504P. Credit is not allowed for both 501P and 502P-503P-504P sequence. Prerequisite: permission.

PEDS 502P-503P-504P Human Growth and Development (1½-1½-1½) A,W,Sp
Kirschner

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 maturational patterns through the more casual observation of several other children of the same age. The starting point is the newborn as seen in regular monthly visits for well-child care throughout the school year. Physical, emotional, intellectual, etc., growth are followed. Home and family background are studied. There is an opportunity to participate in the doctor-patient relationship. The student follows the same family for nine months and must plan to take this elective for all three quarters. Prerequisite: permission.

PEDS 505P Longitudinal Pediatric Management (*) AWSpS

Baker
Opportunity for the student to continue contact with the child who has been the focus of his learning in 502P-503P-504P. 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 clinician role in relation to this child. Allows longitudinal study of development and the relating of this to clinical medicine. Prerequisites: 502P-503P-504P and permission.

PEDS 511P Community Night Clinics (*, max. 5) AWSpS

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: HUBIO 563P.

PEDS 512P 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 laboratory by examination of fresh abortuses and serially sectioned human embryos. The mechanisms of abnormal development (teratology) are emphasized by techniques being used in the Central Laboratory for Human Embryology. Prerequisite: permission.

CONJ 530P Clinical Infectious Diseases (3)
See Conjoint Courses.

PEDS 551P Pediatric Electrocardiography (2) W
Guntheroth

Brief review of the physiology and physics pertinent to clinical electrocardiography is followed by a presentation of terminology and methods in clinical use. Normal electrocardiograms are studied, followed by abnormal tracings, with emphasis on pediatric material, but including adult material such as myocardial infarction. Prerequisite: HUBIO 540P.

PEDS 553P Nutrition for Physicians (2) AW
Clinically related nutrition considerations in both health and disease. Selected readings provide the information necessary for discussing case problems. The series covers nutritional requirements, dietary practices, and certain nutrition-related pathological states. Emphasis on life styles in our current culture, their impact on nutritional practices, the meaning of food in society, and the challenges of worldwide food and population related problems. An opportunity for student discussion and participation is available in the small-group format. Prerequisite: HUBIO 515P. (Offered alternate years; offered Autumn Quarter 1976 and Winter Quarter 1977.)

PEDS 665P Pediatric General Clerkship (*, max. 24) AWSpS

Kelley
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: HUBIO 563P.

PEDS 669P Neonatal Pediatrics—Clerkship (*, max. 24) AWSpS

Hodson
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: 665P.

PEDS 670P Pediatric Infectious Diseases and Immunology (*, max. 24) AWSpS

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. Opportunity for experience in clinical research and laboratory techniques is provided. Prerequisite: 665P or permission.

PEDS 672P Clinical Experience in Child Growth and Development (*, max. 8) AWSp

Beck
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: HUBIO 563P. (Two or four weeks, full time.)

PEDS 673P Office Practice (*, max. 12) AWSpS

Robertson
Opportunity to observe and function in the private office settings of a number of clinical pediatric faculty and to accompany pediatricians as they pursue their daily activities in the community. Prerequisite: 665P.

PEDS 676P Pediatric Clerkship With the Mentally Handicapped (*, max. 12) AWSpS

Ruvalcaba (Rainier School), Hayden (Fircrest School)
Total care involvement with mentally handicapped 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: 665P. (Four or six weeks, full time.)

CONJ 677P Clinical Allergy (*)
See Conjoint Courses.

PEDS 679P Clinical Problems in Mental Retardation and Related Handicaps (*, max. 12) AWSpS

Holm
Experience in multidisciplinary evaluation of the handicapped child and management of the problem. Children with a variety of developmental deviations living in the community are assessed, and a rehabilitation program is planned. Participation by performing pediatric evaluations, by obtaining neurological, genetic, and other consultations, and by observing additional professional assessments (e.g., psychological testing) as indicated in the total evaluation of the handicapped child. Opportunity to provide parent counseling. Prerequisite: 665P.

PEDS 680P Pediatric Clinics (*, max. 24) AWSpS

Robertson, Staff
Elective part- or full-time experience in pediatric general and subspecialty clinics for twelve weeks. From one to ten half-day sessions may be elected each week in the following areas: general pediatrics, endocrinology, neurology, immunology, arthritis, cardiology, congenital defects and retardation, well-child, teratology, adolescent medicine, allergy, cystic fibrosis, hematology, prematurity,

neonatology, and poison control center. Prerequisite: HUBIO 563P.

PEDS 681P Inborn Errors of Metabolism (*, max. 24) AWSpS

Scott
Clinical and laboratory experience related to biochemical errors of metabolism is offered. Emphasis on the recognition, laboratory diagnosis, and genetic mechanisms operating in human disorders. Prerequisite: 665P or permission.

PEDS 682P Congenital Defects—Clinical Experience (*, max. 24) AWSpS

Shurtleff
Advanced course in pediatrics providing experience in the clinical diagnosis and management of structural and metabolic congenital defects. Prerequisite: permission.

PEDS 685P Pediatric Hematology and Oncology (*, max. 24) AWSpS

Hartmann
Laboratory and conference participation with the hematology and the oncology units at Children's Orthopedic Hospital and Medical Center. Prerequisite: 665P.

PEDS 686P Pediatric Cardiology (*, max. 24) AWSpS

Guntheroth, Morgan
The clerkship deals with both inpatients and outpatients with cardiovascular problems in the pediatric age group. Emphasis on acquiring skills in physical diagnosis and electrocardiography and on clinical knowledge of diagnostic techniques and surgical possibilities. Observation of catheterizations and cardiovascular operations may be arranged at the option of the student. There are weekly cardiac clinics and rounds on inpatients with cardiovascular problems occur twice daily. On average, two or three catheterizations and one cardiac surgery are performed weekly. Prerequisite: 665P.

PEDS 687P Advanced Clinical Clerkship in Child Neurology (*, max. 8) AW

Carlson
Advanced course in neurology dealing with neurological disease in children. Both inpatient and outpatient experience are included. Prerequisite: 665P.

PEDS 688P Adolescent Clinic (*, max. 24) AWSpS

Deisher
Advanced pediatric clerkship dealing with special problems of the adolescent. Medical students are offered an experience in a multidiscipline clinic. Prerequisite: 665P.

PEDS 690P Advanced General Pediatrics (Madigan General Hospital) (*, max. 24) AWSpS

Robertson
Outpatient, ward, and/or newborn experience, especially with the more common types of pediatric problems. Prerequisites: 665P and permission.

PEDS 691P Advanced Pediatric Clerkship (*, max. 24) AWSpS

Robertson, Staff
Ward and/or outpatient experience with direct involvement in patient care. Student works under supervision of residents and attending physicians, having responsibilities comparable to an intern for patient work-up, diagnosis, and care. This externship type of experience can be obtained at any one, or combination, of the hospitals in the affiliated program, including WAMI units in Idaho, Montana, or Washington. Students interested in this option should make arrangements well in advance of registration. Prerequisite: 665P.

PEDS 697P Pediatric Special Electives (*) AWSpS

Morgan
By specific arrangement, for qualified students, special clerkship, externship, or research opportunities can at times be made available at institutions other than the University of Washington. The faculty can advise students of possible opportunities. Students who wish to elect this course should obtain from the Dean's office a "Special Assignment" form at least one month before preregistration. Prerequisite: permission.

SCHOOL OF MEDICINE

PHARMACOLOGY

PHCOL 234 General Pharmacology (4) Sp
Lectures and demonstrations concerning the action of drugs on physiological and pathological processes with special emphasis on agents of special importance in the practice of dentistry. For dental hygiene students.

PHCOL 300 Principles of Drug Action (3) Sp
Dillie
Current concepts of the actions and effects of therapeutic and toxic chemicals. Prerequisite: undergraduate upper-division status.

PHCOL 401 General Pharmacology (5) A
Vincenzi
Introduction to general aspects of pharmacology. Consideration of principles governing drug absorption, distribution, excretion, metabolism, interaction with living systems, and dose-effect relationships. General pharmacology of drugs influencing the autonomic and cardiovascular systems, with emphasis on sites and mechanisms of action. For pharmacy students; others, including medical and graduate students, by permission. Prerequisites: CHEM 236, P BIO 360, B STR 301, PATH 310, BIOC 405, or their equivalents, or permission.

PHCOL 402 General Pharmacology (5) W
Vincenzi
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.

PHCOL 434 General Pharmacology (4) Sp
Lectures and demonstrations concerning the action of drugs on physiological and pathological processes with special emphasis on agents of special importance in the practice of dentistry. For dental students.

PHCOL 498 Undergraduate Thesis (*) AWSpS
For medical students. Prerequisite: permission.

PHCOL 499 Undergraduate Research (*) AWSpS
Participation in departmental research projects. Open to medical students. Prerequisite: permission.

PHCOL 507 Pharmacology Seminar (1) AWSp
Presentation of comprehensive reports on recent medical and scientific literature in fields of current importance. Research progress reports, and reports on results of completed research. Prerequisite: permission.

PHCOL 510 Current Topics in Pharmacology (2) W
Recent progress in pharmacological research. Considered areas include renal pharmacology, polypeptides, and selected aspects of toxicology. Prerequisite: permission. (Offered alternate years; offered 1977-78.)

PHCOL 511 Fundamental Principles and Mechanisms of Drug Action (3) A
Juchau
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 HUBIO 540P, or permission.

PHCOL 512 General Pharmacology (3) W
Horita
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: 511 or HUBIO 532P, or permission.

PHCOL 513 General Pharmacology (2) W
Loomis
Lectures and discussions on drug toxicity, pharmacogenetics, therapy of neoplastic disease, oral contraceptives. Prerequisite: permission.

PHCOL 514 General Pharmacology (3) Sp
Halpern
Advanced elective neuropsychopharmacology as a basis for therapeutic applications of drugs for use in neurology, psychiatry, anesthesiology, and pain management. Neuropharmacological and psychopharmacological correlates presented with clinical demonstration material when applicable and available in an attempt to understand drug choice, efficacy, mechanism of therapeutic action, drug interactions, safety, and limitations of therapeutic effectiveness. Prerequisite: 511 or HUBIO 532P, or permission.

PHCOL 515 General Pharmacology Laboratory (3) W
Juchau
Selected laboratory experiments in pharmacology for demonstration of basic principles of drug actions. Autonomic nervous system, central nervous system, and cardiovascular drugs are employed in both intact and isolated mammalian systems. One lecture and one four-hour laboratory per week. Prerequisite: permission.

PHCOL 525 Cardiac Pharmacology (2) Sp
Vincenzi
Advanced considerations of drug actions on the heart. 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 512 or 514 or HUBIO 540P, or permission. (Offered alternate years; offered 1976-77.)

PHCOL 526 Autonomic Pharmacology (2) W
Horita
Advanced treatment of pharmacologic effects on storage, release, and action of autonomic transmitter substances. Prerequisites: 512 or 401, 402 or 434, or permission. (Offered alternate years; offered 1976-77.)

PHCOL 527 Biochemical Pharmacology (2) A
Juchau
Considerations of the biochemical mechanisms for the biotransformation of drugs and foreign compounds. Included are reaction mechanisms, 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 1976-77.)

PHCOL 528 Neuropsychopharmacology (2) A
Halpern
The pharmacology of the central nervous system. Prerequisites: 514 or 401, 402 or 434, or permission. (Offered alternate years; offered 1977-78.)

PHCOL 532 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 434, or permission. (Offered alternate years; offered 1977-78.)

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 434, or permission. (Offered alternate years; offered 1976-77.)

PHCOL 534 Advanced Dental Pharmacology (3) Sp
In-depth treatment of the pharmacology of those drugs commonly employed in the practice of dentistry. Prerequisite: 434 or equivalent.

PHCOL 541 Special Pharmacological Techniques (3) S
Laboratory treatment of biochemical, biophysical,

and surgical approaches employed in pharmacological investigation. Prerequisites: 401, 402 or 434, or permission.

PHCOL 600 Independent Study or Research (*) AWSpS

PHCOL 697P Pharmacology Special Electives (*) AWSpS
By specific arrangement, for qualified students, special clerkship, externship, or research opportunities can at times be made available at institutions other than the University of Washington. The faculty can advise student of possible opportunities. Students wishing to elect this course should obtain from the Dean's office a "Special Assignment" form at least one month before preregistration.

PHCOL 700 Master's Thesis (*) AWSpS

PHCOL 800 Doctoral Dissertation (*) AWSpS

PHYSIOLOGY AND BIOPHYSICS

CONJ 317-318 Introductory Anatomy and Physiology (6-6) SA, WSp
See Conjoint Courses.

P BIO 350 Basic Human Physiology I (4) A
Brown
Neurophysiology. The function of the human nervous system: peripheral nervous system, sensory function, the brain. Also offered through the Division of Evening and Extension Credit Programs. Prerequisite: general chemistry or zoology or permission.

P BIO 351 Basic Human Physiology II (4) W
Brown
Transport and exchange organ systems. The systems responsible for distribution of materials within the body and regulation of the internal environment: cardiovascular system, respiratory system, renal (kidney) system. Also offered through the Division of Evening and Extension Credit Programs. Prerequisite: general chemistry or zoology or permission.

P BIO 352 Basic Human Physiology III (4) Sp
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. Also offered 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
Lecture, laboratory, and laboratory conference instruction in the basic principles and basic laboratory techniques of physiology. For students of pharmacy and others. Prerequisites: general zoology, chemistry, physics, and microbiology, or permission.

P BIO 403 Topics in Applied Human Physiology (3) A
Brengelmann, Donaldson
Covers those aspects of physiology most applicable to clinical problems (e.g., muscle, circulation, respiration, fluid, acid-base regulation, and temperature regulation). Topics are introduced at an elementary level but developed to a level from which the physiological base of clinical and applied problems can be discussed and from which students can benefit from advanced texts, original literature, or from advanced courses such as P BIO 509 through 514. Prerequisite: permission.

P BIO 405 Human Physiology (6) W
Brengelmann, Luschei
Intensive coverage of advanced physiology through lectures, laboratories, and demonstrations. Required for first-year dental students; graduate students and others by permission.

P BIO 424 Vision and Its Physiological Basis (5) A
Makous, Teller
Phenomena of human vision, including: spectral sensitivity, color vision, spatial interactions, light and dark adaptation, distance perception, and bino-

cular interactions. Techniques for the study of vision in human subjects; emphasis on correlation of human visual functioning with known optical, biochemical, anatomical, and physiological factors. Offered jointly with PSYCH 424. Prerequisite: permission; some background in a physical or biological science is recommended.

P BIO 498 Undergraduate Thesis (*) AWSpS
For medical students. May be repeated for credit. Prerequisite: permission.

P BIO 499 Undergraduate Research (*) AWSpS
For medical students. May be repeated for credit. Prerequisite: permission.

P BIO 503 Biological Instrumentation (4) S
Brown, Fetz, Luschei
Introduction to linear systems and electronic instrumentation used in physiological research. Topics include: basic circuit theory; step and frequency response of first and second order linear systems (RC & RLC circuits); Bode plots of transfer functions and impedance; operational amplifiers—basic principles and practical applications; digital logic and TTL implementation; A/D and D/A conversion; basic computer operations; sources of noise; signal/noise enhancement; transducers, recording and display devices. Designed to provide physiology and medical students with technical training for laboratory research. Prerequisites: beginning calculus and permission.

P BIO 504 Biological Instrumentation Laboratory (2) S
Brown, Fetz, Luschei
Laboratory exercises designed to provide working experience with topics presented in 503. Experiments include: responses of RC and RLC circuits to sine waves and step functions; pressure recording system; operational amplifier circuits; digital logic circuits; A/D conversion. Prerequisite: permission.

P BIO 505 Physiological Acoustics (3) Sp
Miller
Seminars on the physiological basis of audition. Includes discussion of the function and the structure of the auditory system, the ear, mechanics, transduction processes, and physiology of control pathways. Prerequisite: permission. (Offered alternate years with 546; offered 1977-78.)

P BIO 506 Physiological Basis of Dental Science (3) W
Van Hassel
Current concepts in areas of physiology related to dentistry, including pain, taste, speech, 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 ENDO 525. Prerequisite: permission.

P BIO 508 Physiology Laboratory (1-2) AWSp
Fuchs, Kerrick, Rowell
Small-group experiments to complement the content of courses 509 through 514. Four or five different laboratories are scheduled for each quarter. May be repeated for credit. Prerequisite: permission.

P BIO 509 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.

CONJ 509 Neurochemistry (3) W
See Conjoint Courses.

P BIO 510 Nerve-Muscle Physiology (3) A
Almers, Donaldson, Hille, Kerrick
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 excit-

able, synaptic, and contractile phenomena. Prerequisite: permission.

P BIO 511 Neurophysiology (3½) W
Patton
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 511 Functional Neuroanatomy (4)
See Conjoint Courses.

P BIO 512 Cardiovascular Physiology (3) Sp
Rowell
Considers the function of the heart and blood vessels from a cellular and organ point of view, including the regulation of flow to various organs. Integrates much of this material into a consideration of the cardiovascular system. Prerequisite: permission.

P BIO 513 Regulation of Temperature, Respiration, and Acid-Base Balance (3½)
Brengelmann, Brown, Hildebrandt
Introduction to control systems theory covering, in moderate depth, temperature regulation, metabolism, respiratory gas transport, mechanics and control, respiratory control, and acid-base regulation, primarily as related to humans. Prerequisites: elementary physics, mathematics, biology, and permission.

P BIO 514 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 515, 516, 517 Physiological Proseminar (7,7,7) A,W,Sp
Guided survey of the experimental literature of major topics in physiology. Course conducted as seminar with oral analysis of assigned papers and topics. Prerequisite: permission.

P BIO 518 Research Topics in Cardiovascular Physiology (1) WSp
Feigl
Speakers present seminars on current cardiovascular research from several disciplines. May be repeated for credit. Prerequisite: permission.

P BIO 519 Membrane and Muscle Biophysics Seminar (1) AWSp
Hille
Detailed discussion and study of current topics in cell membrane function and muscle contraction. May be repeated for credit.

P BIO 520 Physiology Seminar (*) AWSpS
Selected topics in physiology. May be repeated for credit. Prerequisite: permission.

P BIO 521 Biophysics Seminar (*) AWSpS
Selected topics in biophysics. May be repeated for credit. Prerequisite: permission.

P BIO 522 Pulmonary Mechanics and Gas Exchange (1-3) AWSpS
Hildebrandt
Viscous and elastic properties of chest-lung system; flow of gases in tubes. Generalized alveolar air equations. Gas transport. May be repeated for credit. Prerequisite: permission.

P BIO 523 Heat Transfer and Temperature Regulation (2-5) S
Brengelmann, Brown
Thermal exchange between the body surface and the environment. Heat production and distribution within the body. Properties of cutaneous and deep temperature receptors. Neural integration and homeothermy. Prerequisite: permission.

P BIO 524 Advanced Membrane Potentials (*) Sp
Almers, Hille
Quantitative analysis of electrical activity in nerve. Active sodium-potassium transport. Ionic flux equa-

tions. Conductance changes. Calculations of the action potential. May be repeated for credit. Prerequisite: permission.

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 (1-3) AWSpS
Hildebrandt
Chemical and neural control of respiration. May be repeated for credit. Prerequisite: permission.

P BIO 529 Abnormal Physiology (2) W
Crill
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 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, Wiederhielm
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 1976-77.)

P BIO 532 Mathematical Methods of Physiology and Biophysics (3)
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 533 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; s-plane description of feedback systems; synthesis of descriptive functions of experimental results; effect of nonlinearities 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 534; offered 1977-78.)

P BIO 534 Applications of Biological Control Systems (3) W
Fuchs
Examples of biological control systems are discussed in detail. Problems in research on respiratory, cardiovascular, hormonal, metabolic, oculomotor, and other regulatory systems are presented. Prerequisite: permission. (Offered alternate years with 533; offered 1976-77.)

P BIO 535 Operative Techniques in Neurophysiology (2-5) S
Luschei, Smith
Decerebration, laminectomy, cortical ablation, stereotaxic lesions, cardiovascular surgery, chronic electrode implants, anesthesiology, and colony management. Prerequisite: permission.

SCHOOL OF MEDICINE

P BIO 536 Behavioral Techniques in Neurophysiology (2-3) Sp

Luschei

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. (Not offered every year.)

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 541 Motor Systems I: Peripheral Mechanisms (3)

Luschei

Critical reading and discussion of research papers on the current physiology of the motor unit, afferent inputs and segmental interneurons that control motor units. Each student is responsible for leading the discussion of one topic. Prerequisites: 511 or equivalent, and permission.

P BIO 542 Motor Systems II: Brainstem Mechanisms (3)

Anderson, Fuchs

Critical discussion of research papers and resulting concepts regarding the role of various brainstem systems in controlling somatic and ocular movements. Each student is responsible for leading the discussion of one topic. Prerequisites: 511 or equivalent, and permission.

P BIO 543 Motor Systems III: Cerebral Cortex and Cerebellum (3)

Felz, Kennedy

Critical reading and discussion of classical and current papers on motor cortex, corticospinal, corticopontine, and corticobulbar systems; on cerebellar circuitry and function, and cerebrocerebellar relations. Each student is responsible for leading the discussion of one topic. Prerequisites: 511 or equivalent, and permission.

P BIO 545 Physiology of Vision (3) Sp

Teller

Selected readings from recent literature on visual systems. Emphasis is placed on studies of single neuron discharge, but other topics, such as biochemistry of visual pigments and optical properties of the eye, are usually included. May be repeated for credit. Prerequisite: permission. (Not offered every year.)

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 1976-77.)

P BIO 549 Properties of Neurons (*)

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. (Not offered every year.)

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. (Offered alternate years; offered 1976-77.)

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 (*) W

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 570 Selected Topics in Endocrinology and Metabolism (3) A

Gale

Reading and discussion of current literature with emphasis on regulatory mechanisms in mammals. May be repeated for credit. Prerequisite: permission.

P BIO 580 Special Topics in Physiological Control Systems (*)

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 594 Neurological Study Unit (2) AW

Crill

Faculty and student discussion of neurological topics illustrated with clinical cases or demonstrations include the following: physiology, neuroanatomy, neurology, neuropathology, neurosurgery, and psychiatry. May be repeated for credit. Offered on credit/no credit basis only. Prerequisite for medical students: HUBIO 532P taken prior.

P BIO 600 Independent Study of Research (*) AWSpS

P BIO 700 Master's Thesis (*) AWSpS

P BIO 800 Doctoral Dissertation (*) AWSpS

PSYCHIATRY AND BEHAVIORAL SCIENCES

Courses numbered with a "P" suffix are not graduate courses and are restricted to medical student enrollment only.

PBSCI 267 Mental Health and the Community (2) W

Broughton, 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.

PBSCI 451 Principles of Personality Development (2) Sp

Heilbrunn

Consideration is given to the physiologic, psychological, and cultural factors from maturity through old age. Prerequisite: senior or graduate standing.

PBSCI 452 Clinical Psychiatry (2 or 3) W

Harlock, 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. Designed for students in the social and health sciences including premedicine, psychology, social work, occupational therapy, society and justice, etc. Didactic earns only two credits; didactic plus patient demonstrations earns three credits.

PBSCI 498 Undergraduate Thesis(*) AWSpS

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. (Two, four, or six weeks, full time.)

PBSCI 499 Undergraduate Research (*, max. 15) AWSpS

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. (Four, six, or twelve weeks.)

PBSCI 540P Physiology of Emotions (*) WSp

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. For medical students; graduate students by permission.

PBSCI 541P Clinical Geropsychiatry (3) AWSp

Preston, B. 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 542P Culture and Illness (2) Sp

James

Examination of several social systems with regard to the manner in which patterns of illness are developed, maintained, or modified by cultural elements. Lecture-discussion course with guided reading. May be repeated for credit. (Limit: fifteen students.)

PBSCI 545P 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 547P 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 relationship 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 548P Aging and Adult Development (2) AWSp

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 553 Psychodynamics of Psychopathology (2) A

Heilbrunn

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 psychiatric syndromes. Relevant case illustrations are offered as basis for therapeutic intervention. Medical students and graduate students.

PBSCI 555P Psychoanalytic Theory (1) W

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 and graduate students. (Limit: fifteen students.)

PBSCI 556P Classical Readings in Psychiatry (2) Sp

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 557P Theory of Learning and Behavior Modification (2) AW

Carr
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 558P Psycho-Social Growth and Development (2) A

Townes, Trupin
Reviews the current literature on psychosocial influences upon the development of the child—interpersonal, moral, emotional, cognitive, etc. Emphasis on the application of knowledge within a medical practice. Open to medical students and to advanced undergraduates. Seminar format with guided readings.

PBSCI 560P 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 562P Principles of Hypnosis (2) WSp

Ripley
History and theory of hypnosis. Induction techniques. Application to the treatment of illness. Medical students only; others by permission. Prerequisite: permission.

PBSCI 566 Biological Correlates of Psychiatry (2) Sp

Heilbrunn
Anatomical and physiological factors involved in various forms of psychopathology. Medical and graduate students.

PBSCI 570P Chemical Aspects of Behavior (2) Sp

Masuda
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, brain substances and drugs, and behavior). Seminar format with guided reading. Open to third- and fourth-year medical students only. (Limit: ten students.)

PBSCI 591P Seminars and Conferences in Psychiatry (*) AWSp

Ripley, Staff
Special seminars and conferences on a variety of topics can be arranged to accommodate the particular interests of students. Prerequisite: permission.

PBSCI 592P 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.

PBSCI 664P Clerkship in Ambulatory Services, HCMHC (12) S

Nash
Trainee has 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, and individual, family, and group psychotherapy. Minority and disadvantaged populations also are considered. Prerequisites: 665P and HUBIO

563P, or permission. Medical students; graduate students by permission. (Six weeks, full time; twelve weeks, half-time; limit: four students.)

PBSCI 665P Clinical Clerkships (*, max. 24)

AWSpS
Ely, Johnson, Sata
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 or she 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 psychological tests, ward milieu management, group psychotherapy, and the physical and pharmacological treatments. Clinical conferences with discussion of psychoses, psychoneuroses, and psychosomatic disorders. Limited consultation and screening experience available. Third- and fourth-year medical students only. (Limit: eighteen students.)

PBSCI 666P WAMI Psychiatry and Behavioral Sciences Clerkship (12) AWSpS

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 diagnosis, 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. (Six weeks, full time.)

PBSCI 675P Psychiatric Externship (*, max. 12)

AWSp
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: 665P. (Limit: four students.)

PBSCI 690P Adult Development Program (*, max. 24) AWSpS

Bakker
In the Adult Development Program (ADP), the student functions as a team member. He or she is expected to participate in all the classes offered in the program. The student functions as a consultant to a client assigned to him. He or she has opportunity to acquire experience with a wide variety of behavior change techniques, including group experiences, role playing, couples workshops, fixed-role workshop, etc. Prerequisite: HUBIO 563P. (Six or twelve weeks, full time; limit: three students.)

PBSCI 693P Combined Psychiatry Clerkship (*, max. 24) AWSpS

Ely, Johnson
Twelve weeks of intensive experience and contact with adults and adolescents on a psychiatric inpatient service at University Hospital or Veterans Administration Hospital. Some consultation service experience also offered. Under individual faculty level supervision, clerkship offers equivalent of time spent on psychiatry during a standard rotating internship. Duties and responsibilities are comparable to those discharged by first-year psychiatric residents and involve primary patient care responsibility. In addition to being the patients' primary physicians, students are carefully instructed in understanding psychodynamics and psychopathology of emotional and behavioral problems, various interactions between doctor and patient, and methods of counseling and psychotherapy. Medical students only. Required for Behavioral Sciences Pathway students. (Limit: six students.)

PBSCI 695P Clerkship in Community Mental Health (*, max. 12) AWSpS

Nash
Elective course offering actual field experience in working with community agencies and with personnel in providing direct and indirect mental health services. Students participate in community

consultation and community education programs as well as in didactic teaching seminars. The program is geared to the specific interests of each student. Third- and fourth-year medical students only. Prerequisite: HUBIO 563P. (Six weeks, full time; limit: three students.)

PBSCI 696P Clerkship in Adult and/or Child Outpatient Psychiatry (*, max. 24) AWSp

Casey, Gode, Hampson
Full-time students divide their time between adult outpatient and child outpatient. Part-time students spend all their time on either the adult outpatient or the child outpatient services. The adult outpatient experience emphasizes treating emotional problems and problems of living that are frequently seen in a typical medical practice. Students have primary responsibilities as therapists to several patients as well as participants in patient evaluations. Students in the Division of Child Psychiatry participate in evaluation of the children and families and have the opportunity to follow families with a mental health professional. They participate in a pediatric-psychiatric liaison service and observe and work with children with learning problems of emotional origin. Both adult and child services offer supervision and didactic programs. Third- and fourth-year medical students. (Six or twelve weeks, full time; four or five half-days per week for twelve weeks, part time.)

PBSCI 697P Psychiatry Special Electives (*, max. 24) AWSpS

Elsdorfer
By specific arrangement, for qualified students, special clerkship, externship, or research opportunities can at times be made available both on campus and 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.

RADIOLOGY

Courses numbered with a "P" suffix are not graduate courses and are restricted to medical student enrollment only.

RADGY 477 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. Experiments are designed to permit the student to utilize the theory discussed and to make actual determinations of transfer coefficients. Offered jointly with NUC E 477.

RADGY 487 Radioactive 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 NUC E 487. Prerequisite: permission.

RADGY 498 Undergraduate Thesis (*) AWSp

Figley
The student may write a thesis in either therapeutic or diagnostic radiology. Medical students only. Prerequisite: permission.

RADGY 499 Undergraduate Research (*) AWSp

Figley
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. Figley, 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,

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lar, 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, 506 Radiological Physics I, II (1-3, max. 3; 1-3, max. 3) A,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

Emphasizes methods and procedures rather than facility or equipment design.

RADGY 510 Special Topics in Radiation Biology (2) Sp

Christensen

Detailed study of current research of special significance to the development of radiation biology. Prerequisite: permission.

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

Examines the interactions of ionizing radiations with matter and the physical principles involved in their measurement in greater depth than 505. Presented in group tutorial, as well as didactic lecture form. For students contemplating a career in research concerned with ionizing radiation and assumes a sound background in physics. Mainly suited to students in the Research Scientist Pathway with at least a physics major at the first degree level and a continuing interest in physics. Prerequisite: permission.

RADGY 540, 541 Nuclear Energy, Man, and His Environment I, II (3,3)

Robkin

Investigations into various aspects of the interaction of radiation with biological material. Included are topics in the analysis of radiation fields, dosimetry, shielding, biological response to radiation, mathematical modeling, etc. Seminar with the discussion not limited to material already described in the literature. Original research not excluded. Offered jointly with NUC E 540, 541. Prerequisite: permission.

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 560P Introduction to Clinical Radiology (1) Sp

Figley, Parker, Troupin

Elective course intended to introduce clinical diagnostic radiology and radiation oncology. In small tutorial groups, the students analyze x-ray examinations that depict some of the internal structure, function, and derangement studied in the first-year curriculum. In radiation oncology the same group sees patients who are afflicted with cancer; diagnosis and treatment are discussed, building on student knowledge of general and specific organ system pathology. Prerequisite: HUBIO 520P.

RADGY 580P Nuclear Medicine Technique, 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 600 Independent Study or Research (*, max. 12) AWSpS

Prerequisite: permission.

RADGY 693P General Radiology Clerkship (*, max. 12) 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 is designed to provide insight into radiologic care delivery in community practice. Prerequisite: HUBIO 563P.

RADGY 695P Clinical Cancer Management (*, max. 8) AWSpS

Parker (University Hospital)

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: MED 665P or HUBIO 563P, or permission. (Two weeks.)

RADGY 696P Nuclear Medicine Clerkship (*, max. 12) AWSpS

Nelp

Student participates from 8:00 a.m. to 5:00 p.m. daily in the nuclear medicine clinical laboratory, where 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. (Two, four, or six weeks.)

RADGY 697P Radiology Special Electives (*, max. 24) AWSpS

Troupin

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.

REHABILITATION MEDICINE

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REHAB 290 Pre-Occupational Therapy Clerkship (2) AWSp

Becker

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

Staffs of departments of Medicine, Obstetrics and

Gynecology, Orthopaedics, Pediatrics,

Rehabilitation Medicine, Psychiatry and

Behavioral Sciences, Radiology, Surgery, and

community agencies serving various disability

groups

Lectures in medical science fields related to: general surgery, obstetrics and gynecology, internal medicine, neurology, rehabilitation medicine, orthopaedics, psychiatry and behavioral sciences,

rheumatology, and pediatrics. Required for occupational therapy, prosthetics and orthotics, and physical therapy students, and rehabilitation counseling students. Offered on credit/no credit basis only.

REHAB 332 Pathologic Physiology for Physical Therapists and Occupational Therapists (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: B STR 301, ZOOL 208 or 118, and permission.

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 orthoses for management of spinal pathology. Each student plans, fabricates, and fits orthoses for lumbar, dorsolumbar, thoracic, and cervical regions. Required for prosthetics and orthotics majors; others by permission.

REHAB 341 Upper-Limb Prosthetics (4) W

Dralle

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.

REHAB 342 Upper-Limb Prosthetics II (4) Sp

Dralle

Instruction in, and experience with, the use of prosthetic components and materials, including preprosthetic care, prosthetic components, principles of fabrication and harnessing, and techniques of checkout and prosthetic training for all amputation types. Instruction in, and a review of, anatomy, biomechanics, normal and abnormal locomotion, and motor disability as they pertain to upper-limb prosthetics, as well as medical management and prescription considerations. Instruction and practice in immediate postsurgical fitting techniques.

REHAB 343 Upper-Limb Orthotics (6) S

Simons

Instruction in, and experience with, the use of orthotic components and materials. Students evaluate and fabricate therapeutic and functional orthoses, including externally powered devices. Required for prosthetics and orthotics majors; others by permission.

REHAB 380 Occupational Therapy in the Health-Care System (2) A

Becker

Exploration of the meaning of occupational performance and the importance of purposeful activities in maintaining health and an overview of the health-care delivery system as applied to rehabilitation and health maintenance. Emphasis centers on the role of occupational therapy and its relationship to health professions. Prerequisite: occupational therapy major.

REHAB 408 Tests and Measurements in Physical Therapy (3) A

Hertling, 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 and pain evaluation. Laboratory. Required for physical therapy students.

UCONJ 410 Study of Interdisciplinary Evaluation and Management of Handicapped Children (3)

For course description, see Interschool or Intercollege Programs.

REHAB 414 Psychological Aspects of Disability (3) AW

Fordyce

Psychological processes underlying adjustment to disability; application of behavioral/analysis systems in patient therapy management; effects of in-

Intellectual and perceptual deficit on patient performance and treatment strategies. Required for physical therapy students; others by permission. Prerequisite: PSYCH 100.

REHAB 415 Undergraduate Seminar for Physical Therapy Students (2-1-2) A,W,Sp
McMillan
Basic principles of medical ethics; history, scope of physical therapy; relationships of physical therapy, occupational therapy, nursing, rehabilitation counseling, social service, and other allied services. Required for physical therapy students. Offered on credit/no credit basis only.

REHAB 416 Principles of Physical Therapy Administration (4) Sp
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-Limb Prosthetics I (8) A
Simons
Instruction in fabrication, fitting, and alignment of the patellar-tendon-bearing prosthesis. Emphasis is placed on the biomechanics of below-knee fit and alignment, dynamic alignment, and the use of the below-knee adjustable leg and duplication devices, as well as methods of suspension. Required for prosthetics and orthotics majors; others by permission.

REHAB 421 Lower-Limb Prosthetics II (11) W
Simons
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 423 Lower-Limb Orthotics (8) A
Lund
Instruction in, and experience with, the use of orthotic components and material, including measurement and fitting of lower-limb orthoses and shoe modifications to patients. Each student evaluates patients and plans, fabricates, fits, and checks out several orthoses. Required for prosthetics and orthotics majors; others by permission.

REHAB 427, 428 Applied Prosthetics and Orthotics I, II (1-1-1; 5) Sp,S
Simons
Further 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
Simons, Zeitl
Lecture and laboratory designed to introduce the student to the principles of immediate postsurgical prosthetic fitting, including patient management for both upper and lower extremities.

REHAB 430 Advanced Limb Prosthetics and Engineering Concepts (4) S
Dralle, Lund, Simons
Instruction and experience in the use of prosthetic components and materials including casting techniques and alignment procedures used for hip disarticulation patients and the Symes prostheses. Instruction in, and review of, anatomy, biomechanics, normal and abnormal locomotion, and motor disability as they pertain to hip disarticulation and Symes prostheses. Instruction in the physical principles that underlie modern prosthetic/orthotic devices and practice. Hydraulic control, material behavior, force analysis and basic electronics with emphasis on application to prosthetic/orthotic practice.

REHAB 435 Professional and Therapeutic Communication in Occupational Therapy (3) W
Harlock
Review of concepts of social behavior typical of

small-group interaction and dynamics. Focus on principles and purposes of effective interpersonal and organizational communication. Analysis of selected examples of dysfunctional communication are analyzed. Laboratory experience includes practice with various interpersonal and small-group communication techniques. Prerequisite: occupational therapy major.

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 443 Kinesiology Laboratory (2) Sp
Herling, McGee
Laboratory practice and clinical problem-solving sessions related to joint motion, muscle function, and gait evaluations in the normal and abnormal state. Required for students in physical therapy in prosthetics and orthotics.

REHAB 444-445 Function of the Locomotor System (4-4) A,W
DeLisa, Lehmann
Functions of musculoskeletal system as applied to normal and pathologic patterns of motion. Emphasis on upper extremity, shoulder girdle, lower extremity, and trunk. Anatomy of peripheral-vascular and peripheral-nervous system. Required for occupational therapy students and physical therapy students; others by permission. Prerequisites: B STR 301, ZOOL 208 or 118.

REHAB 446, 447 Anatomy Laboratory for Occupational Therapists (1,1) A,W
Becker, Hager
Study of musculoskeletal, peripheral-vascular, and peripheral-nervous systems from prosected material. Required for occupational therapy students.

REHAB 451, 452 Functional Anatomy Laboratory (1,1) A,W
McGee
Study of musculoskeletal, peripheral-vascular, and peripheral-nervous systems from prosected material. Required for physical therapy students.

REHAB 459 Physical Therapy Procedures I (2) A
Bernt
Introductory principles and concepts of acute care pertinent to physical therapists. Laboratory and clinical practice of basic procedures (e.g., monitoring vital signs, suctioning, use of standard hospital equipment, positioning and transfer techniques). Required for physical therapy students.

REHAB 460 Physical Therapy Procedures II (2) A
McGee
Introductory principles and concepts related to clinical physical therapy. Laboratory and clinical practice of basic physical therapy procedures in hydrotherapy, thermotherapy, and cryotherapy. Application of physiological principles to clinical procedures. Required for physical therapy students.

REHAB 461 Physical Therapy Procedures III (3) W
Trotter
Exercises commonly used for treatment purposes in physical therapy. Motor learning, physiological effects, safe and effective utilization of selected equipment, and development of appropriate exercise programs. Laboratory. Required for physical therapy students.

REHAB 462 Physical Therapy Procedures IV (2) Sp
Herling
Introduction to physical restoration techniques. Lecture and laboratory in basic transfer; ambulation activities; selection, care, and use of wheelchairs, crutches, canes, and other assistive devices. Practice in selected clinical problem-solving sessions. Required for physical therapy students.

REHAB 463 Physical Therapy Procedures V (1) W
McGee
Theory, technique, demonstration, and practice in

the use of the physical agents employed in physical therapy, which include ultraviolet radiation, short-wave diathermy, ultrasound, and microwaves. Required for physical therapy students.

REHAB 464 Physical Therapy Procedures VI (3) W
Herling
Lectures and laboratories in massage, traction, and soft-tissue techniques. Required for physical therapy students.

REHAB 465 Physical Therapy Procedures VII (1) Sp
McGee
Theory, technique, demonstration, and practice in the use of low-frequency currents employed in physical therapy. Required for physical therapy students.

REHAB 466-467 Advanced Biophysical and Physiological Effects of Modalities (2-2) A,W
Lehmann
Biophysical principles of equipment employed in physical therapy, physiological effects produced. Required for physical therapy students; others by permission.

REHAB 468 Therapeutic Modalities: Activities and Analyses (1-4) A
Hagedorn
Laboratory devoted to the development of skills in the analysis, adaptation, and teaching of arts and recreational activities with an emphasis on their therapeutic application to occupational therapy. Prerequisite: occupational therapy major.

REHAB 469 Therapeutic Modalities: Facilitating Movement (3) W
Becker
Laboratory study of special skills in occupational therapy directed toward facilitation of movements as applied to treatment. Includes the use of prostheses, fabrication of orthotics and adaptive devices or equipment, teaching methods for activities of daily living, and demonstrations of proprioceptive neuromuscular facilitation. Prerequisite: occupational therapy major.

REHAB 471- Therapeutic Exercise for Neurologic Dysfunctions (5-) A
Trotter
Methods of application, physiologic and therapeutic effects of exercises commonly used for treatment purposes in physical therapy. Special attention given to correlation of techniques to appropriate age level and handicap. Simulations of patient management. New developments from the field analyzed and evaluated. Required for physical therapy students.

REHAB 472 Management of Selected Therapeutic Problems (-3) Sp
Trotter
See 471- for course description.

REHAB 473 Administration and Supervision in Occupational Therapy (3) Sp
Harlock
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 475 Physical Restoration (2) A
Herling
Instruction in theory and methods of physical restoration of the severely handicapped patient. Laboratory demonstration and practice, in splinting procedures, orthopaedic tractions, and ambulation activities; 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
Lund-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 students; others by permission.

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REHAB 477 Group Techniques (3) A *Harlock*

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 *Beukelman*

Orientation information for speech pathology and audiology students in rehabilitation principles and techniques. Offered jointly with SPHSC 452. Lecture and clinical observation in all areas of rehabilitation, emphasizing cooperation and coordination of various professions in rehabilitation.

REHAB 481, 482, 483, 484 The Dynamics of Occupational Therapy (4,4,4,4) Sp,A,W,Sp *Hagedorn, Hager, Harlock*

Series of sequential interrelated courses examining the development and integration of skills, life tasks, and roles essential to productive living for the individual from birth through old age. The dynamics of occupational therapy in facilitating functional, physical, social, emotional, work, and leisure performance of persons whose behavior is dysfunctional in one or more of these areas is studied. Included are assessment methods, selection and use of modalities, and effects of cultural and environmental factors on treatment planning. Laboratory sessions are scheduled in various clinical settings to provide observation and limited participation in application of treatment principles. Prerequisite: occupational therapy major.

REHAB 489, 490, 491 Clinical Clerkships in Physical Therapy (2,3,4) A,W,Sp *Trotter*

Observation, instruction, and supervised practice in 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 492 Pathways in Occupational Therapy (3, max. 6) WSp *Lucci*

Provides the opportunity for continued study in a specific area of interest under the preceptorship of selected faculty members with guided readings and clinical experiences. Results of each study are shared through periodic class meetings. One quarter required, repeat optional. Offered on credit/no credit basis only. Prerequisite: occupational therapy major.

REHAB 494 Field Experience (14) *Lucci*

A minimum of six months of directed and supervised occupational therapy field work experience at the University-affiliated hospitals and other approved centers. Required for occupational therapy major. Offered on credit/no credit basis only.

REHAB 495 Clinical Affiliation in Physical Therapy (2-5, max. 5)S *Trotter*

Twelve to fifteen weeks with six hundred minimum working hours. Clinical application of physical therapy techniques under supervision in affiliated hospitals. Required for physical therapy students. Offered on credit/no credit basis only.

REHAB 498 Undergraduate Thesis (*) *Lehmann*

Prerequisite: permission.

REHAB 499 Undergraduate Research (*) AWSpS *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.

REHAB 500 Specialized Clinical Experience in Physical Therapy (3-5, max. 10) AWSpS *Trotter*

Student is assigned to an affiliated clinical facility. Activities could focus on a wide variety of processes. These might include acquisition of an advanced and/or specialized treatment skill to be used in direct patient care; the development and presentation of an inservice 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 *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 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 disability. Required for rehabilitation counseling students; others by permission.

REHAB 520 Seminar (1-5) AWSp *Lehmann, Lucci*

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 Neurophysiological Topics in Rehabilitation Medicine (2) 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 524, 525, 526 Approach to Treatment Strategies in Occupational Therapy (4,4,4) A,W,Sp *Hagedorn, Hager, Harlock*

Process of collecting, analyzing, and interpreting assessment data, formulating treatment objectives, and selecting and utilizing treatment media. Emphasis on the importance of ascertaining all ability requirements for human functional performance with the social, emotional, physical, and culturally handicapped. Prerequisite: occupational therapy major.

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 *Mott*

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 re-

sources in planning for vocational/educational placement after follow-up, and develops activity-oriented schedules. Prerequisite: permission.

REHAB 534 Normal Developmental Sequencing in Occupational Therapy (3) AWSp *Tyler*

Study of the motor, perceptual, cognitive, and social skills of the child from birth to ten years. Laboratory experiences include use of assessment tools and techniques, and detection of perceptiveness of parents' concerns. Prerequisite: permission.

REHAB 535 Physical Medicine and Rehabilitation Administration (2-5) AWSpS *Lehmann, Lucci*

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 539 Communication Disorders in Rehabilitation Medicine (2) S *Beukelman*

Overview of communication disorders secondary to central and peripheral nervous system impairment. Emphasis on facilitating identification of speech/language disorders with discussion of implications for rehabilitation. Prerequisite: graduate student status (postdoctoral fellow).

REHAB 540 Application of Measurement Systems (3) AWSp *Peck*

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, max. 9) AWSp *Tyler*

Seminar and clinical practicum concerned with the evaluation and therapy of the motor, perceptual, and adaptive skills of neurologically impaired and mentally retarded 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 academicians trainees. Prerequisite: resident standing in rehabilitation medicine; others by permission.

REHAB 550 Electromyography for Occupational Therapists (3) AWSp *Trotter*

Introduction to clinical electromyography methods as a research tool through lectures, demonstrations, and practice sessions. Prerequisite: permission.

REHAB 553P First-Year Clinical Elective in Physical Medicine and Rehabilitation (3) AWSp *Lehmann*

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. (Ten weeks.)

REHAB 555P Neuromuscular Electrodagnosis (2½) AWS *Kraft*

Lecture-demonstration of fundamentals of electromyography and peripheral nerve stimulation followed by student participation in clinical electrodiagnosis examinations. An effort is made to develop in the student an awareness of the usefulness of these tests so that he will, in the future, know when

such procedures are indicated for his patients and will be able to interpret the results rather than to develop proficiency in performing these examinations. Prerequisite: HUBIO 563P.

REHAB 568 Biophysics as Applied to Physical Medicine (2) A
Lehmann

Propagation and absorption characteristics of physical forms of energy used for treatment in physical medicine. Physiologic effects basic to prescription of the physical therapy modalities. Prerequisite: resident standing in rehabilitation medicine; others by permission.

REHAB 596 Electromyography and Electrodiagnosis (3) S
Kraft

Comprehensive, didactic course covering all aspects of clinical electromyography and electrodiagnosis. The course is given in two parts, the first covering basic neurophysiology and the second covering clinical electromyography, with emphasis on disease states. Prerequisite: residency in rehabilitation medicine; others by permission.

REHAB 597-598-599 Electromyography and Electrodiagnosis Laboratory (1-1-1) A,W,Sp
Kraft

Elective work in clinical electromyography and other electrodiagnostic methods. Prerequisite: residency in rehabilitation medicine; others by permission.

REHAB 600 Independent Study or Research (*)
AWSpS

REHAB 654P Second-Year Clinical Elective in Physical Medicine and Rehabilitation (*, max. 24)
WS

O'Shaughnessy
Special emphasis on the technique of eliciting historical and physical evidence of ability of the patient to function in his environment. Topics include transfer abilities, normal and abnormal gait, reambulation, communication disorders, modalities in physical medicine, psychological aspects of disability, learning aspects in chronic disease, vocational evaluation, principles of physical and occupational therapy, educational problems of the disabled, neuromuscular electrodiagnosis, braces, and prosthetics. Patients with stroke, amputation, spinal cord injury, arthritis, and multiple injuries are followed. Patient care responsibilities are assumed by the student appropriate with his level. Prerequisites: HUBIO 532P, 553P.

REHAB 685P Basic Rehabilitation Medicine (4)
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: HUBIO 563P.

REHAB 686P Rehabilitation Medicine Clerkship—Pediatrics (*, max. 12) AWSpS

Stolov
Clerkship experience in the specific rehabilitation approaches for the disabling pediatric diseases. Includes school planning, family counseling, and community support services. The 6-credit (four-week) package is an inpatient experience. The 9-credit (six-week) package includes, in addition, a two-week clinic and consultation experience. Prerequisite: HUBIO 563P; PEDS 665P recommended.

REHAB 687P Rehabilitation Medicine Clerkship—Medical (*, max. 12) AWSpS

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: HUBIO 563P.

REHAB 688P Rehabilitation Medicine Clerkship—Surgical (*, max. 12) AWSpS

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: HUBIO 563P. (Six weeks.)

REHAB 696P Rehabilitation Medicine Outpatient Clinics (4) AWSp

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: HUBIO 563P.

REHAB 697P Rehabilitation Medicine Special Electives (*, max. 24) AWSpS

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 700 Master's Thesis (*) AWSpS

SURGERY

Courses numbered with a "P" suffix are not graduate courses and are restricted to medical student enrollment only.

SURG 498 Undergraduate Thesis (*) AWSpS

Schilling
Offered to those students who have engaged in undergraduate research in general surgery. (Full or part time.)

SURG 499 Undergraduate Research (*) AWSpS

Schilling
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 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.)

SURG 525 Seminar in Plastic and Maxillofacial Surgery (*) AWSp

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: 665P and permission of department.

CONJ 585 Surgical Anatomy (1-3, max. 12)
See Conjoint Courses.

SURG 600 Independent Study or Research (*)
AWSpS

SURG 665P Clinical Clerkship (*, max. 24)
AWSpS

Heimbach
Student is introduced to the diagnosis and the management of problems amenable to surgical therapy. A comprehensive program is offered that includes instruction in the physiological basis of surgical care, 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: HUBIO 563P. (Six weeks, full time; limit: twenty students.)

SURG 681P Peripheral Vascular Disease (4 or 8)
AWSp

Strandness
An intensive, in-depth look at peripheral arterial and venous problems. This includes: (1) methods of clinical evaluation; (2) new diagnostic procedures; and (3) the available methods of treatment. Emphasis on active student participation in patient work-up, performance of 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 source material for the student. Prerequisites: 665P, HUBIO 563P. (Two or four weeks, full time; limit: two students.)

SURG 682P Externship in General Surgery (*, max. 12) AWSpS

Heimbach
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 outpatient follow-up 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: 665P. (Four or six weeks, full time; limit: four students.)

SURG 683P Pediatric Surgery Externship (8 or 12) AWSpS

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 obviously a preponderance of 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: 665P. (Four or six weeks, full time; limit: two students.)

SURG 684P Trauma and Emergency Care (8)
AWSpS

Horowitz
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: HUBIO 563P. (Two or four weeks, full time; limit: four students.)

SURG 685P Cardiac Surgery Externship (*, max. 12) AWSpS

Dillard
Students actively engage in the care and treatment of inpatient and outpatient surgical cardiovascular cases. They work closely with the cardiovascular

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team on preoperative diagnostic studies, in the operating room, and in postoperative patient care. Prerequisite: 665P. (Six weeks, full time; limit: two students.)

SURG 686P Plastic Surgery Clerkship and Preceptorship (*, max. 12) AWSpS

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: HUBIO 563P. (Four or six weeks, full time; limit: one student.)

SURG 697P Surgery Special Electives (*, max. 24) AWSpS

Schilling
By specific arrangement, for qualified students, special clerkship, externship, or research opportunities can at times be made available at institutions other than the University of Washington. The faculty can advise students of possible opportunities. Students wishing to elect this course should obtain from the Dean's office a "Special Assignment" form at least one month before preregistration. Prerequisites: 665P and departmental permission. (Four, six, or twelve weeks, full time.)

UROLOGY

Courses numbered with a "P" suffix are not graduate courses and are restricted to medical student enrollment only.

UROL 498 Undergraduate Thesis (*).AWSpS
Ansell, Barnes, Chapman, Correa, Kivlat, Mayo, Monda, Tremann
Provides an opportunity for medical students to write theses in the area of urology. Prerequisite: permission of sponsor and department.

UROL 499 Undergraduate Research (*).AWSpS
Ansell, Barnes, Chapman, Correa, Kivlat, Mayo, Monda, Tremann
The student participates in current urologic research projects under supervision of full-time staff. Certain specific problems may be elected by the student. Elective for medical students. Prerequisites: permission of sponsor and department.

CONJ 660P Clinical Research Center Clerkship (*, max. 24)
See Conjoint Courses.

UROL 675P Urology Preceptorship (*, max. 8) AWSpS
Kivlat
Student follows a preceptor in all of his work in order to better understand the pathophysiology and management of the problems of the urogenital system and to become acquainted with the office management of urological problems. Prerequisite: HUBIO 562P. (Two or four weeks.)

UROL 680P Urology Clerkship (*, max. 8) AWSpS
Ansell, Chapman, Correa, Kivlat, Mayo, Monda, 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: HUBIO 562P. (Two or four weeks.)

UROL 685P Urology Subinternship (*, max. 12) AWSpS
Ansell, Chapman, Correa, Kivlat, Mayo, Monda, Tremann
Subintern is responsible 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: MED 665P or PEDS 665P or permission.

UROL 697P Urology Special Electives (*, max. 24) AWSpS
Chapman, Correa, Kivlat, Mayo, Monda, 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. (Six or twelve weeks.)

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Courses for Undergraduates (Majors only)

NURS 263 Communication In Helping Relationships (3) WS
Introduction to communication within the helping process. Factors affecting communication, such as anxiety, anger, setting and purpose are discussed. Interviewing individuals and analyzing the interactions required. Open to nonmajors with consent of instructor. Prerequisites: sophomore standing, PSYCH 100 or 101.

NURS 281 Nursing Process I (6) WS
Beginning course in nursing process: systematic method of assessing human needs and maintaining optimal health. Theory, seminar, and clinical laboratory include application of the process to selected functional status abilities of patients in various clinical settings. Three hours theory, seminar; eight hours laboratory weekly. Prerequisites: sophomore standing, MICRO 301, 302, CONJ 317-318, CHEM 101, 102, PE 205, PHCOL 315, H EC 319.

NURS 297 Human Development I: Adolescence Through Aging (4) WS
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 non-nursing majors with permission. Two hours lecture, four hours laboratory weekly. Prerequisites: sophomore standing and CONJ 317-318 or equivalent, or permission.

NURS 298 Introduction to Normal Growth and Development (2)
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.

NURS 299 Introduction to Normal Growth and Development (2)
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.

NURS 300 Human Development II: Conception Through School Age (4) AS
Further development of knowledge and skills established in 297. Development of assessment skills and knowledge basic to management of infants, preschoolers, school-age children. Study and practice include parameters of normal growth and development from conception through school age; child-rearing practices; selected behavior patterns; environmental influences on growth and development, and major parental concerns. Open to nonnursing

majors with permission. Two hours lecture, four hours laboratory weekly. Prerequisites: 297 and sophomore standing.

NURS 301 Principles of Patient Teaching (3)
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 patients, family members, or auxiliary nursing personnel. One hour laboratory weekly.

NURS 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 process and skills. Three hours theory, seminar; eight hours laboratory weekly. Prerequisite: 281; 300 and 303 may be taken concurrently or before.

NURS 303 Psychosocial Care In Adaptive and Maladaptive Behaviors (2) 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 PSYCH 100 or 101, or permission.

NURS 321 Nursing Care of Ill Adults and Children I (4) ASp
Commonly occurring alterations, involving concept of dynamic equilibrium and compensatory mechanisms that produce broad pathological changes, are considered as a basis for comprehensive nursing interventions in the care of the ill adult and child. Prerequisites: 263, 300, 302, 303. Taken concurrently with 322 or 324 or later with permission.

NURS 322 Nursing Care of Ill Adults and Children I Laboratory (8) AWSpS
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 in 324. Two hours clinical seminar, fourteen hours laboratory weekly. Offered on credit/no credit basis only. Prerequisites: 263, 300, 302, 303. Taken concurrently with 321 or 323 or later with permission.

NURS 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 preventive, maintenance, and restorative elements of comprehensive nursing care; immediate, acute, and long term. Taken concurrently with 322 or 324 or later with permission.

NURS 324 Nursing Care of Ill Adults and Children II Laboratory (8) AWSpS
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 will include experiences with persons in the acute-care setting, the community, and nursing homes. Two hours clinical seminar, fourteen hours laboratory weekly. Taken concurrently with 321 or 323 or later with permission. Offered on credit/no credit basis only.

NURS 325 Nursing Care of Ill Adults and Children III (4) AWSpS
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.

NURS 326 Nursing Care of Ill Adults and Children III Laboratory (8) AWSpS
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 broad-

ened and are more complex. Synthesis and application become the integral foci of critical thinking, clinical judgment, and evaluation in the nursing process. Two hours clinical seminar, fourteen hours laboratory weekly. Offered on credit/no credit basis only. Prerequisites: 323, 324. Taken concurrently with 325 or later with permission.

NURS 351 Changing Concepts of Professional Nursing (4)

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.

NURS 353 Scientific Basis for Nursing Actions (3)

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 standing in the registered nurse curriculum pattern.

NURS 354 Comprehensive Maternal-Child Nursing (4)

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.

NURS 356 Comprehensive Medical-Surgical Nursing (4)

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.

NURS 358 Psychiatric Concepts for Nursing Actions (4)

Theory and clinical experience in application of selected concepts in interactions with patients with specific emotional problems. Course serves 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 meeting the emotional needs of patients is emphasized. Six hours of clinical laboratory weekly. Prerequisites: 351, 353 and junior year standing in the registered nurse curriculum pattern.

NURS 361 Cultural Variation and Nursing Practice (3) AWSpS

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.

NURS 367 Family-Centered Maternal and Infant Nursing (4)

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.

NURS 368 Laboratory in Maternal and Infant Nursing (5)

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.

NURS 369 Family-Centered Nursing of Children (4)

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.

NURS 370 Laboratory in Nursing of Children (5)

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.

NURS 371 Principles of Medical-Surgical Nursing (4)

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, or permission. To be taken concurrently with 372.

NURS 372 Medical-Surgical Nursing Practice (5)

Application of scientific and nursing principles to the care of adult medical and surgical patients. The problem-solving approach is used with the major emphasis placed on helping the student learn how to analyze and interpret information obtained from student's own observations and other sources, decide on a course of action, carry out the plan, and evaluate the outcome. Patient care and clinical conferences 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.

NURS 373 Principles of Medical-Surgical Nursing (4)

Understanding of the scientific and nursing principles essential to effective nursing care of 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 the individual patient. Prerequisites: junior year standing in the basic curriculum pattern, 371 and 372, or permission. To be taken concurrently with 374.

NURS 374 Medical-Surgical Nursing Practice (5)

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 in 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 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.

NURS 400 Family-Centered Maternal and Child Nursing in the Community (6) AWSpS

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. Offered on credit/no credit basis only. Prerequisites: 325, 326, 403, 407; 400 must be taken before 423 in maternal and child nursing.

NURS 401 Maximizing Health in the Community —Theory (2) AWSpS

Prevention of disease, health maintenance, and health promotion, with focus on community organization, public health principles, health education and selected community health problems, and the nurse's role in promoting optimal health conditions. Synthesis of previous learnings about the family and groups within the context of a community setting are emphasized. Two hours of lecture weekly. Prerequisites: 325, 326, 403, 407; 401 must be taken

before 423 in community health nursing. (First time offered: Winter Quarter 1977.)

NURS 402 Maximizing Health in the Community —Clinical (7) AWSpS

Application of the process of community health nursing and principles of community organization in promoting optimal health conditions within households, families, groups, and communities. The student collaborates with health team members, using an interdisciplinary approach in a variety of settings. Fourteen hours of laboratory weekly, including two hours of clinical seminar. Offered on credit/no credit basis only. Prerequisites: 325, 326, 403, 407; 402 must be taken before 423 in community health nursing. (First time offered: Winter Quarter 1977.)

NURS 403 Psychosocial Nursing Care in Adaptive and Maladaptive Behaviors II (3) AWSpS

Concepts and principles of care of emotionally disturbed persons with emphasis on the social milieu. Includes study of dynamics and behavior patterns associated with maladaptive behavior, plus theories and rationale of nursing intervention and rehabilitation. Open to nursing majors with junior standing. Three hours of lecture weekly.

NURS 405 Care Systems Analysis (3) AWSpS

Comparative analysis of past, current, and emerging health-care systems and their effect on the delivery of nursing care services. Emphasis on the health-care needs and values of the public and socioeconomic, political, and technological factors that influence the delivery of nursing care services. Open to nonnursing majors with permission. Prerequisite: upper-division standing.

NURS 406 Introduction to Research in Nursing (3) AWSpS

Introduction to concepts and processes of research utilized in investigation of nursing problems. Prerequisite: one elementary statistics course.

NURS 407 Psychosocial Nursing Practice (7) AWSpS

Application of principles and concepts in care of emotionally disturbed persons with emphasis on treatment modalities such as group therapy, client-centered therapy, environmental management, and social action. Includes experiences in acute care, day care, congregate care, and outpatient facilities. Two hours of clinical seminar and twelve hours of laboratory weekly. Open to nursing majors with junior standing. To be taken concurrently or following 403. Offered on credit/no credit basis only.

NURS 408 The Profession of Nursing (2) AWSpS

Forces that have shaped, and are shaping, the nursing profession are examined, in particular those affecting nursing education. The legal and ethical commitments of the nurse are discussed, and, in addition, the political role of the individual nurse in influencing the introduction or modification of health legislation is explored. Special emphasis on the role of woman in the development of nursing, and a few selected leaders of nursing in the United States are introduced. Open to nursing majors with senior standing. Two hours of lecture-discussion weekly. (First time offered: Winter Quarter 1977.)

NURS 409 History and Trends of Nursing (3)

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) AWSpS

For course description, see Interschool or Intercollegiate Programs.

NURS 412 Scientific Principles in Nursing Care (3)

Undergraduate seminar devoted to critical analysis of selected nursing situations, with identification of the natural and behavioral science principles that guide nursing actions. Prerequisite: senior standing in the School of Nursing.

SCHOOL OF NURSING

NURS 413 Principles of Psychiatric Nursing (5)
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.

NURS 414 Psychiatric Nursing Practice (5)
Application of psychiatric-mental health principles and skills in the care of selected psychiatric patients. Offered on credit/no credit basis only. Fifteen hours of clinical laboratory weekly. Prerequisites: senior standing in the School of Nursing and 413 taken concurrently.

NURS 415 Community Health Nursing Principles (3)
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 HSERV 323.

NURS 416 Community Health Nursing Practice (5)
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. Offered on credit/no credit basis only. Prerequisites: senior standing in the School of Nursing and 415 taken concurrently.

NURS 420 Special Fields of Community Health Nursing (3-8) A
Practicum devoted to nursing responsibilities in special fields such as school health nursing or occupational health nursing. Emphasis and credit of course varies with the interest and needs of the student. Nine to twenty-four hours clinical laboratory weekly, including two hours of conference. Prerequisites: 415, 416, or equivalent, postbaccalaureate standing in the School of Nursing.

NURS 421 Nursing Leadership (4)
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.

NURS 422 Senior Clinical Nursing (6)
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. Offered on credit/no credit basis only. Prerequisites: senior standing in the School of Nursing, and 421 taken concurrently.

NURS 423 Nurse Practitioner in Special Fields (12) AWSpS
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. Two to five lecture hours, twenty-one to thirty laboratory hours weekly. Offered on credit/no credit basis only. Prerequisites: senior standing. (First time offered: Winter Quarter 1977.)

NURS 429 Nursing Functions in Gerontology (2)
Aging as a normal developmental process; the problems of the aged; the community resources available; and the derivation of implications for nursing care of aged persons from gerontological concepts. Prerequisite: senior standing in the School of Nursing.

NURS 499 Undergraduate Research (1-5, max. 5) AWSpS
Supervised individual research on a specific nursing problem. Prerequisites: junior year standing in the School of Nursing, cumulative grade-point average of 3.00 or better, and permission.

Courses for Graduates Only

NURS 438 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: 530, 531, 532.

NURS 446 Practice Supervision in Nursing Service (3) Sp
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
Leitch, 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) Sp
Draye, Jones, Leitch, 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. Prerequisite: 450.

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) S
Bush, Hitchens
Theoretical basis for interpersonal process in the treatment of maladaptive behaviors. Synthesis of nursing intervention, based on concepts in psychosocial nursing and in the social and behavioral sciences. Analysis of social, medical, and educative models for treating behavioral disorders and the rationale for use of medications in psychiatric treatment.

NURS 461 Behavioral Analysis Through Multi-Media (3) S
Osborne
Consideration of various media through which be-

havior 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 behaviors. Exploration of new approaches is encouraged.

NURS 464 The Community and Mental Health: Theory and Research Foundations (3) ASp
MacElveen, Nakagawa, Osborne
Study of factors contributing to mental health and mental illness; the impact of values, ethnic and racial differences, social status differences, and selected group dimensions on individuals in different communities. Opportunity to compare indices of mental health and illness, concepts of community, and parameters of community structure employed in the study of community mental health.

NURS 466 Continuing Education in Nursing (3) Sp
Planning, developing, and evaluating continuing education programs in various institutions and agencies. Includes the application of adult learning principles to a variety of situations, such as workshops, in-service and staff development programs. Prerequisite: graduate standing.

NURS 467 Evaluation of Performance in Nursing (3) SpS
Philosophy and rationale of evaluation for nurses with administrative, teaching, and supervisory responsibility in various health agencies. The purposes of evaluation as they relate to guidance of students or staff toward personal satisfaction and growth, and toward improved patient care.

NURS 468 Practice Teaching in Psychosocial Nursing (3) A
Experience with master teacher in selected clinical teaching-learning situations. Identification, analysis, and solution of teaching-learning problems. A minimum of six hours of guided clinical experience weekly, plus seminar. Prerequisites: 464, 502, 508, the completion of one pathway in psychosocial nursing (or equivalent), and permission; 510, taken prior to, or concurrently with, 468 recommended.

NURS 470 Practicum in Interpersonal Approaches in Nursing (2-6) AS
Supervised experience in working with individuals who are experiencing emotional distress. Guided experiences in individual therapy approaches are oriented toward assisting the client to identify and alter maladaptive behaviors. Prerequisite: 460, which may be taken concurrently, or equivalent.

NURS 488 Effects of Alcohol and Its Relation to Health and Disease (3) ASpS
Heinemann
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 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) WSp
Estes
Analysis of family problems associated with alcoholism. Emphasis on social, cultural, and physiological implications; examination of theories of prevention and counseling practices employed. Case method and clinical presentations. Open to upper-division and graduate students.

NURS 490 Alcohol Practicum I (2-6, max. 6) AWSpS
Baker, Estes, Heinemann
Guided practicum in nursing of alcoholic and other drug-dependent persons; prevention, management, and rehabilitation of the acutely ill. Major components include the critical assessment of patients, including physical examinations, nursing histories, evaluation of therapeutic interventions, and analysis of preventive methods employed with specific groups. Weekly conferences provide guidance for learning. Credit variable, depending upon objectives agreed upon by student in counsel with faculty adviser.

UCONJ 490 Social Sensitivity in Health Care (3) AWP

For course description, see Interschool or Intercollegiate Programs.

NURS 491 Alcohol Practicum II (2-6, max. 6) AWP

Baker, Estes, Heinemann

Guided practicum in nursing of alcoholic and other drug-dependent persons; postacute stage of illness. Students function as primary or cotherapists in the application and evaluation of selected therapeutic interventions. Weekly conferences provide guidance for learning, based on an analysis of audiotapes, videotapes, and process recordings of students' experiences with clients.

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 ANTH 440. Prerequisite: permission.

NURS 502 Applied Group Development Principles (3) AWP

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 506 Seminar in Nursing Service Administration (3) Sp

Aeschliman

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) WSp

Analysis of literature on crisis, family structure, function and interactional processes, and skills of intervention. Application of various frameworks, such as systems theory and cybernetics to a development of theory in family therapy. Use of theory in assessment of dysfunctional families and applicability to alternative family life styles. Examination of sociocultural forces external to the family.

NURS 508 Historical and Contemporary Perspectives in Personality Theories (3) AW

Graves

Social history is examined as influenced by selected personality theories. A comparative analysis of psychoanalytic, learning, and phenomenological personality theories with emphasis on orientations toward health, illness, and treatment.

NURS 509 Practice Teaching in Physiological Nursing (3) SpS

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. (Not offered 1976.)

NURS 510 Curriculum Development in Nursing Education (3 or 5) WSp

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. Entry card required.

NURS 511 Psychosomatic Nursing (3) Sp

Brown

Seminar and clinical experiences centering on interrelationships of physical and emotional aspects of illness and development of principles of nursing care. A minimum of four hours of guided experience weekly.

NURS 512 Community Mental Health: Strategies and Programs (2) AW

Mitsunaga, Osborne

Community mental health as the study of problems

and the implementation of strategies to alleviate invidious sociopsychological factors that afflict high-risk mental illness populations. Includes study of multidisciplinary relationships, community organization, and psychiatric traditions that inhibit or potentiate community mental health programs, and evaluation of community mental health programs and social action strategies.

NURS 513 Seminar in Group Treatment (2) Sp

Larson

Seminar on the theoretical basis for working with various treatment groups. Analysis of selected approaches to group treatment. Analysis of leader responsibilities and functions in the development of therapeutic group experiences.

NURS 514 Practicum for Community Mental Health (3-3) WSp

MacElveen, Nakagawa

Field study in community assessment and social action relative to mental health. Experiences include the development and evaluation of community mental health programs through participation with community members, community groups, and practicing professionals. Prerequisite: 512.

NURS 516 Assessment in Child and Adolescent Psychosocial Nursing (3) W

Egger, Siemon

Opportunity for the student to extend and refine understanding of child/adolescent psychosocial nursing; psychodynamics and psychosocial maladaptations of childhood, adolescence, and parenthood with concomitant operationalized responses. Seminars, lectures, and experiential learning relate to methods of assessing the psychodynamics of the various psychosocial stressors and responses.

NURS 517 Therapeutic Approaches: Child and Adolescent Psychosocial Nursing (2) ASP

Egger

Focus on exploration of primary and secondary prevention of emotional disturbances in children and adolescents, promotion of positive mental health in families, and potential roles of the nurse in child/adolescent psychosocial nursing. Various treatment modalities are examined. This course presupposes an existing understanding of vulnerable children's/adolescents' responses to stress and conflict and the ability to utilize nursing assessment with those children/adolescents experiencing psychosocial needs. 516 strongly recommended.

NURS 518 Practicum in Child and Adolescent Psychosocial Nursing (2-6, max. 6) SpS

Egger, Siemon

Opportunity for the student to synthesize and reconceptualize 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, which may be taken concurrently.

NURS 520 Methods of Research in Nursing (3) ASP

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) WS

Continuation of 520, with 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) AS

Analysis and synthesis of concepts relevant to therapeutic nursing based upon consideration of the dignity of man and selected aspects of theories related to the interaction process in nurse-patient relationships. Library research, field study, and a minimum of two laboratory hours weekly.

NURS 524 Seminar in Nursing Leadership Processes (3) ASP

Benollet

Considers the dynamic processes involved in leadership roles assumed by nurses in a variety of set-

tings. Included in the course is an explanation 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) W

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.

NURS 526 Evaluative Analysis of Health Care Programs (3) A

Gurel

Evaluative analysis of health-care programs in light of decision-making processes. Attention centers on the evaluative analysis, developing measurable objectives, measurement of quantitative and qualitative objectives, experimental design, reliability and validity of measurements, goal attainment scaling as a means for measuring treatment outcome. Prerequisite: one quarter of statistics.

NURS 527 Practicum in Family Treatment (2-6) WSpS

Whitley, Staff

Supervised experience as a cotherapist within a family. Opportunities for primary and secondary intervention in family crises, as well as longer term therapy. Emphasis on treatment of all family members, including extended family as appropriate. Supervision provided by nursing faculty member. Prerequisites: 502, 507, which may be taken concurrently, or equivalent, and permission.

NURS 528 Field Study in Evaluative Analysis for Health Care Programs (3, max. 6) WSp

Gurel

Field study in evaluation. Experiences include pre-evaluation studies; consultation with community members, community groups, and agency personnel to operationalize health-care program objectives in terms of measurable goals; construction of evaluation protocols; and assessment of program functioning in relation to program objectives. Prerequisite: 526.

NURS 529 Practicum in Group Treatment (2-6) SpS

Kelley, Larson, MacElveen

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 Maternal and Child Nursing: Concepts, Issues, and Trends (3) A

Lectures and seminars of this core course are designed to assist the graduate student in exploring and analyzing selected topics of the theoretical framework, societal influences, current trends and health needs upon which the practice of maternal and child nursing is based. Seminars focus the lecture content to the four specific pathways: nursing of children, maternal-infant nursing, predictive nursing care of the infant and young child, and handicapped-child care.

NURS 531 Maternal and Child Nursing: Assessment and Prediction (4) W

Theories and issues related to health care of families with special emphasis on the events of pregnancy, growth and development, and illness in the child's life. Alternative seminars and pathway field experiences available in nursing care of children, predictive health of the neonate and young child, and maternal-infant nursing. Offered on credit/no credit basis only. Prerequisite: 530.

NURS 532 Maternal and Child Nursing: Care Process (3-8, max. 8) Sp

Therapeutic approaches to care of mothers, infants, and children in a variety of health settings. Involves individual and group strategies of health-care delivery. Student continues in selected pathway directions. 3 credits required for all MCN majors. Course may be repeated for a maximum of 5 additional credits. Offered on credit/no credit basis only. Prerequisites: 530, 531.

SCHOOL OF PHARMACY

NURS 535 Nursing the Child With Handicaps: Evaluation (3) A
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. A minimum of four hours field study weekly. Enrollment limited. 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. A minimum of four hours field study weekly. Enrollment limited. Prerequisite: permission.

NURS 537 Nursing the Child With Handicaps: Care Process (4) WS
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 purpose is to provide 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. Prerequisites: 523, 535, 536, 537.

NURS 539 Nursing the Child With Handicaps: Community (2) S
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 come under review. A minimum of four hours field study weekly. Prerequisites: 535, 537, 538.

NURS 540 Seminar in Physiological Nursing (3) ASp
Donaldson
 Focus on selected physical health problems that occur in many disease states. Relates physiology to pathophysiology and compensatory mechanisms. Major emphasis on interrelationships between problems and multiple effects of therapies. Implications for nursing diagnosis and therapy. Assumes basic knowledge of anatomy and physiology. Entry card required.

NURS 541 Clinical Physiological Nursing Seminar I (3) WSp
 Guided experience in nursing practice with selected individuals in a specialized field of nursing. Synthesis and application of relevant principles and theories from biological, behavioral, and pathological sciences; proficiency in comprehensive nursing assessments, interventions, and evaluations; effective collaborative functioning as a member of the health team. Entry card required. Prerequisite: 540.

NURS 542 Seminar in Cardiovascular Nursing (3) W
Mansfield
 Systematic inquiry into the influence of physical and emotional factors on pathophysiology underlying selected cardiovascular conditions; group study of current therapies with emphasis on prevention and rehabilitation. Individual study of topic of interest. Prerequisite: 540 or permission.

NURS 543 Seminar in Nursing in Gerontology (3) A
Patrick
 Gerontological research findings applied to complex nursing problems in maintenance of health and maximum functioning in the aged.

NURS 544 Clinical Physiological Nursing Seminar II (3) S
 Continuation of 541. Guided experience in selected situations in area of clinical interest. A minimum of seven hours of guided experience weekly. Prerequisites: 540, 541, and permission.

NURS 545 Special Topics in Physiological Nursing (2 or 3, max. 10) WSpS
 Guided survey of the experimental literature of major topics in physiological nursing, including cardiopulmonary, biology of aging, neuromuscular, cancer, and endocrine. Course conducted as a seminar with analysis and discussion of selected topics and readings. Implications for future research and health care are emphasized. Entry card required.

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 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 HSERV 323.

NURS 558 Seminar in Advanced Community Health Nursing (3) S
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 562 Implications of Concepts From Anthropology for Nursing (3) A
Chrisman
 Examination of selected core concepts from anthropology and assessment of the implications of these concepts for nursing research. Prerequisite: permission.

NURS 563 Implications of Sociology for Research in Nursing (3) W
 Examination of principles and concepts from sociology and their implications for nursing research. Prerequisite: permission.

NURS 564 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 565 Implications From Microbiology for Nursing (2) W
Hellstrom
 Examination of selected major fields in microbiology. Exploration of particular aspects of those fields and of current research progress in microbiology. Prerequisite: permission.

NURS 569 Consultation and Supervision in Psychosocial Nursing (3) A
 Seminar and guided experiences that explore the interpersonal processes in consultation and supervision in psychosocial nursing. Students examine the effects of the organization and the setting on the therapeutic relationships. Mental health consultation theories are studied in relation to the roles of the clinical specialist, supervisor, and instructor in psychosocial nursing. Each student is required to develop a consultative or supervisory relationship

in a clinical setting. Prerequisites: 464, 502, and 508, plus one psychosocial pathway.

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) S
 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
Disbrow
 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 in nursing. Prerequisite: permission.

NURS 573 Selected Topics in Maternal and Child Nursing (3, max. 12) AWSpS
 In-depth examination of the literature pertinent to major theoretical issues in maternal and child nursing. Seminar with analysis and discussion of selected topics and readings. Implications for research, prevention, and health care.

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 stressed.

NURS 575 Death Influence in Clinical Practice (4) WS
Benoit
 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'Neill
 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, Chrisman
 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 relating 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.

NURS 579 Field Course in Cross-Cultural Nursing (6) S
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.

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

Courses for Undergraduates

PHSCI 320, 321 Pharmaceutical Sciences Laboratory (3,2) A,W

Elmer, Kuehn, McCarthy

Laboratory demonstrates by experimentation basic analytical procedures and the properties of drugs in different physical and biological systems. Prerequisites: CHEM 236; 320 for 321.

PHSCI 332 General and Physical Principles (3) W

Hultic, Kuehn

Lecture and laboratory present those physical-chemical properties of drug systems that have a significant effect on the therapeutic efficacy of drugs. Prerequisite: PHARM 331.

PHSCI 350 Psychotropic Plants (3) Sp

Brady

Lecture course reviewing the ethnobotany, history, chemistry, and physiological activity of various plants used throughout the world for stimulant and psychotropic purposes. Prerequisites: CHEM 236 and BIOL 212, or equivalents.

PHSCI 400 Biophysical Medicinal Chemistry (4) Sp

Hultic, 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: CHEM 236 or 337 or equivalent.

PHSCI 405 Biopharmaceutics and Pharmacokinetics (5) Sp

Kuehn, 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 PHCOL 402.

PHSCI 412, 413, 414 Pharmacognosy (3,3,2) A,W,Sp

Brady, Elmer

Medicinally and pharmaceutically useful products of plant, microbial, and animal origin. Biologic and chemical properties are emphasized. Prerequisites: BIOC 405, BIOL 212, CHEM 236, MICRO 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: P BIO 360.

PHSCI 432 Bionucleonics Laboratory (3) Sp

Lectures, experiments, and demonstrations of radioisotope detection equipment and techniques and selected radiotracer techniques. Experiments illustrate applications of bionucleonics to problems in the pharmaceutical sciences. Prerequisite: permission.

PHSCI 435 Diagnostic Medicinal Chemistry (2) A
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: P BIO 360 and BIOC 405.

PHSCI 440, 441, 442 Medicinal Chemistry (4,4,3) A,W,Sp

Hultic, McCarthy, Nelson, Trager

Study of the various classes of medicinal compounds with particular emphasis on biological activity, mechanism of action, biotransformation, and the structural and physical properties governing absorption, distribution, and excretion. Prerequisites: CHEM 236 and P BIO 360.

PHSCI 445 Radiopharmaceutics (3) W

Fundamentals of radioactivity; properties of radiation; instrumentation used in nuclear medicine; problems associated with the formulation, production, and use of radiopharmaceutics; and a discussion of radiopharmaceutics currently used for diagnosis and therapy. Prerequisite: 332.

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 latentation); molecular mechanisms of drug action; topics in drug design. Prerequisites: 442, BIOC 442 or 405, PHCOL 513 or 402 or permission.

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: PHCOL 402.

PHSCI 497 Toxicology (2) W

Krupski

Study of the properties and toxic effects of various substances used in medicine, as well as chemicals employed in industry and as insecticides, rodenticides, and fungicides. Includes symptoms, treatment, antidotes, and prognosis for various classes of poisons, and also a study of environmental pollutants and their effect on biological systems. Prerequisite: PHCOL 402.

PHSCI 499 Undergraduate Research (*, max. 6) AWSpS

Research problems in 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

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 1976-77.)

PHSCI 520 Seminar (1, max. 5) AWSp

Graduate students attend seminars and make one formal presentation per year while in residence; 1 credit per year is allowed. Offered on credit/no credit basis only.

PHSCI 521, 522 Advanced Medicinal Chemistry (3,3) W,Sp

Hultic, McCarthy, Nelson, Trager

Application of integrated data from the physical and biological sciences to problems of chemotherapy, including transport of drugs to site of action, biotransformation of drugs, interaction of drugs with enzyme systems, and recent advances in drug design. Prerequisites: CHEM 457, 531, and BIOC 442, or permission. (Offered alternate years; offered 1976-77.)

PHSCI 581 Topics in Pharmacognosy (1, max. 2) AWSp

Brady

Discussions and readings of topics of current in-

terest in the field of pharmacognosy. Subject matter changes from year to year. Prerequisite: reading knowledge of German.

PHSCI 600 Independent Study or Research (*) AWSpS

PHSCI 700 Master's Thesis (*) AWSpS

PHSCI 800 Doctoral Dissertation (*)

PHARMACY PRACTICE

Courses for Undergraduates

PHARM 204 Orientation (2) A

Orr

Study of the profession of pharmacy, its development and its literature.

PHARM 310 Drugs in Our Society (3) SpS

Hammarlund

Designed to develop a general knowledge of drugs and an understanding of their proper use. Discussion of drug problems and methods for their control. For nonmajors only.

PHARM 311 Drugs in Our Society: Special Projects (2) SpS

Hammarlund

For nonmajors only. The student undertakes a 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) ASp

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; other health science students by permission. Prior or concurrent courses in anatomy, physiology, and microbiology strongly recommended.

PHARM 329-330 Pharmaceutical Calculations (0-1) A,W

Hammarlund

Study of the practical calculations used in pharmacy. Offered on credit/no credit basis only.

PHARM 331 General and Physical Principles (4) A

Hammarlund

Introduction to the study of pharmacy as a laboratory science. The intent of the course is to study the theory and the problems involved in incorporating chemicals into forms suitable for administration as human medication and stable enough to be transported and stored. Prerequisites: CHEM 236 and PHYS 116.

PHARM 350 Fundamentals of Pharmacotherapeutics (2) W

Plein

Drug information resources; principles of pharmacology; dosage forms and mathematics of drug administration; systems for providing drug therapy; pharmacologic and therapeutic classes of drugs. For nursing students. Prerequisites: CHEM 102, CONJ -317-, 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: MICRO 301, 302; CONJ -318, which may be taken concurrently, or permission.

PHARM 407 Prescription Practice (4) A

Hall

Study of the supply of drugs through prescription or

GRADUATE SCHOOL OF PUBLIC AFFAIRS

other type of order. The interaction of the pharmacist with his clientele and other health professionals in the process of ordering, supplying, and encouraging the proper use of drugs. Prerequisites: 330, PHSCI 405, and PHCOL 402.

PHARM 408 Evaluation of Drug Products (3) W Hall

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: third-year standing and permission.

PHARM 412 Drug Products for Autotherapy (2) Sp Hall

Self-medication as a public health problem. An analytical study of the use and abuse of nonprescription remedies by the general public.

PHARM 420 Manufacturing Pharmacy (3) AW E. Plein

Technology of various dosage forms and the manufacture of pharmaceuticals on a small-plant scale. Prerequisite: PHSCI 332.

PHARM 450 Pharmacy Laws (3) Sp Pitte

Study of the laws regulating the practice of pharmacy. These include federal, state, and municipal laws, and professional ethics. Prerequisite: second-year standing.

PHARM 451 Pharmacy Administration (3) W Campbell

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. Sickroom supplies, surgical and orthopaedic appliances are discussed.

PHARM 452 Contemporary Problems (1) WSP Orr

Discussion of current trends affecting the role of pharmacy in health-care delivery. Offered on credit/no credit basis only. Prerequisite: third-year standing.

PHARM 465 The General Practice of Pharmacy (2, max. 4) AWSp

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: PHSCI 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. 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 Introduction to Clinical Pharmacy (6) A

Fuller, Ivey, Kradjan, E. Plein, Smith
Orientation to the clinical roles of the pharmacist and other health professionals and study of the more common diseases and their drug therapy. Considered are patient records, 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, PHSCI 405, 414, and 442.

PHARM 485 Clinical Pharmacy (7) W

Fuller, Ivey, Kradjan, E. Plein, Smith
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. Laboratories 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

Fuller, Ivey, Kradjan, E. Plein, Smith
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) AWSpS

Supervised experience in the clinical roles of pharmacy practice in selected inpatient care facilities. Under 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 of drug therapy problems to other health-care professionals, provide in-service education programs and drug utilization reviews. Interdisciplinary approaches to providing patient care are emphasized. Daily conferences with the faculty supervisor are usually included. Offered on credit/no credit basis only. Prerequisite: permission.

PHARM 488 Clinical Clerkship: Outpatient Care (*, max. 15) AWSpS

Supervised experience in performing clinical roles of pharmacy practice in selected ambulatory patient care facilities. Under supervision by 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 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 489 Clinical Clerkship: Drug Information Services (*, max. 15) AWSpS

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: PHSCI 405 and permission.

PHARM 493 Nursing Home Pharmacy (5) WSP E. Plein, J. Plein

Students under the direction of a registered pharmacist participate in supplying full pharmacy service (clinical plus administrative) to patients in the nursing home selected as a laboratory for the

project. Students monitor patients' drug therapy, confer with nursing home staff and the patients' physician regarding individual patients' drug therapies, present in-service seminars, develop skills in communicating with other health professionals and with geriatric patients, and confer with and assist the pharmacist(s) who supplies the nursing home with pharmacy service. Prerequisites: 407, 484, and permission; 483 recommended.

PHARM 495 Special Studies in Pharmacy (*, max. 6) AWSpS

Special studies of professional topics in pharmacy. An opportunity to expand the breadth and depth of 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) AWSpS

Pharmaceutical research problems. Prerequisites: cumulative grade-point average of 2.50 and permission.

Courses for Graduates Only

PHARM 505 Clinical Pharmacokinetics (2) W

Fuller, Ivey, Kradjan, Kuehn, Levy, Smith
Includes didactic presentation of advanced biopharmaceutic concepts, including two-compartment models and volumes of distribution. Student presentations are assigned and coordinated to demonstrate solution of pharmacokinetic problems derived from patient case histories. Prerequisites: 484, PHSCI 405, and permission.

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 NURS 515. Prerequisite: permission.

PHARM 520 Seminar (1, max. 5) AWSp

Graduate students must attend seminars and make one formal presentation per year while in residence; 1 credit per year is allowed. Offered on credit/no credit basis only.

PHARM 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 1977-78.)

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 1977-78.)

PHARM 580 Advanced Manufacturing Pharmacy (5) Sp

E. Plein
Study of the methods of manufacture of pharmaceutical preparations on a semicommercial scale. Prerequisites: CHEM 457, which may be taken concurrently, and permission. (Offered alternate years; offered 1976-77.)

PHARM 584 Seminar in Clinical Pharmacy (2, max. 8) AW

Fuller, Ivey, Kradjan, Plein, Smith
Weekly series of student-presented seminars, based on patient presentations or in-depth literature reviews. Students prepare and present these seminars to be expanded into discussions of therapeutic and medical problem solving. Prerequisite: permission.

PHARM 600 Independent Study or Research (*, max. 6) AWSpS

PHARM 700 Master's Thesis (*, max. 6) AWSpS

GRADUATE SCHOOL OF PUBLIC AFFAIRS

PUBLIC ADMINISTRATION

Courses for Graduates Only

PB AD 500 General Seminar (1, max. 9) AWSp

PB AD 501 Public Policy and Administration (3) A

Interaction between the bureaucracy and those institutions, organizations, and groups involved in the policy process. Analysis of current policy problems is made from this perspective. Offered jointly with POL S 570.

PB AD 502 The Administrator and the Policy Process (3) W

Context of public administration from the perspective of the administrator. Through case and research materials, field inquiries and interviews, the manifold roles and functions of the administrator are examined, particularly in relation to the process of implementing, making, and changing public policy. Offered jointly with POL S 571.

PB AD 503 Administrative and Executive Leadership (3) Sp

Nature of executive life in the public sector, the function of leadership in implementing, making, and changing policy. Leadership styles, the relation of leadership to its constituencies and communities. Offered jointly with POL S 572.

PB AD 505 The Law of Public Administration (3) Sp

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

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

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-utility relationships, and assessment of alternative options or "trade-offs" in activity components of large-scale action programs.

PB AD 521 Public Management: Program Planning and Design (3) 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

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 PPB approach, and the aspects of budget administration, such as revenue estimating, allotment control, and cost accounting.

PB AD 523 Public Management: Personnel (3) ASp

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 Education and Training for the Public Service (3) W

Preparation of students for participation in the Pacific Northwest continuing education and training for public administration network, and to address substantive issues in training and management-education in the public sector. The role of the local and state training director in developing human resources is explored and contrasted with federal organizations such as the Federal Executive Institute and the United States Conference of Mayors. Training methods, laboratory models, the relation of theory to executive training, and methods of evaluation also are examined.

PB AD 525 Organization Development in Public Agencies (3) W

Examination of the philosophies, theories, and models of behavioral science interventions in organizational diagnosis and development (OD). In addition to a review of the basic literature dealing with the OD approach, emphasis is placed on examination of case studies and class experience in OD applications, including organizational diagnosis, problem confrontation, and team building. Prerequisite: permission.

PB AD 526 Social Intervention (3) Sp

Exploration of the public manager's role as an interventionist, as well as the decision to seek third-party involvement in policy disputes between competing interest groups. Diagnosis of organizational problems, administrative responses to political and social environmental pressures, the organization as a learning system, and the limits of public organization change. Theoretical considerations in intervention, as well as the internal contradictions faced by static organizations in changing society. Prerequisite: 524 or permission.

PB AD 527 Quantitative Analysis (3) AW

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 528 Advanced Quantitative Methods in Public Administration (3) WSp

Discussion of several important and current topics in operations research: optimization theory, simulation, time series analysis, Monte Carlo method, queueing 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 530 Financial Management in the Public Sector (3) Sp

Exploration of the managerial uses of accounting and other processes of financial management in the public sector. Topics covered include: financial planning and control, fund accounting, cost accounting, asset accounting, internal controls, auditing, financial analysis, and financial reporting. Prerequisite: permission.

PB AD 541 Social Theory and the Public Policy Process (3) A

Approaches to the study of organizational behavior in a changing society, including consideration of formal and informal organization, personality needs, role playing, client relations, and sociopolitical and technological environment.

PB AD 542 Social Research and the Public Policy Process (3) W

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

Survey of systems theory approaches to the study and the analysis of public organizations and their environments, including systems analysis, cybernetics, information theory, and general and social systems theory.

PB AD 551 Comparative Administrative Systems (3) W

Methodological problems of research in comparative administration. Theoretical and substantive aspects of administrative systems in urban-industrial and developing nations. Offered jointly with POL S 579.

PB AD 552 Administrative Problems of Development (3) Sp

Problems of administering developing nation-states and regions, including theoretical aspects of development administration, bureaucratic change, administrative-political interaction in policy making, organizational development, political impact of administering major programs. Prerequisites: POL S 473, 474, or permission.

PB AD 599 Special Topics (2-6, max. 6) AWSp

Systematic study and analysis of special subject matter in public administration and policy. Topic for each quarter varies. Prerequisite: permission.

PB AD 600 Independent Study or Research (*)

PUBLIC POLICY

Courses for Graduates Only

PB PL 505 Health Policy and Medical Care (2) Sp

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 HSERV 505. Prerequisite: permission.

PB PL 507 International Organizations and Ocean Management (3) W

Survey of the manner in which international organizations attempt to manage and regulate the uses of the ocean. Primary emphasis on the analysis of processes that support or constrain these organizations and on the search for alternative policies and organizations. Offered jointly with IMS 507. Prerequisite: IMS 501 or permission.

PB PL 514 Program Evaluation (3) W

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 practical settings. Case studies are used to illustrate the various types of evaluation. Offered jointly with HSERV 514. Prerequisites: adequate background in quantitative methods (e.g., BIOT 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, voucher systems, block grants, revenue sharing, and tax

SCHOOL OF PUBLIC HEALTH AND COMMUNITY MEDICINE

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) A

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 POL S 534.

PB PL 535-536 Seminar in American Foreign Policy (3-3) W,Sp

Foreign policy and defense policy formation and execution. Administration of national security programs, White House, Congress, state and defense departments, special problems, and case studies. Prerequisite: 534.

PB PL 540, 541, 542 Social Management of Technology I, II, III (3,3,3) A,W,Sp

Analysis of the 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; process of public decision making. Offered jointly with CIVE 540, 541, 542 and SMT 540, 541, 542. Prerequisites: permission for 540; 540 for 541; 541 for 542.

PB PL 548 Economics of Labor and Human Resources (3) Sp

Economic analysis of policy-related topics in human resources. Topics include labor demand and supply, education and occupation, wage structures and income inequality, discrimination, and poverty. Offered jointly with ECON 548. Prerequisite: equivalent of ECON 400, or permission; not open to economics majors.

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. Objective 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 557 The Politics of Collective Bargaining in the Public Sector (3) Sp

Seminar explores purposes served by establishment of collective bargaining, the benefits and beneficiaries of the bargaining process, and implications of bargaining for the political power of managers, union leaders, union rank and file, unorganized workers, and citizen consumers. Both private and public sectors are discussed with focus on collective bargaining in government agencies. Participants need some background in organizational theory and are expected to engage in fairly extensive reading and in a research project.

PB PL 561-562 Policy Development and Administration: Urban Affairs (3-3) A,W

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 process 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 relationships between research and public policy. Prerequisite: ECON 416.

PB PL 571, 572, 573 Public and Educational Policy Issues in the Development of Human Talent (3,3,3) A,W,Sp

Higher education and the nation's human resources; trends, projections, policy issues, problems and goals in the relation between education and utilization of professional and specialized personnel. Offered jointly with EDEPS 571, 572, 573. Prerequisite: permission.

PB PL 583, 584, 585 Seminar in Science and Public Policy (3,3,3) A,W,Sp

Issues and problems relating to the interaction of science and scientists with the public policy-making 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 586 International Science and Technology Policy (3) A

Seminar is designed: first, to analyze the relationships between R&D policy, capabilities, and national technological strategies for advanced industrial and less-developed countries; second, to deal with the international implications of particular technologies as countries try to make policy for them in regional and global organizations. Examples of specific technologies are chosen from such fields as space telecommunication, weather and climate modification, airline transportation, nuclear energy and seabed exploitation.

PB PL 590, 591, 592 Midcareer Seminar (3,3,3) A,W,Sp

Interdisciplinary seminar in public policy for mid-career 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

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

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 (*) AWSps

PB PL 604, 605, 606, 607 Degree Project (2-6, 2-6, 2-6)

The economics courses below serve as an integral part of the Graduate School of Public Affairs curriculum.

ECON 392 American Indian Economic Development Problems (5) W

Trosper
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 microtheory with emphasis on applications to public policy. Designed primarily for graduate students majoring in fields other than economics. No credit given if 300 has been taken for credit.

ECON 401 Fundamentals of Macro-Theory (3) W

Fundamentals of macrotheory 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)

Examines what is happening in urban areas. Use of economic analysis to explain urban trends; urban government organization; and problems of housing and renewal, transportation, poverty and race, and the environment. Offered jointly with GEOG 416. Prerequisite: 300 or 400, or equivalent.

ECON 435 Natural Resource Utilization and Public Policy (5) AWSp

Special emphasis on elements of economic theory relating to resource-oriented industries. Case studies in the theory and practice of resource management dealing with both stock and flow resources. Benefit-cost analysis and the evaluation of multipurpose projects.

ECON 445 Income Distribution and Public Policy (5)

Income distribution implications and economic effects of public policies toward unemployment, illness, industrial accidents, old age, poverty, and discrimination from age, sex, or race. Prerequisite: 200 or 201 or permission.

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 finance problems. Prerequisite: 201, 400 or equivalent.

ECON 452 Economic Approaches to Political Analysis (5)

Application of economic theory and methodology to political phenomena. Emphasis on theory construction with application in American context. Offered jointly with POL S 416. Prerequisites: 201, 400, or equivalent.

ECON 553 Economic Analysis and Government Programs (3) Sp

Application of economic analysis to public enterprises and programs. Prerequisites: 400, 401, or equivalent.

SCHOOL OF PUBLIC HEALTH AND COMMUNITY MEDICINE

BIostatISTICS

Courses for Undergraduates

BIOST 410 Principles of Communicable Disease Control and Biostatistics (2) AWSp

Vital statistics, measure of central tendency and dispersion, introduction to interpreting statistical data, and control of communicable disease. Required of senior nursing students in the basic nursing curriculum. Offered jointly with EPI 410. Prerequisite: HSERV 323.

BIOST 472 Introduction to Statistics in Health Sciences (3) AWSp

Feigl, Martin
Description and examples of common concepts of biostatistics. Principles of statistical reasoning and critical interpretation of quantitative biomedical writing, rather than computational technique, are emphasized.

BIOST 473 Applications of Statistics to Health Sciences (3) W

Feigl
Presentation of quantitative research methods—forms design, data collection and handling, introduction to the computer. Students learn to use standard statistical computer programs (BMD, SPSS). Prerequisite: 472 or equivalent.

BIOST 497 Biostatistics Special Electives (*)

AWSps
Offered when demand is sufficient.

BIOST 499 Undergraduate Research (*) AWSps

Courses for Graduates Only

BIOST 511 Medical Biometry I (3) A

Kronmal
Presentation of the principles and methods of data description and elementary parametric and nonparametric statistical analysis. Examples are drawn from the biomedical literature, and real data sets are analyzed by the students after a brief introduction to the use of standard statistical computer program packages (e.g., SPSS and BMD). Statistical techniques covered include description of samples, comparison of two sample means and proportions, simple linear regression and correlation.

BIOST 512 Medical Biometry II (3) W

Feigl
Statistical aspects of the design of experiments, further analysis of qualitative data, basic epidemiologic statistics, and an introduction to the analysis of variance. Critical interpretation of medical literature is stressed. Prerequisite: 511 or equivalent.

BIOST 513 Medical Biometry III (3) Sp

Fisher
Analysis of covariance and multiple regression, including stepwise multiple regression, are emphasized in this course. Other topics presented include elements of survival table analysis, classification procedures, and clustering in time and space. Prerequisite: 511 or 473, or equivalent.

BIOST 519 Analysis of Random Data (3) A

Techniques of exploratory data analysis; resistant techniques; data transforms; parameter estimation; estimation of probability density functions; hypothesis testing; linear and nonlinear least squares techniques; 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. Offered jointly with E E 519.

BIOST 520 Nonparametric Methods (3)

Martin
Methods course in nonparametric statistics with some discussion of robust data analysis. No advanced mathematics or statistics required. Useful to nonmajors with only a statistical methods course background and some research experience. The level is about that of J. V. Bradley's *Distribution-Free Statistical Tests* or Hollander and Wolf's *Nonparametric Statistical Methods*. Primary emphasis on rank tests, correlations and confidence intervals, and a few selected topics. Prerequisite: 511 or equivalent, or permission.

BIOST 521 Operations Research for Health Services (3) W

Diehr
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.

BIOST 522 Application of Vital and Health Statistics (2) Sp

Lee
Analysis of routinely collected data on the health status and care of populations, with emphasis on the potential and limitations of this approach. Stressed are the importance of such data for the development and the evaluation of programs and the recognition of new hazards. Offered jointly with EPI 522. Prerequisite: 472 or equivalent, or permission.

BIOST 523 Computer Applications in Biostatistics (3)

Diehr
For simple linear and multiple regression, students learn about methods, available computer programs, transformations of data, and interpretation of computer output. Exercises are carried out on real biomedical data, preferably from student projects. Discriminant functions and dummy variable regression are included. Prerequisite: 511 or equivalent, or permission.

BIOST 528 Special Topics in Intermediate Biostatistics (3)

Intermediate topics in biostatistics offered by regular and visiting faculty members upon demand. Prerequisites: 472 and 473, or 511, or equivalent.

BIOST 529 Sample Survey Techniques (3) Sp

Thompson
Design and implementation of selection and estimation procedures in sample surveys. Emphasis on the sampling of human populations, although principles apply to other sampling problems. Topics include simple, stratified, and cluster sampling, multistage and two-phase procedures, optimal allocation of resources; estimation theory, replicated designs, variance estimation, national samples and census materials. The content of this course is comparable to QMETH 529 (Survey Sampling); these two courses offered alternate years. Prerequisite: 511 or permission.

BIOST 571 Applied Regression Analysis (3) A

Kronmal, Wahl
Advanced statistical methods course for biostatistics and other graduate students already familiar with the general linear hypothesis. Topics covered are ordinary and multiple regression use of transformations, methods of model selection (stepwise, Mallows' Cp, ridge regression), and analysis of residuals. Prerequisites: 513 and MATH 485.

BIOST 572 Multivariate Statistical Methods (3) W

Fisher, Martin
Following a review of the multivariate normal distribution, this course considers discriminant methods and linear models for dependent multivariate observations, then surveys methods of principal components and factor analysis. Prerequisites: 571 and MATH 485.

BIOST 573 Statistical Methods for Categorical Data (3) Sp

Breslow, Davis
Maximum likelihood fitting of log-linear models for multidimensional contingency tables and logistic regression models for binary response variables. Exact methods for selected problems. Prerequisites: 513 and MATH 485.

BIOST 574 Statistical Computing (3)

Kronmal, Martin
Application of numerical methods to statistical problems; generation of pseudo random numbers, design and execution of Monte Carlo studies, comparative evaluation of statistical algorithms, matrix methods, computation of distribution functions. Prerequisites: MATH 483 and programming, or permission. (Offered alternate years.)

BIOST 575 Population Models (3)

Polissar
Examples of mathematical and statistical models in demography are discussed with an eye toward needed research. Real and simulated data are used. Topics include: the life table; stationary, stable, and quasi-stable populations; determinants of the age-

structure of a population; age-specific models of mortality, fertility, and nuptiality; models of conception and birth; estimation of demographic rates. Prerequisite: MATH 483 or permission.

BIOST 576 Statistical Methods for Survival Data (3)

Breslow, Prentice
Statistical methods for censored survival data arising from follow-up studies on human or animal populations. Includes a discussion of the life table and the fitting of regression models with both parametric and nonparametric survival distributions. Prerequisites: 513 or Q SCI 383, and MATH 483.

BIOST 577 Design of Medical Studies (3)

Feigl, Fisher
Review of the classical principles of experimental design, followed by discussion of the specific problems of prospective observational studies and clinical trials. Determination of sample size, randomization methods, sequential designs, and data-management systems. Some knowledge of experimental design is assumed. Prerequisites: 512 and MATH 483.

BIOST 578 Special Topics in Advanced Biostatistics (3)

Advanced-level topics in biostatistics offered by regular and visiting faculty. Prerequisite: permission.

BIOST 580 Seminar in Biostatistics (*, max. 5)

AWSp
Presentation and discussion of special topics and research results in biostatistics. Speakers include resident faculty, visiting scientists, and advanced graduate students. Required of students in the Biostatistics Pathway of the Biomathematics Group.

BIOST 582 Seminar in Biostatistics Applied to Health Services Research (1, max. 5) AW

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. Offered jointly with HSERV 582.

BIOST 590 Biostatistical Consulting (*) AWSps

Feigl, Martin, van Belle
Training in consulting on the biostatistical aspect of research problems arising in the biomedical field. Students, initially under the close supervision of a faculty member, participate in discussions with investigators leading to the design and/or the analysis of a quantitative investigation of a problem. With experience, independent associations of student and research worker are encouraged, with subsequent review by faculty of resulting design and analysis. Required of students in the Biostatistics Pathway of the Biomathematics Group. Prerequisite: permission.

BIOST 600 Independent Study or Research (*) AWSps

Prerequisite: permission.

BIOST 700 Master's Thesis (*) AWSps

Prerequisite: permission.

ENVIRONMENTAL HEALTH

Courses for Undergraduates

ENVH 411 Introduction to Environmental Health (3) AWSp

Hallen
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.

ENVH 430 Methods in Environmental Sampling and Analysis I (3) A

Wetzler
Field sampling methods and selected laboratory

SCHOOL OF PUBLIC HEALTH AND COMMUNITY MEDICINE

analyses of various waters and wastes are conducted. Official methods for characterizing physical and chemical quality of water and wastes are demonstrated. Microbiological criteria are emphasized for student participation, including: enumeration of sub groups in populations, selective inhibitor, characteristics of normal flora, rationale of "indicator" organisms, etc. Prerequisites: junior standing, 440, which may be taken concurrently, MICRO 301 and 302, and permission.

ENVH 431. Methods in Environmental Sampling and Analysis II (3) W Wetzler

Pertinent methods for collection of food and food-stuff samples are demonstrated. The usual official analytical procedures of FDA, USDA, and/or AOAC are presented or demonstrated for foods and dairy products. Criteria for wholesomeness, safety, and inhibition of spoilage are examined in detail. Pertinent samples and analyses of typical physical environments surrounding stored foods are examined. Prerequisites: 430, MICRO 301 and 302, and permission.

ENVH 440 Water and Waste Sanitation (4) A Jackson

Study of the health implications of water use and sewage disposal methodology. Focal concerns include water-quality evaluation, pollution factors, individual and public water and sewage facilities, site selection criteria, and legislative and agency activities. The knowledge and skills required for effective field performance by the environmental health specialist are emphasized.

ENVH 441 Food Sanitation (4) W Jackson

Advanced study of the sanitary control of the production, processing, and distribution of food products, emphasizing control of food-borne diseases. Prerequisites: 411, environmental health major, and MICRO 301 and 302, or permission.

ENVH 442 Vector Control (3) Sp Hallen

Advanced study of the impact of and the control of rodents and arthropod vectors of disease, including consideration of economic poisons used, their regulation, and safety measures.

ENVH 443 Human Habitat and Health (3) Sp Van Dusen

Examination of the impact of housing on man's total health and well-being; the environmental health problems associated with inadequate housing; the environmental health specialist's responsibility in promoting health in both private and public accommodations including schools, migrant housing, jails, and institutions; and the interrelationship of health with existing housing programs. Prerequisites: 411 and environmental health major, or permission.

ENVH 444 Institutional Environmental Health (2) Sp Fish

Examination of the environmental health and safety hazards that can adversely affect hospital and nursing home patients, staff, and surrounding community; the means by which hazards can be prevented and controlled; and the interrelationships between administrative and regulatory activities. Prerequisites: 411 and environmental health major, or permission.

ENVH 449 Respiration, Circulation, and Environmental Health (2) Frank

Structure and function of the respiratory and cardiac 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.

ENVH 450 Measurement and Control of Air Pollution (2) A Breyse, Horstman

Description of methods for air pollution research and control, including field-survey techniques, stack sampling, continuous monitoring, and use of control

equipment. Administrative problems are also discussed.

ENVH 451 Mechanisms of Cellular Responses to Air Pollution (2) W Kaplan, Luchtel, McJilton

Designed for students who wish to obtain an insight into the effects of air pollution at the cellular and subcellular levels. Ultrastructural morphology of the lung and pathological changes due to air pollutants; biochemical reactions of oxidant irritants, hydrocarbons, and particulates; relationships between air pollution and degenerative aging processes. Prerequisites: general and organic chemistry and introductory biology; 449 and 450 recommended.

ENVH 453 Industrial Hygiene and Safety (3) W Breyse, Horstman

Review of occupational health and safety hazards, including causes, effects, evaluation, prevention, and legislation. Prerequisite: 411 or permission.

ENVH 457 Noise and the Environment (2) Sp Breyse

Examination of urban community noise problems, including sources, effects, and control, and legislation.

ENVH 460 Accident Prevention (2) A Breyse

Discussion of the accident process and the classification of accidents, including epidemiologic indices. Analysis of accident statistics and research studies relating to control planning; survey of existing programs and legislation. Term field project and report.

ENVH 462 Laboratory Management and Safety (1) W Breyse

Designed for laboratory management safety, to consider chemical and physical hazards; their control and management.

ENVH 479 Environmental Research Design (1) AWSp Van Dusen

Designed to assist in the development of environmental health research projects. Common research designs, methodology, principles, and problems with emphasis on effective research problem definition, implementation, and data presentation.

ENVH 480 Environmental Health Problems (*, max. 6) AWSp Van Dusen, Staff

Individual projects involving library, laboratory, or field study of a specific environmental health problem. Prerequisite: environmental health major or permission.

ENVH 482 Field Practice—Technology (2-6) AWSp

Assignment to a local health department for supervised application of public health practices and environmental control techniques. Prerequisites: environmental health major and permission.

ENVH 483 Field Practice—Program Planning (6) AWSp

Assignment to a local health department for supervised observation and experience in environmental health program planning. Prerequisites: environmental health major and permission.

ENVH 484 Field Practice—Community Resources (3) AWSp

Assignment to a local health department for training in the utilization of community resources. Prerequisites: environmental health major and permission.

ENVH 497 Environmental Health Special Electives (*). AWSp

Off-campus course for medical students.

ENVH 499 Undergraduate Research (*). AWSp Van Dusen, Staff

Individual research on a specific topic in environmental health upon which specific conclusions, judgments, or evaluation can be made or facts can be presented. Prerequisites: environmental health major or permission.

Courses for Graduates Only

ENVH 511 Environmental Health (3) A

Breyse, Frank, Goble, Hallen, Milner, Wilson
Consideration of the health effects of environmental exposures using a problem-oriented approach embracing the natural, community, air pollution, and working environments. Group discussion by didactic instruction where appropriate.

ENVH 521 Environmental Components and Problem Identification (3) A Hallen

Examination of the physical components that influence man's health and his efficiency of performance. Application of techniques for the gathering of information and identifying environmental problems in the community or in industry. The techniques used include: questionnaire and interview schedule development, issue analysis, nominal group process, and environmental impact statements. Prerequisite: environmental health graduate student or permission.

ENVH 522 Environmental Program Planning (3) W Fish, Hallen

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.

ENVH 523 Environmental Health Program Management (3) Sp Fish, Hallen

Examination of environmental health programs for the identification of management practices and problems. Specific problems considered include program organization, communications and coordination, supervision, decision making, and personnel recruitment, utilization, and evaluation.

ENVH 533 Industrial Hygiene Instrument Laboratory (2) W Breyse, Horstman

Laboratory focuses on theory and practical use of various sampling instruments utilized to evaluate potential industrial hazards. Prerequisite: 453 or permission.

ENVH 555 Industrial Hygiene Chemistry Laboratory (2) Sp Horstman

Laboratory focuses on theory and practical use of various chemical analytical instruments utilized to evaluate potential industrial hazards. Prerequisite: 453 or permission.

ENVH 557 Control of the Industrial Environment (3) Sp Breyse, Hubbard

Principles of control of the industrial environment, including noise and hazardous chemicals, with special emphasis on design of exhaust-ventilation systems. Prerequisite: 453 or permission.

ENVH 571 Occupational Physiology and Toxicology (3) W Goble, Milner

Study of the function of bodily systems in relationship to potential occupational disease, including methods used to evaluate potentially toxic or hazardous exposures and their known effects. Prerequisites: CHEM 232, ZOOL 208, or permission.

ENVH 572 Etiology 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 EPI 572. Prerequisite: EPI-511 or permission.

ENVH 573 Medical Management of Environmental Injuries (2) Sp Milner

Considers the methods of prevention and treatment of environmental trauma. Major emphasis is on

environmental abnormalities encountered in the Pacific Northwest during sporting activities. Specific topics include frostbite, heatstroke, high-altitude disease, SCUBA problems, etc. For second-, third-, and fourth-year medical students only.

ENVH 580 Environmental Seminar (1, max. 6) AWSpS
Current environmental health research and environmental control programs.

ENVH 581 Environmental Reading (1, max. 6) AWSpS
Critical reading of selected basic and applied research publications on environmental health problems and programs.

ENVH 590 Selected Topics (1-6) AWSpS
In-depth study of a current environmental health topic and/or special summer format presenting introductory material. May be taken with HSERV 590 and EPI 590. For more information and permission, consult department program adviser.

ENVH 599 Field Studies (2-6, max. 6) AWSpS
Assignment to an environmental research or service program for application of evaluation techniques.

ENVH 600 Independent Study or Research (*) AWSpS
Prerequisite: permission.

ENVH 700 Master's Thesis (*) AWSpS
Prerequisite: permission.

EPIDEMIOLOGY AND INTERNATIONAL HEALTH

EPI 420 Introduction to Epidemiology (3) A
Descriptive, analytic, and experimental epidemiology, as presented in examples from infectious and chronic noninfectious disease. Includes descriptive statistics as applicable in epidemiology. Prerequisite: HSERV 323, MICRO 301 or permission, or graduate standing.

EPI 497 Epidemiology and International Health Special Electives (*) AWSpS
Off-campus course for medical students. Prerequisite: permission.

EPI 499 Undergraduate Research (*) AWSpS
Prerequisite: permission.

Courses for Graduates Only

EPI 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.

EPI 511 Principles of Epidemiology (3-4) 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.

EPI 512 Epidemiology of Chronic Diseases (3) W
Wells
Study of the principles and practices of epidemiology as applied to the noncommunicable diseases. Prerequisites: 511 and BIOST 511, or permission.

EPI 513 Epidemiology of Infectious Diseases (3) Sp
Alexander
Study of the principles and the practices of epidemiology, as derived from a study of communicable diseases. Prerequisite: 511 or permission.

EPI 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 mental retardation, together with the evaluation of control problems. Prerequisites: graduate, medical, or dental school standing and 510 or 511, or permission.

EPI 522 Application of Vital and Health Statistics (2) Sp
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 BIOST 522. Prerequisite: BIOST 472 or equivalent, or permission.

EPI 523 The Epidemiology of Mental Retardation (2) Sp
LaVeck
Epidemiologic principles and methods and their application in the acquisition of new knowledge about mental retardation. The prevalence of mental retardation and the numerous variables that relate to the distribution and determinants of mental subnormality. Discussions on current epidemiologic and pediatric literature relevant to birth order, family size, nutrition, perinatal events, and specific etiologic agents as these relate to mental retardation. Critiques of current literature relevant to surveys, case-control studies, and cohort studies in the field. The application of screening for developmental defects and specific mental retardation problems. Epidemiology of residents in institutions. Evaluation of the impact of intervention, including infant stimulation, on subsequent social and cognitive development. Prerequisite: graduate student in public health, medicine, nursing, special education, or psychology, or permission.

EPI 531 Problems in International Health (3) A
Alexander, Gale
Survey of the relationship of the sociocultural, political, economic, and demographic characteristics of developing countries to disease occurrence and to the solution of health problems. Prerequisite: graduate or medical student or permission.

EPI 572 Etiology 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 ENVH 572. Prerequisite: 511 or permission.

EPI 583 Epidemiology and Biostatistics Research Seminar (1, max. 3) AWSpS
Promotes critical reading of scientific papers and increases knowledge and understanding of principles and methods in epidemiology. Prerequisite: permission.

EPI 587 Genetic Epidemiology (3) A
Ward
Epidemiology of genetic disease and genetic aspects of the epidemiological distribution of disease in a variety of different populations. Factors influencing reproductive outcome and subsequent growth and development. Interaction of genetic and environmental factors to produce multifactorial diseases. Biological cost of cultural transition: interaction of changing demographic profiles with rapid environmental change (including the influence of public health programs and medical care) to produce new profiles of disease. The genetic consequence of such changes. Offered jointly with PHY A 587. Prerequisite: PHY A 482 or permission.

EPI 590 Selected Topics in Epidemiology or International Health (2-6, max. 6) AWSpS
Tutorials are arranged for a small number of students for in-depth examination of an area of epidemiology or international health, usually of current nature. Seminar format. Prerequisite: 511. Also a special summer format presenting introductory

material. May be taken with ENVH 590 and/or HSERV 590. For more information and permission, consult the department program adviser.

EPI 598 Teaching Methods in Epidemiology and/or Preventive Medicine (1-3) AWSpS
Foy
Supervised teaching experience in public health and in epidemiology. Student formulates an outline for a course in epidemiology or related subject. Student makes one or more formal presentations to class and is encouraged to use modern educational methods and teaching media. Student constructs test questions on lecture subjects. Prerequisite: EDPSY 449 or equivalent.

EPI 599 Practice of Epidemiology (*) AWSpS
Peterson
Participation in the field investigations of acute or chronic disease occurrence. Prerequisite: permission.

EPI 600 Independent Study or Research (*) AWSpS
Prerequisite: permission.

EPI 700 Master's Thesis (*) AWSpS
Prerequisite: permission.

EPI 800 Doctoral Dissertation (*) AWSpS
Prerequisite: permission.

HEALTH SERVICES

HSERV 411 Introduction to Health Services and Community Medicine (3) AWSpS

Gilson
Broad survey of key elements in public health and personal health services. The objective is to create familiarity with major issues, terminology, and selected specific programs in the health-care field. For future health professionals and others wanting a broad exposure to health issues.

HSERV 485 Health Services Administration for Selected Populations I (3) W
French
Introduction to the health-care industry. Survey of the institutions, programs, policies, and resources of the health-care delivery system and current problems of major concern. Prerequisites: junior or senior standing, and permission.

HSERV 486 Health Services Administration for Selected Populations II (3) Sp
French
An in-depth examination of the roles of health-care professionals and institutions in delivering health-care services to the community. Study and discussion of the accessibility, availability, and acceptability of services to the community. Examination of the community's role in health policy formulation and planning. Prerequisites: 485 and junior or senior standing, or permission.

HSERV 497 Health Services Special Electives (*) AWSpS
Off-campus course for medical students.

HSERV 498 Undergraduate Thesis (*) AWSpS

HSERV 499 Undergraduate Research (*) AWSpS

Courses for Graduates Only

HSERV 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 PB PL 505. Prerequisite: permission.

HSERV 511 Health Services and Medical Care (3) A
Williams
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

RESERVE OFFICER TRAINING PROGRAMS

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.

HSERV 512 Medical Care (3) W *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.

HSERV 513 Health Planning: Implementation and Goals (3) A *Blackman*

Study and discussion of the methods of health planning and resource allocation in the health services area. Cost benefit and cost effectiveness, program budgeting, and other techniques are explored in relationship to the methodology for measuring health benefits and efficiency. The evaluation of programs, methods for such investigation and analysis, and related topics are included. Prerequisite: 511 or equivalent, or permission.

HSERV 514 Program Evaluation (3) W *Shortell*

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 practical settings. Case studies are used to illustrate the various types of evaluation. Offered jointly with PB PL 514. Prerequisites: adequate background in quantitative methods (e.g., BIOST 512 or 513) and permission.

HSERV 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.

HSERV 522 Community Organization for Health (4) W *Anderson*

Emphasis on the diagnosis of community health problems and various organizational practices utilized for effective solution. Review and analysis of the community organization process; resources; role of the community health workers, relationship to the practice of community health education. One-half day of fieldwork required. Prerequisite: permission.

HSERV 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. Sites may include neighborhood clinics, health planning bodies, medical practice settings, public health agencies, special problem clinics and facilities, environmental programs and services. Prerequisite: medical student or permission.

HSERV 533 Quality of Health Care: Evaluation and Assurance (3) Sp *LoGerfo*

Survey of methods used to assess components of medical care services and an analysis of their application to care by physicians, nurses, physician extenders, social services, hospitals, nursing homes, and emergency services. An overview of legal and professional quality assurance mechanisms also is presented, with analysis of their actual and potential impact. Prerequisite: 511, BIOST 511, or equivalent.

HSERV 546 Economic Studies of Health Care (3) Sp *McCaffree, Watts*

Examination of topics related to the economics of health care, including supply and demand factors, financing of care, efficiency and cost of delivery, and allied areas. Offered jointly with ECON 546. Prerequisite: graduate standing in the School of Public Health and Community Medicine; others by permission.

HSERV 551 Health Services Management I (3) A *Dowling*

Deals 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.

HSERV 552 Seminar in Hospital Management (3) W *Dowling*

Examination of decision making, change implementation, and control processes in hospitals. Emphasizes (1) behavioral, organizational, and situational factors affecting the management role in hospitals, and (2) management strategies for analyzing problems and implementing changes to improve hospital performance. Seminar/case study format. Prerequisite: 511 or 551 or A ORG 550, or permission.

HSERV 553 Health Services Management III (3) Sp *Tiscornia*

Third course in a three-course sequence dealing with the management of health services institutions and programs. Topics covered are: health services law, hospital and program policy decisions, financial planning, and hospital design and architecture; and the presentation of hospital survey and health services research project reports. Prerequisites: 551 and permission.

HSERV 561 Seminar on Sociological Aspects of Health and Healing (3) A *Shortell*

Critical examination and discussion of sociological approaches—methodological, theoretical, and empirical—in the health-care field. Particular attention is paid to applied studies in the field and, more broadly, to the implications for decision making from the sociological perspective. Prerequisite: 511 or undergraduate major in sociology or permission.

HSERV 567 Politics of Health Care (3) Sp *Yondorf*

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.

HSERV 580 Health Services Research Seminar (*) W

Presentations 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.

HSERV 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.

HSERV 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 BIOST 582. Prerequisite: permission.

HSERV 584 Seminar: Health Manpower (3) W *Lawrence*

Review of current status of health manpower in the United States and growth in health professions in this century. Discusses approaches to health manpower planning. Limited to twenty students by prior arrangement with instructor.

HSERV 590 Selected Topics in Health Services (*) AWSpS

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 ENVH 590 and/or EPI 590. For more information and permission, consult department program adviser.

HSERV 595, 596, 597 Field Analysis Project/Research Project (3,3,3) A,W,Sp *Blackman, Dowling, Shortell, Trivedi, Watts, Williams*

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.

HSERV 599 Field Practice in Public Health (*) AWSpS

Individually assigned and supervised student field placements in agencies and programs related to areas of concentration. Health education, medical-care organization and administration, public health program areas, and associate placements are developed, depending on student interest and educational needs. Prerequisite: graduate standing in the School of Public Health and Community Medicine; others by permission.

HSERV 600 Independent Study or Research (*) AWSpS

Prerequisite: permission.

HSERV 700 Master's Thesis (*) AWSpS

Prerequisite: permission.

PATHOBIOLOGY

PABIO 451 Laboratory Diagnosis of Viral Infections (4) Sp *Cooney*

Lecture and laboratory covering diagnostic procedures for etiologic diagnosis of viral infections: upper respiratory, lower respiratory, systemic, and central nervous system. Symptomatology: indications for specimen collection, types of specimens for examination, methods for virus isolation, identification of agents, serologic methods, interpretation of results. Prerequisites: MICRO 441, 442 or equivalent.

PABIO 497 Pathobiology Special Electives (*) AWSpS

Off-campus course for medical students.

PABIO 499 Undergraduate Research (*) AWSpS

Courses for Graduates Only

PABIO 511 Pathobiological Frontiers (3) Sp *Kenny*

Study and discussion of the present concepts of pathobiology as related to disease, presented in a

format suitable for graduate students knowledgeable in health-related areas, but who are not in biologically oriented programs. Topic areas include: host-parasite interactions, host responses, pathogenesis, and methods of biological experimentation. Prerequisite: permission.

PABIO 521 Mammalian Cell Culture as a Tool for Virus Research (3) A

Kenny
General concepts and techniques of cell culture as applied to virus isolation, propagation, and quantitation. The nutrition, growth characteristics, and metabolism of animal cell cultures are considered in detail. Laboratory includes a special problem of the student's choice. Prerequisite: permission.

PABIO 522 Antigenic Analysis of Micro-organisms (3) W

Kenny
Theory, techniques, and strategy for antigenic analysis of micro-organisms. Emphasis is placed on the use of recent electrophoretic methods for quantitative analysis of complex antigenic mixtures. Prerequisite: permission.

PABIO 524 Methods for Ultrastructure of Micro-organisms (3) W

Boatman
Specific methods for the investigation of the ultrastructure of micro-organisms are described following discussion of the design and operation of the electron microscope. Lectures cover the morphology and structure of bacteria, mycoplasmas, and bacterial and animal viruses. Instruction is given in operating the electron microscope, in the examination of specimens, and in producing photographic data. Students are expected to pursue a small topic of their choice. Prerequisite: permission.

PABIO 525 Cell Surface Membrane in Cell Sociology and Immunology (2) Sp

Hakomori
Structure and function of cell surface membranes in relation to various immunobiological and pathobiological phenomena (differentiation, organization, infection, cancer, etc.) are covered. Offered jointly with MICRO 525. Prerequisites: BIOC 440, 441, 442 and MICRO 447, and permission.

PABIO 580 Pathobiology Seminar (1, max. 9) AWSpS

Research reports from both students and faculties are presented and discussed. Topics include immunohistochemistry, viruses, membranes, infectious diseases, immune response. Prerequisite: permission.

PABIO 581 Current Literature in Pathobiology (1, max. 12) AWSpS

Critical evaluation of recent articles on infectious agents. Emphasis on literature dealing with immunological, biochemical, and molecular studies of selected pathogenic micro-organisms and viruses. Prerequisite: graduate student standing in pathobiology; others by permission.

PABIO 582 Seminar on Molecular Biology of Animal Viruses (1, max. 12) AW

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.

PABIO 598 Didactic Pathobiology (*, max. 12) AWSp

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.

PABIO 600 Independent Study or Research (*)

Prerequisite: permission.

PABIO 700 Master's Thesis (*)

Prerequisite: permission.

RESERVE OFFICER TRAINING PROGRAMS

AEROSPACE STUDIES

Courses for Undergraduates

A S 101, 102, 103 Aerospace Studies 100 (1,1,1) A,W,Sp

Examines the role of United States military forces in the contemporary world, with particular attention to the United States Air Force, its organization and mission. The functions of strategic offensive and defensive forces, general purpose forces and aerospace support forces are covered. One classroom hour and one hour of corps training per week.

A S 211, 212, 213 Aerospace Studies 200 (1,1,1) A,W,Sp

Introduction to the study of air power. The course is developed from a historical perspective starting before the Wright brothers and continuing through the early 1970s. The development and employment of air power in military and nonmilitary operations to support national objectives is covered. One classroom hour and one hour of corps training per week. Prerequisites: 103 or equivalent for 211; 211 for 212; 212 for 213.

A S 321, 322, 323 Aerospace Studies 300 (3,3,3) A,W,Sp

Study of United States defense policy with respect to those political, economic, and social constraints involved in its formulation and implementation. Includes an examination of the military professional, his role and civil-military relationship in a democratic society. Three classroom hours and one hour of corps training per week. Prerequisites: 213 or equivalent for 321; 321 for 322; 322 for 323.

A S 430 Flight Instruction Program Ground School (2) Sp

Ground school to supplement flight training for Air Force ROTC cadets in light aircraft; includes weather, navigation, and Federal Aviation Agency regulations. Prerequisite: permission.

A S 431, 432, 433 Aerospace Studies 400 (3,3,3) A,W,Sp

Study of Air Force leadership and management. Includes professional responsibilities, military justice system, leadership theory functions and practices, management principles and functions, and problem solving. Three classroom hours and one hour of corps training per week. Prerequisites: 323 or equivalent for 431; 431 for 432; 432 for 433.

MILITARY SCIENCE

Courses for Undergraduates

M SCI 101, 102, 103 Military Science I: Basic (1,1,1) AWSp,AWSp,AWSp

History, organization, and mission of the United States Army and the ROTC program and the relationship of the program to the citizen's military and civilian obligations; functions and organization of the defense establishment of the United States and the interrelationships among the services under the Department of Defense; evolution of warfare, to include the meaning and scope of the principles of war and the development of weapons and associated equipment used in warfare. All cadets are also required to participate in the leadership development program, which emphasizes practical application of basic leadership principles and skills. This program requires ten hours participation per quarter. An additional course in the cadet's required or elective program of study at the University is used to enhance the cadet's overall leadership development.

M SCI 201, 202, 203 Military Science II: Basic (3,2,1) AWSp,AWSp,AWSp

Fundamentals of military map reading, aerial photography interpretation and field navigation with map and compass; principles of the art of warfare as they are exemplified in American military history; tactical lessons and leadership techniques demonstrated in the most significant American campaigns and engagements; fundamentals and techniques of small-unit tactics, emphasizing the importance of firepower, movement, and communications; the duties, responsibilities, and methods of employment of basic military units. All cadets are also required to participate in the leadership development program, which emphasizes practical application of basic leadership principles and skills. This program requires participation in one weekend exercise during the school year.

M SCI 301, 302, 303 Military Science III: Advanced (3,3,3) AWSp,AWSp,AWSp

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 factors affecting human behavior; affords opportunities to apply leadership and management techniques. Explains the roles of the various branches in the overall mission of the Army and their functions in support of field forces; the role of the leader in directing and coordinating individuals and military units in the accomplishment of missions from squad to battalion level; the principles of command control, leadership techniques, and communication systems used in the Army. All cadets are also required to participate in the leadership development program, which is a practicum of skills and principles taught in the previous two years or at basic camp for two-year program students. This program requires participation two weekend exercises during the school year. An additional course in the cadet's required or elective program of study at the University is used to enhance the cadet's overall leadership development. A tax-free stipend of \$100 per month is paid to contract students enrolled in the advanced program.

M SCI 304 Survey of Military History (1) A
Generalship and the art of warfare as they are exemplified 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 201.

M SCI 401, 403 Military Science IV: Advanced (2,2) AWSp,AWSp

Examination of the factors influencing world change, 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 by which administration, logistics, and planning are coordinated into successful military operations; an introduction to the basic concepts of the legislative and executive authority establishing 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 successful military operations. GIS 432, Systems of Military Law, is offered for 3 credits in Autumn and Spring quarters. Although the course is scheduled to be taken during the Military Science IV year it may be taken at any time offered during the Military Science III and Military Science IV years. Military Science IV cadets participate in the leadership development program described for Military Science IIIs above, but with emphasis on planning and execution of the program under the supervision of the Military Science IV adviser. Two additional courses in the cadet's required or elective program of study at the University are used to enhance the cadet's overall leadership development. A tax-free stipend of \$100 per month is paid to contract students enrolled in the advanced program.

SCHOOL OF SOCIAL WORK

NAVAL SCIENCE

Courses for Undergraduates

N SCI 111 The Naval Service (3) A

General introduction to the Navy, its organization, missions, roles, tasks, and operating methods. The relationship to the other services within the Department of Defense is emphasized.

N SCI 112 Naval Ship Systems I (3) W

Study of the varied ship systems operational in the Navy today, including the principles of characteristic propulsion systems and auxiliary machinery and the elements of ship stability and damage control. An introduction to nuclear propulsion.

N SCI 113 Naval Ship Systems II (3) Sp

Continuation of 112.

N SCI 211 Naval Weapon Systems (3) A

Concept of naval weapons systems and the systems approach, the techniques of linear analysis of ballistics and weapons, the dynamics of basic components of weapons control systems. The tools are provided for understanding the basic principles that are involved in all modern naval weapon systems.

N SCI 212 Sea Power Practicum I (2) W

Seminar-type course in which discussion centers on the role of sea power in the history of the United States, the current status of the various elements of the nation's sea power as they influence the development and implementation of national security policy, and the economic effects of the elements of sea power (the Navy, the merchant marine, port facilities, fisheries, and oceanographic capabilities).

N SCI 213 Sea Power Practicum II (2) Sp

Continuation of 212.

N SCI 311 Navigation (3) A

Comprehensive study of the science of terrestrial 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 "dq's work" of the ship's navigator.

N SCI 313 Naval Operations (3) Sp

Introduction to naval operations, the employment of naval forces, naval tactics, formulation of operations plans and orders, employment of detection equipment, and meteorology. The subject of operations analysis as a tool for decision making is introduced.

N SCI 410 Naval Operations Analysis (3)

Provides the student background to understand operations analysis projects and his role in data gathering for useful quantitative information in the solution of analytical problems. Makes use of integral calculus and basic computer programming. Prerequisites: MATH 114, 124, 125, 126, or permission.

N SCI 411 Psychology of Leadership (3) A

Introduction of the theory and techniques of naval leadership based on those principles of behavioral science that are pertinent to understanding individual and group behavior of adults. It introduces the student to the management process and the relationship of management functions to leadership. Acceptance of a traditional deep sense of moral responsibility on the part of the aspiring leader is stressed.

N SCI 412 Naval Organization and Management I (3) W

Study of organization, systems, and techniques employed in the Navy for management of its human, financial, and material resources. Some of the work relates to the administration of discipline in the Navy under the Uniform Code of Military Justice. Emphasis is placed on the leadership and management role of the junior officer in the fleet.

N SCI 413 Naval Organization and Management II (3) Sp

Continuation of 412.

MARINE CORPS OPTION COURSES

N SCI 321 Evolution of Warfare I (3) A

Introduction to the art of war, the evolution of warfare from the earliest recorded battles to the present day.

N SCI 322 Evolution of Warfare II (3) W

Continuation of 321.

N SCI 323 Marine Corps Operations (3) Sp

Introduction to the basic tactics employed by the Marine Corps. Covers the roles and the missions of the Marine Corps, its relationship to the other services, and its employment in the implementation of national policy. Familiarizes the student with Marine Corps organization.

N SCI 421 Amphibious Warfare I (3) A

Historic review of the great amphibious operations conducted in the Pacific theater of operations during World War II and of the doctrine for amphibious warfare that evolved.

N SCI 422 Amphibious Warfare II (3) W

Continuation of 421, covering the amphibious operations in the European theater of operations during World War II, the Korean War, Lebanon, Cuba, Santo Domingo, and Vietnam. Planning for amphibious operations, including command relationships, task organization, and other aspects.

N SCI 423 USMC Leadership and Administration of Justice (3) Sp

Concepts, objectives, characteristic qualities, and practical techniques of leadership as exercised by the Marine Corps officer are studied. Emphasis is placed on the leadership and management role of the junior officer in the fleet marine forces.

SCHOOL OF SOCIAL WORK

Courses for Undergraduates

SOC W 300 Historical and Contemporary

Approaches to Social Welfare (5) AWSp

Berleman, Duplica, 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

Duplica, Hanneman, Leigh

Provides a conceptual framework for social work practice with individuals, families, small groups, and communities; an introduction to the roles, tasks, and functions of the social welfare practitioner and to theories and methods of intervention; and develops skills in problem assessment, intervention, termination, and evaluation. Open only to social welfare juniors.

SOC W 320 Contemporary Approaches to Social Welfare (3) AW and/or Sp

Berleman, Duplica, Parsons

Selected public social policy in the areas of income maintenance and social service with a view toward analyzing their effectiveness as instruments for reducing poverty in this country. Income and service strategies in public assistance programs and the impact of inherent developments such as revenue sharing and budgetary restrictions on these programs. Criteria for analyzing income maintenance schemes such as family allowances and negative income tax. Open to majors and nonmajors.

SOC W 360 Working With Volunteers in Social Work Settings (2) W

Bryant, Kelley

Historic role of the volunteer, current functions performed by volunteers, and the probable roles of volunteers in the future. Those anticipating becoming volunteers or interested in the role of the volunteer within social work settings gain a perspective on their organizational place and function.

SOC W 390 Introduction to Social Welfare Research (3) AWSp

Herrick

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 395 Program Evaluation in Social Welfare (3) W

Roffman

Program evaluation with the purpose of orienting the student to the dynamics and functions of evaluation in social action programs. Objectives are: to develop an understanding of the variety and character of various evaluative techniques, to develop competence in evaluating social programs, and to grasp an appreciation of the various alternatives for using the results of evaluation studies in improving organizational performance.

SOC W 401 Interviewing and Counseling Skills (3) Sp

Kelley, Miller

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 (1-5, max. 15) AWSp

Prerequisite: permission.

SOC W 410- Beginning Social Work Practice (2-)

A

Allen, Bracht, Ellis, Mundt, Ochoa

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-) W

Allen, Bracht, Ellis, Mundt, Ochoa

Continuation of concepts and methods initiated in 410-, with emphasis on service methods. Prerequisites: 410- and 415-. To be taken concurrently with 416-.

SOC W -412 Beginning Social Work Practice (2-) Sp

Allen, Bracht, Ellis, Mundt, 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 414 Fieldwork Seminar (2) Sp

Duplica

Two-hour seminar, meeting once a week, under the direction of the instructor. Integration of social work practicum experiences with social work theory through the medium of discussion, case presentations, and written assignments. Offered as an elective only for undergraduate social welfare seniors. Entry card required.

SOC W 415- Beginning Field Instruction (4-) A

Students are placed in selected social service agencies and accept beginning social service assignments under the supervision of competent agency personnel. Offered on credit/no credit basis only. To be taken concurrently with 410-. Prerequisites: social welfare major, and 300.

SOC W -416- Beginning Field Instruction (4-) W

Continuation of student placements in assigned social service agencies. Students assume increasing responsibility for particular service assignments. Offered on credit/no credit basis only. To be taken concurrently with -411-. Prerequisites: 410- and 415-.

SOC W -417 Beginning Field Instruction (4-) Sp

Continuation of student placements in social service agencies. Students complete service assignments

and work through termination process. Offered on credit/no credit basis only. To be taken concurrently with 412. Prerequisites: 410-411- and 415-416.

Note: SOC W 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 generation lines, 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 421 Methods of Child Care and Treatment (3)

Whittaker
Major foci include an introduction to the continuum of child welfare services, as well as some practical approaches to working with children and adolescents in a wide variety of practice settings.

SOC W 422 Human Growth and Behavior: Childhood and Adolescent Development (5) W

Malier
Study of the beginning continuum of human development relative to the sociocultural influences of an individual's life experiences. Focus includes cognitive, affective, and behavioral dimensions of development, their interrelationship and their influence upon a person's capacity to deal with his or her life requirements. Emphasizes the practical application of such knowledge for work with children and adolescents in a variety of human services settings (e.g., ways of observing and studying children, relationship, use of play, etc.). Open to majors and nonmajors.

SOC W 423, 424 Chemical Addictions and Society (3,3) W,Sp

Roffman
423: Focuses on the pharmacology, psychology, and sociology of drug-seeking behavior; 424: considers treatment and control approaches and the assessment of their effectiveness. Several concurrent "topic seminars" organized to deal with feminism, crisis management, drug philosophy, minority cultures, drug counseling, regional planning, and residential programs are offered each quarter. Prerequisite: 423 or permission for 424.

SOC W 430 Child Care Work Practice (3) WSp

Whittaker
Specialized practice with emotionally disturbed and delinquent children in group care settings, with focus on providing child care staff with specific tools for teaching alternative behavior. Major topics include: etiology and diagnosis; observing and recording children's behavior; special problems of group living; life-space interviewing; token economies; activity programming; group interventions; parental involvement; organizational requisites and community linkages. Prerequisites: 310, 410, or permission.

SOC W 447 Physical Structure and Human Interaction (2) W

Resnick, Sasanoff
For social work and architectural students. Examines the effect of physical structure on human interaction. Offered jointly with ARCH 447. Prerequisite: permission.

SOC W 470 Crisis Intervention in Social Welfare (3) A

Lewin
Introduction to: interventive methods and response to persons in crisis; use of crisis to produce positive change, concepts of crisis and crisis intervention; and the 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 matters of contemporary 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 (3, max. 6)

Bentz, 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.

SOC W 504 Social Problems and Social Welfare (3, max. 9)

Bracht, Bryant, Dear, Elmore, Herrick, Parsons, Roffman, Weller
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 interventive skill course (SOC W 560) concerned with ameliorating or alleviating the social problem under study.

SOC W 507 Seminar (3, max. 6) AWSp

Bryant, Duplica, Roffman
Prerequisite: permission.

SOC W 508 Integrative Seminar (3)

SOC W 509 Readings in Social Work () AWSpS*
May be repeated for credit. Prerequisite: permission.

SOC W 515 Field Instruction (2-8) AWSp
Social work majors only. Prerequisite: permission.

SOC W 529, 530, 531, Introduction to Human Services Practice (3; 3, max. 6; 3, max. 6)

Dwinell, Farber, Hanneman, Miller, Mundi, Richey, Teather
Topics covering various helping methods used in practice with individuals, families, and small groups.

SOC W 533 Advanced Human Services Practice (3, max. 9)

Dwinell, Griswold, Hanneman, Leigh, Lewin, Malier, Miller, Mundi, Norton, Ochoa, Resnick, Richey, Teather, Whittaker
Advanced human services practice in special areas. Intensive study of practice materials with emphasis upon development of appropriate interventive and methodological skills.

SOC W 535 Advanced Field Instruction (2-10, max. 20) AWSp

Prerequisite: 515.

SOC W 540 Human Behavior and Social Environment (3)

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)

Anderson, Blanchard, Dwinell, Farber, Ishisaka, Malier, Mundi, Resnick, Richey, Teather
Specific aspects of biopsychosociocultural development.

SOC W 552 History of Poverty and Inequality: The Anglo-American Experience (1485-1900) (3) W

Berlieman
Examines the roots of modern social welfare policy and program in two historic periods: the reign of

the Tudors (1485-1603) and the evolution of welfare policy compatible with the aims of the nation state; and the significant societal and intellectual developments preceding the English Poor Law Reform of 1834. The English welfare heritage as it subsequently shapes public and private welfare measures in the United States also receives attention, as does the relevance of these early beginnings to today's conceptualization of welfare policy.

SOC W 553 Seminar in Contemporary Social Welfare Policy (3) S

Dear
Major American social welfare programs and some of the policies that guide their development and implementation; contemporary income maintenance policies and their effectiveness in reducing income inequality. This course is closely linked to, and built upon, the first-quarter course, 552. Selected issues and dilemmas followed in that course, which serve as the focus for policy debate, are examined in the context of current welfare programs.

SOC W 560 Basic COD Interventive Skills (3, max. 12) WSp

Bracht, Bryant, Dear, Ellis, Elmore, Jaffee, Patti, Resnick, Stier, Weatherley
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. Prerequisite for COD students: concurrent registration in 569.

SOC W 570 Specialized COD Interventive Skills (3, max. 9)

Methodologically based course related to specialized aspects of COD practice. Includes such areas as grant writing, budget preparation, and interdisciplinary methods.

SOC W 575 Special Topics in Social Welfare Policy (3, max. 9)

Anderson, Northwood, Parsons
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.

SOC W 580 Introduction to Advanced Research Methods and Design (3) A

Gottlieb, Hutchins
Introduction to the broad scientific issues and the specific methodological strategies used in formulating and answering research questions within the field of social welfare. Required of all first-year students in the social welfare Ph.D program; open to others by permission.

SOC W 585 Systematic Theory Building (3)

Beatty, Northwood
Study of research methodology as used in the construction of theory relevant to social work practice. Focus is on selected problems requiring theory production, as related to individual theses and to the assessment of research studies and policy papers.

SOC W 586 Statistics in Social Work (3) Levy

SOC W 588 Research in Community and Organizational Settings (3, max. 9)

Study of selective research methods and techniques useful in measuring organizational performance, evaluating program effectiveness, and determining community need and demand for various types of social welfare services.

SOC W 590 Social Welfare Research (3)

Beatty, Griswold, Herrick, Hutchins, Jaffee, Northwood
Three major objectives: (1) to introduce the student to the logic of the scientific method as applied to research in social welfare; (2) to provide the student with a beginning understanding of the interrelated steps in the conduct of research; and (3) to equip students for roles as consumers of, and participants in, social welfare research.

SCHOOL OF SOCIAL WORK

SOC W 591 Individual or Group Research Project
(3, 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
(3-3)
Beatty, Gottlieb, Griswold, Herrick, Hutchins, Jaffee, Levy, Northwood, Schinke
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 596-597 Field Research Methods (3-3)
A,W

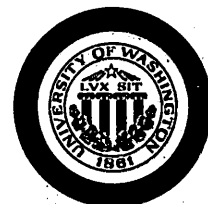
Northwood
Students should be concurrently registered in 700 and 535. Prerequisites: 590, 594-595 for 596-; 596- for 597.

SOC W 598-599 Research Problems and Priorities in Social Work and Social Welfare (3-3) A,W
Briar, Patti

Seminar assesses the current state of knowledge in selected major areas of social work and social welfare, examines analytic and methodological problems in conducting research in these areas, and identifies research priorities. Emphasis on peer learning centered on the identification of central research problems in the areas of social policy, program evaluation, and intervention with individuals, groups, families, and organizations. Prerequisite: admission to social welfare Ph.D. program or permission.

SOC W 600 Independent Study or Research (*)
AWSpS

SOC W 700 Master's Thesis (*) AWSp



FACULTY INDEX

The first date following a name indicates the beginning of academic service at the University. When two dates are given, the second, in parentheses, is the date of promotion to present academic rank. Members of the Graduate School faculty are designated by an asterisk.

All appointments shown are as of December 1975.

A

- AAGAARD, GEORGE N.,* 1954 (1967), Professor of Medicine and Pharmacology; B.S., 1934, M.B., 1936, M.D., 1937, Minnesota
- AAGAARD, KNUT N., 1968 (1973), Research Associate Professor of Oceanography; A.B., 1961, Oberlin; M.S., 1964, Ph.D., 1966, Washington
- AASHEIM, GEORDIS M., 1960 (1963), Assistant Professor of Anesthesiology; Chief of Anesthesiology, Veterans Administration Hospital; B.S., 1953, Saskatchewan; M.D., 1955, Toronto
- ABBOTT, ROBERT D., 1975, Assistant Professor of Education; B.A., 1967, California Western; M.S., 1968, Ph.D., 1970, Washington
- ABBS, JAMES H.,* 1970 (1975), Associate Professor of Speech and Hearing Sciences; B.S., 1967, Wisconsin State; M.S., 1968, Ph.D., 1970, Wisconsin
- ABERNATHY, RUTH, 1966 (1973), Professor Emeritus of Physical and Health Education; A.B., 1929, Oklahoma; M.A., 1931, Ph.D., 1943, Columbia
- ABRAMS, ROBERT EDWARD, 1971 (1973), Assistant Professor of English; B.A., 1965, Dartmouth; Ph.D., 1973, Indiana
- ACKER, WILLIAM C., 1970, Lecturer in Electrical Engineering; Senior Engineer, Applied Physics Laboratory; B.S., 1957, M.S.E.E., 1963, Washington
- ADAMS, HARMON F., 1974, Assistant Professor of Restorative Dentistry; D.D.S., 1960, Washington
- ADAMS, JOHN B., 1975, Research Professor of Geological Sciences; B.S., 1956, Stanford; M.S., 1958, Ph.D., 1961, Washington
- ADAMS, ROBERT PARDEE,* 1947 (1966), Professor of English; B.A., 1931, Oberlin; Ph.D., 1937, Chicago
- ADAMSON, JOHN W., 1962 (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)
- ADELBERGER, ERIC G.,* 1970 (1975), 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
- AFFLECK, JAMES Q.,* 1967 (1974), Professor of Education; B.A., 1955, Washington; M.A., 1963, San Francisco State; Ed.D., 1968, Columbia
- AGABIAN, NINA,* 1973, Assistant Professor of Biochemistry; B.A., 1966, M.S., 1968, Adelphi; Ph.D., 1971, Albert Einstein College of Medicine
- AGUILAR, RICARDO D., 1975, Lecturer in Chicano Studies; B.A., 1971, M.A., 1972, Texas (El Paso)
- AHLERS, ELEANOR E.,* 1966 (1970), Professor of Librarianship; A.B., 1932, Washington; B.L.S., 1942, Denver; M.A., 1957, Washington
- AKAMATSU, TOSHIO J., 1963 (1971), Associate Professor of Anesthesiology; Chief, Division of Obstetric Anesthesia; B.A., 1955, M.D., 1959, Minnesota
- ALBERS, JOHN J., 1971, Research Assistant Professor of Medicine; A.B., 1965, M.S., 1965, Ph.D., 1969, Illinois
- ALBERTS, WILLIAM W.,* 1967 (1972), Professor of Finance and Business Economics; B.A., 1948, M.A., 1956, Ph.D., 1961, Chicago
- ALBRECHT, ROBERT G.,* 1960 (1967), Associate Professor of Architecture; B.S.C.E., 1956, Washington; M.S.C.E., 1960, Massachusetts Institute of Technology
- ALBRECHT, ROBERT WILLIAM,* 1961 (1971), Professor of Nuclear Engineering; B.S.E.E., 1957, Purdue; M.S.N.E., 1958, Ph.D., 1961, Michigan
- ALDEN, DAURIL,* 1959 (1969), Professor of History and Latin American Studies; Chairman, Latin American Studies; A.B., 1950, M.A., 1952, Ph.D., 1959, California (Berkeley)
- ALDEN, RICHARD S.,* 1961 (1969), Associate Professor of Architecture; B.Arch., 1957, Washington; M.Arch., 1960, Yale; Ph.D., 1971, Pennsylvania
- ALEXANDER, DANIEL E., 1954 (1961), Associate Professor of Mechanical Engineering; B.S. in M.E., 1947, M.S. in M.E., 1954, Washington
- ALEXANDER, E. RUSSELL,* 1961 (1969), Professor of Epidemiology and International Health; Ph.B., 1948; S.B., 1950, M.D., 1953, Chicago
- ALEXANDER, EDWARD,* 1962 (1969), Professor of English; B.A., 1957, Columbia; M.A., 1959, Ph.D., 1963, Minnesota
- ALEXANDER, RUTH A., 1975, Instructor in Psychosocial Nursing; B.S., 1969, South Dakota State; M.N., 1971, Washington
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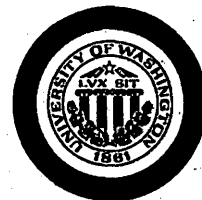
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EXPLANATION OF ABBREVIATIONS

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.

A A:	Aeronautics and Astronautics (Engineering)	CMU:	Communications, Communications (Arts and Sciences)
AAS:	Asian American Studies (Arts and Sciences)	COM D:	Community Dentistry (Dentistry)
ACCTG:	Accounting (Business Administration)	CONJ:	Conjoint (Medicine)
ADMIN:	Administration (Business Administration)	C PHY:	Comparative Physiology (Interdisciplinary Graduate Programs)
AFSTU:	African Studies (Arts and Sciences)	C SCI:	Computer Science (Interdisciplinary Graduate Programs)
AIS:	American Indian Studies (Arts and Sciences)	CZECH:	Czech, Slavic Languages and Literature (Arts and Sciences)
AKKAD:	Akkadian, Near Eastern Languages and Literature (Arts and Sciences)	DAN:	Danish, Scandinavian Languages and Literature (Arts and Sciences)
ANEST:	Anesthesiology (Medicine)	DANCE:	Dance, Music (Arts and Sciences)
ANTH:	Anthropology, Anthropology (Arts and Sciences)	D ART:	Drama Arts (Interdisciplinary Graduate Programs)
A ORG:	Administrative Theory and Organizational Behavior (Business Administration)	DENT:	Dentistry (Dentistry)
ARAB:	Arabic, Near Eastern Languages and Literature (Arts and Sciences)	D HYG:	Dental Hygiene (Dentistry)
ARAM:	Aramaic, Near Eastern Languages and Literature (Arts and Sciences)	DRAMA:	Drama, Drama (Arts and Sciences)
ARCH:	Architecture (Architecture and Urban Planning)	EASIA:	East Asia, Institute for Comparative and Foreign Area Studies (Arts and Sciences)
ARCHY:	Archaeology, Anthropology (Arts and Sciences)	ECON:	Economics, Economics (Arts and Sciences)
ART:	Art, Art (Arts and Sciences)	EDADM:	Educational Administration (Education)
ART H:	Art History, Art (Arts and Sciences)	EDC&I:	Educational Curriculum and Instruction (Education)
A S:	Aerospace Studies (Reserve Officers Training Programs)	EDEPS:	Educational Policy Studies (Education)
ASIAN:	Asian Languages and Literature, Asian Languages and Literature (Arts and Sciences)	EDHED:	Higher Education (Education)
ASTR:	Astronomy, Astronomy (Arts and Sciences)	EDPSY:	Educational Psychology (Education)
ATM S:	Atmospheric Sciences, Atmospheric Sciences (Arts and Sciences)	EDSPE:	Special Education (Education)
		EDUC:	Independent Study, Research, and Field Experience (Teaching Practicum) (Education)
B A:	Business Administration (Business Administration)	E E:	Electrical Engineering (Engineering)
BA RM:	Research Methods (Business Administration)	ENDO:	Endodontics (Dentistry)
B CMU:	Business Communications (Business Administration)	ENGL:	English (Arts and Sciences)
B CON:	Building Construction (Architecture and Urban Planning)	ENGR:	Engineering, College Courses (Engineering)
B ECN:	Business Economics (Business Administration)	ENVR:	Environmental Health (Public Health and Community Medicine)
BG&S:	Business, Government, and Society (Business Administration)	ENV S:	Institute for Environmental Studies (Arts and Sciences)
BIOC:	Biochemistry (Medicine)	EPI:	Epidemiology and International Health (Public Health and Community Medicine)
BIOEN:	Bioengineering (Interschool or Intercollege Programs)	FAMED:	Family Medicine (Medicine)
BI HS:	Biomedical History (Medicine)	FD SC:	Food Science (Fisheries)
BIOL:	Biology, Biology (Arts and Sciences)	FIN:	Finance (Business Administration)
BIOST:	Biostatistics (Public Health and Community Medicine)	FINN:	Finnish, Scandinavian Languages and Literature (Arts and Sciences)
BLK S:	Black Studies (Arts and Sciences)	FISH:	Fisheries (Fisheries)
BMATH:	Biostatistics (Interdisciplinary Graduate Programs)	FOR B:	Biological Sciences (Forest Resources)
BOT:	Botany, Botany (Arts and Sciences)	FOR M:	Management and Social Sciences (Forest Resources)
B POL:	Business Policy (Business Administration)	FOR W:	Wood and Paper (Forest Resources)
B STR:	Biological Structure (Medicine)	FREN:	French, Romance Languages and Literature (Arts and Sciences)
BULGR:	Bulgarian, Slavic Languages and Literature (Arts and Sciences)		
CATA:	Catalan, Romance Languages and Literature (Arts and Sciences)	GENET:	Genetics, Genetics (Arts and Sciences)
CER E:	Ceramic Engineering, Mining, Metallurgical, and Ceramic Engineering (Engineering)	GEOG:	Geography, Geography (Arts and Sciences)
CESM:	Structural Engineering and Engineering Mechanics, Civil Engineering (Engineering)	GEOL:	Geological Sciences, Geological Sciences (Arts and Sciences)
CETC:	Transportation, Construction, and Geometronics, Civil Engineering (Engineering)	GERM:	Germanics, Germanics (Arts and Sciences)
CEWA:	Water and Air Resources, Civil Engineering (Engineering)	GIS:	General and Interdisciplinary Studies, General and Interdisciplinary Studies (Arts and Sciences)
CH E:	Chemical Engineering (Engineering)	GPYS:	Geophysics, Geophysics (Arts and Sciences)
CHEM:	Chemistry, Chemistry (Arts and Sciences)	GRK:	Greek, Classics (Arts and Sciences)
CHIN:	Chinese, Asian Languages and Literature (Arts and Sciences)	G ST:	General Studies (Arts and Sciences)
CINE:	Cinema Studies (Arts and Sciences)	HD UR:	Hindi-Urdu, Asian Languages and Literature (Arts and Sciences)
CIVE:	Core Courses, Civil Engineering (Engineering)	HEBR:	Hebrew, Near Eastern Languages and Literature (Arts and Sciences)
CL AR:	Classical Archaeology, Classics (Arts and Sciences)	H EC:	Home Economics, Home Economics (Arts and Sciences)
CLAS:	Classics, Classics (Arts and Sciences)	H ED:	Health Education, Physical and Health Education (Arts and Sciences)
CLIT:	Comparative Literature, Comparative Literature (Arts and Sciences)	HRYS:	Human Resource Systems (Business Administration)
CL LI:	Classical Linguistics, Classics (Arts and Sciences)	HSERV:	Health Services (Public Health and Community Medicine)

HSS:	Humanistic-Social Studies (Engineering)	PHSC1:	Pharmaceutical Sciences (Pharmacy)
HST:	History, General, History (Arts and Sciences)	PHY A:	Physical Anthropology, Anthropology (Arts and Sciences)
HSTAA:	History of the Americas, History (Arts and Sciences)	PHYS:	Physics, Physics (Arts and Sciences)
HSTAM:	Ancient and Medieval History, History (Arts and Sciences)	POL S:	Political Science, Political Science (Arts and Sciences)
HSTAS:	History of Asia, History (Arts and Sciences)	POLSH:	Polish, Slavic Languages and Literature (Arts and Sciences)
HSTEU:	Modern European History, History (Arts and Sciences)	PORT:	Portuguese, Romance Languages and Literature (Arts and Sciences)
HUBIO:	Human Biology (Medicine)	P PSY:	Physiology Psychology (Interdisciplinary Graduate Programs)
HUM:	Humanities, Humanities (Arts and Sciences)	PROS:	Prosthodontics (Dentistry)
HUNGR:	Hungarian, Slavic Languages and Literature (Arts and Sciences)	PROV:	Provençal, Romance Languages and Literature (Arts and Sciences)
IASIA:	Inner Asia, Institute for Comparative and Foreign Area Studies (Arts and Sciences)	PRSAN:	Persian, Near Eastern Languages and Literature (Arts and Sciences)
I BUS:	International Business (Business Administration)	PSYCH:	Psychology, Psychology (Arts and Sciences)
ICEL:	Icelandic, Scandinavian Languages and Literature (Arts and Sciences)	P T:	Physical Therapy (Medicine)
INDN:	Indian, Asian Languages and Literature (Arts and Sciences)	QMETH:	Quantitative Methods (Business Administration)
IMS:	Institute for Marine Studies (Interschool or Intercollege Programs)	Q SCI:	Quantitative Science (Interschool or Intercollege Programs)
IPHD:	Individual Doctor of Philosophy Degree Program (Interdisciplinary Graduate Programs)	QUAT:	Quaternary Studies (Interdisciplinary Graduate Programs)
ITAL:	Italian, Romance Languages and Literature (Arts and Sciences)	RADGY:	Radiology (Medicine)
JAPAN:	Japan, Asian Languages and Literature (Arts and Sciences)	RAD S:	Radiological Sciences (Interdisciplinary Graduate Programs)
KOR:	Korean, Asian Languages and Literature (Arts and Sciences)	REEU:	Russia and Eastern Europe, Institute for Comparative and Foreign Area Studies (Arts and Sciences)
LAB M:	Laboratory Medicine (Medicine)	REHAB:	Rehabilitation Medicine (Medicine)
L ARC:	Landscape Architecture (Architecture and Urban Planning)	RELIG:	Religious Studies/Comparative Religion, Institute for Comparative and Foreign Area Studies (Arts and Sciences)
LAT:	Latin, Classics (Arts and Sciences)	RES D:	Restorative Dentistry (Dentistry)
LAW:	Law (Law)	R INS:	Risk and Insurance (Business Administration)
LIBR:	Librarianship (Librarianship)	R MN:	Romanian, Romance Languages and Literature (Arts and Sciences)
LING:	Linguistics (Arts and Sciences)	ROM:	Romance Linguistics and Literature (Arts and Sciences)
MATH:	Mathematics, Mathematics (Arts and Sciences)	ROMAN:	Romance Languages and Literature, Romance Languages and Literature (Arts and Sciences)
M E:	Mechanical Engineering (Engineering)	ROMN:	Romanian, Slavic Languages and Literature (Arts and Sciences)
MED:	Medicine (Medicine)	RUSS:	Russian, Slavic Languages and Literature (Arts and Sciences)
MED P:	Medical Practice (Medicine)	SASIA:	South Asia, Institute for Comparative and Foreign Area Studies (Arts and Sciences)
MED T:	Medical Technology (Medicine)	SCAND:	Scandinavian, Scandinavian Languages and Literature (Arts and Sciences)
MET E:	Metallurgical Engineering, Mining, Metallurgical, and Ceramic Engineering (Engineering)	SCND:	Scandinavian Languages and Literature, Scandinavian Languages and Literature (Arts and Sciences)
MICRO:	Microbiology and Immunology, Microbiology and Immunology (Arts and Sciences)	SER C:	Serbo-Croatian, Slavic Languages and Literature (Arts and Sciences)
MICRO:	Microbiology and Immunology, Microbiology and Immunology (Medicine)	SLAV:	Slavic, Slavic Languages and Literature (Arts and Sciences)
MIN E:	Mining Engineering, Mining, Metallurgical, and Ceramic Engineering (Engineering)	SLAVC:	Slavic Languages and Literature, Slavic Languages and Literature (Arts and Sciences)
MKTG:	Marketing (Business Administration)	SMT:	Social Management of Technology (Interschool or Intercollege Programs)
MONG:	Mongolian, Asian Languages and Literature (Arts and Sciences)	SNKRT:	Sanskrit, Asian Languages and Literature (Arts and Sciences)
M SCI:	Military Science (Reserve Officer Training Programs)	SOC:	Sociology, Sociology (Arts and Sciences)
MTL E:	Materials Engineering (Engineering)	SOC S:	Social Science, Social Science (Arts and Sciences)
MUSAP:	Music Applied, Music (Arts and Sciences)	SOC W:	Social Work (Arts and Sciences, and Social Work)
MUSIC:	Music, Music (Arts and Sciences)	SOCWL:	Social Welfare (Interdisciplinary Graduate Programs)
N E:	Near Eastern Languages and Literature, Near Eastern Languages and Literature (Arts and Sciences)	SO JU:	Society and Justice, Society and Justice (Arts and Sciences)
NORW:	Norwegian, Scandinavian Languages and Literature (Arts and Sciences)	SPAN:	Spanish, Romance Languages and Literature (Arts and Sciences)
NR:	Neurological Surgery (Medicine)	SPCH:	Speech Communication, Speech Communication (Arts and Sciences)
N SCI:	Naval Science (Reserve Officer Training Programs)	SPHSC:	Speech and Hearing Sciences, Speech and Hearing Sciences (Arts and Sciences)
NUC E:	Nuclear Engineering (Engineering)	SURG:	Surgery (Medicine)
NURS:	Nursing (Nursing)	SWED:	Swedish, Scandinavian Languages and Literature (Arts and Sciences)
OB GY:	Obstetrics and Gynecology (Medicine)	TAGLG:	Tagalog, Asian Languages and Literature (Arts and Sciences)
OCEAN:	Oceanography, Oceanography (Arts and Sciences)	TAMIL:	Tamil, Asian Languages and Literature (Arts and Sciences)
ODTP:	Oral Diagnosis and Treatment Planning (Dentistry)	THAI:	Thai, Asian Languages and Literature (Arts and Sciences)
O ENG:	Ocean Engineering (Engineering)	TIB:	Tibetan, Asian Languages and Literature (Arts and Sciences)
OPHTH:	Ophthalmology (Medicine)	TKIC:	Turkic, Asian Languages and Literature (Arts and Sciences)
OPSYS:	Operations and Systems Analysis (Business Administration)	TKISH:	Turkish, Near Eastern Languages and Literature (Arts and Sciences)
ORALB:	Oral Biology (Dentistry)	TRANS:	Transportation (Business Administration)
ORALM:	Oral Medicine (Dentistry)	UCONJ:	University Conjoint (Interschool or Intercollege Programs)
ORTHO:	Orthodontics (Dentistry)	U D:	Urban Development (Business Administration)
ORTHOP:	Orthopaedics (Medicine)	UGAR:	Ugaritic, Near Eastern Languages and Literature (Arts and Sciences)
O S:	Oral Surgery (Dentistry)	UKR:	Ukrainian, Slavic Languages and Literature (Arts and Sciences)
OT:	Occupational Therapy (Medicine)	URB P:	Urban Planning (Architecture and Urban Planning)
OTOL:	Otolaryngology (Medicine)	UROL:	Urology (Medicine)
PABIO:	Pathobiology (Public Health and Community Medicine)	WLF S:	Wildlife Science (Interschool or Intercollege Programs)
P AFR:	Public Affairs (Public Affairs)	WOMEN:	Women Studies (Arts and Sciences)
PATH:	Pathology (Medicine)	ZOOL:	Zoology, Zoology (Arts and Sciences)
PB AD:	Public Administration (Public Affairs)		
P BIO:	Physiology and Biophysics (Medicine)		
PB PL:	Public Policy (Public Affairs)		
PBSCI:	Psychiatry and Behavioral Sciences		
PE:	Physical Education, Physical and Health Education (Arts and Sciences)		
PEDO:	Pedodontics (Dentistry)		
PEDS:	Pediatrics (Medicine)		
PERIO:	Periodontics (Dentistry)		
PHARM:	Pharmacy Practice (Pharmacy)		
PHCOL:	Pharmacology (Medicine)		
PHIL:	Philosophy, Philosophy (Arts and Sciences)		



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